23°, 337° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.....Zn=360°–Z

Dec. °	68° Hc ° ′	d ′	Z °	69° Hc ° ′	d ′	Z °	70° Hc ° ′	d ′	Z °	71° Hc ° ′	d ′	Z °	72° Hc ° ′	d ′	Z °	73° Hc ° ′	d ′	Z °	74° Hc ° ′	d ′	Z °	75° Hc ° ′	d ′	Z °	Dec. °
0	20 10.3	+59.2	155.4	19 15.7	+59.3	155.5	18 21.0	+59.4	155.7	17 26.3	+59.5	155.8	16 31.6	+59.5	155.9	15 36.7	+59.6	156.1	14 41.9	+59.6	156.2	13 47.0	+59.6	156.3	0
1	21 09.5	+59.3	155.2	20 15.0	+59.3	155.4	19 20.4	+59.4	155.5	18 25.8	+59.4	155.7	17 31.1	+59.5	155.8	16 36.3	+59.6	155.9	15 41.5	+59.6	156.1	14 46.6	+59.7	156.2	1
2	22 08.8	+59.2	155.1	21 14.3	+59.4	155.2	20 19.8	+59.4	155.4	19 25.2	+59.5	155.5	18 30.6	+59.5	155.7	17 35.9	+59.6	155.8	16 41.1	+59.6	155.9	15 46.3	+59.7	156.1	2
3	23 08.0	+59.3	154.9	22 13.7	+59.3	155.1	21 19.2	+59.4	155.2	20 24.7	+59.4	155.4	19 30.1	+59.5	155.5	18 35.5	+59.5	155.7	17 40.7	+59.7	155.8	16 46.0	+59.6	156.0	3
4	24 07.3	+59.2	154.7	23 13.0	+59.3	154.9	22 18.6	+59.4	155.1	21 24.1	+59.5	155.3	20 29.6	+59.5	155.4	19 35.0	+59.6	155.6	18 40.4	+59.6	155.7	17 45.6	+59.7	155.8	4
5	25 06.5	+59.2	154.5	24 12.3	+59.2	154.7	23 18.0	+59.3	154.9	22 23.6	+59.4	155.1	21 29.1	+59.5	155.3	20 34.6	+59.5	155.4	19 40.0	+59.6	155.6	18 45.3	+59.7	155.7	5
6	26 05.7	+59.2	154.4	25 11.5	+59.3	154.6	24 17.3	+59.4	154.8	23 23.0	+59.4	155.0	22 28.6	+59.5	155.1	21 34.1	+59.6	155.3	20 39.6	+59.6	155.5	19 45.0	+59.6	155.6	6
7	27 04.9	+59.1	154.2	26 10.8	+59.3	154.4	25 16.7	+59.3	154.6	24 22.4	+59.4	154.8	23 28.1	+59.5	155.0	22 33.7	+59.5	155.2	21 39.2	+59.6	155.3	20 44.6	+59.7	155.5	7
8	28 04.0	+59.2	154.0	27 10.1	+59.2	154.2	26 16.0	+59.3	154.4	25 21.8	+59.4	154.6	24 27.6	+59.4	154.8	23 33.2	+59.5	155.0	22 38.8	+59.6	155.2	21 44.3	+59.6	155.4	8
9	29 03.2	+59.2	153.8	28 09.3	+59.2	154.0	27 15.3	+59.3	154.3	26 21.2	+59.4	154.5	25 27.0	+59.5	154.7	24 32.7	+59.5	154.9	23 38.4	+59.5	155.1	22 43.9	+59.6	155.3	9
10	30 02.4	+59.1	153.6	29 08.5	+59.3	153.9	28 14.6	+59.3	154.1	27 20.6	+59.4	154.3	26 26.5	+59.4	154.5	25 32.2	+59.6	154.8	24 37.9	+59.6	155.0	23 43.5	+59.7	155.1	10
11	31 01.5	+59.1	153.4	30 07.8	+59.2	153.7	29 13.9	+59.3	153.9	28 20.0	+59.3	154.2	27 25.9	+59.5	154.4	26 31.8	+59.5	154.6	25 37.5	+59.6	154.8	24 43.2	+59.6	155.0	11
12	32 00.6	+59.1	153.2	31 07.0	+59.1	153.5	30 13.2	+59.3	153.7	29 19.3	+59.4	154.0	28 25.4	+59.4	154.2	27 31.3	+59.5	154.5	26 37.1	+59.5	154.7	25 42.8	+59.6	154.9	12
13	32 59.7	+59.0	153.0	32 06.1	+59.2	153.3	31 12.5	+59.2	153.6	30 18.7	+59.3	153.8	29 24.8	+59.4	154.1	28 30.8	+59.4	154.3	27 36.6	+59.6	154.6	26 42.4	+59.6	154.8	13
14	33 58.7	+59.1	152.8	33 05.3	+59.2	153.1	32 11.7	+59.3	153.4	31 18.0	+59.4	153.7	30 24.2	+59.4	153.9	29 30.2	+59.5	154.2	28 36.2	+59.5	154.4	27 42.0	+59.6	154.6	14
15	34 57.8	+59.0	152.6	34 04.5	+59.1	152.9	33 11.0	+59.2	153.2	32 17.4	+59.3	153.5	31 23.6	+59.4	153.8	30 29.7	+59.5	154.0	29 35.7	+59.6	154.3	28 41.6	+59.6	154.5	15
16	35 56.8	+59.0	152.4	35 03.6	+59.1	152.7	34 10.2	+59.2	153.0	33 16.7	+59.3	153.3	32 23.0	+59.4	153.6	31 29.2	+59.4	153.9	30 35.3	+59.5	154.1	29 41.2	+59.6	154.4	16
17	36 55.8	+59.0	152.1	36 02.7	+59.1	152.5	35 09.4	+59.2	152.8	34 16.0	+59.2	153.1	33 22.4	+59.3	153.4	32 28.6	+59.5	153.7	31 34.8	+59.5	154.0	30 40.8	+59.6	154.2	17
18	37 54.8	+58.9	151.9	37 01.8	+59.0	152.3	36 08.6	+59.1	152.6	35 15.2	+59.3	152.9	34 21.7	+59.4	153.2	33 28.1	+59.4	153.5	32 34.3	+59.5	153.8	31 40.4	+59.6	154.1	18
19	38 53.7	+58.9	151.7	38 00.8	+59.1	152.0	37 07.7	+59.2	152.4	36 14.5	+59.2	152.7	35 21.1	+59.3	153.1	34 27.5	+59.4	153.4	33 33.8	+59.5	153.7	32 40.0	+59.5	154.0	19
20	39 52.6	+58.9	151.4	38 59.9	+59.0	151.8	38 06.9	+59.1	152.2	37 13.7	+59.3	152.5	36 20.4	+59.3	152.9	35 26.9	+59.4	153.2	34 33.3	+59.5	153.5	33 39.5	+59.6	153.8	20
21	40 51.5	+58.9	151.2	39 58.9	+58.9	151.6	39 06.0	+59.1	152.0	38 13.0	+59.1	152.3	37 19.7	+59.3	152.7	36 26.3	+59.4	153.0	35 32.8	+59.4	153.4	34 39.1	+59.5	153.7	21
22	41 50.4	+58.8	150.9	40 57.8	+59.0	151.3	40 05.1	+59.1	151.7	39 12.1	+59.2	152.1	38 19.0	+59.3	152.5	37 25.7	+59.4	152.9	36 32.2	+59.5	153.2	35 38.6	+59.5	153.5	22
23	42 49.2	+58.8	150.6	41 56.8	+58.9	151.1	41 04.2	+59.0	151.5	40 11.3	+59.2	151.9	39 18.3	+59.2	152.3	38 25.1	+59.3	152.7	37 31.7	+59.4	153.0	36 38.1	+59.5	153.4	23
24	43 48.0	+58.7	150.4	42 55.7	+58.9	150.8	42 03.2	+59.0	151.3	41 10.5	+59.1	151.7	40 17.5	+59.3	152.1	39 24.4	+59.4	152.5	38 31.1	+59.4	152.9	37 37.6	+59.5	153.2	24
25	44 46.7	+58.7	150.1	43 54.6	+58.8	150.6	43 02.2	+59.0	151.0	42 09.6	+59.1	151.5	41 16.8	+59.2	151.9	40 23.8	+59.3	152.3	39 30.5	+59.4	152.7	38 37.1	+59.5	153.0	25
26	45 45.4	+58.6	149.8	44 53.4	+58.8	150.3	44 01.2	+58.9	150.8	43 08.7	+59.1	151.2	42 16.0	+59.2	151.7	41 23.1	+59.3	152.1	40 29.9	+59.4	152.5	39 36.6	+59.5	152.9	26
27	46 44.0	+58.6	149.5	45 52.2	+58.7	150.0	45 00.1	+58.9	150.5	44 07.8	+59.0	151.0	43 15.2	+59.1	151.4	42 22.4	+59.2	151.9	41 29.3	+59.4	152.3	40 36.1	+59.5	152.7	27
28	47 42.6	+58.5	149.2	46 50.9	+58.8	149.7	45 59.0	+58.9	150.2	45 06.8	+59.0	150.7	44 14.3	+59.2	151.2	43 21.6	+59.3	151.7	42 28.7	+59.3	152.1	41 35.6	+59.4	152.5	28
29	48 41.1	+58.5	148.8	47 49.7	+58.6	149.4	46 57.9	+58.8	150.0	46 05.8	+59.0	150.5	45 13.5	+59.0	151.0	44 20.9	+59.2	151.5	43 28.0	+59.4	151.9	42 35.0	+59.4	152.3	29
30	49 39.6	+58.4	148.5	48 48.3	+58.6	149.1	47 56.7	+58.7	149.7	47 04.8	+58.9	150.2	46 12.5	+59.1	150.7	45 20.1	+59.2	151.2	44 27.4	+59.3	151.7	43 34.4	+59.4	152.2	30
31	50 38.0	+58.4	148.1	49 46.9	+58.6	148.8	48 55.4	+58.8	149.4	48 03.7	+58.9	149.9	47 11.6	+59.0	150.5	46 19.3	+59.1	151.0	45 26.7	+59.2	151.5	44 33.8	+59.4	152.0	31
32	51 36.4	+58.3	147.8	50 45.5	+58.4	148.4	49 54.2	+58.6	149.0	49 02.6	+58.8	149.6	48 10.6	+59.0	150.2	47 18.4	+59.2	150.7	46 25.9	+59.3	151.3	45 33.2	+59.4	151.8	32
33	52 34.7	+58.1	147.4	51 43.9	+58.4	148.1	50 52.8	+58.6	148.7	50 01.4	+58.8	149.3	49 09.6	+59.0	149.9	48 17.6	+59.0	150.5	47 25.2	+59.2	151.0	46 32.6	+59.3	151.5	33
34	53 32.8	+58.2	147.0	52 42.3	+58.4	147.7	51 51.4	+58.6	148.4	51 00.2	+58.7	149.0	50 08.6	+58.9	149.6	49 16.6	+59.1	150.2	48 24.4	+59.2	150.8	47 31.9	+59.3	151.3	34
35	54 31.0	+58.0	146.5	53 40.7	+58.2	147.3	52 50.0	+58.5	148.0	51 58.9	+58.7	148.7	51 07.5	+58.8	149.3	50 15.7	+59.0	150.0	49 23.6	+59.2	150.5	48 31.2	+59.3	151.1	35
36	55 29.0	+57.9	146.1	54 38.9	+58.2	146.9	53 48.5	+58.4	147.6	52 57.6	+58.6	148.3	52 06.3	+58.8	149.0	51 14.7	+59.0	149.7	50 22.8	+59.1	150.3	49 30.5	+59.3	150.9	36
37	56 26.9	+57.8	145.6	55 37.1	+58.1	146.5	54 46.9	+58.3	147.2	53 56.2	+58.6	148.0	53 05.1	+58.8	148.7	52 13.7	+58.9	149.4	51 21.9	+59.1	150.0	50 29.8	+59.2	150.6	37
38	57 24.7	+57.7	145.1	56 35.2	+58.0	146.0	55 45.2	+58.2	146.8	54 54.8	+58.4	147.6	54 03.9	+58.7	148.4	53 12.6	+58.9	149.1	52 21.0	+59.0	149.7	51 29.0	+59.2	150.4	38
39	58 22.4	+57.5	144.6	57 33.2	+57.8	145.5	56 43.4	+58.2	146.4	55 53.2	+58.4	147.2	55 02.6	+58.6	148.0	54 11.5	+58.8	148.7	53 20.0	+59.0	149.4	52 28.2	+59.1	150.1	39
40	59 19.9	+57.4	144.1	58 31.0	+57.8	145.0	57 41.6	+58.0	145.9	56 51.6	+58.3	146.8	56 01.2	+58.5	147.6	55 10.3	+58.8	148.4	54 19.0	+58.9	149.1	53 27.3	+59.1	149.8	40
41	60 17.3	+57.2	143.5	59 28.8	+57.6	144.5	58 39.6	+58.0	145.5	57 49.9	+58.2	146.4	56 59.7	+58.5	147.2	56 09.1	+58.6	148.0	55 17.9	+58.9	148.8	54 26.4	+59.1	149.5	41
42	61 14.5	+57.1	142.9	60 26.4	+57.4	143.9	59 37.6	+57.8	145.0	58 48.1	+58.2	145.9	57 58.2	+58.4	146.8	57 07.7	+58.7	147.7	56 16.8	+58.9	148.5	55 25.5	+59.0	149.2	42
43	62 11.6	+56.9	142.2	61 23.8	+57.3	143.4	60 35.4	+57.6	144.4	59 46.3	+57.9	145.4	58 56.6	+58.3	146.4	58 06.4	+58.5	147.3	57 15.7	+58.7	148.1	56 24.5	+59.0	148.9	43
44	63 08.5	+56.6	141.5	62 21.1	+57.1	142.7	61 33.0	+57.5	143.8	60 44.2	+57.9	144.9	59 54.9	+58.1	145.9	59 04.9	+58.5	146.8	58 14.4	+58.7	147.7	57 23.5	+58.9	148.6	44
45	64 05.1	+56.4	140.8	63 18.2	+56.9	142.0	62 30.5	+57.4	143.2	61 42.1	+57.7	144.4	60 53.0	+58.1	145.4	60 03.4	+58.3	146.4	59 13.1	+58.6	147.3	58 22.4	+58.8	148.2	45
46	65 01.5	+56.2	140.0	64 15.1	+56.7	141.3	63 27.9	+57.1	142.6	62 39.8	+57.6	143.8	61 51.1	+57.9	144.9	61 01.7	+58.3	145.9	60 11.7	+58.6	146.9	59 21.2	+58.8	147.8	46
47	65 57.7	+55.8	139.1	65 11.8	+56.4	140.6	64 25.0	+57.0	141.9	63 37.4	+57.4	143.1	62 49.0	+57.8	144.3	62 00.0	+58.1	145.4	61 10.3	+58.4	146.5	60 20.0	+58.7	147.4	47
48	66 53.5	+55.5	138.2	66 08.2	+56.2	139.7	65 22.0	+56.7	141.2	64 34.8	+57.2	142.5	63 46.8	+57.7	143.7	62 58.1	+58.0	144.9	62 08.7	+58.3	146.0	61 18.7	+58.6	147.0	48
49	67 49.0	+55.1	137.2	67 04.4	+55.8	138.8	66 18.7	+56.4	140.4	65 32.0	+57.0	141.8	64 44.5	+57.4	143.1	63 56.1	+57.9	144.3	63 07.0	+58.2	145.5	62 17.3	+58.5	146.5	49
50	68 44.1	+54.7	136.2	68 00.2	+55.5	137.9	67 15.1	+56.2	139.5	66 29.0	+56.7	141.0	65 41.9	+57.3	142.4	64 54.0	+57.7	143.7	64 05.2	+58.1	144.9	63 15.8	+58.4	146.1	50
51	69 38.8	+54.2	135.0	68 55.7	+55.0	136.9	68 11.3	+55.8	138.6	67 25.7	+56.5	140.2	66 39.2	+57.0	141.6	65 51.7	+57.5	143.0	65 03.3	+58.0	144.3	64 14.2	+58.3	145.5	51
52	70 33.0	+53.5	133.7	69 50.7	+54.6	135.7	69 07.1	+55.4	137.6	68 22.2	+56.2	139.3	67 36.2	+56.8	140.8	66 49.2	+57.3	142.3	66 01.3	+57.7	143.7	65 12.5	+58.2	145.0	52
53	71 26.5	+53.0	132.4	70 45.3	+54.0	134.5	70 02.5	+55.0	136.5	69 18.4	+55.7	138.3	68 33.0	+56.5	140.0	67 46.5	+57.1	141.6	66 59.0	+57.6	143.0	66 10.7	+58.0	144.4	53
54	72 19.5	+52.1	130.9	71 39.3	+53.4	133.1	70 57.5	+54.5	135.3	70 14.1	+55.4	137.2	69 29.5	+56.1	139.0	68 43.6	+56.8	140.7	67 56.6	+57.4	142.3	67 08.7	+57.8	143.8	54
55	73 11.6	+51.3	129.2	72 32.7	+52.7	131.7	71 52.0	+53.8	133.9	71 09.5	+54.9	136.1	70 25.6	+55.8	138.0	69 40.4	+56.5	139.8	68 54.0	+57.1	141.5	68 06.5	+57.7	143.1	55
56	74 02.9	+50.2	127.3	73 25.4	+51.8	130.0	72 45.8	+53.2	132.5	72 04.4	+54.4	134.8	71 21.4	+55.3	136.9	70 36.9	+56.1	138.8	69 51.1	+56.8	140.6	69 04.2	+57.4	142.3	56
57	74 53.1	+49.1	125.3	74 17.2	+50.9	128.2	73 39.0	+52.4	130.9	72 58.8	+53.7	133.4	72 16.7	+54.8	135.6	71 33.0	+55.8	137.7	70 47.9	+56.6	139.7	70 01.6	+57.2	141.5	57
58	75 42.2	+47.5	123.0	75 08.1	+49.6	126.2	74 31.4	+51.4	129.1	73 52.5	+52.9	131.8	73 11.5	+54.2	134.3	72 28.8	+55.2	136.5	71 44.5	+56.1	138.6	70 58.8	+56.9	140.6	58
59	76 29.7	+45.9	120.5	75 57.7	+48.3	123.9	75 22.8	+50.3	127.1	74 45.4	+52.0	130.1	74 05.7	+53.5	132.7	73 24.0	+54.7	135.2	72 40.6	+55.7	137.5	71 55.7	+56.5	139.6	59
60	77 15.6	+43.8	117.6	76 46.0	+46.6	121.4	76 13.1	+49.0	124.9	75 37.4	+51.0	128.1	74 59.2	+52.6	131.0	74 18.7	+54.1	133.7	73 36.3	+55.2	136.2	72 52.2	+56.1	138.4	60
61	77 59.4	+41.3	114.5	77 32.6	+44.5	118.6	77 02.1	+47.3	122.4	76 28.4	+49.7	125.9	75 51.8	+51.6	129.1	75 12.8	+53.2	132.1	74 31.5	+54.6	134.8	73 48.3	+55.7	137.2	61
62	78 40.7	+38.5	110.9	78 17.1	+42.2	115.4	77 49.4	+45.4	119.6	77 18.1	+48.1	123.4	76 43.4	+50.4	127.0	76 06.0	+52.3	130.2	75 26.1	+53.8	133.2	74 44.0	+55.1	135.8	62
63	79 19.2	+34.9	106.8	78 59.3	+39.3	111.8	78 34.8	+43.0	116.4	78 06.2	+46.2	120.6	77 33.8	+48.9	124.5	76 58.3	+51.1	128.1	76 19.9	+52.9	131.4	75 39.1	+54.4	134.3	63
64	79 54.1	+30.9	102.3	79 38.6	+35.8	107.7	79 17.8	+40.2	112.7	78 52.4	+43.8	117.4	78 22.7	+47.0	121.8	77 49.4	+49.6	125.7	77 12.8	+51.9	129.3	76 33.5	+53.6	132.5	64
65	80 25.0	+26.1	97.3	80 14.4	+31.6	103.1	79 58.0	+36.6	108.6	79 36.2	+41.1	113.8	79 09.7	+44.8	118.6	78 39.0	+47.9	123.0	78 04.7	+50.4	126.9	77 27.1	+52.5	130.5	65
66	80 51.1	+20.5	91.8	80 46.0	+26.7	97.9	80 34.6	+32.4	103.9	80 17.3	+37.5	109.6	79 54.5	+42.0	114.9	79 26.9	+45.8	119.8	78 55.1	+48.8	124.2	78 19.6	+51.3	128.2	66
67	81 11.6	+14.4	85.7	81 12.7	+21.0	92.2	81 07.0	+27.4	98.6	80 54.8	+33.3	104.8	80 36.5	+38.5	110.7	80 12.7	+42.9	116.1	79 43.9	+46.7	121.1	79 10.9	+49.7	125.6	67
68	81 26.0	+7.7	79.3	81 33.7	+14.6	86.0	81 34.4	+21.6	92.7	81 28.1	+28.2	99.4	81 15.0	+34.2	105.8	80 55.6	+39.5	111.8	80 30.6	+44.0	117.4	80 00.6	+47.7	122.5	68
69	81 33.7	+0.7	72.6	81 48.3	+7.7	79.2	81 56.0	+14.8	86.2	81 56.3	+22.0	93.3	81 49.2	+28.9	100.2	81 35.1	+35.2	106.9	81 14.6	+40.5	113.1	80 48.3	+45.0	118.8	69
70	81 34.4	−6.3	65.8	81 56.0	+0.3	72.2	82 10.8	+7.5	79.2	82 18.3	+15.1	86.5	82 18.1	+22.7	93.9	82 10.3	+29.8	101.1	81 55.1	+36.2	108.1	81 33.3	+41.7	114.5	70
71	81 28.1	−13.1	59.0	81 56.3	−7.1	65.1	82 18.3	−0.2	71.8	82 33.4	+7.4	79.1	82 40.8	+15.3	86.8	82 40.1	+23.3	94.6	82 31.3	+30.8	102.2	82 15.0	+37.3	109.4	71
72	81 15.0	−19.4	52.5	81 49.2	−14.1	58.1	82 18.1	−7.8	64.3	82 40.8	−0.7	71.4	82 56.1	+7.3	79.0	83 03.4	+15.6	87.1	83 02.1	+24.0	95.3	82 52.3	+31.8	103.3	72
73	80 55.6	−25.0	46.4	81 35.1	−20.5	51.3	82 10.3	−15.2	57.0	82 40.1	−8.8	63.5	83 03.4	−1.3	70.9	83 19.0	+7.1	79.0	83 26.1	+15.9	87.5	83 24.1	+24.7	96.2	73
74	80 30.6	−30.0	40.8	81 14.6	−26.3	45.0	81 55.1	−21.8	50.0	82 31.3	−16.3	55.9	83 02.1	−9.8	62.6	83 26.1	−2.0	70.4	83 42.0	+6.8	78.9	83 48.8	+16.3	88.0	74
75	80 00.6	−34.2	35.7	80 48.3	−31.3	39.3	81 33.3	−27.6	43.5	82 15.0	−23.2	48.6	82 52.3	−17.6	54.6	83 24.1	−10.9	61.6	83 48.8	−2.7	69.8	84 05.1	+6.5	78.9	75
76	79 26.4	−37.8	31.1	80 17.0	−35.5	34.1	81 05.7	−32.7	37.6	81 51.8	−29.1	41.9	82 34.7	−24.7	47.0	83 13.2	−19.1	53.2	83 46.1	−12.2	60.5	84 11.6	−3.6	69.1	76
77	78 48.6	−40.8	26.9	79 41.5	−39.0	29.4	80 33.0	−36.8	32.4	81 22.7	−34.1	35.9	82 10.0	−30.6	40.2	82 54.1	−26.3	45.3	83 33.9	−20.7	51.7	84 08.0	−13.6	59.3	77
78	78 07.8	−43.4	23.3	79 02.5	−42.0	25.3	79 56.2	−40.3	27.7	80 48.6	−38.2	30.6	81 39.4	−35.6	34.0	82 27.8	−32.3	38.3	83 13.2	−28.0	43.5	83 54.4	−22.4	49.9	78
79	77 24.4	−45.4	20.0	78 20.5	−44.4	21.7	79 15.9	−43.1	23.6	80 10.4	−41.5	25.9	81 03.8	−39.7	28.7	81 55.5	−37.1	32.1	82 45.2	−34.0	36.2	83 32.0	−29.9	41.5	79
80	76 39.0	−47.3	17.1	77 36.1	−46.4	18.4	78 32.8	−45.5	20.0	79 28.9	−44.4	21.8	80 24.1	−42.9	24.0	81 18.4	−41.1	26.7	82 11.2	−38.8	29.9	83 02.1	−35.8	34.0	80
81	75 51.7	−48.7	14.5	76 49.7	−48.1	15.6	77 47.3	−47.4	16.8	78 44.5	−46.5	18.2	79 41.2	−45.5	20.0	80 37.3	−44.3	22.0	81 32.4	−42.6	24.5	82 26.3	−40.5	27.7	81
82	75 03.0	−50.0	12.2	76 01.6	−49.6	13.0	76 59.9	−49.0	14.0	77 58.0	−48.4	15.1	78 55.7	−47.6	16.5	79 53.0	−46.7	18.0	80 49.8	−45.6	20.0	81 45.8	−44.2	22.3	82
83	74 13.0	−51.1	10.1	75 12.0	−50.7	10.7	76 10.9	−50.4	11.5	77 09.6	−49.9	12.4	78 08.1	−49.4	13.4	79 06.3	−48.7	14.6	80 04.2	−48.0	16.0	81 01.6	−47.0	17.8	83
84	73 21.9	−52.0	8.2	74 21.3	−51.8	8.7	75 20.5	−51.5	9.3	76 19.7	−51.2	10.0	77 18.7	−50.8	10.7	78 17.6	−50.4	11.6	79 16.2	−49.8	12.7	80 14.6	−49.1	13.9	84
85	72 29.9	−52.8	6.5	73 29.5	−52.6	6.9	74 29.0	−52.4	7.3	75 28.5	−52.2	7.8	76 27.9	−51.9	8.4	77 27.2	−51.6	9.0	78 26.4	−51.3	9.8	79 25.5	−50.9	10.7	85
86	71 37.1	−53.4	5.0	72 36.9	−53.4	5.2	73 36.6	−53.2	5.5	74 36.3	−53.1	5.9	75 36.0	−52.9	6.3	76 35.6	−52.7	6.8	77 35.1	−52.4	7.3	78 34.6	−52.2	7.9	86
87	70 43.7	−54.1	3.6	71 43.5	−54.0	3.7	72 43.4	−53.9	3.9	73 43.2	−53.8	4.2	74 43.1	−53.7	4.4	75 42.9	−53.6	4.8	76 42.7	−53.5	5.1	77 42.4	−53.3	5.5	87
88	69 49.6	−54.6	2.3	70 49.5	−54.5	2.4	71 49.5	−54.5	2.5	72 49.4	−54.4	2.6	73 49.4	−54.4	2.8	74 49.3	−54.3	3.0	75 49.2	−54.3	3.2	76 49.1	−54.2	3.4	88
89	68 55.0	−55.0	1.1	69 55.0	−55.0	1.1	70 55.0	−55.0	1.2	71 55.0	−55.0	1.3	72 55.0	−55.0	1.3	73 55.0	−55.0	1.4	74 54.9	−54.9	1.5	75 54.9	−54.9	1.6	89
90	68 00.0	−55.4	0.0	69 00.0	−55.4	0.0	70 00.0	−55.4	0.0	71 00.0	−55.5	0.0	72 00.0	−55.5	0.0	73 00.0	−55.5	0.0	74 00.0	−55.5	0.0	75 00.0	−55.5	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

23°, 337° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 23°, 337°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	20 10.3	−59.3	155.4	19 15.7	−59.4	155.5	18 21.0	−59.4	155.7	17 26.3	−59.4	155.8	16 31.6	−59.6	155.9	15 36.7	−59.5	156.1	14 41.9	−59.6	156.2	13 47.0	−59.7	156.3	0
1	19 11.0	−59.3	155.6	18 16.3	−59.3	155.7	17 21.6	−59.4	155.8	16 26.9	−59.5	156.0	15 32.0	−59.5	156.1	14 37.2	−59.6	156.2	13 42.3	−59.7	156.3	12 47.3	−59.7	156.4	1
2	18 11.7	−59.3	155.7	17 17.0	−59.4	155.9	16 22.2	−59.4	156.0	15 27.4	−59.5	156.1	14 32.5	−59.5	156.2	13 37.6	−59.6	156.3	12 42.6	−59.6	156.4	11 47.6	−59.7	156.5	2
3	17 12.4	−59.3	155.9	16 17.6	−59.3	156.0	15 22.8	−59.4	156.1	14 27.9	−59.5	156.2	13 33.0	−59.6	156.3	12 38.0	−59.6	156.4	11 43.0	−59.6	156.5	10 47.9	−59.6	156.6	3
4	16 13.1	−59.3	156.1	15 18.3	−59.4	156.2	14 23.4	−59.5	156.3	13 28.4	−59.5	156.4	12 33.4	−59.5	156.5	11 38.4	−59.6	156.5	10 43.4	−59.7	156.6	9 48.3	−59.7	156.7	4
5	15 13.8	−59.3	156.2	14 18.9	−59.4	156.3	13 23.9	−59.4	156.4	12 28.9	−59.4	156.5	11 33.9	−59.5	156.6	10 38.8	−59.6	156.7	9 43.7	−59.6	156.7	8 48.6	−59.7	156.8	5
6	14 14.5	−59.3	156.4	13 19.5	−59.3	156.5	12 24.5	−59.4	156.6	11 29.5	−59.5	156.6	10 34.4	−59.6	156.7	9 39.2	−59.6	156.8	8 44.1	−59.7	156.8	7 48.9	−59.7	156.9	6
7	13 15.2	−59.3	156.5	12 20.2	−59.4	156.6	11 25.1	−59.5	156.7	10 30.0	−59.5	156.8	9 34.8	−59.5	156.8	8 39.6	−59.6	156.9	7 44.4	−59.6	157.0	6 49.2	−59.7	157.0	7
8	12 15.9	−59.3	156.7	11 20.8	−59.4	156.8	10 25.6	−59.4	156.8	9 30.5	−59.5	156.9	8 35.3	−59.6	157.0	7 40.0	−59.6	157.0	6 44.8	−59.7	157.1	5 49.5	−59.7	157.1	8
9	11 16.6	−59.4	156.8	10 21.4	−59.4	156.9	9 26.2	−59.5	157.0	8 31.0	−59.5	157.0	7 35.7	−59.5	157.1	6 40.4	−59.6	157.1	5 45.1	−59.6	157.2	4 49.8	−59.7	157.2	9
10	10 17.2	−59.3	157.0	9 22.0	−59.4	157.0	8 26.7	−59.4	157.1	7 31.5	−59.5	157.2	6 36.2	−59.6	157.2	5 40.8	−59.6	157.3	4 45.5	−59.7	157.3	3 50.1	−59.7	157.3	10
11	9 17.9	−59.3	157.1	8 22.6	−59.4	157.2	7 27.3	−59.5	157.2	6 32.0	−59.6	157.3	5 36.6	−59.6	157.3	4 41.2	−59.6	157.4	3 45.8	−59.6	157.4	2 50.4	−59.6	157.4	11
12	8 18.6	−59.4	157.3	7 23.2	−59.4	157.3	6 27.8	−59.4	157.4	5 32.4	−59.5	157.4	4 37.0	−59.5	157.5	3 41.6	−59.6	157.5	2 46.2	−59.7	157.5	1 50.8	−59.7	157.5	12
13	7 19.2	−59.3	157.4	6 23.8	−59.4	157.5	5 28.4	−59.5	157.5	4 32.9	−59.5	157.5	3 37.5	−59.6	157.6	2 42.0	−59.6	157.6	1 46.5	−59.6	157.6	0 51.1	−59.7	157.6	13
14	6 19.9	−59.4	157.6	5 24.4	−59.4	157.6	4 28.9	−59.4	157.6	3 33.4	−59.5	157.7	2 37.9	−59.5	157.7	1 42.4	−59.6	157.7	0 46.9	−59.7	157.7	0 08.6	+59.7	22.3	14
15	5 20.5	−59.3	157.7	4 25.0	−59.4	157.8	3 29.5	−59.5	157.8	2 33.9	−59.5	157.8	1 38.4	−59.6	157.8	0 42.8	−59.6	157.8	0 12.8	+59.6	22.2	1 08.3	+59.7	22.2	15
16	4 21.2	−59.4	157.9	3 25.6	−59.4	157.9	2 30.0	−59.5	157.9	1 34.4	−59.5	157.9	0 38.8	−59.6	157.9	0 16.8	+59.6	22.1	1 12.4	+59.7	22.1	2 08.0	+59.7	22.1	16
17	3 21.8	−59.3	158.0	2 26.2	−59.4	158.0	1 30.5	−59.4	158.1	0 34.9	−59.5	158.1	0 20.8	+59.5	21.9	1 16.4	+59.6	21.9	2 12.1	+59.6	22.0	3 07.7	+59.7	22.0	17
18	2 22.5	−59.4	158.2	1 26.8	−59.4	158.2	0 31.1	−59.5	158.2	0 24.6	+59.5	21.8	1 20.3	+59.6	21.8	2 16.0	+59.6	21.8	3 11.7	+59.7	21.9	4 07.4	+59.7	21.9	18
19	1 23.1	−59.3	158.3	0 27.4	−59.4	158.3	0 28.4	+59.4	21.7	1 24.1	+59.5	21.7	2 19.9	+59.5	21.7	3 15.6	+59.6	21.7	4 11.4	+59.6	21.7	5 07.1	+59.7	21.8	19
20	0 23.8	−59.4	158.5	0 32.0	+59.4	21.5	1 27.8	+59.5	21.5	2 23.6	+59.6	21.6	3 19.4	+59.6	21.6	4 15.2	+59.6	21.6	5 11.0	+59.7	21.6	6 06.8	+59.7	21.7	20
21	0 35.6	+59.3	21.4	1 31.4	+59.5	21.4	2 27.3	+59.5	21.4	3 23.2	+59.5	21.4	4 19.0	+59.6	21.5	5 14.8	+59.6	21.5	6 10.7	+59.6	21.5	7 06.5	+59.7	21.6	21
22	1 34.9	+59.4	21.2	2 30.9	+59.4	21.3	3 26.8	+59.4	21.3	4 22.7	+59.5	21.3	5 18.6	+59.5	21.3	6 14.4	+59.6	21.4	7 10.3	+59.7	21.4	8 06.2	+59.6	21.5	22
23	2 34.3	+59.3	21.1	3 30.3	+59.4	21.1	4 26.2	+59.5	21.1	5 22.2	+59.5	21.2	6 18.1	+59.6	21.2	7 14.0	+59.6	21.3	8 10.0	+59.6	21.3	9 05.8	+59.7	21.4	23
24	3 33.6	+59.4	21.0	4 29.7	+59.4	21.0	5 25.7	+59.4	21.0	6 21.7	+59.5	21.0	7 17.7	+59.5	21.1	8 13.6	+59.6	21.1	9 09.6	+59.6	21.2	10 05.5	+59.7	21.3	24
25	4 33.0	+59.3	20.8	5 29.1	+59.4	20.8	6 25.1	+59.5	20.9	7 21.2	+59.5	20.9	8 17.2	+59.6	21.0	9 13.2	+59.6	21.0	10 09.2	+59.7	21.1	11 05.2	+59.7	21.2	25
26	5 32.3	+59.4	20.7	6 28.5	+59.4	20.7	7 24.6	+59.4	20.7	8 20.7	+59.5	20.8	9 16.8	+59.5	20.8	10 12.8	+59.6	20.9	11 08.9	+59.6	21.0	12 04.9	+59.7	21.0	26
27	6 31.7	+59.3	20.5	7 27.9	+59.4	20.6	8 24.0	+59.5	20.6	9 20.2	+59.5	20.7	10 16.3	+59.6	20.7	11 12.4	+59.6	20.8	12 08.5	+59.6	20.9	13 04.6	+59.6	20.9	27
28	7 31.0	+59.4	20.4	8 27.3	+59.4	20.4	9 23.5	+59.4	20.5	10 19.7	+59.5	20.5	11 15.9	+59.5	20.6	12 12.0	+59.6	20.7	13 08.1	+59.7	20.7	14 04.2	+59.7	20.8	28
29	8 30.4	+59.3	20.2	9 26.7	+59.4	20.3	10 22.9	+59.5	20.3	11 19.2	+59.5	20.4	12 15.4	+59.5	20.5	13 11.6	+59.6	20.5	14 07.8	+59.6	20.6	15 03.9	+59.7	20.7	29
30	9 29.7	+59.3	20.1	10 26.1	+59.3	20.1	11 22.4	+59.4	20.2	12 18.7	+59.5	20.3	13 14.9	+59.6	20.3	14 11.2	+59.6	20.4	15 07.4	+59.6	20.5	16 03.6	+59.6	20.6	30
31	10 29.0	+59.4	19.9	11 25.4	+59.4	20.0	12 21.8	+59.4	20.1	13 18.2	+59.4	20.1	14 14.5	+59.5	20.2	15 10.8	+59.5	20.3	16 07.0	+59.6	20.4	17 03.2	+59.7	20.5	31
32	11 28.4	+59.3	19.8	12 24.8	+59.4	19.8	13 21.2	+59.5	19.9	14 17.6	+59.5	20.0	15 14.0	+59.5	20.1	16 10.3	+59.6	20.2	17 06.6	+59.7	20.3	18 02.9	+59.7	20.4	32
33	12 27.7	+59.3	19.6	13 24.2	+59.4	19.7	14 20.7	+59.4	19.8	15 17.1	+59.5	19.9	16 13.5	+59.6	20.0	17 09.9	+59.6	20.1	18 06.3	+59.6	20.2	19 02.6	+59.6	20.3	33
34	13 27.0	+59.3	19.5	14 23.6	+59.3	19.5	15 20.1	+59.4	19.6	16 16.6	+59.5	19.7	17 13.1	+59.5	19.8	18 09.5	+59.5	19.9	19 05.9	+59.6	20.0	20 02.2	+59.7	20.2	34
35	14 26.3	+59.3	19.3	15 22.9	+59.4	19.4	16 19.5	+59.4	19.5	17 16.1	+59.4	19.6	18 12.6	+59.5	19.7	19 09.0	+59.6	19.8	20 05.5	+59.6	19.9	21 01.9	+59.6	20.1	35
36	15 25.6	+59.3	19.1	16 22.3	+59.4	19.2	17 18.9	+59.4	19.3	18 15.5	+59.5	19.4	19 12.1	+59.5	19.6	20 08.6	+59.6	19.7	21 05.1	+59.6	19.8	22 01.5	+59.6	19.9	36
37	16 24.9	+59.3	19.0	17 21.7	+59.3	19.1	18 18.3	+59.4	19.2	19 15.0	+59.4	19.3	20 11.6	+59.5	19.4	21 08.2	+59.5	19.5	22 04.7	+59.6	19.7	23 01.1	+59.7	19.8	37
38	17 24.2	+59.3	18.8	18 21.0	+59.3	18.9	19 17.7	+59.4	19.0	20 14.4	+59.5	19.2	21 11.1	+59.5	19.3	22 07.7	+59.5	19.4	23 04.3	+59.6	19.6	24 00.8	+59.6	19.7	38
39	18 23.5	+59.3	18.7	19 20.3	+59.4	18.8	20 17.1	+59.4	18.9	21 13.9	+59.4	19.0	22 10.6	+59.5	19.1	23 07.2	+59.6	19.3	24 03.9	+59.5	19.4	25 00.4	+59.6	19.6	39
40	19 22.8	+59.3	18.5	20 19.7	+59.3	18.6	21 16.5	+59.4	18.7	22 13.3	+59.4	18.9	23 10.1	+59.4	19.0	24 06.8	+59.5	19.1	25 03.4	+59.6	19.3	26 00.0	+59.6	19.5	40
41	20 22.1	+59.2	18.3	21 19.0	+59.3	18.5	22 15.9	+59.4	18.6	23 12.7	+59.5	18.7	24 09.5	+59.5	18.9	25 06.3	+59.5	19.0	26 03.0	+59.6	19.2	26 59.6	+59.7	19.3	41
42	21 21.3	+59.3	18.2	22 18.3	+59.3	18.3	23 15.3	+59.3	18.4	24 12.2	+59.4	18.6	25 09.0	+59.5	18.7	26 05.8	+59.5	18.9	27 02.6	+59.5	19.0	27 59.3	+59.6	19.2	42
43	22 20.6	+59.2	18.0	23 17.6	+59.3	18.1	24 14.6	+59.4	18.3	25 11.6	+59.4	18.4	26 08.5	+59.4	18.6	27 05.3	+59.5	18.7	28 02.1	+59.6	18.9	28 58.9	+59.6	19.1	43
44	23 19.8	+59.2	17.8	24 16.9	+59.3	18.0	25 14.0	+59.3	18.1	26 11.0	+59.4	18.3	27 07.9	+59.5	18.4	28 04.8	+59.5	18.6	29 01.7	+59.5	18.8	29 58.5	+59.5	18.9	44
45	24 19.0	+59.2	17.6	25 16.2	+59.3	17.8	26 13.3	+59.3	17.9	27 10.4	+59.3	18.1	28 07.4	+59.4	18.3	29 04.3	+59.5	18.4	30 01.2	+59.5	18.6	30 58.0	+59.6	18.8	45
46	25 18.2	+59.3	17.5	26 15.5	+59.2	17.6	27 12.6	+59.3	17.8	28 09.7	+59.4	17.9	29 06.8	+59.4	18.1	30 03.8	+59.5	18.3	31 00.7	+59.6	18.5	31 57.6	+59.6	18.7	46
47	26 17.5	+59.1	17.3	27 14.7	+59.3	17.4	28 11.9	+59.3	17.6	29 09.1	+59.4	17.8	30 06.2	+59.4	17.9	31 03.3	+59.4	18.1	32 00.3	+59.5	18.3	32 57.2	+59.5	18.5	47
48	27 16.6	+59.2	17.1	28 14.0	+59.2	17.3	29 11.2	+59.3	17.4	30 08.5	+59.3	17.6	31 05.6	+59.4	17.8	32 02.7	+59.5	18.0	32 59.8	+59.5	18.2	33 56.7	+59.6	18.4	48
49	28 15.8	+59.2	16.9	29 13.2	+59.2	17.1	30 10.5	+59.3	17.2	31 07.8	+59.3	17.4	32 05.0	+59.4	17.6	33 02.2	+59.4	17.8	33 59.3	+59.4	18.0	34 56.3	+59.5	18.2	49
50	29 15.0	+59.1	16.7	30 12.4	+59.2	16.9	31 09.8	+59.2	17.1	32 07.1	+59.3	17.3	33 04.4	+59.4	17.4	34 01.6	+59.4	17.6	34 58.7	+59.5	17.9	35 55.8	+59.5	18.1	50
51	30 14.1	+59.1	16.5	31 11.6	+59.2	16.7	32 09.0	+59.3	16.9	33 06.4	+59.3	17.1	34 03.8	+59.3	17.3	35 01.0	+59.4	17.5	35 58.2	+59.5	17.7	36 55.3	+59.6	17.9	51
52	31 13.2	+59.1	16.3	32 10.8	+59.1	16.5	33 08.3	+59.2	16.7	34 05.7	+59.3	16.9	35 03.1	+59.3	17.1	36 00.4	+59.4	17.3	36 57.7	+59.4	17.5	37 54.9	+59.5	17.8	52
53	32 12.3	+59.1	16.1	33 09.9	+59.2	16.3	34 07.5	+59.2	16.5	35 05.0	+59.3	16.7	36 02.4	+59.4	16.9	36 59.8	+59.4	17.1	37 57.1	+59.5	17.4	38 54.4	+59.4	17.6	53
54	33 11.4	+59.1	15.9	34 09.1	+59.1	16.1	35 06.7	+59.2	16.3	36 04.3	+59.2	16.5	37 01.8	+59.3	16.7	37 59.2	+59.4	16.9	38 56.6	+59.4	17.2	39 53.8	+59.5	17.4	54
55	34 10.5	+59.0	15.7	35 08.2	+59.1	15.9	36 05.9	+59.2	16.1	37 03.5	+59.2	16.3	38 01.1	+59.2	16.5	38 58.6	+59.3	16.8	39 56.0	+59.4	17.0	40 53.3	+59.5	17.2	55
56	35 09.5	+59.0	15.5	36 07.3	+59.1	15.7	37 05.1	+59.1	15.9	38 02.7	+59.2	16.1	39 00.3	+59.3	16.3	39 57.9	+59.3	16.6	40 55.4	+59.3	16.8	41 52.8	+59.4	17.1	56
57	36 08.5	+59.0	15.3	37 06.4	+59.1	15.5	38 04.2	+59.1	15.7	39 01.9	+59.2	15.9	39 59.6	+59.2	16.1	40 57.2	+59.3	16.4	41 54.7	+59.4	16.6	42 52.2	+59.4	16.9	57
58	37 07.5	+59.0	15.1	38 05.5	+59.0	15.3	39 03.3	+59.1	15.5	40 01.1	+59.2	15.7	40 58.8	+59.3	15.9	41 56.5	+59.3	16.2	42 54.1	+59.3	16.4	43 51.6	+59.4	16.7	58
59	38 06.5	+58.9	14.8	39 04.5	+59.0	15.0	40 02.4	+59.1	15.2	41 00.3	+59.1	15.5	41 58.1	+59.2	15.7	42 55.8	+59.2	16.0	43 53.4	+59.4	16.2	44 51.0	+59.4	16.5	59
60	39 05.4	+59.0	14.6	40 03.5	+59.0	14.8	41 01.5	+59.0	15.0	41 59.4	+59.1	15.2	42 57.3	+59.1	15.5	43 55.0	+59.3	15.7	44 52.8	+59.2	16.0	45 50.4	+59.3	16.3	60
61	40 04.4	+58.8	14.3	41 02.5	+58.9	14.5	42 00.5	+59.0	14.8	42 58.5	+59.1	15.0	43 56.4	+59.2	15.3	44 54.3	+59.2	15.5	45 52.0	+59.3	15.8	46 49.7	+59.4	16.1	61
62	41 03.2	+58.9	14.1	42 01.4	+58.9	14.3	42 59.5	+59.0	14.5	43 57.6	+59.0	14.8	44 55.6	+59.1	15.0	45 53.5	+59.1	15.3	46 51.3	+59.2	15.6	47 49.1	+59.3	15.9	62
63	42 02.1	+58.8	13.8	43 00.3	+58.9	14.0	43 58.5	+58.9	14.3	44 56.6	+59.0	14.5	45 54.7	+59.0	14.8	46 52.6	+59.2	15.0	47 50.5	+59.3	15.3	48 48.4	+59.2	15.6	63
64	43 00.9	+58.7	13.5	43 59.2	+58.8	13.8	44 57.4	+58.9	14.0	45 55.6	+59.0	14.3	46 53.7	+59.1	14.5	47 51.8	+59.1	14.8	48 49.8	+59.1	15.1	49 47.6	+59.3	15.4	64
65	43 59.6	+58.8	13.3	44 58.0	+58.8	13.5	45 56.3	+58.9	13.7	46 54.6	+58.9	14.0	47 52.8	+59.0	14.3	48 50.9	+59.1	14.5	49 48.9	+59.2	14.8	50 46.9	+59.2	15.1	65
66	44 58.4	+58.6	13.0	45 56.8	+58.8	13.2	46 55.2	+58.8	13.5	47 53.5	+58.9	13.7	48 51.8	+58.9	14.0	49 50.0	+59.0	14.3	50 48.1	+59.1	14.6	51 46.1	+59.2	14.9	66
67	45 57.0	+58.7	12.7	46 55.6	+58.7	12.9	47 54.0	+58.8	13.2	48 52.4	+58.8	13.4	49 50.7	+58.9	13.7	50 49.0	+59.0	14.0	51 47.2	+59.0	14.3	52 45.3	+59.1	14.6	67
68	46 55.7	+58.6	12.4	47 54.3	+58.6	12.6	48 52.8	+58.7	12.9	49 51.2	+58.8	13.1	50 49.6	+58.9	13.4	51 48.0	+58.9	13.7	52 46.2	+59.1	14.0	53 44.4	+59.1	14.3	68
69	47 54.3	+58.5	12.1	48 52.9	+58.6	12.3	49 51.5	+58.7	12.5	50 50.0	+58.8	12.8	51 48.5	+58.8	13.1	52 46.9	+58.9	13.4	53 45.3	+58.9	13.7	54 43.5	+59.1	14.0	69
70	48 52.8	+58.4	11.7	49 51.5	+58.5	12.0	50 50.2	+58.6	12.2	51 48.8	+58.7	12.5	52 47.3	+58.8	12.8	53 45.8	+58.9	13.1	54 44.2	+58.9	13.4	55 42.6	+59.0	13.7	70
71	49 51.2	+58.4	11.4	50 50.0	+58.5	11.6	51 48.8	+58.5	11.9	52 47.5	+58.6	12.1	53 46.1	+58.7	12.4	54 44.7	+58.7	12.7	55 43.1	+58.9	13.1	56 41.6	+58.9	13.4	71
72	50 49.6	+58.4	11.0	51 48.5	+58.4	11.3	52 47.3	+58.5	11.5	53 46.1	+58.6	11.8	54 44.8	+58.6	12.1	55 43.4	+58.8	12.4	56 42.0	+58.8	12.7	57 40.5	+58.9	13.1	72
73	51 48.0	+58.2	10.6	52 46.9	+58.4	10.9	53 45.8	+58.4	11.1	54 44.7	+58.4	11.4	55 43.4	+58.6	11.7	56 42.2	+58.6	12.0	57 40.8	+58.7	12.3	58 39.4	+58.8	12.7	73
74	52 46.2	+58.2	10.3	53 45.3	+58.2	10.5	54 44.2	+58.4	10.8	55 43.1	+58.5	11.0	56 42.0	+58.5	11.3	57 40.8	+58.6	11.6	58 39.5	+58.7	12.0	59 38.2	+58.8	12.3	74
75	53 44.4	+58.1	9.8	54 43.5	+58.2	10.1	55 42.6	+58.2	10.3	56 41.6	+58.3	10.6	57 40.5	+58.4	10.9	58 39.4	+58.5	11.2	59 38.2	+58.6	11.5	60 37.0	+58.6	11.9	75
76	54 42.5	+58.0	9.4	55 41.7	+58.0	9.7	56 40.8	+58.1	9.9	57 39.9	+58.2	10.2	58 38.9	+58.3	10.5	59 37.9	+58.4	10.8	60 36.8	+58.5	11.1	61 35.6	+58.6	11.5	76
77	55 40.5	+57.9	9.0	56 39.7	+58.0	9.2	57 38.9	+58.1	9.5	58 38.1	+58.1	9.7	59 37.2	+58.2	10.0	60 36.3	+58.3	10.3	61 35.3	+58.4	10.6	62 34.2	+58.5	11.0	77
78	56 38.4	+57.8	8.5	57 37.7	+57.9	8.7	58 37.0	+57.9	9.0	59 36.2	+58.0	9.2	60 35.4	+58.1	9.5	61 34.6	+58.2	9.8	62 33.7	+58.3	10.2	63 32.7	+58.4	10.5	78
79	57 36.2	+57.6	8.0	58 35.6	+57.7	8.2	59 34.9	+57.8	8.5	60 34.2	+57.9	8.7	61 33.5	+58.0	9.0	62 32.8	+58.0	9.3	63 32.0	+58.1	9.6	64 31.1	+58.2	10.0	79
80	58 33.8	+57.5	7.5	59 33.3	+57.6	7.7	60 32.7	+57.7	7.9	61 32.1	+57.8	8.2	62 31.5	+57.8	8.5	63 30.8	+58.0	8.8	64 30.1	+58.0	9.1	65 29.3	+58.2	9.4	80
81	59 31.3	+57.4	6.9	60 30.9	+57.4	7.1	61 30.4	+57.5	7.4	62 29.9	+57.6	7.6	63 29.3	+57.7	7.9	64 28.8	+57.7	8.2	65 28.1	+57.9	8.5	66 27.5	+57.9	8.8	81
82	60 28.7	+57.2	6.3	61 28.3	+57.3	6.5	62 27.9	+57.4	6.8	63 27.5	+57.4	7.0	64 27.0	+57.5	7.2	65 26.5	+57.6	7.5	66 26.0	+57.7	7.8	67 25.4	+57.8	8.1	82
83	61 25.9	+57.0	5.7	62 25.6	+57.1	5.9	63 25.3	+57.1	6.1	64 24.9	+57.3	6.3	65 24.5	+57.4	6.6	66 24.1	+57.4	6.8	67 23.7	+57.5	7.1	68 23.2	+57.6	7.4	83
84	62 22.9	+56.9	5.1	63 22.7	+56.9	5.2	64 22.4	+57.0	5.4	65 22.2	+57.0	5.6	66 21.9	+57.1	5.8	67 21.5	+57.2	6.1	68 21.2	+57.2	6.4	69 20.8	+57.4	6.6	84
85	63 19.8	+56.6	4.4	64 19.6	+56.6	4.5	65 19.4	+56.7	4.7	66 19.2	+56.8	4.9	67 19.0	+56.8	5.1	68 18.7	+56.9	5.3	69 18.4	+57.1	5.5	70 18.2	+57.1	5.8	85
86	64 16.4	+56.3	3.6	65 16.2	+56.5	3.7	66 16.1	+56.5	3.9	67 16.0	+56.5	4.0	68 15.8	+56.6	4.2	69 15.6	+56.7	4.4	70 15.5	+56.7	4.6	71 15.3	+56.7	4.9	86
87	65 12.7	+56.1	2.8	66 12.7	+56.1	2.9	67 12.6	+56.1	3.0	68 12.5	+56.2	3.2	69 12.4	+56.2	3.3	70 12.3	+56.3	3.5	71 12.2	+56.3	3.6	72 12.0	+56.5	3.8	87
88	66 08.8	+55.8	1.9	67 08.8	+55.8	2.0	68 08.7	+55.9	2.1	69 08.7	+55.8	2.2	70 08.6	+55.9	2.3	71 08.6	+55.9	2.4	72 08.5	+56.0	2.5	73 08.5	+56.0	2.7	88
89	67 04.6	+55.4	1.0	68 04.6	+55.4	1.0	69 04.6	+55.4	1.1	70 04.5	+55.5	1.1	71 04.5	+55.5	1.2	72 04.5	+55.5	1.3	73 04.5	+55.5	1.3	74 04.5	+55.5	1.4	89
90	68 00.0	+55.0	0.0	69 00.0	+55.0	0.0	70 00.0	+55.0	0.0	71 00.0	+55.0	0.0	72 00.0	+55.0	0.0	73 00.0	+55.0	0.0	74 00.0	+54.9	0.0	75 00.0	+54.9	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 157°, 203°

Dec.	68°			69°			70°			71°		
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°
0	20 00.7	+59.2	154.3	19 06.6	+59.3	154.5	18 12.4	+59.4	154.6	17 18.2	+59.4	154.8
1	20 59.9	+59.2	154.2	20 05.9	+59.3	154.3	19 11.8	+59.3	154.5	18 17.6	+59.4	154.6
2	21 59.1	+59.2	154.0	21 05.2	+59.2	154.2	20 11.1	+59.3	154.3	19 17.0	+59.4	154.5
3	22 58.3	+59.2	153.8	22 04.4	+59.3	154.0	21 10.4	+59.4	154.2	20 16.4	+59.4	154.3
4	23 57.5	+59.1	153.6	23 03.7	+59.2	153.8	22 09.8	+59.3	154.0	21 15.8	+59.4	154.2
5	24 56.6	+59.2	153.5	24 02.9	+59.2	153.7	23 09.1	+59.3	153.9	22 15.2	+59.4	154.0
6	25 55.8	+59.1	153.3	25 02.1	+59.2	153.5	24 08.4	+59.3	153.7	23 14.6	+59.3	153.9
7	26 54.9	+59.1	153.1	26 01.3	+59.2	153.3	25 07.7	+59.3	153.5	24 13.9	+59.4	153.7
8	27 54.0	+59.1	152.9	27 00.5	+59.2	153.1	26 07.0	+59.2	153.3	25 13.3	+59.3	153.6
9	28 53.1	+59.1	152.7	27 59.7	+59.2	152.9	27 06.2	+59.3	153.2	26 12.6	+59.4	153.4
10	29 52.2	+59.0	152.5	28 58.9	+59.1	152.7	28 05.5	+59.2	153.0	27 12.0	+59.3	153.2
11	30 51.2	+59.1	152.3	29 58.0	+59.2	152.6	29 04.7	+59.3	152.8	28 11.3	+59.3	153.1
12	31 50.3	+59.0	152.1	30 57.2	+59.1	152.4	30 04.0	+59.2	152.6	29 10.6	+59.3	152.9
13	32 49.3	+59.0	151.9	31 56.3	+59.1	152.2	31 03.2	+59.2	152.4	30 09.9	+59.3	152.7
14	33 48.3	+58.9	151.6	32 55.4	+59.1	152.0	32 02.4	+59.1	152.3	31 09.2	+59.3	152.5
15	34 47.2	+59.0	151.4	33 54.5	+59.0	151.7	33 01.5	+59.2	152.1	32 08.5	+59.2	152.4
16	35 46.2	+58.9	151.2	34 53.5	+59.1	151.5	34 00.7	+59.1	151.9	33 07.7	+59.3	152.2
17	36 45.1	+58.9	151.0	35 52.6	+59.0	151.3	34 59.8	+59.2	151.7	34 07.0	+59.2	152.0
18	37 44.0	+58.9	150.7	36 51.6	+59.0	151.1	35 59.0	+59.1	151.4	35 06.2	+59.2	151.8
19	38 42.9	+58.8	150.5	37 50.6	+58.9	150.9	36 58.1	+59.0	151.2	36 05.4	+59.1	151.6
20	39 41.7	+58.8	150.2	38 49.5	+58.9	150.6	37 57.1	+59.1	151.0	37 04.5	+59.2	151.4
21	40 40.5	+58.7	150.0	39 48.4	+58.9	150.4	38 56.2	+59.0	150.8	38 03.7	+59.1	151.2
22	41 39.2	+58.8	149.7	40 47.3	+58.9	150.1	39 55.2	+59.0	150.5	39 02.8	+59.1	150.9
23	42 38.0	+58.6	149.4	41 46.2	+58.8	149.9	40 54.2	+58.9	150.3	40 01.9	+59.1	150.7
24	43 36.6	+58.7	149.1	42 45.0	+58.8	149.6	41 53.1	+59.0	150.1	41 01.0	+59.1	150.5
25	44 35.3	+58.6	148.8	43 43.8	+58.7	149.3	42 52.1	+58.9	149.8	42 00.1	+59.0	150.3
26	45 33.9	+58.5	148.5	44 42.5	+58.7	149.0	43 51.0	+58.8	149.5	42 59.1	+59.0	150.0
27	46 32.4	+58.5	148.2	45 41.2	+58.7	148.7	44 49.8	+58.8	149.3	43 58.1	+59.0	149.8
28	47 30.9	+58.4	147.9	46 39.9	+58.6	148.4	45 48.6	+58.8	149.0	44 57.1	+58.9	149.5
29	48 29.3	+58.4	147.5	47 38.5	+58.6	148.1	46 47.4	+58.7	148.7	45 56.0	+58.9	149.2
30	49 27.7	+58.3	147.2	48 37.1	+58.5	147.8	47 46.1	+58.7	148.4	46 54.9	+58.8	149.0
31	50 26.0	+58.2	146.8	49 35.6	+58.4	147.5	48 44.8	+58.6	148.1	47 53.7	+58.8	148.7
32	51 24.2	+58.1	146.4	50 34.0	+58.3	147.1	49 43.4	+58.6	147.8	48 52.5	+58.7	148.4
33	52 22.3	+58.1	146.0	51 32.3	+58.3	146.7	50 42.0	+58.5	147.4	49 51.2	+58.7	148.1
34	53 20.4	+57.9	145.6	52 30.6	+58.3	146.4	51 40.5	+58.4	147.1	50 49.9	+58.7	147.7
35	54 18.3	+57.9	145.2	53 28.9	+58.1	146.0	52 38.9	+58.4	146.7	51 48.6	+58.6	147.4
36	55 16.2	+57.8	144.7	54 27.0	+58.0	145.5	53 37.3	+58.3	146.3	52 47.2	+58.5	147.0
37	56 14.0	+57.6	144.2	55 25.0	+58.0	145.1	54 35.6	+58.2	145.9	53 45.7	+58.4	146.7
38	57 11.6	+57.5	143.7	56 23.0	+57.8	144.6	55 33.8	+58.1	145.5	54 44.1	+58.4	146.3
39	58 09.1	+57.4	143.2	57 20.8	+57.7	144.1	56 31.9	+58.0	145.0	55 42.5	+58.2	145.9
40	59 06.5	+57.2	142.6	58 18.5	+57.6	143.6	57 29.9	+57.9	144.6	56 40.7	+58.2	145.4
41	60 03.7	+57.1	142.0	59 16.1	+57.4	143.1	58 27.8	+57.8	144.1	57 38.9	+58.1	145.0
42	61 00.8	+56.8	141.4	60 13.5	+57.3	142.5	59 25.6	+57.6	143.5	58 37.0	+58.0	144.5
43	61 57.6	+56.7	140.7	61 10.8	+57.1	141.9	60 23.2	+57.5	143.0	59 35.0	+57.8	144.0
44	62 54.3	+56.4	140.0	62 07.9	+56.9	141.3	61 20.7	+57.3	142.4	60 32.8	+57.7	143.5
45	63 50.7	+56.2	139.3	63 04.8	+56.7	140.6	62 18.0	+57.2	141.8	61 30.5	+57.6	142.9
46	64 46.9	+55.8	138.5	64 01.5	+56.4	139.8	63 15.2	+57.0	141.1	62 28.1	+57.4	142.3
47	65 42.7	+55.6	137.6	64 57.9	+56.2	139.0	64 12.2	+56.7	140.4	63 25.5	+57.2	141.7
48	66 38.3	+55.2	136.7	65 54.1	+55.9	138.2	65 08.9	+56.5	139.6	64 22.7	+57.0	141.0
49	67 33.5	+54.8	135.7	66 50.0	+55.6	137.3	66 05.4	+56.2	138.8	65 19.7	+56.8	140.3
50	68 28.3	+54.4	134.6	67 45.6	+55.1	136.3	67 01.6	+55.9	137.9	66 16.5	+56.5	139.5
51	69 22.7	+53.8	133.4	68 40.7	+54.8	135.3	67 57.5	+55.5	137.0	67 13.0	+56.3	138.6
52	70 16.5	+53.2	132.1	69 35.5	+54.2	134.1	68 53.0	+55.2	136.0	68 09.3	+55.9	137.7
53	71 09.7	+52.6	130.7	70 29.7	+53.7	132.8	69 48.2	+54.6	134.8	69 05.2	+55.5	136.7
54	72 02.3	+51.7	129.2	71 23.4	+53.1	131.5	70 42.8	+54.2	133.6	70 00.7	+55.1	135.6
55	72 54.0	+50.8	127.5	72 16.5	+52.2	130.0	71 37.0	+53.5	132.3	70 55.8	+54.6	134.4
56	73 44.8	+49.8	125.6	73 08.7	+51.4	128.3	72 30.5	+52.8	130.8	71 50.4	+54.0	133.1
57	74 34.6	+48.5	123.6	74 00.1	+50.4	126.5	73 23.3	+52.0	129.2	72 44.4	+53.3	131.7
58	75 23.1	+47.1	121.3	74 50.5	+49.2	124.5	74 15.3	+51.0	127.4	73 37.7	+52.6	130.1
59	76 10.2	+45.3	118.8	75 39.7	+47.8	122.2	75 06.3	+49.8	125.4	74 30.3	+51.6	128.4
60	76 55.5	+43.3	•116.0	76 27.5	+46.0	119.7	75 56.1	+48.5	123.2	75 21.9	+50.5	126.4
61	77 38.8	+40.8	•112.8	77 13.5	+44.1	•116.9	76 44.6	+46.8	120.7	76 12.4	+49.2	124.2
62	78 19.6	+38.0	•109.3	77 57.6	+41.6	•113.7	77 31.4	+44.9	•117.9	77 01.6	+47.6	121.7
63	78 57.6	+34.5	•105.4	78 39.2	+38.8	•110.2	78 16.3	+42.5	•114.7	77 49.2	+45.7	•118.9
64	79 32.1	+30.6	•101.0	79 18.0	+35.4	•106.2	78 58.8	+39.6	•111.1	78 34.9	+43.4	•115.8
65	80 02.7	+25.9	•96.1	79 53.4	+31.3	•101.7	79 38.4	+36.2	•107.1	79 18.3	+40.5	•112.2
66	80 28.6	+20.6	•90.8	80 24.7	+26.5	•96.7	80 14.6	+32.1	•102.5	79 58.8	+37.1	•108.0
67	80 49.2	+14.8	•85.0	80 51.2	+21.1	•91.2	80 46.7	+27.2	•97.4	80 35.9	+32.9	•103.4
68	81 04.0	+8.3	•78.9	81 12.3	+14.9	•85.2	81 13.9	+21.6	•91.7	81 08.8	+27.9	•98.1
69	81 12.3	+1.6	•72.4	81 27.2	+8.3	•78.8	81 35.5	+15.2	•85.4	81 36.7	+22.1	•92.2
70	81 13.9	−5.1	•65.9	81 35.5	+1.2	•72.1	81 50.7	+8.1	•78.7	81 58.8	+15.4	•85.7
71	81 08.8	−11.7	•59.4	81 36.7	−5.8	•65.2	81 58.8	+0.8	•71.7	82 14.2	+8.1	•78.6
72	80 57.1	−17.9	•53.1	81 30.9	−12.6	•58.4	81 59.6	−6.6	•64.5	82 22.3	+0.3	•71.2
73	80 39.2	−23.4	•47.1	81 18.3	−19.0	•51.9	81 53.0	−13.7	•57.4	82 22.6	−7.5	•63.7
74	80 15.8	−28.4	•41.5	80 59.3	−24.8	•45.7	81 39.3	−20.2	•50.6	82 15.1	−14.8	•56.3
75	79 47.4	−32.7	•36.4	80 34.5	−29.7	•40.0	81 19.1	−26.1	•44.2	82 00.3	−21.6	•49.2
76	79 14.7	−36.4	•31.8	80 04.8	−34.0	•34.8	80 53.0	−31.1	•38.4	81 38.7	−27.6	•42.6
77	78 38.3	−39.5	•27.7	79 30.8	−37.6	•30.2	80 21.9	−35.4	•33.1	81 11.1	−32.5	•36.7
78	77 58.8	−42.2	•24.0	78 53.2	−40.7	•26.0	79 46.5	−38.9	•28.5	80 38.6	−36.8	•31.3
79	77 16.6	−44.3	•20.6	78 12.5	−43.3	•22.3	79 07.6	−41.9	•24.3	80 01.8	−40.3	•26.6
80	76 32.3	−46.3	17.7	77 29.2	−45.4	19.0	78 25.7	−44.4	•20.6	79 21.5	−43.2	•22.5
81	75 46.0	−47.8	15.0	76 43.8	−47.2	16.1	77 41.3	−46.4	17.4	78 38.3	−45.5	•18.8
82	74 58.2	−49.2	12.6	75 56.6	−48.7	13.5	76 54.9	−48.2	14.5	77 52.8	−47.5	15.6
83	74 09.0	−50.4	10.5	75 07.9	−50.0	11.1	76 06.7	−49.6	11.9	77 05.3	−49.1	12.8
84	73 18.6	−51.3	8.5	74 17.9	−51.0	9.0	75 17.1	−50.7	9.6	76 16.2	−50.4	10.3
85	72 27.3	−52.2	6.8	73 26.9	−52.0	7.1	74 26.4	−51.8	7.6	75 25.8	−51.5	8.1
86	71 35.1	−52.9	5.2	72 34.9	−52.8	5.4	73 34.6	−52.6	5.8	74 34.3	−52.5	6.1
87	70 42.2	−53.5	3.7	71 42.1	−53.5	3.9	72 42.0	−53.4	4.1	73 41.8	−53.3	4.3
88	69 48.7	−54.1	2.4	70 48.6	−54.0	2.5	71 48.6	−54.0	2.6	72 48.5	−54.0	2.8
89	68 54.6	−54.6	1.1	69 54.6	−54.6	1.2	70 54.6	−54.6	1.2	71 54.5	−54.5	1.3
90	68 00.0	−55.0	0.0	69 00.0	−55.0	0.0	70 00.0	−55.0	0.0	71 00.0	−55.1	0.0
	68°			69°			70°			71°		

72°			73°			74°			75°			Dec.
Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
16 23.9	+59.4	154.9	15 29.5	+59.5	155.0	14 35.1	+59.6	155.1	13 40.6	+59.6	155.3	0
17 23.3	+59.5	154.8	16 29.0	+59.6	154.9	15 34.7	+59.6	155.0	14 40.2	+59.7	155.1	1
18 22.8	+59.5	154.6	17 28.6	+59.5	154.8	16 34.3	+59.5	154.9	15 39.9	+59.6	155.0	2
19 22.3	+59.4	154.5	18 28.1	+59.5	154.6	17 33.8	+59.6	154.8	16 39.5	+59.7	154.9	3
20 21.7	+59.5	154.4	19 27.6	+59.5	154.5	18 33.4	+59.6	154.7	17 39.2	+59.6	154.8	4
21 21.2	+59.4	154.2	20 27.1	+59.5	154.4	19 33.0	+59.6	154.5	18 38.8	+59.6	154.7	5
22 20.6	+59.5	154.1	21 26.6	+59.5	154.2	20 32.6	+59.5	154.4	19 38.4	+59.6	154.6	6
23 20.1	+59.4	153.9	22 26.1	+59.5	154.1	21 32.1	+59.6	154.3	20 38.0	+59.7	154.4	7
24 19.5	+59.4	153.8	23 25.6	+59.5	154.0	22 31.7	+59.5	154.1	21 37.7	+59.6	154.3	8
25 18.9	+59.4	153.6	24 25.1	+59.5	153.8	23 31.2	+59.6	154.0	22 37.3	+59.6	154.2	9
26 18.3	+59.4	153.5	25 24.6	+59.5	153.7	24 30.8	+59.5	153.9	23 36.9	+59.6	154.1	10
27 17.7	+59.4	153.3	26 24.1	+59.5	153.5	25 30.3	+59.6	153.7	24 36.5	+59.6	154.0	11
28 17.1	+59.4	153.1	27 23.6	+59.4	153.4	26 29.9	+59.5	153.6	25 36.1	+59.6	153.8	12
29 16.5	+59.4	153.0	28 23.0	+59.5	153.2	27 29.4	+59.5	153.5	26 35.7	+59.5	153.7	13
30 15.9	+59.3	152.8	29 22.5	+59.4	153.1	28 28.9	+59.5	153.3	27 35.2	+59.6	153.6	14
31 15.2	+59.4	152.6	30 21.9	+59.4	152.9	29 28.4	+59.5	153.2	28 34.8	+59.6	153.4	15
32 14.6	+59.3	152.5	31 21.3	+59.4	152.8	30 27.9	+59.5	153.0	29 34.4	+59.5	153.3	16
33 13.9	+59.3	152.3	32 20.7	+59.4	152.6	31 27.4	+59.5	152.9	30 33.9	+59.6	153.1	17
34 13.2	+59.3	152.1	33 20.1	+59.4	152.4	32 26.9	+59.4	152.7	31 33.5	+59.5	153.0	18
35 12.5	+59.3	151.9	34 19.5	+59.4	152.2	33 26.3	+59.5	152.6	32 33.0	+59.5	152.9	19
36 11.8	+59.2	151.7	35 18.9	+59.3	152.1	34 25.8	+59.4	152.4	33 32.5	+59.5	152.7	20
37 11.0	+59.3	151.5	36 18.2	+59.3	151.9	35 25.2	+59.4	152.2	34 32.0	+59.5	152.6	21
38 10.3	+59.2	151.3	37 17.5	+59.4	151.7	36 24.6	+59.4	152.1	35 31.5	+59.5	152.4	22
39 09.5	+59.2	151.1	38 16.9	+59.3	151.5	37 24.0	+59.4	151.9	36 31.0	+59.5	152.2	23
40 08.7	+59.2	150.9	39 16.2	+59.2	151.3	38 23.4	+59.4	151.7	37 30.5	+59.5	152.1	24
41 07.9	+59.1	150.7	40 15.4	+59.3	151.1	39 22.8	+59.4	151.5	38 30.0	+59.4	151.9	25
42 07.0	+59.1	150.5	41 14.7	+59.2	150.9	40 22.2	+59.3	151.3	39 29.4	+59.4	151.7	26
43 06.1	+59.1	150.2	42 13.9	+59.2	150.7	41 21.5	+59.3	151.1	40 28.8	+59.5	151.5	27
44 05.2	+59.1	150.0	43 13.1	+59.2	150.5	42 20.8	+59.3	150.9	41 28.3	+59.4	151.4	28
45 04.3	+59.0	149.8	44 12.3	+59.2	150.2	43 20.1	+59.3	150.7	42 27.7	+59.3	151.2	29
46 03.3	+59.0	149.5	45 11.5	+59.1	150.0	44 19.4	+59.2	150.5	43 27.0	+59.4	151.0	30
47 02.3	+58.9	149.2	46 10.6	+59.1	149.8	45 18.6	+59.2	150.3	44 26.4	+59.3	150.8	31
48 01.2	+59.0	149.0	47 09.7	+59.0	149.5	46 17.8	+59.2	150.1	45 25.7	+59.3	150.6	32
49 00.2	+58.8	148.7	48 08.7	+59.1	149.3	47 17.0	+59.2	149.8	46 25.0	+59.3	150.3	33
49 59.0	+58.8	148.4	49 07.8	+59.0	149.0	48 16.2	+59.1	149.6	47 24.3	+59.3	150.1	34
50 57.8	+58.8	148.1	50 06.8	+58.9	148.7	49 15.3	+59.1	149.3	48 23.6	+59.2	149.9	35
51 56.6	+58.7	147.7	51 05.7	+58.9	148.4	50 14.4	+59.1	149.0	49 22.8	+59.2	149.6	36
52 55.3	+58.7	147.4	52 04.6	+58.8	148.1	51 13.5	+59.0	148.8	50 22.0	+59.1	149.4	37
53 54.0	+58.6	147.0	53 03.4	+58.8	147.8	52 12.5	+58.9	148.5	51 21.1	+59.2	149.1	38
54 52.6	+58.5	146.7	54 02.2	+58.7	147.4	53 11.4	+58.9	148.2	52 20.3	+59.1	148.8	39
55 51.1	+58.4	146.3	55 00.9	+58.7	147.1	54 10.3	+58.9	147.8	53 19.4	+59.0	148.6	40
56 49.5	+58.4	145.9	55 59.6	+58.6	146.7	55 09.2	+58.8	147.5	54 18.4	+59.0	148.3	41
57 47.9	+58.2	145.4	56 58.2	+58.5	146.3	56 08.0	+58.8	147.2	55 17.4	+58.9	147.9	42
58 46.1	+58.2	145.0	57 56.7	+58.4	145.9	57 06.8	+58.6	146.8	56 16.3	+58.9	147.6	43
59 44.3	+58.0	144.5	58 55.1	+58.4	145.5	58 05.4	+58.6	146.4	57 15.2	+58.8	147.3	44
60 42.3	+57.9	144.0	59 53.5	+58.2	145.0	59 04.0	+58.5	146.0	58 14.0	+58.8	146.9	45
61 40.2	+57.8	143.5	60 51.7	+58.1	144.5	60 02.5	+58.5	145.5	59 12.8	+58.7	146.5	46
62 38.0	+57.7	142.9	61 49.8	+58.0	144.0	61 01.0	+58.3	145.1	60 11.5	+58.6	146.1	47
63 35.7	+57.4	142.3	62 47.8	+57.9	143.5	61 59.3	+58.2	144.6	61 10.1	+58.5	145.6	48
64 33.1	+57.3	141.6	63 45.7	+57.7	142.9	62 57.5	+58.1	144.1	62 08.6	+58.4	145.2	49
65 30.4	+57.1	140.9	64 43.4	+57.5	142.2	63 55.6	+57.9	143.5	63 07.0	+58.3	144.7	50
66 27.5	+56.8	140.1	65 40.9	+57.4	141.6	64 53.5	+57.8	142.9	64 05.3	+58.1	144.1	51
67 24.3	+56.6	139.3	66 38.3	+57.1	140.8	65 51.3	+57.6	142.3	65 03.4	+58.1	143.6	52
68 20.9	+56.2	138.4	67 35.4	+56.9	140.1	66 48.9	+57.4	141.6	66 01.5	+57.8	143.0	53
69 17.1	+55.9	137.5	68 32.3	+56.6	139.2	67 46.3	+57.2	140.8	66 59.3	+57.7	142.3	54
70 13.0	+55.5	136.4	69 28.9	+56.3	138.3	68 43.5	+56.9	140.0	67 57.0	+57.5	141.6	55
71 08.5	+55.1	135.3	70 25.2	+55.9	137.3	69 40.4	+56.7	139.1	68 54.5	+57.3	140.8	56
72 03.6	+54.4	134.0	71 21.1	+55.4	136.2	70 37.1	+56.3	138.1	69 51.8	+56.9	139.9	57
72 58.0	+53.9	132.6	72 16.5	+55.0	134.9	71 33.4	+55.9	137.1	70 48.7	+56.7	139.0	58
73 51.9	+53.1	131.1	73 11.5	+54.4	133.6	72 29.3	+55.4	135.9	71 45.4	+56.3	138.0	59
74 45.0	+52.3	129.4	74 05.9	+53.7	132.1	73 24.7	+54.9	134.6	72 41.7	+55.9	136.9	60
75 37.3	+51.2	127.4	74 59.6	+52.8	130.4	74 19.6	+54.2	133.1	73 37.6	+55.4	135.6	61
76 28.5	+49.9	125.3	75 52.4	+51.9	128.5	75 13.8	+53.5	131.5	74 33.0	+54.8	134.2	62
77 18.4	+48.4	122.8	76 44.3	+50.7	126.4	76 07.3	+52.6	129.7	75 27.8	+54.1	132.6	63
78 06.8	+46.5	•120.0	77 35.0	+49.2	124.0	76 59.9	+51.4	127.6	76 21.9	+53.2	130.9	64
78 53.3	+44.3	•116.9	78 24.2	+47.4	•121.2	77 51.3	+50.0	125.2	77 15.1	+52.2	128.8	65
79 37.6	+41.5	•113.3	79 11.6	+45.2	•118.1	78 41.3	+48.3	122.5	78 07.3	+50.9	126.5	66
80 19.1	+38.0	•109.1	79 56.8	+42.4	•114.4	79 29.6	+46.2	•119.4	78 58.2	+49.2	123.8	67
80 57.1	+33.8	•104.3	80 39.2	+39.1	•110.2	80 15.8	+43.5	•115.7	79 47.4	+47.1	•120.7	68
81 30.9	+28.7	•98.9	81 18.3	+34.7	•105.4	80 59.3	+40.0	•111.5	80 34.5	+44.6	•117.1	69
81 59.6	+22.7	•92.8	81 53.0	+29.6	•99.8	81 39.3	+35.8	•106.5	81 19.1	+41.2	•112.8	70
82 22.3	+15.7	•86.0	82 22.6	+23.3	•93.4	82 15.1	+30.5	•100.8	82 00.3	+36.9	•107.8	71
82 38.0	+7.9	•78.6	82 45.9	+15.9	•86.3	82 45.6	+23.9	•94.2	82 37.2	+31.4	•101.9	72
82 45.9	−0.3	•70.8	83 01.8	+7.7	•78.5	83 09.5	+16.3	•86.7	83 08.6	+24.7	•95.0	73
82 45.6	−8.4	•62.8	83 09.5	−0.9	•70.3	83 25.8	+7.5	•78.5	83 33.3	+16.5	•87.2	74
82 37.2	−16.2	•55.0	83 08.6	−9.5	•61.9	83 33.3	−1.7	•69.7	83 49.8	+7.3	•78.4	75
82 21.0	−23.0	•47.7	82 59.1	−17.5	•53.7	83 31.6	−10.7	•60.8	83 57.1	−2.5	•69.1	76
81 58.0	−29.1	•40.9	82 41.6	−24.7	•46.0	83 20.9	−19.1	•52.2	83 54.6	−12.1	•59.6	77
81 28.9	−34.1	•34.8	82 16.9	−30.8	•39.0	83 01.8	−26.4	•44.2	83 42.5	−20.8	•50.5	78
80 54.8	−38.3	•29.4	81 46.1	−35.7	•32.8	82 35.4	−32.5	•37.0	83 21.7	−28.3	•42.2	79
80 16.5	−41.7	•24.7	81 10.4	−39.8	•27.4	82 02.9	−37.5	•30.7	82 53.4	−34.4	•34.8	80
79 34.8	−44.4	•20.6	80 30.6	−43.1	•22.7	81 25.4	−41.4	•25.3	82 19.0	−39.2	•28.4	81
78 50.4	−46.7	•17.0	79 47.5	−45.7	•18.6	80 44.0	−44.5	•20.6	81 39.8	−43.0	•23.0	82
78 03.7	−48.5	13.9	79 01.8	−47.8	15.1	79 59.5	−47.0	•16.6	80 56.8	−46.0	•18.4	83
77 15.2	−50.0	11.1	78 14.0	−49.6	12.0	79 12.5	−48.9	13.1	80 10.8	−48.3	•14.4	84
76 25.2	−51.3	8.7	77 24.4	−50.9	9.4	78 23.6	−50.6	10.1	79 22.5	−50.1	11.1	85
75 33.9	−52.3	6.5	76 33.5	−52.1	7.0	77 33.0	−51.8	7.6	78 32.4	−51.5	8.2	86
74 41.6	−53.2	4.6	75 41.4	−53.0	4.9	76 41.2	−52.9	5.3	77 40.9	−52.7	5.7	87
73 48.4	−53.9	2.9	74 48.4	−53.9	3.1	75 48.3	−53.8	3.3	76 48.2	−53.7	3.6	88
72 54.5	−54.5	1.4	73 54.5	−54.5	1.5	74 54.5	−54.5	1.6	75 54.5	−54.5	1.7	89
72 00.0	−55.1	0.0	73 00.0	−55.1	0.0	74 00.0	−55.1	0.0	75 00.0	−55.1	0.0	90
72°			73°			74°			75°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 24°, 336°

Dec. °	68° Hc ° ′	d ′	Z °	69° Hc ° ′	d ′	Z °	70° Hc ° ′	d ′	Z °	71° Hc ° ′	d ′	Z °	72° Hc ° ′	d ′	Z °	73° Hc ° ′	d ′	Z °	74° Hc ° ′	d ′	Z °	75° Hc ° ′	d ′	Z °	Dec. °
0	20 00.7	−59.2	154.3	19 06.6	−59.3	154.5	18 12.4	−59.3	154.6	17 18.2	−59.5	154.8	16 23.9	−59.5	154.9	15 29.5	−59.6	155.0	14 35.1	−59.6	155.1	13 40.6	−59.6	155.3	0
1	19 01.5	−59.2	154.5	18 07.3	−59.3	154.7	17 13.1	−59.4	154.8	16 18.7	−59.4	154.9	15 24.4	−59.5	155.0	14 29.9	−59.5	155.2	13 35.5	−59.6	155.3	12 41.0	−59.7	155.4	1
2	18 02.3	−59.2	154.7	17 08.0	−59.3	154.8	16 13.7	−59.4	155.0	15 19.3	−59.4	155.1	14 24.9	−59.5	155.2	13 30.4	−59.6	155.3	12 35.9	−59.6	155.4	11 41.3	−59.7	155.5	2
3	17 03.1	−59.3	154.9	16 08.7	−59.3	155.0	15 14.3	−59.3	155.1	14 19.9	−59.5	155.2	13 25.4	−59.5	155.3	12 30.8	−59.5	155.4	11 36.3	−59.6	155.5	10 41.6	−59.6	155.6	3
4	16 03.8	−59.2	155.0	15 09.4	−59.3	155.1	14 15.0	−59.4	155.3	13 20.4	−59.4	155.4	12 25.9	−59.5	155.4	11 31.3	−59.6	155.5	10 36.7	−59.7	155.6	9 42.0	−59.7	155.7	4
5	15 04.6	−59.3	155.2	14 10.1	−59.3	155.3	13 15.6	−59.4	155.4	12 21.0	−59.5	155.5	11 26.4	−59.5	155.6	10 31.7	−59.5	155.7	9 37.0	−59.6	155.7	8 42.3	−59.6	155.8	5
6	14 05.3	−59.2	155.4	13 10.8	−59.3	155.5	12 16.2	−59.4	155.5	11 21.5	−59.4	155.6	10 26.9	−59.5	155.7	9 32.2	−59.6	155.8	8 37.4	−59.6	155.8	7 42.7	−59.7	155.9	6
7	13 06.1	−59.3	155.5	12 11.5	−59.4	155.6	11 16.8	−59.4	155.7	10 22.1	−59.5	155.8	9 27.4	−59.5	155.8	8 32.6	−59.6	155.9	7 37.8	−59.6	156.0	6 43.0	−59.6	156.0	7
8	12 06.8	−59.3	155.7	11 12.1	−59.3	155.8	10 17.4	−59.4	155.8	9 22.6	−59.4	155.9	8 27.9	−59.6	156.0	7 33.0	−59.5	156.0	6 38.2	−59.6	156.1	5 43.4	−59.7	156.1	8
9	11 07.5	−59.2	155.8	10 12.8	−59.4	155.9	9 18.0	−59.4	156.0	8 23.2	−59.5	156.0	7 28.3	−59.5	156.1	6 33.5	−59.6	156.1	5 38.6	−59.6	156.2	4 43.7	−59.7	156.2	9
10	10 08.3	−59.3	156.0	9 13.4	−59.3	156.1	8 18.6	−59.4	156.1	7 23.7	−59.4	156.2	6 28.8	−59.5	156.2	5 33.9	−59.6	156.3	4 39.0	−59.6	156.3	3 44.0	−59.6	156.3	10
11	9 09.0	−59.3	156.1	8 14.1	−59.3	156.2	7 19.2	−59.4	156.3	6 24.3	−59.5	156.3	5 29.3	−59.5	156.4	4 34.3	−59.5	156.4	3 39.4	−59.7	156.4	2 44.4	−59.7	156.4	11
12	8 09.7	−59.3	156.3	7 14.8	−59.4	156.4	6 19.8	−59.4	156.4	5 24.8	−59.5	156.4	4 29.8	−59.5	156.5	3 34.8	−59.6	156.5	2 39.7	−59.6	156.5	1 44.7	−59.7	156.5	12
13	7 10.4	−59.3	156.5	6 15.4	−59.3	156.5	5 20.4	−59.4	156.5	4 25.3	−59.4	156.6	3 30.3	−59.6	156.6	2 35.2	−59.6	156.6	1 40.1	−59.6	156.6	0 45.0	−59.6	156.7	13
14	6 11.1	−59.3	156.6	5 16.1	−59.4	156.7	4 21.0	−59.5	156.7	3 25.9	−59.5	156.7	2 30.7	−59.5	156.7	1 35.6	−59.6	156.7	0 40.5	−59.6	156.8	0 14.6	+59.7	23.2	14
15	5 11.8	−59.3	156.8	4 16.7	−59.4	156.8	3 21.5	−59.4	156.8	2 26.4	−59.5	156.8	1 31.2	−59.5	156.9	0 36.0	−59.5	156.9	0 19.1	+59.7	23.1	1 14.3	+59.7	23.1	15
16	4 12.5	−59.3	156.9	3 17.3	−59.3	156.9	2 22.1	−59.4	157.0	1 26.9	−59.5	157.0	0 31.7	−59.5	157.0	0 23.5	+59.6	23.0	1 18.8	+59.6	23.0	2 14.0	+59.6	23.0	16
17	3 13.2	−59.2	157.1	2 18.0	−59.4	157.1	1 22.7	−59.4	157.1	0 27.4	−59.4	157.1	0 27.8	+59.6	22.9	1 23.1	+59.6	22.9	2 18.4	+59.6	22.9	3 13.6	+59.7	22.9	17
18	2 14.0	−59.3	157.2	1 18.6	−59.3	157.2	0 23.3	−59.4	157.2	0 32.0	+59.5	22.8	1 27.4	+59.5	22.8	2 22.7	+59.6	22.8	3 18.0	+59.6	22.8	4 13.3	+59.7	22.8	18
19	1 14.7	−59.3	157.4	0 19.3	−59.4	157.4	0 36.1	+59.4	22.6	1 31.5	+59.5	22.6	2 26.9	+59.5	22.6	3 22.3	+59.5	22.7	4 17.6	+59.6	22.7	5 13.0	+59.6	22.7	19
20	0 15.4	−59.3	157.5	0 40.1	+59.3	22.5	1 35.5	+59.4	22.5	2 31.0	+59.4	22.5	3 26.4	+59.5	22.5	4 21.8	+59.6	22.5	5 17.2	+59.7	22.6	6 12.6	+59.7	22.6	20
21	0 43.9	+59.3	22.3	1 39.4	+59.4	22.3	2 34.9	+59.5	22.3	3 30.4	+59.5	22.4	4 25.9	+59.5	22.4	5 21.4	+59.6	22.4	6 16.9	+59.6	22.5	7 12.3	+59.7	22.5	21
22	1 43.2	+59.3	22.2	2 38.8	+59.4	22.2	3 34.4	+59.4	22.2	4 29.9	+59.5	22.2	5 25.4	+59.6	22.3	6 21.0	+59.5	22.3	7 16.5	+59.6	22.3	8 12.0	+59.6	22.4	22
23	2 42.5	+59.3	22.0	3 38.2	+59.3	22.0	4 33.8	+59.4	22.1	5 29.4	+59.4	22.1	6 25.0	+59.5	22.1	7 20.5	+59.6	22.2	8 16.1	+59.6	22.2	9 11.6	+59.7	22.3	23
24	3 41.8	+59.3	21.9	4 37.5	+59.4	21.9	5 33.2	+59.4	21.9	6 28.8	+59.5	22.0	7 24.5	+59.5	22.0	8 20.1	+59.6	22.1	9 15.7	+59.6	22.1	10 11.3	+59.6	22.2	24
25	4 41.1	+59.3	21.7	5 36.9	+59.3	21.7	6 32.6	+59.4	21.8	7 28.3	+59.5	21.8	8 24.0	+59.5	21.9	9 19.7	+59.5	21.9	10 15.3	+59.6	22.0	11 10.9	+59.7	22.1	25
26	5 40.4	+59.3	21.6	6 36.2	+59.4	21.6	7 32.0	+59.4	21.6	8 27.8	+59.4	21.7	9 23.5	+59.5	21.7	10 19.2	+59.6	21.8	11 14.9	+59.6	21.9	12 10.6	+59.6	22.0	26
27	6 39.7	+59.3	21.4	7 35.6	+59.3	21.4	8 31.4	+59.4	21.5	9 27.2	+59.5	21.6	10 23.0	+59.5	21.6	11 18.8	+59.5	21.7	12 14.5	+59.6	21.8	13 10.2	+59.7	21.9	27
28	7 39.0	+59.3	21.2	8 34.9	+59.4	21.3	9 30.8	+59.4	21.4	10 26.7	+59.4	21.4	11 22.5	+59.5	21.5	12 18.3	+59.6	21.6	13 14.1	+59.6	21.6	14 09.9	+59.6	21.7	28
29	8 38.3	+59.3	21.1	9 34.3	+59.3	21.1	10 30.2	+59.4	21.2	11 26.1	+59.5	21.3	12 22.0	+59.5	21.4	13 17.9	+59.5	21.4	14 13.7	+59.6	21.5	15 09.5	+59.7	21.6	29
30	9 37.6	+59.3	20.9	10 33.6	+59.3	21.0	11 29.6	+59.4	21.1	12 25.6	+59.4	21.1	13 21.5	+59.5	21.2	14 17.4	+59.6	21.3	15 13.3	+59.6	21.4	16 09.2	+59.6	21.5	30
31	10 36.9	+59.2	20.8	11 32.9	+59.4	20.8	12 29.0	+59.4	20.9	13 25.0	+59.5	21.0	14 21.0	+59.5	21.1	15 17.0	+59.5	21.2	16 12.9	+59.6	21.3	17 08.8	+59.6	21.4	31
32	11 36.1	+59.3	20.6	12 32.3	+59.3	20.7	13 28.4	+59.4	20.8	14 24.5	+59.4	20.9	15 20.5	+59.5	21.0	16 16.5	+59.6	21.1	17 12.5	+59.6	21.2	18 08.4	+59.7	21.3	32
33	12 35.4	+59.3	20.5	13 31.6	+59.3	20.5	14 27.8	+59.3	20.6	15 23.9	+59.4	20.7	16 20.0	+59.5	20.8	17 16.1	+59.5	20.9	18 12.1	+59.6	21.0	19 08.1	+59.6	21.2	33
34	13 34.7	+59.2	20.3	14 30.9	+59.3	20.4	15 27.1	+59.4	20.5	16 23.3	+59.5	20.6	17 19.5	+59.5	20.7	18 15.6	+59.5	20.8	19 11.7	+59.5	20.9	20 07.7	+59.6	21.0	34
35	14 33.9	+59.3	20.1	15 30.2	+59.3	20.2	16 26.5	+59.4	20.3	17 22.8	+59.4	20.4	18 19.0	+59.4	20.5	19 15.1	+59.5	20.7	20 11.2	+59.6	20.8	21 07.3	+59.6	20.9	35
36	15 33.2	+59.2	20.0	16 29.5	+59.3	20.1	17 25.9	+59.3	20.2	18 22.2	+59.4	20.3	19 18.4	+59.5	20.4	20 14.6	+59.5	20.5	21 10.8	+59.6	20.7	22 06.9	+59.6	20.8	36
37	16 32.4	+59.2	19.8	17 28.8	+59.3	19.9	18 25.2	+59.4	20.0	19 21.6	+59.4	20.1	20 17.9	+59.4	20.3	21 14.1	+59.6	20.4	22 10.4	+59.5	20.5	23 06.5	+59.6	20.7	37
38	17 31.6	+59.3	19.6	18 28.1	+59.3	19.8	19 24.6	+59.3	19.9	20 21.0	+59.4	20.0	21 17.3	+59.5	20.1	22 13.7	+59.5	20.3	23 09.9	+59.6	20.4	24 06.1	+59.6	20.6	38
39	18 30.9	+59.2	19.5	19 27.4	+59.3	19.6	20 23.9	+59.3	19.7	21 20.4	+59.4	19.8	22 16.8	+59.4	20.0	23 13.2	+59.4	20.1	24 09.5	+59.5	20.3	25 05.7	+59.6	20.4	39
40	19 30.1	+59.2	19.3	20 26.7	+59.2	19.4	21 23.2	+59.4	19.5	22 19.8	+59.3	19.7	23 16.2	+59.5	19.8	24 12.6	+59.5	20.0	25 09.0	+59.5	20.1	26 05.3	+59.6	20.3	40
41	20 29.3	+59.2	19.1	21 25.9	+59.3	19.3	22 22.6	+59.3	19.4	23 19.1	+59.4	19.5	24 15.7	+59.4	19.7	25 12.1	+59.5	19.8	26 08.5	+59.6	20.0	27 04.9	+59.6	20.2	41
42	21 28.5	+59.2	19.0	22 25.2	+59.2	19.1	23 21.9	+59.3	19.2	24 18.5	+59.4	19.4	25 15.1	+59.4	19.5	26 11.6	+59.5	19.7	27 08.1	+59.5	19.9	28 04.5	+59.5	20.0	42
43	22 27.7	+59.1	18.8	23 24.4	+59.3	18.9	24 21.2	+59.3	19.1	25 17.9	+59.3	19.2	26 14.5	+59.4	19.4	27 11.1	+59.4	19.5	28 07.6	+59.5	19.7	29 04.0	+59.6	19.9	43
44	23 26.8	+59.2	18.6	24 23.7	+59.2	18.7	25 20.5	+59.2	18.9	26 17.2	+59.3	19.0	27 13.9	+59.4	19.2	28 10.5	+59.5	19.4	29 07.1	+59.5	19.6	30 03.6	+59.5	19.8	44
45	24 26.0	+59.1	18.4	25 22.9	+59.2	18.6	26 19.7	+59.3	18.7	27 16.5	+59.4	18.9	28 13.3	+59.4	19.1	29 10.0	+59.4	19.2	30 06.6	+59.5	19.4	31 03.1	+59.6	19.6	45
46	25 25.1	+59.2	18.2	26 22.1	+59.2	18.4	27 19.0	+59.3	18.5	28 15.9	+59.3	18.7	29 12.7	+59.3	18.9	30 09.4	+59.4	19.1	31 06.1	+59.5	19.3	32 02.7	+59.5	19.5	46
47	26 24.3	+59.1	18.0	27 21.3	+59.2	18.2	28 18.3	+59.2	18.4	29 15.2	+59.3	18.5	30 12.0	+59.4	18.7	31 08.8	+59.4	18.9	32 05.6	+59.4	19.1	33 02.2	+59.5	19.3	47
48	27 23.4	+59.1	17.8	28 20.5	+59.1	18.0	29 17.5	+59.2	18.2	30 14.5	+59.3	18.4	31 11.4	+59.3	18.6	32 08.2	+59.4	18.7	33 05.0	+59.5	19.0	34 01.7	+59.5	19.2	48
49	28 22.5	+59.1	17.7	29 19.6	+59.2	17.8	30 16.7	+59.2	18.0	31 13.8	+59.2	18.2	32 10.7	+59.4	18.4	33 07.6	+59.4	18.6	34 04.5	+59.4	18.8	35 01.2	+59.5	19.0	49
50	29 21.6	+59.0	17.5	30 18.8	+59.1	17.6	31 15.9	+59.2	17.8	32 13.0	+59.3	18.0	33 10.1	+59.3	18.2	34 07.0	+59.4	18.4	35 03.9	+59.4	18.6	36 00.7	+59.5	18.9	50
51	30 20.6	+59.1	17.3	31 17.9	+59.1	17.4	32 15.1	+59.2	17.6	33 12.3	+59.2	17.8	34 09.4	+59.3	18.0	35 06.4	+59.4	18.2	36 03.3	+59.5	18.5	37 00.2	+59.5	18.7	51
52	31 19.7	+59.0	17.0	32 17.0	+59.1	17.2	33 14.3	+59.2	17.4	34 11.5	+59.2	17.6	35 08.7	+59.2	17.8	36 05.8	+59.3	18.1	37 02.8	+59.4	18.3	37 59.7	+59.4	18.5	52
53	32 18.7	+59.0	16.8	33 16.1	+59.1	17.0	34 13.5	+59.1	17.2	35 10.7	+59.2	17.4	36 07.9	+59.3	17.6	37 05.1	+59.3	17.9	38 02.2	+59.3	18.1	38 59.1	+59.5	18.4	53
54	33 17.7	+59.0	16.6	34 15.2	+59.0	16.8	35 12.6	+59.1	17.0	36 09.9	+59.2	17.2	37 07.2	+59.2	17.4	38 04.4	+59.3	17.7	39 01.5	+59.4	17.9	39 58.6	+59.4	18.2	54
55	34 16.7	+59.0	16.4	35 14.2	+59.1	16.6	36 11.7	+59.1	16.8	37 09.1	+59.2	17.0	38 06.4	+59.3	17.2	39 03.7	+59.3	17.5	40 00.9	+59.3	17.7	40 58.0	+59.4	18.0	55
56	35 15.7	+58.9	16.2	36 13.3	+59.0	16.4	37 10.8	+59.1	16.6	38 08.3	+59.1	16.8	39 05.7	+59.2	17.0	40 03.0	+59.3	17.3	41 00.2	+59.4	17.5	41 57.4	+59.4	17.8	56
57	36 14.6	+58.9	15.9	37 12.3	+58.9	16.1	38 09.9	+59.0	16.4	39 07.4	+59.1	16.6	40 04.9	+59.1	16.8	41 02.3	+59.2	17.1	41 59.6	+59.3	17.3	42 56.8	+59.4	17.6	57
58	37 13.5	+58.9	15.7	38 11.2	+59.0	15.9	39 08.9	+59.0	16.1	40 06.5	+59.1	16.4	41 04.0	+59.2	16.6	42 01.5	+59.2	16.9	42 58.9	+59.3	17.1	43 56.2	+59.3	17.4	58
59	38 12.4	+58.8	15.5	39 10.2	+58.9	15.7	40 07.9	+59.0	15.9	41 05.6	+59.0	16.1	42 03.2	+59.1	16.4	43 00.7	+59.2	16.6	43 58.2	+59.2	16.9	44 55.5	+59.3	17.2	59
60	39 11.2	+58.8	15.2	40 09.1	+58.9	15.4	41 06.9	+59.0	15.7	42 04.6	+59.1	15.9	43 02.3	+59.1	16.2	43 59.9	+59.2	16.4	44 57.4	+59.2	16.7	45 54.8	+59.3	17.0	60
61	40 10.0	+58.8	15.0	41 08.0	+58.8	15.2	42 05.9	+58.9	15.4	43 03.7	+58.9	15.7	44 01.4	+59.1	15.9	44 59.1	+59.1	16.2	45 56.6	+59.2	16.5	46 54.1	+59.3	16.8	61
62	41 08.8	+58.8	14.7	42 06.8	+58.8	14.9	43 04.8	+58.9	15.2	44 02.6	+59.0	15.4	45 00.5	+59.0	15.7	45 58.2	+59.1	15.9	46 55.8	+59.2	16.2	47 53.4	+59.2	16.5	62
63	42 07.6	+58.7	14.4	43 05.6	+58.8	14.6	44 03.7	+58.8	14.9	45 01.6	+58.9	15.1	45 59.5	+59.0	15.4	46 57.3	+59.1	15.7	47 55.0	+59.1	16.0	48 52.6	+59.3	16.3	63
64	43 06.3	+58.6	14.1	44 04.4	+58.7	14.4	45 02.5	+58.8	14.6	46 00.5	+58.9	14.9	46 58.5	+58.9	15.1	47 56.4	+59.0	15.4	48 54.1	+59.1	15.7	49 51.9	+59.1	16.1	64
65	44 04.9	+58.6	13.8	45 03.1	+58.7	14.1	46 01.3	+58.8	14.3	46 59.4	+58.8	14.6	47 57.4	+58.9	14.9	48 55.4	+59.0	15.2	49 53.2	+59.1	15.5	50 51.0	+59.2	15.8	65
66	45 03.5	+58.6	13.5	46 01.8	+58.7	13.8	47 00.1	+58.7	14.0	47 58.2	+58.8	14.3	48 56.3	+58.9	14.6	49 54.4	+58.9	14.9	50 52.3	+59.0	15.2	51 50.2	+59.1	15.5	66
67	46 02.1	+58.5	13.2	47 00.5	+58.6	13.5	47 58.8	+58.6	13.7	48 57.0	+58.8	14.0	49 55.2	+58.8	14.3	50 53.3	+58.9	14.6	51 51.3	+59.0	14.9	52 49.3	+59.0	15.2	67
68	47 00.6	+58.5	12.9	47 59.1	+58.5	13.2	48 57.4	+58.7	13.4	49 55.8	+58.7	13.7	50 54.0	+58.8	14.0	51 52.2	+58.9	14.3	52 50.3	+59.0	14.6	53 48.3	+59.0	15.0	68
69	47 59.1	+58.3	12.6	48 57.6	+58.5	12.8	49 56.1	+58.5	13.1	50 54.5	+58.6	13.4	51 52.8	+58.7	13.7	52 51.1	+58.8	14.0	53 49.3	+58.8	14.3	54 47.3	+59.0	14.6	69
70	48 57.4	+58.4	12.2	49 56.1	+58.4	12.5	50 54.6	+58.5	12.7	51 53.1	+58.6	13.0	52 51.5	+58.7	13.3	53 49.9	+58.7	13.6	54 48.1	+58.9	14.0	55 46.3	+58.9	14.3	70
71	49 55.8	+58.2	11.9	50 54.5	+58.3	12.1	51 53.1	+58.4	12.4	52 51.7	+58.5	12.7	53 50.2	+58.6	13.0	54 48.6	+58.7	13.3	55 47.0	+58.7	13.6	56 45.2	+58.9	14.0	71
72	50 54.0	+58.2	11.5	51 52.8	+58.3	11.7	52 51.5	+58.4	12.0	53 50.2	+58.4	12.3	54 48.8	+58.5	12.6	55 47.3	+58.6	12.9	56 45.7	+58.7	13.3	57 44.1	+58.8	13.6	72
73	51 52.2	+58.1	11.1	52 51.1	+58.2	11.4	53 49.9	+58.2	11.6	54 48.6	+58.4	11.9	55 47.3	+58.4	12.2	56 45.9	+58.5	12.5	57 44.4	+58.6	12.9	58 42.9	+58.7	13.2	73
74	52 50.3	+58.0	10.7	53 49.3	+58.0	10.9	54 48.1	+58.2	11.2	55 47.0	+58.2	11.5	56 45.7	+58.4	11.8	57 44.4	+58.5	12.1	58 43.0	+58.6	12.5	59 41.6	+58.6	12.8	74
75	53 48.3	+58.0	10.3	54 47.3	+58.1	10.5	55 46.3	+58.1	10.8	56 45.2	+58.2	11.1	57 44.1	+58.2	11.4	58 42.9	+58.3	11.7	59 41.6	+58.4	12.0	60 40.2	+58.6	12.4	75
76	54 46.3	+57.8	9.8	55 45.4	+57.9	10.1	56 44.4	+58.0	10.3	57 43.4	+58.1	10.6	58 42.3	+58.2	10.9	59 41.2	+58.3	11.2	60 40.0	+58.4	11.6	61 38.8	+58.4	12.0	76
77	55 44.1	+57.7	9.4	56 43.3	+57.7	9.6	57 42.4	+57.9	9.9	58 41.5	+57.9	10.1	59 40.5	+58.1	10.4	60 39.5	+58.1	10.8	61 38.4	+58.2	11.1	62 37.2	+58.4	11.5	77
78	56 41.8	+57.6	8.9	57 41.0	+57.7	9.1	58 40.3	+57.7	9.4	59 39.4	+57.9	9.6	60 38.6	+57.9	9.9	61 37.6	+58.1	10.3	62 36.6	+58.2	10.6	63 35.6	+58.2	11.0	78
79	57 39.4	+57.4	8.3	58 38.7	+57.5	8.6	59 38.0	+57.6	8.8	60 37.3	+57.7	9.1	61 36.5	+57.8	9.4	62 35.7	+57.9	9.7	63 34.8	+58.0	10.0	64 33.8	+58.1	10.4	79
80	58 36.8	+57.3	7.8	59 36.2	+57.4	8.0	60 35.6	+57.5	8.3	61 35.0	+57.5	8.5	62 34.3	+57.6	8.8	63 33.6	+57.7	9.1	64 32.8	+57.8	9.5	65 31.9	+58.0	9.8	80
81	59 34.1	+57.1	7.2	60 33.6	+57.2	7.4	61 33.1	+57.3	7.7	62 32.5	+57.4	7.9	63 31.9	+57.5	8.2	64 31.3	+57.6	8.5	65 30.6	+57.7	8.8	66 29.9	+57.8	9.2	81
82	60 31.2	+57.0	6.6	61 30.8	+57.1	6.8	62 30.4	+57.1	7.0	63 29.9	+57.2	7.3	64 29.4	+57.3	7.6	65 28.9	+57.4	7.8	66 28.3	+57.5	8.2	67 27.7	+57.6	8.5	82
83	61 28.2	+56.8	6.0	62 27.9	+56.8	6.2	63 27.5	+56.9	6.4	64 27.1	+57.0	6.6	65 26.7	+57.1	6.9	66 26.3	+57.1	7.1	67 25.8	+57.3	7.4	68 25.3	+57.3	7.7	83
84	62 25.0	+56.5	5.3	63 24.7	+56.6	5.5	64 24.4	+56.7	5.6	65 24.1	+56.8	5.9	66 23.8	+56.8	6.1	67 23.4	+57.0	6.3	68 23.1	+57.0	6.6	69 22.6	+57.2	6.9	84
85	63 21.5	+56.3	4.5	64 21.3	+56.4	4.7	65 21.1	+56.4	4.9	66 20.9	+56.5	5.1	67 20.6	+56.6	5.3	68 20.4	+56.6	5.5	69 20.1	+56.7	5.8	70 19.8	+56.8	6.0	85
86	64 17.8	+56.0	3.8	65 17.7	+56.1	3.9	66 17.5	+56.2	4.0	67 17.4	+56.2	4.2	68 17.2	+56.3	4.4	69 17.0	+56.4	4.6	70 16.8	+56.4	4.8	71 16.6	+56.5	5.1	86
87	65 13.8	+55.8	2.9	66 13.8	+55.7	3.0	67 13.7	+55.8	3.2	68 13.6	+55.9	3.3	69 13.5	+55.9	3.4	70 13.4	+56.0	3.6	71 13.2	+56.1	3.8	72 13.1	+56.1	4.0	87
88	66 09.6	+55.4	2.0	67 09.5	+55.5	2.1	68 09.5	+55.5	2.2	69 09.5	+55.4	2.3	70 09.4	+55.5	2.4	71 09.4	+55.5	2.5	72 09.3	+55.6	2.7	73 09.2	+55.7	2.8	88
89	67 05.0	+55.0	1.0	68 05.0	+55.0	1.1	69 05.0	+55.0	1.1	70 04.9	+55.1	1.2	71 04.9	+55.1	1.3	72 04.9	+55.1	1.3	73 04.9	+55.1	1.4	74 04.9	+55.1	1.5	89
90	68 00.0	+54.6	0.0	69 00.0	+54.6	0.0	70 00.0	+54.6	0.0	71 00.0	+54.5	0.0	72 00.0	+54.5	0.0	73 00.0	+54.5	0.0	74 00.0	+54.5	0.0	75 00.0	+54.5	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 156°, 204°

25°, 335° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.....Zn=360°–Z

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	19 50.8	+59.2	153.3	18 57.2	+59.2	153.5	18 03.5	+59.3	153.6	17 09.7	+59.4	153.7	16 15.8	+59.5	153.9	15 21.9	+59.5	154.0	14 28.0	+59.5	154.1	13 34.0	+59.6	154.2	0
1	20 50.0	+59.1	153.1	19 56.4	+59.2	153.3	19 02.8	+59.3	153.4	18 09.1	+59.3	153.6	17 15.3	+59.4	153.7	16 21.4	+59.5	153.9	15 27.5	+59.6	154.0	14 33.6	+59.6	154.1	1
2	21 49.1	+59.1	152.9	20 55.6	+59.2	153.1	20 02.1	+59.2	153.3	19 08.4	+59.4	153.4	18 14.7	+59.4	153.6	17 20.9	+59.5	153.7	16 27.1	+59.6	153.9	15 33.2	+59.6	154.0	2
3	22 48.2	+59.1	152.8	21 54.8	+59.2	152.9	21 01.3	+59.3	153.1	20 07.8	+59.3	153.3	19 14.1	+59.5	153.4	18 20.4	+59.5	153.6	17 26.7	+59.5	153.7	16 32.8	+59.6	153.9	3
4	23 47.3	+59.1	152.6	22 54.0	+59.2	152.8	22 00.6	+59.3	153.0	21 07.1	+59.4	153.1	20 13.6	+59.4	153.3	19 19.9	+59.5	153.5	18 26.2	+59.5	153.6	17 32.4	+59.6	153.8	4
5	24 46.4	+59.1	152.4	23 53.2	+59.1	152.6	22 59.9	+59.2	152.8	22 06.5	+59.3	153.0	21 13.0	+59.4	153.2	20 19.4	+59.5	153.3	19 25.7	+59.6	153.5	18 32.0	+59.6	153.6	5
6	25 45.5	+59.0	152.2	24 52.3	+59.2	152.4	23 59.1	+59.3	152.6	23 05.8	+59.3	152.8	22 12.4	+59.4	153.0	21 18.9	+59.4	153.2	20 25.3	+59.5	153.4	19 31.6	+59.6	153.5	6
7	26 44.5	+59.1	152.0	25 51.5	+59.1	152.2	24 58.4	+59.2	152.4	24 05.1	+59.3	152.6	23 11.8	+59.4	152.8	22 18.3	+59.5	153.0	21 24.8	+59.5	153.2	20 31.2	+59.6	153.4	7
8	27 43.6	+59.0	151.8	26 50.6	+59.2	152.0	25 57.6	+59.2	152.3	25 04.4	+59.3	152.5	24 11.2	+59.3	152.7	23 17.8	+59.4	152.9	22 24.3	+59.6	153.1	21 30.8	+59.6	153.3	8
9	28 42.6	+59.0	151.6	27 49.8	+59.1	151.8	26 56.8	+59.2	152.1	26 03.7	+59.3	152.3	25 10.5	+59.4	152.5	24 17.2	+59.5	152.7	23 23.9	+59.5	152.9	22 30.4	+59.6	153.1	9
10	29 41.6	+59.0	151.4	28 48.9	+59.0	151.6	27 56.0	+59.2	151.9	27 03.0	+59.3	152.1	26 09.9	+59.4	152.4	25 16.7	+59.4	152.6	24 23.4	+59.5	152.8	23 30.0	+59.5	153.0	10
11	30 40.6	+58.9	151.2	29 47.9	+59.1	151.4	28 55.2	+59.1	151.7	28 02.3	+59.2	152.0	27 09.3	+59.3	152.2	26 16.1	+59.4	152.4	25 22.9	+59.5	152.7	24 29.5	+59.6	152.9	11
12	31 39.5	+59.0	150.9	30 47.0	+59.1	151.2	29 54.3	+59.2	151.5	29 01.5	+59.3	151.8	28 08.6	+59.3	152.0	27 15.5	+59.5	152.3	26 22.4	+59.5	152.5	25 29.1	+59.5	152.7	12
13	32 38.5	+58.9	150.7	31 46.1	+59.0	151.0	30 53.5	+59.1	151.3	30 00.8	+59.2	151.6	29 07.9	+59.4	151.9	28 15.0	+59.4	152.1	27 21.9	+59.4	152.4	26 28.6	+59.6	152.6	13
14	33 37.4	+58.9	150.5	32 45.1	+59.0	150.8	31 52.6	+59.1	151.1	31 00.0	+59.2	151.4	30 07.3	+59.3	151.7	29 14.4	+59.3	152.0	28 21.3	+59.5	152.2	27 28.2	+59.5	152.5	14
15	34 36.3	+58.9	150.3	33 44.1	+59.0	150.6	32 51.7	+59.1	150.9	31 59.2	+59.2	151.2	31 06.6	+59.3	151.5	30 13.7	+59.4	151.8	29 20.8	+59.5	152.1	28 27.7	+59.6	152.3	15
16	35 35.2	+58.8	150.0	34 43.1	+58.9	150.4	33 50.8	+59.1	150.7	32 58.4	+59.2	151.0	32 05.9	+59.2	151.3	31 13.1	+59.4	151.6	30 20.3	+59.4	151.9	29 27.3	+59.5	152.2	16
17	36 34.0	+58.8	149.8	35 42.0	+59.0	150.2	34 49.9	+59.1	150.5	33 57.6	+59.2	150.8	33 05.1	+59.3	151.2	32 12.5	+59.3	151.5	31 19.7	+59.4	151.8	30 26.8	+59.5	152.0	17
18	37 32.8	+58.8	149.5	36 41.0	+58.9	149.9	35 49.0	+59.0	150.3	34 56.8	+59.1	150.6	34 04.4	+59.2	151.0	33 11.8	+59.4	151.3	32 19.1	+59.5	151.6	31 26.3	+59.5	151.9	18
19	38 31.6	+58.7	149.3	37 39.9	+58.9	149.7	36 48.0	+59.0	150.1	35 55.9	+59.1	150.4	35 03.6	+59.2	150.8	34 11.2	+59.3	151.1	33 18.6	+59.4	151.4	32 25.8	+59.5	151.7	19
20	39 30.3	+58.7	149.0	38 38.8	+58.8	149.4	37 47.0	+59.0	149.8	36 55.0	+59.1	150.2	36 02.8	+59.2	150.6	35 10.5	+59.3	150.9	34 18.0	+59.4	151.3	33 25.3	+59.4	151.6	20
21	40 29.0	+58.7	148.8	39 37.6	+58.8	149.2	38 46.0	+58.9	149.6	37 54.1	+59.1	150.0	37 02.0	+59.2	150.4	36 09.8	+59.3	150.7	35 17.4	+59.3	151.1	34 24.7	+59.5	151.4	21
22	41 27.7	+58.6	148.5	40 36.4	+58.8	148.9	39 44.9	+58.9	149.4	38 53.2	+59.0	149.8	38 01.2	+59.2	150.2	37 09.1	+59.2	150.6	36 16.7	+59.4	150.9	35 24.2	+59.5	151.3	22
23	42 26.3	+58.6	148.2	41 35.2	+58.7	148.7	40 43.8	+58.9	149.1	39 52.2	+59.0	149.5	39 00.4	+59.1	150.0	38 08.3	+59.3	150.4	37 16.1	+59.3	150.7	36 23.7	+59.4	151.1	23
24	43 24.9	+58.5	147.9	42 33.9	+58.7	148.4	41 42.7	+58.9	148.9	40 51.2	+59.0	149.3	39 59.5	+59.1	149.7	39 07.6	+59.2	150.2	38 15.4	+59.4	150.5	37 23.1	+59.4	150.9	24
25	44 23.4	+58.5	147.6	43 32.6	+58.7	148.1	42 41.6	+58.8	148.6	41 50.2	+59.0	149.1	40 58.6	+59.1	149.5	40 06.8	+59.2	149.9	39 14.8	+59.3	150.4	38 22.5	+59.4	150.8	25
26	45 21.9	+58.4	147.3	44 31.3	+58.6	147.8	43 40.4	+58.7	148.3	42 49.2	+58.9	148.8	41 57.7	+59.1	149.3	41 06.0	+59.2	149.7	40 14.1	+59.3	150.2	39 21.9	+59.4	150.6	26
27	46 20.3	+58.4	146.9	45 29.9	+58.5	147.5	44 39.1	+58.8	148.0	43 48.1	+58.9	148.6	42 56.8	+59.0	149.0	42 05.2	+59.1	149.5	41 13.4	+59.2	150.0	40 21.3	+59.4	150.4	27
28	47 18.7	+58.3	146.6	46 28.4	+58.6	147.2	45 37.9	+58.6	147.7	44 47.0	+58.8	148.3	43 55.8	+59.0	148.8	43 04.3	+59.2	149.3	42 12.6	+59.3	149.7	41 20.7	+59.3	150.2	28
29	48 17.0	+58.3	146.3	47 27.0	+58.4	146.9	46 36.5	+58.7	147.4	45 45.8	+58.8	148.0	44 54.8	+58.9	148.5	44 03.5	+59.0	149.0	43 11.9	+59.2	149.5	42 20.0	+59.4	150.0	29
30	49 15.3	+58.1	145.9	48 25.4	+58.4	146.5	47 35.2	+58.6	147.1	46 44.6	+58.8	147.7	45 53.7	+58.9	148.3	45 02.5	+59.1	148.8	44 11.1	+59.2	149.3	43 19.4	+59.3	149.8	30
31	50 13.4	+58.1	145.5	49 23.8	+58.3	146.2	48 33.8	+58.5	146.8	47 43.4	+58.7	147.4	46 52.6	+58.9	148.0	46 01.6	+59.0	148.6	45 10.3	+59.1	149.1	44 18.7	+59.2	149.6	31
32	51 11.5	+58.0	145.1	50 22.1	+58.2	145.8	49 32.3	+58.4	146.5	48 42.1	+58.6	147.1	47 51.5	+58.8	147.7	47 00.6	+59.0	148.3	46 09.4	+59.2	148.8	45 17.9	+59.3	149.4	32
33	52 09.5	+58.0	144.7	51 20.3	+58.2	145.4	50 30.7	+58.4	146.1	49 40.7	+58.6	146.8	48 50.3	+58.8	147.4	47 59.6	+59.0	148.0	47 08.6	+59.1	148.6	46 17.2	+59.2	149.1	33
34	53 07.5	+57.8	144.3	52 18.5	+58.1	145.0	51 29.1	+58.4	145.8	50 39.3	+58.6	146.5	49 49.1	+58.8	147.1	48 58.6	+58.9	147.7	48 07.7	+59.0	148.3	47 16.4	+59.2	148.9	34
35	54 05.3	+57.7	143.8	53 16.6	+58.0	144.6	52 27.5	+58.2	145.4	51 37.9	+58.4	146.1	50 47.9	+58.6	146.8	49 57.5	+58.8	147.4	49 06.7	+59.0	148.1	48 15.6	+59.2	148.7	35
36	55 03.0	+57.6	143.4	54 14.6	+57.9	144.2	53 25.7	+58.2	145.0	52 36.3	+58.4	145.7	51 46.5	+58.7	146.5	50 56.3	+58.8	147.1	50 05.7	+59.0	147.8	49 14.8	+59.1	148.4	36
37	56 00.6	+57.5	142.9	55 12.5	+57.8	143.7	54 23.9	+58.0	144.6	53 34.7	+58.4	145.4	52 45.2	+58.5	146.1	51 55.1	+58.8	146.8	51 04.7	+59.0	147.5	50 13.9	+59.1	148.2	37
38	56 58.1	+57.3	142.3	56 10.3	+57.7	143.3	55 21.9	+58.0	144.1	54 33.1	+58.2	145.0	53 43.7	+58.5	145.7	52 53.9	+58.7	146.5	52 03.7	+58.9	147.2	51 13.0	+59.1	147.9	38
39	57 55.4	+57.2	141.8	57 08.0	+57.5	142.8	56 19.9	+57.9	143.7	55 31.3	+58.2	144.5	54 42.2	+58.4	145.4	53 52.6	+58.6	146.1	53 02.6	+58.8	146.9	52 12.1	+59.0	147.6	39
40	58 52.6	+57.1	141.2	58 05.5	+57.4	142.2	57 17.8	+57.7	143.2	56 29.5	+58.0	144.1	55 40.6	+58.3	145.0	54 51.2	+58.6	145.8	54 01.4	+58.8	146.6	53 11.1	+59.0	147.3	40
41	59 49.7	+56.8	140.6	59 02.9	+57.3	141.7	58 15.5	+57.7	142.7	57 27.5	+58.0	143.6	56 38.9	+58.3	144.5	55 49.8	+58.5	145.4	55 00.2	+58.7	146.2	54 10.1	+58.9	147.0	41
42	60 46.5	+56.7	140.0	60 00.2	+57.1	141.1	59 13.2	+57.5	142.1	58 25.5	+57.8	143.1	57 37.2	+58.1	144.1	56 48.3	+58.4	145.0	55 58.9	+58.6	145.8	55 09.0	+58.9	146.7	42
43	61 43.2	+56.4	139.3	60 57.3	+56.9	140.5	60 10.7	+57.3	141.6	59 23.3	+57.7	142.6	58 35.3	+58.0	143.6	57 46.7	+58.3	144.6	56 57.5	+58.6	145.5	56 07.9	+58.8	146.3	43
44	62 39.6	+56.2	138.6	61 54.2	+56.7	139.8	61 08.0	+57.1	141.0	60 21.0	+57.6	142.1	59 33.3	+57.9	143.1	58 45.0	+58.2	144.1	57 56.1	+58.5	145.1	57 06.7	+58.7	146.0	44
45	63 35.8	+55.9	137.8	62 50.9	+56.5	139.1	62 05.1	+57.0	140.3	61 18.6	+57.4	141.5	60 31.2	+57.8	142.6	59 43.2	+58.2	143.7	58 54.6	+58.4	144.6	58 05.4	+58.7	145.6	45
46	64 31.7	+55.7	136.9	63 47.4	+56.2	138.3	63 02.1	+56.8	139.7	62 16.0	+57.2	140.9	61 29.0	+57.7	142.1	60 41.4	+58.0	143.2	59 53.0	+58.3	144.2	59 04.1	+58.5	145.2	46
47	65 27.4	+55.3	136.1	64 43.6	+56.0	137.5	63 58.9	+56.5	138.9	63 13.2	+57.0	140.2	62 26.7	+57.4	141.5	61 39.4	+57.8	142.6	60 51.3	+58.2	143.7	60 02.6	+58.5	144.7	47
48	66 22.7	+54.9	135.1	65 39.6	+55.6	136.7	64 55.4	+56.3	138.1	64 10.2	+56.8	139.5	63 24.1	+57.3	140.8	62 37.2	+57.7	142.1	61 49.5	+58.1	143.2	61 01.1	+58.4	144.3	48
49	67 17.6	+54.5	134.1	66 35.2	+55.3	135.8	65 51.7	+55.9	137.3	65 07.0	+56.6	138.8	64 21.4	+57.1	140.2	63 34.9	+57.6	141.5	62 47.6	+58.0	142.7	61 59.5	+58.3	143.8	49
50	68 12.1	+54.0	133.0	67 30.5	+54.9	134.8	66 47.6	+55.7	136.4	66 03.6	+56.3	138.0	65 18.5	+56.9	139.4	64 32.5	+57.4	140.8	63 45.6	+57.8	142.1	62 57.8	+58.2	143.3	50
51	69 06.1	+53.5	131.8	68 25.4	+54.4	133.7	67 43.3	+55.3	135.4	66 59.9	+56.0	137.1	66 15.4	+56.6	138.7	65 29.9	+57.1	140.1	64 43.4	+57.6	141.5	63 56.0	+58.1	142.8	51
52	69 59.6	+52.9	130.5	69 19.8	+54.0	132.5	68 38.6	+54.8	134.4	67 55.9	+55.7	136.2	67 12.0	+56.4	137.8	66 27.0	+57.0	139.4	65 41.0	+57.5	140.8	64 54.1	+57.8	142.2	52
53	70 52.5	+52.1	129.1	70 13.8	+53.3	131.2	69 33.4	+54.4	133.3	68 51.6	+55.2	135.2	68 08.4	+56.0	136.9	67 24.0	+56.7	138.6	66 38.5	+57.2	140.1	65 51.9	+57.8	141.5	53
54	71 44.6	+51.4	127.5	71 07.1	+52.7	129.9	70 27.8	+53.8	132.0	69 46.8	+54.8	134.0	69 04.4	+55.7	135.9	68 20.7	+56.3	137.7	67 35.7	+57.0	139.3	66 49.7	+57.5	140.9	54
55	72 36.0	+50.4	125.8	71 59.8	+51.9	128.3	71 21.6	+53.2	130.7	70 41.6	+54.3	132.8	70 00.1	+55.2	134.9	69 17.0	+56.1	136.7	68 32.7	+56.7	138.5	67 47.2	+57.3	140.1	55
56	73 26.4	+49.3	124.0	72 51.7	+51.0	126.7	72 14.8	+52.4	129.2	71 35.9	+53.7	131.5	70 55.3	+54.7	133.7	70 13.1	+55.6	135.7	69 29.4	+56.5	137.6	68 44.5	+57.1	139.3	56
57	74 15.7	+48.1	121.9	73 42.7	+49.9	124.8	73 07.2	+51.6	127.6	72 29.6	+53.0	130.1	71 50.0	+54.2	132.4	71 08.7	+55.2	134.6	70 25.9	+56.0	136.6	69 41.6	+56.8	138.5	57
58	75 03.8	+46.5	119.7	74 32.6	+48.8	122.8	73 58.8	+50.6	125.8	73 22.6	+52.2	128.5	72 44.2	+53.6	131.0	72 03.9	+54.7	133.3	71 21.9	+55.7	135.5	70 38.4	+56.5	137.5	58
59	75 50.3	+44.9	117.2	75 21.4	+47.2	120.6	74 49.4	+49.4	123.8	74 14.8	+51.2	126.7	73 37.8	+52.7	129.4	72 58.6	+54.1	132.0	72 17.6	+55.2	134.3	71 34.9	+56.1	136.5	59
60	76 35.2	+42.7	114.4	76 08.6	+45.6	118.1	75 38.8	+48.0	121.5	75 06.0	+50.1	124.7	74 30.5	+51.9	127.7	73 52.7	+53.3	130.4	73 12.8	+54.6	133.0	72 31.0	+55.6	135.3	60
61	77 17.9	+40.4	111.3	76 54.2	+43.6	115.3	76 26.8	+46.4	119.0	75 56.1	+48.7	122.5	75 22.4	+50.8	125.8	74 46.0	+52.5	128.8	74 07.4	+53.9	131.5	73 26.6	+55.1	134.0	61
62	77 58.3	+37.5	107.8	77 37.8	+41.1	112.2	77 13.2	+44.3	116.2	76 44.8	+47.2	120.1	76 13.2	+49.5	123.6	75 38.5	+51.5	126.9	75 01.3	+53.1	129.9	74 21.7	+54.6	132.6	62
63	78 35.8	+34.2	104.0	78 18.9	+38.4	108.7	77 57.5	+42.0	113.1	77 32.0	+45.2	117.3	77 02.7	+47.9	121.2	76 30.0	+50.3	124.7	75 54.4	+52.2	128.0	75 16.3	+53.7	131.0	63
64	79 10.0	+30.3	99.7	78 57.3	+35.0	104.8	78 39.5	+39.2	109.6	78 17.2	+42.9	114.1	77 50.6	+46.1	118.4	77 20.3	+48.7	122.3	76 46.6	+51.0	125.9	76 10.0	+52.9	129.2	64
65	79 40.3	+25.8	95.0	79 32.3	+31.0	100.4	79 18.7	+35.8	105.6	79 00.1	+40.0	110.6	78 36.7	+43.8	115.2	78 09.0	+47.0	119.6	77 37.6	+49.6	123.5	77 02.9	+51.8	127.2	65
66	80 06.1	+20.7	89.9	80 03.3	+26.4	95.6	79 54.5	+31.8	101.2	79 40.1	+36.7	106.6	79 20.5	+41.0	111.7	78 56.0	+44.7	116.4	78 27.2	+47.9	120.8	77 54.7	+50.4	124.8	66
67	80 26.8	+15.1	84.3	80 29.7	+21.2	90.3	80 26.3	+27.1	96.2	80 16.8	+32.6	102.0	80 01.5	+37.6	107.6	79 40.7	+42.0	112.8	79 15.1	+45.7	117.7	78 45.1	+48.8	122.2	67
68	80 41.9	+9.0	78.4	80 50.9	+15.3	84.5	80 53.4	+21.7	90.7	80 49.4	+27.8	96.9	80 39.1	+33.5	102.9	80 22.7	+38.6	108.7	80 00.8	+43.0	114.1	79 33.9	+46.7	119.1	68
69	80 50.9	+2.5	72.2	81 06.2	+8.9	78.3	81 15.1	+15.5	84.7	81 17.2	+22.2	91.2	81 12.6	+28.5	97.7	81 01.3	+34.4	104.0	80 43.8	+39.6	109.9	80 20.6	+44.1	115.5	69
70	80 53.4	−4.0	65.9	81 15.1	+2.1	71.9	81 30.6	+8.8	78.2	81 39.4	+15.7	84.9	81 41.1	+22.7	91.8	81 35.7	+29.4	98.5	81 23.4	+35.5	105.1	81 04.7	+40.7	111.2	70
71	80 49.4	−10.3	59.6	81 17.2	−4.6	65.3	81 39.4	+1.7	71.5	81 55.1	+8.7	78.2	82 03.8	+16.0	85.2	82 05.1	+23.3	92.4	81 58.9	+30.2	99.5	81 45.4	+36.5	106.3	71
72	80 39.1	−16.4	53.5	81 12.6	−11.3	58.7	81 41.1	−5.4	64.6	82 03.8	+1.3	71.1	82 19.8	+8.6	78.1	82 28.4	+16.2	85.5	82 29.1	+23.9	93.1	82 21.9	+31.2	100.6	72
73	80 22.7	−21.9	47.7	81 01.3	−17.5	52.3	81 35.7	−12.3	57.7	82 05.1	−6.2	63.8	82 28.4	+0.7	70.6	82 44.6	+8.4	78.0	82 53.0	+16.6	85.9	82 53.1	+24.7	93.9	73
74	80 00.8	−26.9	42.2	80 43.8	−23.2	46.3	81 23.4	−18.7	51.1	81 58.9	−13.5	56.6	82 29.1	−7.2	63.0	82 53.0	+0.1	70.1	83 09.6	+8.2	78.0	83 17.8	+16.8	86.3	74
75	79 33.9	−31.2	37.2	80 20.6	−28.2	40.7	81 04.7	−24.5	44.9	81 45.4	−20.0	49.7	82 21.9	−14.6	55.4	82 53.1	−8.2	62.0	83 17.8	−0.6	69.6	83 34.6	+8.0	77.9	75
76	79 02.7	−35.0	32.5	79 52.4	−32.5	35.6	80 40.2	−29.6	39.1	81 25.4	−26.0	43.3	82 07.3	−21.6	48.2	82 44.9	−16.0	54.1	83 17.2	−9.4	61.0	83 42.6	−1.4	69.0	76
77	78 27.7	−38.2	28.4	79 19.9	−36.3	30.9	80 10.6	−33.9	33.9	80 59.4	−31.1	37.4	81 45.7	−27.5	41.6	82 28.9	−23.2	46.6	83 07.8	−17.6	52.6	83 41.2	−10.7	59.8	77
78	77 49.5	−40.9	24.6	78 43.6	−39.4	26.7	79 36.7	−37.7	29.2	80 28.3	−35.4	32.1	81 18.2	−32.7	35.5	82 05.7	−29.2	39.7	82 50.2	−24.9	44.8	83 30.5	−19.3	51.0	78
79	77 08.6	−43.3	21.2	78 04.2	−42.1	23.0	78 59.0	−40.7	25.0	79 52.9	−39.0	27.3	80 45.5	−36.9	30.1	81 36.5	−34.3	33.5	82 25.3	−31.0	37.7	83 11.2	−26.8	42.8	79
80	76 25.3	−45.2	18.2	77 22.1	−44.3	19.6	78 18.3	−43.2	21.2	79 13.9	−42.0	23.1	80 08.6	−40.4	25.4	81 02.2	−38.5	28.1	81 54.3	−36.0	31.4	82 44.4	−32.9	35.5	80
81	75 40.1	−46.9	15.5	76 37.8	−46.3	16.6	77 35.1	−45.5	17.9	78 31.9	−44.5	19.4	79 28.2	−43.3	21.2	80 23.7	−41.9	23.3	81 18.3	−40.2	25.9	82 11.5	−37.9	29.1	81
82	74 53.2	−48.4	13.0	75 51.5	−47.8	13.9	76 49.6	−47.2	15.0	77 47.4	−46.5	16.1	78 44.9	−45.7	17.5	79 41.8	−44.6	19.2	80 38.1	−43.4	21.2	81 33.6	−41.8	23.6	82
83	74 04.8	−49.5	10.8	75 03.7	−49.2	11.5	76 02.4	−48.7	12.3	77 00.9	−48.2	13.3	77 59.2	−47.6	14.3	78 57.2	−46.9	15.6	79 54.7	−46.0	17.1	80 51.8	−44.9	18.9	83
84	73 15.3	−50.7	8.8	74 14.5	−50.3	9.4	75 13.7	−50.1	10.0	76 12.7	−49.7	10.7	77 11.6	−49.3	11.5	78 10.3	−48.8	12.4	79 08.7	−48.1	13.6	80 06.9	−47.4	14.9	84
85	72 24.6	−51.5	7.0	73 24.2	−51.4	7.4	74 23.6	−51.1	7.9	75 23.0	−50.8	8.4	76 22.3	−50.5	9.0	77 21.5	−50.2	9.7	78 20.6	−49.8	10.5	79 19.5	−49.3	11.5	85
86	71 33.1	−52.3	5.3	72 32.8	−52.2	5.6	73 32.5	−52.0	6.0	74 32.2	−51.9	6.3	75 31.8	−51.7	6.8	76 31.3	−51.4	7.3	77 30.8	−51.2	7.8	78 30.2	−50.9	8.5	86
87	70 40.8	−53.1	3.8	71 40.6	−52.9	4.0	72 40.5	−52.9	4.3	73 40.3	−52.7	4.5	74 40.1	−52.6	4.8	75 39.9	−52.5	5.1	76 39.6	−52.3	5.5	77 39.3	−52.1	5.9	87
88	69 47.7	−53.6	2.4	70 47.7	−53.6	2.6	71 47.6	−53.5	2.7	72 47.6	−53.5	2.9	73 47.5	−53.4	3.0	74 47.4	−53.3	3.2	75 47.3	−53.3	3.4	76 47.2	−53.2	3.7	88
89	68 54.1	−54.1	1.2	69 54.1	−54.1	1.2	70 54.1	−54.1	1.3	71 54.1	−54.1	1.4	72 54.1	−54.1	1.4	73 54.1	−54.1	1.5	74 54.0	−54.0	1.6	75 54.0	−54.0	1.7	89
90	68 00.0	−54.6	0.0	69 00.0	−54.6	0.0	70 00.0	−54.6	0.0	71 00.0	−54.6	0.0	72 00.0	−54.7	0.0	73 00.0	−54.7	0.0	74 00.0	−54.7	0.0	75 00.0	−54.7	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

25°, 335° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 25°, 335°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	19 50.8	−59.1	153.3	18 57.2	−59.3	153.5	18 03.5	−59.3	153.6	17 09.7	−59.4	153.7	16 15.8	−59.4	153.9	15 21.9	−59.5	154.0	14 28.0	−59.6	154.1	13 34.0	−59.6	154.2	0
1	18 51.7	−59.2	153.5	17 57.9	−59.2	153.6	17 04.2	−59.4	153.8	16 10.3	−59.4	153.9	15 16.4	−59.5	154.0	14 22.4	−59.5	154.1	13 28.4	−59.6	154.2	12 34.4	−59.7	154.3	1
2	17 52.5	−59.2	153.7	16 58.7	−59.2	153.8	16 04.8	−59.3	153.9	15 10.9	−59.4	154.0	14 16.9	−59.4	154.2	13 22.9	−59.5	154.3	12 28.8	−59.5	154.4	11 34.7	−59.6	154.5	2
3	16 53.3	−59.1	153.8	15 59.5	−59.3	154.0	15 05.5	−59.3	154.1	14 11.5	−59.4	154.2	13 17.5	−59.5	154.3	12 23.4	−59.5	154.4	11 29.3	−59.6	154.5	10 35.1	−59.6	154.6	3
4	15 54.2	−59.2	154.0	15 00.2	−59.3	154.1	14 06.2	−59.3	154.2	13 12.1	−59.4	154.3	12 18.0	−59.4	154.4	11 23.9	−59.5	154.5	10 29.7	−59.6	154.6	9 35.5	−59.7	154.7	4
5	14 55.0	−59.2	154.2	14 00.9	−59.2	154.3	13 06.9	−59.4	154.4	12 12.7	−59.4	154.5	11 18.6	−59.5	154.6	10 24.4	−59.6	154.7	9 30.1	−59.6	154.7	8 35.8	−59.6	154.8	5
6	13 55.8	−59.2	154.3	13 01.7	−59.3	154.4	12 07.5	−59.3	154.5	11 13.3	−59.4	154.6	10 19.1	−59.5	154.7	9 24.8	−59.5	154.8	8 30.5	−59.5	154.9	7 36.2	−59.6	154.9	6
7	12 56.6	−59.2	154.5	12 02.4	−59.3	154.6	11 08.2	−59.4	154.7	10 13.9	−59.4	154.8	9 19.6	−59.4	154.8	8 25.3	−59.5	154.9	7 31.0	−59.6	155.0	6 36.6	−59.7	155.0	7
8	11 57.4	−59.2	154.7	11 03.1	−59.3	154.8	10 08.8	−59.3	154.8	9 14.5	−59.4	154.9	8 20.2	−59.5	155.0	7 25.8	−59.6	155.0	6 31.4	−59.6	155.1	5 36.9	−59.6	155.1	8
9	10 58.2	−59.3	154.8	10 03.8	−59.2	154.9	9 09.5	−59.4	155.0	8 15.1	−59.4	155.1	7 20.7	−59.5	155.1	6 26.2	−59.5	155.2	5 31.8	−59.6	155.2	4 37.3	−59.6	155.2	9
10	9 58.9	−59.2	155.0	9 04.6	−59.3	155.1	8 10.1	−59.3	155.1	7 15.7	−59.4	155.2	6 21.2	−59.5	155.2	5 26.7	−59.5	155.3	4 32.2	−59.6	155.3	3 37.7	−59.7	155.4	10
11	8 59.7	−59.2	155.2	8 05.3	−59.3	155.2	7 10.8	−59.4	155.3	6 16.3	−59.5	155.3	5 21.7	−59.5	155.4	4 27.2	−59.6	155.4	3 32.6	−59.6	155.4	2 38.0	−59.6	155.5	11
12	8 00.5	−59.2	155.3	7 06.0	−59.3	155.4	6 11.4	−59.4	155.4	5 16.8	−59.4	155.5	4 22.2	−59.4	155.5	3 27.6	−59.5	155.5	2 33.0	−59.6	155.6	1 38.4	−59.7	155.6	12
13	7 01.3	−59.3	155.5	6 06.7	−59.3	155.5	5 12.0	−59.3	155.6	4 17.4	−59.4	155.6	3 22.8	−59.5	155.6	2 28.1	−59.5	155.7	1 33.4	−59.6	155.7	0 38.7	−59.6	155.7	13
14	6 02.0	−59.2	155.6	5 07.4	−59.3	155.7	4 12.7	−59.4	155.7	3 18.0	−59.4	155.7	2 23.3	−59.5	155.8	1 28.6	−59.6	155.8	0 33.8	−59.6	155.8	0 20.9	+59.6	24.2	14
15	5 02.8	−59.2	155.8	4 08.1	−59.3	155.8	3 13.3	−59.4	155.9	2 18.6	−59.5	155.9	1 23.8	−59.5	155.9	0 29.0	−59.5	155.9	0 25.8	+59.5	24.1	1 20.5	+59.7	24.1	15
16	4 03.6	−59.3	156.0	3 08.8	−59.3	156.0	2 13.9	−59.3	156.0	1 19.1	−59.4	156.0	0 24.3	−59.5	156.0	0 30.5	+59.6	24.0	1 25.3	+59.6	24.0	2 20.2	+59.6	24.0	16
17	3 04.3	−59.2	156.1	2 09.5	−59.4	156.1	1 14.6	−59.4	156.2	0 19.7	−59.4	156.2	0 35.2	+59.5	23.8	1 30.1	+59.5	23.8	2 24.9	+59.6	23.9	3 19.8	+59.6	23.9	17
18	2 05.1	−59.3	156.3	1 10.1	−59.3	156.3	0 15.2	−59.4	156.3	0 39.7	+59.5	23.7	1 34.7	+59.5	23.7	2 29.6	+59.5	23.7	3 24.5	+59.6	23.7	4 19.4	+59.7	23.8	18
19	1 05.8	−59.2	156.4	0 10.8	−59.3	156.4	0 44.2	+59.3	23.6	1 39.2	+59.4	23.6	2 34.2	+59.4	23.6	3 29.1	+59.6	23.6	4 24.1	+59.6	23.6	5 19.1	+59.6	23.7	19
20	0 06.6	−59.2	156.6	0 48.5	+59.3	23.4	1 43.5	+59.4	23.4	2 38.6	+59.4	23.4	3 33.6	+59.5	23.4	4 28.7	+59.5	23.5	5 23.7	+59.6	23.5	6 18.7	+59.7	23.6	20
21	0 52.6	+59.3	23.2	1 47.8	+59.3	23.2	2 42.9	+59.4	23.3	3 38.0	+59.4	23.3	4 33.1	+59.5	23.3	5 28.2	+59.6	23.4	6 23.3	+59.6	23.4	7 18.4	+59.6	23.4	21
22	1 51.9	+59.2	23.1	2 47.1	+59.3	23.1	3 42.3	+59.3	23.1	4 37.4	+59.5	23.1	5 32.6	+59.5	23.2	6 27.8	+59.5	23.2	7 22.9	+59.6	23.3	8 18.0	+59.6	23.3	22
23	2 51.1	+59.3	22.9	3 46.4	+59.3	22.9	4 41.6	+59.4	23.0	5 36.9	+59.4	23.0	6 32.1	+59.5	23.1	7 27.3	+59.5	23.1	8 22.5	+59.5	23.2	9 17.6	+59.6	23.2	23
24	3 50.4	+59.2	22.8	4 45.7	+59.3	22.8	5 41.0	+59.4	22.8	6 36.3	+59.4	22.9	7 31.6	+59.4	22.9	8 26.8	+59.5	23.0	9 22.0	+59.6	23.0	10 17.2	+59.7	23.1	24
25	4 49.6	+59.2	22.6	5 45.0	+59.3	22.6	6 40.4	+59.3	22.7	7 35.7	+59.4	22.7	8 31.0	+59.5	22.8	9 26.3	+59.6	22.8	10 21.6	+59.6	22.9	11 16.9	+59.6	23.0	25
26	5 48.8	+59.3	22.4	6 44.3	+59.3	22.5	7 39.7	+59.4	22.5	8 35.1	+59.4	22.6	9 30.5	+59.5	22.7	10 25.9	+59.5	22.7	11 21.2	+59.6	22.8	12 16.5	+59.6	22.9	26
27	6 48.1	+59.2	22.3	7 43.6	+59.3	22.3	8 39.1	+59.3	22.4	9 34.5	+59.5	22.4	10 30.0	+59.5	22.5	11 25.4	+59.5	22.6	12 20.8	+59.5	22.7	13 16.1	+59.6	22.8	27
28	7 47.3	+59.2	22.1	8 42.9	+59.3	22.2	9 38.4	+59.4	22.2	10 34.0	+59.4	22.3	11 29.5	+59.4	22.4	12 24.9	+59.5	22.5	13 20.3	+59.6	22.6	14 15.7	+59.7	22.6	28
29	8 46.5	+59.3	22.0	9 42.2	+59.3	22.0	10 37.8	+59.3	22.1	11 33.4	+59.4	22.2	12 28.9	+59.5	22.2	13 24.4	+59.5	22.3	14 19.9	+59.6	22.4	15 15.4	+59.6	22.5	29
30	9 45.8	+59.2	21.8	10 41.5	+59.2	21.9	11 37.1	+59.4	21.9	12 32.8	+59.4	22.0	13 28.4	+59.4	22.1	14 23.9	+59.6	22.2	15 19.5	+59.5	22.3	16 15.0	+59.6	22.4	30
31	10 45.0	+59.2	21.6	11 40.7	+59.3	21.7	12 36.5	+59.3	21.8	13 32.2	+59.4	21.9	14 27.8	+59.5	22.0	15 23.5	+59.5	22.1	16 19.0	+59.6	22.2	17 14.6	+59.6	22.3	31
32	11 44.2	+59.2	21.5	12 40.0	+59.3	21.6	13 35.8	+59.3	21.6	14 31.6	+59.3	21.7	15 27.3	+59.4	21.8	16 23.0	+59.5	21.9	17 18.6	+59.5	22.0	18 14.2	+59.6	22.2	32
33	12 43.4	+59.2	21.3	13 39.3	+59.2	21.4	14 35.1	+59.4	21.5	15 30.9	+59.4	21.6	16 26.7	+59.5	21.7	17 22.5	+59.4	21.8	18 18.1	+59.6	21.9	19 13.8	+59.6	22.0	33
34	13 42.6	+59.2	21.1	14 38.5	+59.3	21.2	15 34.5	+59.3	21.3	16 30.3	+59.4	21.4	17 26.2	+59.4	21.5	18 21.9	+59.5	21.7	19 17.7	+59.5	21.8	20 13.4	+59.6	21.9	34
35	14 41.8	+59.2	21.0	15 37.8	+59.3	21.1	16 33.8	+59.3	21.2	17 29.7	+59.4	21.3	18 25.6	+59.4	21.4	19 21.4	+59.5	21.5	20 17.2	+59.6	21.7	21 13.0	+59.5	21.8	35
36	15 41.0	+59.2	20.8	16 37.1	+59.2	20.9	17 33.1	+59.3	21.0	18 29.1	+59.3	21.1	19 25.0	+59.4	21.3	20 20.9	+59.5	21.4	21 16.8	+59.5	21.5	22 12.5	+59.6	21.7	36
37	16 40.2	+59.1	20.6	17 36.3	+59.2	20.7	18 32.4	+59.3	20.9	19 28.4	+59.4	21.0	20 24.4	+59.4	21.1	21 20.4	+59.4	21.2	22 16.3	+59.5	21.4	23 12.1	+59.6	21.5	37
38	17 39.3	+59.2	20.5	18 35.5	+59.3	20.6	19 31.7	+59.3	20.7	20 27.8	+59.3	20.8	21 23.8	+59.4	21.0	22 19.8	+59.5	21.1	23 15.8	+59.5	21.3	24 11.7	+59.6	21.4	38
39	18 38.5	+59.1	20.3	19 34.8	+59.2	20.4	20 31.0	+59.2	20.5	21 27.1	+59.4	20.7	22 23.2	+59.4	20.8	23 19.3	+59.5	21.0	24 15.3	+59.5	21.1	25 11.3	+59.5	21.3	39
40	19 37.6	+59.2	20.1	20 34.0	+59.2	20.2	21 30.2	+59.3	20.4	22 26.5	+59.3	20.5	23 22.6	+59.4	20.7	24 18.8	+59.4	20.8	25 14.8	+59.5	21.0	26 10.8	+59.6	21.1	40
41	20 36.8	+59.1	19.9	21 33.2	+59.2	20.1	22 29.5	+59.3	20.2	23 25.8	+59.3	20.3	24 22.0	+59.4	20.5	25 18.2	+59.4	20.7	26 14.3	+59.5	20.8	27 10.4	+59.5	21.0	41
42	21 35.9	+59.1	19.7	22 32.4	+59.2	19.9	23 28.8	+59.2	20.0	24 25.1	+59.3	20.2	25 21.4	+59.4	20.3	26 17.6	+59.5	20.5	27 13.8	+59.5	20.7	28 09.9	+59.5	20.9	42
43	22 35.0	+59.1	19.6	23 31.6	+59.1	19.7	24 28.0	+59.2	19.9	25 24.4	+59.3	20.0	26 20.8	+59.3	20.2	27 17.1	+59.4	20.4	28 13.3	+59.4	20.5	29 09.4	+59.6	20.7	43
44	23 34.1	+59.1	19.4	24 30.7	+59.2	19.5	25 27.2	+59.3	19.7	26 23.7	+59.3	19.8	27 20.1	+59.4	20.0	28 16.5	+59.4	20.2	29 12.7	+59.5	20.4	30 09.0	+59.5	20.6	44
45	24 33.2	+59.1	19.2	25 29.9	+59.1	19.3	26 26.5	+59.2	19.5	27 23.0	+59.3	19.7	28 19.5	+59.3	19.8	29 15.9	+59.4	20.0	30 12.2	+59.4	20.2	31 08.5	+59.5	20.4	45
46	25 32.3	+59.1	19.0	26 29.0	+59.1	19.1	27 25.7	+59.2	19.3	28 22.3	+59.2	19.5	29 18.8	+59.3	19.7	30 15.3	+59.3	19.9	31 11.6	+59.5	20.1	32 08.0	+59.5	20.3	46
47	26 31.4	+59.0	18.8	27 28.1	+59.2	19.0	28 24.9	+59.1	19.1	29 21.5	+59.3	19.3	30 18.1	+59.3	19.5	31 14.6	+59.4	19.7	32 11.1	+59.4	19.9	33 07.5	+59.4	20.1	47
48	27 30.4	+59.0	18.6	28 27.3	+59.1	18.8	29 24.0	+59.2	18.9	30 20.8	+59.2	19.1	31 17.4	+59.3	19.3	32 14.0	+59.3	19.5	33 10.5	+59.4	19.7	34 06.9	+59.5	20.0	48
49	28 29.4	+59.1	18.4	29 26.4	+59.0	18.6	30 23.2	+59.1	18.7	31 20.0	+59.2	18.9	32 16.7	+59.3	19.1	33 13.3	+59.4	19.4	34 09.9	+59.4	19.6	35 06.4	+59.5	19.8	49
50	29 28.5	+58.9	18.2	30 25.4	+59.1	18.4	31 22.3	+59.2	18.6	32 19.2	+59.2	18.8	33 16.0	+59.2	19.0	34 12.7	+59.3	19.2	35 09.3	+59.4	19.4	36 05.9	+59.4	19.6	50
51	30 27.4	+59.0	18.0	31 24.5	+59.0	18.2	32 21.5	+59.1	18.4	33 18.4	+59.2	18.6	34 15.2	+59.3	18.8	35 12.0	+59.3	19.0	36 08.7	+59.4	19.2	37 05.3	+59.4	19.5	51
52	31 26.4	+59.0	17.8	32 23.5	+59.0	17.9	33 20.6	+59.1	18.1	34 17.6	+59.1	18.4	35 14.5	+59.2	18.6	36 11.3	+59.3	18.8	37 08.1	+59.3	19.0	38 04.7	+59.4	19.3	52
53	32 25.4	+58.9	17.5	33 22.5	+59.0	17.7	34 19.7	+59.0	17.9	35 16.7	+59.1	18.2	36 13.7	+59.2	18.4	37 10.6	+59.2	18.6	38 07.4	+59.3	18.9	39 04.1	+59.4	19.1	53
54	33 24.3	+58.9	17.3	34 21.5	+59.0	17.5	35 18.7	+59.1	17.7	36 15.8	+59.1	17.9	37 12.9	+59.2	18.2	38 09.8	+59.3	18.4	39 06.7	+59.3	18.7	40 03.5	+59.4	18.9	54
55	34 23.2	+58.9	17.1	35 20.5	+58.9	17.3	36 17.8	+59.0	17.5	37 14.9	+59.1	17.7	38 12.1	+59.1	18.0	39 09.1	+59.2	18.2	40 06.0	+59.3	18.5	41 02.9	+59.4	18.7	55
56	35 22.1	+58.8	16.8	36 19.4	+59.0	17.1	37 16.8	+59.0	17.3	38 14.0	+59.1	17.5	39 11.2	+59.1	17.8	40 08.3	+59.2	18.0	41 05.3	+59.3	18.3	42 02.3	+59.3	18.6	56
57	36 20.9	+58.8	16.6	37 18.4	+58.8	16.8	38 15.8	+58.9	17.0	39 13.1	+59.0	17.3	40 10.3	+59.1	17.5	41 07.5	+59.2	17.8	42 04.6	+59.2	18.1	43 01.6	+59.3	18.4	57
58	37 19.7	+58.8	16.4	38 17.2	+58.9	16.6	39 14.7	+59.0	16.8	40 12.1	+59.0	17.1	41 09.4	+59.1	17.3	42 06.7	+59.1	17.6	43 03.8	+59.3	17.9	44 00.9	+59.3	18.1	58
59	38 18.5	+58.7	16.1	39 16.1	+58.8	16.3	40 13.7	+58.9	16.6	41 11.1	+59.0	16.8	42 08.5	+59.1	17.1	43 05.8	+59.2	17.3	44 03.1	+59.2	17.6	45 00.2	+59.3	17.9	59
60	39 17.2	+58.8	15.8	40 14.9	+58.8	16.1	41 12.6	+58.8	16.3	42 10.1	+58.9	16.6	43 07.6	+59.0	16.8	44 05.0	+59.0	17.1	45 02.3	+59.1	17.4	45 59.5	+59.2	17.7	60
61	40 16.0	+58.6	15.6	41 13.7	+58.8	15.8	42 11.4	+58.8	16.1	43 09.0	+58.9	16.3	44 06.6	+59.0	16.6	45 04.0	+59.1	16.9	46 01.4	+59.2	17.2	46 58.7	+59.2	17.5	61
62	41 14.6	+58.7	15.3	42 12.5	+58.7	15.5	43 10.2	+58.8	15.8	44 07.9	+58.9	16.0	45 05.6	+58.9	16.3	46 03.1	+59.0	16.6	47 00.6	+59.1	16.9	47 57.9	+59.2	17.2	62
63	42 13.3	+58.6	15.0	43 11.2	+58.7	15.3	44 09.0	+58.8	15.5	45 06.8	+58.8	15.8	46 04.5	+58.9	16.1	47 02.1	+59.0	16.4	47 59.7	+59.0	16.7	48 57.1	+59.1	17.0	63
64	43 11.9	+58.5	14.7	44 09.9	+58.6	15.0	45 07.8	+58.7	15.2	46 05.6	+58.8	15.5	47 03.4	+58.9	15.8	48 01.1	+59.0	16.1	48 58.7	+59.1	16.4	49 56.2	+59.1	16.7	64
65	44 10.4	+58.5	14.4	45 08.5	+58.6	14.7	46 06.5	+58.6	14.9	47 04.4	+58.8	15.2	48 02.3	+58.8	15.5	49 00.1	+58.9	15.8	49 57.8	+58.9	16.1	50 55.3	+59.1	16.5	65
66	45 08.9	+58.4	14.1	46 07.1	+58.5	14.4	47 05.1	+58.7	14.6	48 03.2	+58.7	14.9	49 01.1	+58.8	15.2	49 59.0	+58.8	15.5	50 56.7	+59.0	15.8	51 54.4	+59.0	16.2	66
67	46 07.3	+58.4	13.8	47 05.6	+58.4	14.0	48 03.8	+58.5	14.3	49 01.9	+58.6	14.6	49 59.9	+58.7	14.9	50 57.8	+58.8	15.2	51 55.7	+58.9	15.5	52 53.4	+59.0	15.9	67
68	47 05.7	+58.3	13.4	48 04.0	+58.5	13.7	49 02.3	+58.5	14.0	50 00.5	+58.6	14.3	50 58.6	+58.7	14.6	51 56.6	+58.8	14.9	52 54.6	+58.8	15.2	53 52.4	+59.0	15.6	68
69	48 04.0	+58.3	13.1	49 02.5	+58.3	13.4	50 00.8	+58.4	13.6	50 59.1	+58.5	13.9	51 57.3	+58.6	14.2	52 55.4	+58.7	14.5	53 53.4	+58.8	14.9	54 51.4	+58.8	15.3	69
70	49 02.3	+58.2	12.7	50 00.8	+58.3	13.0	50 59.2	+58.4	13.3	51 57.6	+58.4	13.6	52 55.9	+58.5	13.9	53 54.1	+58.6	14.2	54 52.2	+58.7	14.5	55 50.2	+58.9	14.9	70
71	50 00.5	+58.1	12.4	50 59.1	+58.2	12.6	51 57.6	+58.3	12.9	52 56.0	+58.4	13.2	53 54.4	+58.5	13.5	54 52.7	+58.6	13.8	55 50.9	+58.7	14.2	56 49.1	+58.7	14.6	71
72	50 58.6	+58.0	12.0	51 57.3	+58.1	12.2	52 55.9	+58.2	12.5	53 54.4	+58.3	12.8	54 52.9	+58.4	13.1	55 51.3	+58.5	13.5	56 49.6	+58.6	13.8	57 47.8	+58.7	14.2	72
73	51 56.6	+58.0	11.6	52 55.4	+58.0	11.8	53 54.1	+58.1	12.1	54 52.7	+58.2	12.4	55 51.3	+58.3	12.7	56 49.8	+58.4	13.1	57 48.2	+58.5	13.4	58 46.5	+58.6	13.8	73
74	52 54.6	+57.8	11.1	53 53.4	+58.0	11.4	54 52.2	+58.0	11.7	55 50.9	+58.2	12.0	56 49.6	+58.2	12.3	57 48.2	+58.3	12.6	58 46.7	+58.4	13.0	59 45.1	+58.5	13.4	74
75	53 52.4	+57.8	10.7	54 51.4	+57.8	11.0	55 50.2	+58.0	11.2	56 49.1	+58.0	11.5	57 47.8	+58.1	11.8	58 46.5	+58.2	12.2	59 45.1	+58.3	12.5	60 43.6	+58.5	12.9	75
76	54 50.2	+57.6	10.2	55 49.2	+57.7	10.5	56 48.2	+57.8	10.8	57 47.1	+57.9	11.1	58 45.9	+58.0	11.4	59 44.7	+58.1	11.7	60 43.4	+58.3	12.1	61 42.1	+58.3	12.5	76
77	55 47.8	+57.5	9.7	56 46.9	+57.6	10.0	57 46.0	+57.7	10.3	58 45.0	+57.8	10.6	59 43.9	+57.9	10.9	60 42.8	+58.0	11.2	61 41.7	+58.1	11.6	62 40.4	+58.2	12.0	77
78	56 45.3	+57.4	9.2	57 44.5	+57.5	9.5	58 43.7	+57.5	9.7	59 42.8	+57.6	10.0	60 41.8	+57.8	10.3	61 40.8	+57.9	10.7	62 39.8	+57.9	11.0	63 38.6	+58.1	11.4	78
79	57 42.7	+57.2	8.7	58 42.0	+57.3	8.9	59 41.2	+57.4	9.2	60 40.4	+57.5	9.5	61 39.6	+57.6	9.8	62 38.7	+57.7	10.1	63 37.7	+57.8	10.5	64 36.7	+57.9	10.8	79
80	58 39.9	+57.1	8.1	59 39.3	+57.1	8.4	60 38.6	+57.3	8.6	61 37.9	+57.4	8.9	62 37.2	+57.4	9.2	63 36.4	+57.5	9.5	64 35.5	+57.7	9.8	65 34.6	+57.8	10.2	80
81	59 37.0	+56.9	7.5	60 36.4	+57.0	7.7	61 35.9	+57.1	8.0	62 35.3	+57.1	8.3	63 34.6	+57.3	8.5	64 33.9	+57.4	8.9	65 33.2	+57.5	9.2	66 32.4	+57.6	9.6	81
82	60 33.9	+56.7	6.9	61 33.4	+56.8	7.1	62 33.0	+56.8	7.3	63 32.4	+57.0	7.6	64 31.9	+57.1	7.9	65 31.3	+57.2	8.2	66 30.7	+57.3	8.5	67 30.0	+57.4	8.8	82
83	61 30.6	+56.5	6.2	62 30.2	+56.6	6.4	63 29.8	+56.7	6.6	64 29.4	+56.7	6.9	65 29.0	+56.8	7.1	66 28.5	+56.9	7.4	67 28.0	+57.0	7.7	68 27.4	+57.1	8.1	83
84	62 27.1	+56.2	5.5	63 26.8	+56.3	5.7	64 26.5	+56.4	5.9	65 26.1	+56.5	6.1	66 25.8	+56.6	6.3	67 25.4	+56.7	6.6	68 25.0	+56.8	6.9	69 24.5	+56.9	7.2	84
85	63 23.3	+56.0	4.7	64 23.1	+56.1	4.9	65 22.9	+56.1	5.1	66 22.6	+56.2	5.3	67 22.4	+56.3	5.5	68 22.1	+56.4	5.7	69 21.8	+56.4	6.0	70 21.4	+56.6	6.3	85
86	64 19.3	+55.7	3.9	65 19.2	+55.7	4.0	66 19.0	+55.8	4.2	67 18.8	+55.9	4.4	68 18.7	+55.9	4.6	69 18.5	+56.0	4.8	70 18.2	+56.2	5.0	71 18.0	+56.2	5.3	86
87	65 15.0	+55.4	3.0	66 14.9	+55.4	3.1	67 14.8	+55.5	3.3	68 14.7	+55.6	3.4	69 14.6	+55.6	3.6	70 14.5	+55.6	3.8	71 14.4	+55.7	3.9	72 14.2	+55.8	4.2	87
88	66 10.4	+55.0	2.1	67 10.3	+55.1	2.2	68 10.3	+55.1	2.3	69 10.3	+55.1	2.4	70 10.2	+55.1	2.5	71 10.1	+55.2	2.6	72 10.1	+55.2	2.8	73 10.0	+55.3	2.9	88
89	67 05.4	+54.6	1.1	68 05.4	+54.6	1.1	69 05.4	+54.6	1.2	70 05.4	+54.6	1.2	71 05.3	+54.7	1.3	72 05.3	+54.7	1.4	73 05.3	+54.7	1.5	74 05.3	+54.7	1.5	89
90	68 00.0	+54.1	0.0	69 00.0	+54.1	0.0	70 00.0	+54.1	0.0	71 00.0	+54.1	0.0	72 00.0	+54.1	0.0	73 00.0	+54.1	0.0	74 00.0	+54.0	0.0	75 00.0	+54.0	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 155°, 205°

26°, 334° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.....Zn=360°–Z

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	19 40.5	+59.1	152.3	18 47.4	+59.2	152.4	17 54.2	+59.2	152.6	17 00.9	+59.3	152.7	16 07.5	+59.4	152.8	15 14.1	+59.5	153.0	14 20.6	+59.6	153.1	13 27.1	+59.6	153.2	0
1	20 39.6	+59.1	152.1	19 46.6	+59.1	152.2	18 53.4	+59.3	152.4	18 00.2	+59.3	152.6	17 06.9	+59.4	152.7	16 13.6	+59.4	152.8	15 20.2	+59.5	153.0	14 26.7	+59.6	153.1	1
2	21 38.7	+59.0	151.9	20 45.7	+59.2	152.1	19 52.7	+59.2	152.2	18 59.5	+59.3	152.4	18 06.3	+59.4	152.6	17 13.0	+59.5	152.7	16 19.7	+59.5	152.8	15 26.3	+59.6	153.0	2
3	22 37.7	+59.1	151.7	21 44.9	+59.1	151.9	20 51.9	+59.2	152.1	19 58.8	+59.3	152.2	19 05.7	+59.4	152.4	18 12.5	+59.4	152.6	17 19.2	+59.5	152.7	16 25.9	+59.5	152.8	3
4	23 36.8	+59.0	151.5	22 44.0	+59.1	151.7	21 51.1	+59.2	151.9	20 58.1	+59.3	152.1	20 05.1	+59.3	152.2	19 11.9	+59.5	152.4	18 18.7	+59.5	152.6	17 25.4	+59.6	152.7	4
5	24 35.8	+59.0	151.3	23 43.1	+59.1	151.5	22 50.3	+59.2	151.7	21 57.4	+59.3	151.9	21 04.4	+59.4	152.1	20 11.4	+59.4	152.3	19 18.2	+59.5	152.4	18 25.0	+59.6	152.6	5
6	25 34.8	+59.0	151.1	24 42.2	+59.1	151.3	23 49.5	+59.2	151.5	22 56.7	+59.3	151.7	22 03.8	+59.4	151.9	21 10.8	+59.4	152.1	20 17.7	+59.5	152.3	19 24.6	+59.5	152.5	6
7	26 33.8	+58.9	150.9	25 41.3	+59.1	151.1	24 48.7	+59.2	151.4	23 56.0	+59.2	151.6	23 03.2	+59.3	151.8	22 10.2	+59.5	152.0	21 17.2	+59.5	152.2	20 24.1	+59.6	152.3	7
8	27 32.7	+59.0	150.7	26 40.4	+59.0	150.9	25 47.9	+59.1	151.2	24 55.2	+59.3	151.4	24 02.5	+59.3	151.6	23 09.7	+59.4	151.8	22 16.7	+59.5	152.0	21 23.7	+59.5	152.2	8
9	28 31.7	+58.9	150.5	27 39.4	+59.1	150.7	26 47.0	+59.2	151.0	25 54.5	+59.2	151.2	25 01.8	+59.4	151.5	24 09.1	+59.4	151.7	23 16.2	+59.5	151.9	22 23.2	+59.6	152.1	9
10	29 30.6	+58.9	150.3	28 38.5	+59.0	150.5	27 46.2	+59.1	150.8	26 53.7	+59.2	151.0	26 01.2	+59.3	151.3	25 08.5	+59.4	151.5	24 15.7	+59.4	151.7	23 22.8	+59.5	151.9	10
11	30 29.5	+58.9	150.0	29 37.5	+59.0	150.3	28 45.3	+59.1	150.6	27 52.9	+59.2	150.9	27 00.5	+59.3	151.1	26 07.9	+59.3	151.4	25 15.1	+59.5	151.6	24 22.3	+59.5	151.8	11
12	31 28.4	+58.9	149.8	30 36.5	+59.0	150.1	29 44.4	+59.1	150.4	28 52.1	+59.2	150.7	27 59.8	+59.2	150.9	27 07.2	+59.4	151.2	26 14.6	+59.5	151.4	25 21.8	+59.6	151.7	12
13	32 27.3	+58.8	149.6	31 35.5	+58.9	149.9	30 43.5	+59.0	150.2	29 51.3	+59.2	150.5	28 59.0	+59.3	150.8	28 06.6	+59.4	151.0	27 14.1	+59.4	151.3	26 21.4	+59.5	151.5	13
14	33 26.1	+58.8	149.4	32 34.4	+59.0	149.7	31 42.5	+59.1	150.0	30 50.5	+59.2	150.3	29 58.3	+59.3	150.6	29 06.0	+59.3	150.9	28 13.5	+59.4	151.1	27 20.9	+59.5	151.4	14
15	34 24.9	+58.8	149.1	33 33.4	+58.9	149.5	32 41.6	+59.0	149.8	31 49.7	+59.1	150.1	30 57.6	+59.2	150.4	30 05.3	+59.3	150.7	29 12.9	+59.4	151.0	28 20.4	+59.5	151.2	15
16	35 23.7	+58.8	148.9	34 32.3	+58.9	149.2	33 40.6	+59.0	149.6	32 48.8	+59.1	149.9	31 56.8	+59.2	150.2	31 04.6	+59.4	150.5	30 12.3	+59.4	150.8	29 19.9	+59.5	151.1	16
17	36 22.5	+58.7	148.6	35 31.2	+58.8	149.0	34 39.6	+59.0	149.4	33 47.9	+59.1	149.7	32 56.0	+59.2	150.0	32 04.0	+59.3	150.4	31 11.7	+59.4	150.7	30 19.4	+59.4	150.9	17
18	37 21.2	+58.7	148.4	36 30.0	+58.8	148.8	35 38.6	+59.0	149.1	34 47.0	+59.1	149.5	33 55.2	+59.2	149.8	33 03.3	+59.2	150.2	32 11.1	+59.4	150.5	31 18.8	+59.5	150.8	18
19	38 19.9	+58.6	148.1	37 28.8	+58.8	148.5	36 37.6	+58.9	148.9	35 46.1	+59.0	149.3	34 54.4	+59.2	149.6	34 02.5	+59.3	150.0	33 10.5	+59.4	150.3	32 18.3	+59.5	150.6	19
20	39 18.5	+58.7	147.8	38 27.6	+58.8	148.3	37 36.5	+58.9	148.7	36 45.1	+59.1	149.1	35 53.6	+59.1	149.4	35 01.8	+59.3	149.8	34 09.9	+59.3	150.1	33 17.8	+59.4	150.5	20
21	40 17.2	+58.5	147.6	39 26.4	+58.7	148.0	38 35.4	+58.9	148.4	37 44.2	+59.0	148.8	36 52.7	+59.1	149.2	36 01.1	+59.2	149.6	35 09.2	+59.4	150.0	34 17.2	+59.4	150.3	21
22	41 15.7	+58.6	147.3	40 25.1	+58.7	147.7	39 34.3	+58.8	148.2	38 43.2	+58.9	148.6	37 51.8	+59.1	149.0	37 00.3	+59.2	149.4	36 08.6	+59.3	149.8	35 16.6	+59.4	150.1	22
23	42 14.3	+58.4	147.0	41 23.8	+58.7	147.5	40 33.1	+58.8	147.9	39 42.1	+59.0	148.4	38 50.9	+59.1	148.8	37 59.5	+59.2	149.2	37 07.9	+59.3	149.6	36 16.0	+59.4	150.0	23
24	43 12.7	+58.5	146.7	42 22.5	+58.6	147.2	41 31.9	+58.8	147.7	40 41.1	+58.9	148.1	39 50.0	+59.1	148.6	38 58.7	+59.2	149.0	38 07.2	+59.2	149.4	37 15.4	+59.4	149.8	24
25	44 11.2	+58.4	146.4	43 21.1	+58.5	146.9	42 30.7	+58.7	147.4	41 40.0	+58.9	147.9	40 49.1	+59.0	148.3	39 57.9	+59.1	148.8	39 06.4	+59.3	149.2	38 14.8	+59.4	149.6	25
26	45 09.6	+58.3	146.0	44 19.6	+58.5	146.6	43 29.4	+58.7	147.1	42 38.9	+58.8	147.6	41 48.1	+59.0	148.1	40 57.0	+59.1	148.6	40 05.7	+59.2	149.0	39 14.2	+59.3	149.4	26
27	46 07.9	+58.2	145.7	45 18.1	+58.5	146.3	44 28.1	+58.6	146.8	43 37.7	+58.8	147.3	42 47.1	+58.9	147.8	41 56.1	+59.1	148.3	41 04.9	+59.3	148.8	40 13.5	+59.3	149.2	27
28	47 06.1	+58.2	145.3	46 16.6	+58.4	145.9	45 26.7	+58.6	146.5	44 36.5	+58.8	147.1	43 46.0	+58.9	147.6	42 55.2	+59.1	148.1	42 04.2	+59.1	148.6	41 12.8	+59.3	149.0	28
29	48 04.3	+58.2	145.0	47 15.0	+58.3	145.6	46 25.3	+58.5	146.2	45 35.3	+58.7	146.8	44 44.9	+58.9	147.3	43 54.3	+59.0	147.8	43 03.3	+59.2	148.4	42 12.1	+59.3	148.8	29
30	49 02.5	+58.0	144.6	48 13.3	+58.3	145.3	47 23.8	+58.5	145.9	46 34.0	+58.7	146.5	45 43.8	+58.8	147.1	44 53.3	+59.0	147.6	44 02.5	+59.1	148.1	43 11.4	+59.3	148.6	30
31	50 00.5	+58.0	144.2	49 11.6	+58.2	144.9	48 22.3	+58.5	145.6	47 32.7	+58.6	146.2	46 42.6	+58.8	146.8	45 52.3	+59.0	147.3	45 01.6	+59.1	147.9	44 10.7	+59.2	148.4	31
32	50 58.5	+57.8	143.8	50 09.8	+58.2	144.5	49 20.8	+58.3	145.2	48 31.3	+58.5	145.9	47 41.4	+58.8	146.5	46 51.3	+58.9	147.1	46 00.7	+59.1	147.6	45 09.9	+59.2	148.2	32
33	51 56.3	+57.8	143.4	51 08.0	+58.0	144.1	50 19.1	+58.3	144.8	49 29.8	+58.5	145.5	48 40.2	+58.7	146.2	47 50.2	+58.8	146.8	46 59.8	+59.0	147.4	46 09.1	+59.2	147.9	33
34	52 54.1	+57.7	142.9	52 06.0	+58.0	143.7	51 17.4	+58.2	144.5	50 28.3	+58.5	145.2	49 38.9	+58.6	145.9	48 49.0	+58.9	146.5	47 58.8	+59.0	147.1	47 08.3	+59.1	147.7	34
35	53 51.8	+57.6	142.5	53 04.0	+57.8	143.3	52 15.6	+58.1	144.1	51 26.8	+58.4	144.8	50 37.5	+58.6	145.5	49 47.9	+58.8	146.2	48 57.8	+59.0	146.8	48 07.4	+59.1	147.5	35
36	54 49.4	+57.4	142.0	54 01.8	+57.8	142.9	53 13.7	+58.1	143.7	52 25.2	+58.3	144.4	51 36.1	+58.5	145.2	50 46.7	+58.7	145.9	49 56.8	+58.9	146.6	49 06.5	+59.1	147.2	36
37	55 46.8	+57.3	141.5	54 59.6	+57.6	142.4	54 11.8	+57.9	143.2	53 23.5	+58.2	144.1	52 34.6	+58.5	144.8	51 45.4	+58.7	145.6	50 55.7	+58.9	146.3	50 05.6	+59.0	146.9	37
38	56 44.1	+57.2	141.0	55 57.2	+57.6	141.9	55 09.7	+57.9	142.8	54 21.7	+58.1	143.6	53 33.1	+58.4	144.4	52 44.1	+58.6	145.2	51 54.6	+58.8	145.9	51 04.6	+59.0	146.6	38
39	57 41.3	+57.0	140.4	56 54.8	+57.4	141.4	56 07.6	+57.7	142.3	55 19.8	+58.0	143.2	54 31.5	+58.3	144.1	53 42.7	+58.5	144.9	52 53.4	+58.7	145.6	52 03.6	+59.0	146.4	39
40	58 38.3	+56.9	139.8	57 52.2	+57.2	140.8	57 05.3	+57.6	141.8	56 17.8	+58.0	142.8	55 29.8	+58.2	143.6	54 41.2	+58.5	144.5	53 52.1	+58.7	145.3	53 02.6	+58.9	146.0	40
41	59 35.2	+56.6	139.2	58 49.4	+57.1	140.3	58 02.9	+57.5	141.3	57 15.8	+57.8	142.3	56 28.0	+58.1	143.2	55 39.7	+58.4	144.1	54 50.8	+58.6	144.9	54 01.5	+58.8	145.7	41
42	60 31.8	+56.5	138.5	59 46.5	+56.9	139.7	59 00.4	+57.3	140.8	58 13.6	+57.7	141.8	57 26.1	+58.0	142.8	56 38.1	+58.3	143.7	55 49.4	+58.6	144.6	55 00.3	+58.8	145.4	42
43	61 28.3	+56.2	137.8	60 43.4	+56.7	139.0	59 57.7	+57.2	140.2	59 11.3	+57.5	141.3	58 24.1	+57.9	142.3	57 36.4	+58.2	143.2	56 48.0	+58.5	144.2	55 59.1	+58.7	145.0	43
44	62 24.5	+56.0	137.1	61 40.1	+56.5	138.4	60 54.9	+56.9	139.6	60 08.8	+57.4	140.7	59 22.0	+57.8	141.8	58 34.6	+58.1	142.8	57 46.5	+58.4	143.7	56 57.8	+58.7	144.7	44
45	63 20.5	+55.7	136.3	62 36.6	+56.3	137.6	61 51.8	+56.8	138.9	61 06.2	+57.3	140.1	60 19.8	+57.6	141.2	59 32.7	+58.0	142.3	58 44.9	+58.3	143.3	57 56.5	+58.5	144.3	45
46	64 16.2	+55.4	135.5	63 32.9	+56.0	136.9	62 48.6	+56.6	138.2	62 03.5	+57.0	139.5	61 17.4	+57.5	140.7	60 30.7	+57.8	141.8	59 43.2	+58.2	142.8	58 55.0	+58.5	143.9	46
47	65 11.6	+55.0	134.6	64 28.9	+55.7	136.1	63 45.2	+56.3	137.5	63 00.5	+56.9	138.8	62 14.9	+57.4	140.1	61 28.5	+57.8	141.2	60 41.4	+58.1	142.4	59 53.5	+58.4	143.4	47
48	66 06.6	+54.6	133.6	65 24.6	+55.4	135.2	64 41.5	+56.1	136.7	63 57.4	+56.6	138.1	63 12.3	+57.1	139.4	62 26.3	+57.5	140.7	61 39.5	+57.9	141.8	60 51.9	+58.3	143.0	48
49	67 01.2	+54.2	132.6	66 20.0	+55.0	134.2	65 37.6	+55.7	135.8	64 54.0	+56.4	137.3	64 09.4	+56.9	138.7	63 23.8	+57.4	140.0	62 37.4	+57.8	141.3	61 50.2	+58.2	142.5	49
50	67 55.4	+53.8	131.4	67 15.0	+54.6	133.2	66 33.3	+55.4	134.9	65 50.4	+56.0	136.5	65 06.3	+56.7	138.0	64 21.2	+57.2	139.4	63 35.2	+57.7	140.7	62 48.4	+58.1	141.9	50
51	68 49.2	+53.1	130.2	68 09.6	+54.2	132.1	67 28.7	+55.0	133.9	66 46.4	+55.8	135.6	66 03.0	+56.4	137.2	65 18.4	+57.0	138.7	64 32.9	+57.5	140.1	63 46.5	+57.9	141.4	51
52	69 42.3	+52.5	128.9	69 03.8	+53.6	131.0	68 23.7	+54.6	132.9	67 42.2	+55.4	134.7	66 59.4	+56.1	136.3	66 15.4	+56.8	137.9	65 30.4	+57.3	139.4	64 44.4	+57.7	140.8	52
53	70 34.8	+51.8	127.5	69 57.4	+53.0	129.7	69 18.3	+54.1	131.7	68 37.6	+55.0	133.6	67 55.5	+55.8	135.4	67 12.2	+56.5	137.1	66 27.7	+57.1	138.7	65 42.1	+57.6	140.1	53
54	71 26.6	+51.0	125.9	70 50.4	+52.3	128.3	70 12.4	+53.5	130.5	69 32.6	+54.5	132.5	68 51.3	+55.4	134.4	68 08.7	+56.1	136.2	67 24.8	+56.8	137.9	66 39.7	+57.4	139.4	54
55	72 17.6	+50.0	124.2	71 42.7	+51.6	126.7	71 05.9	+52.8	129.1	70 27.1	+54.0	131.3	69 46.7	+55.0	133.3	69 04.8	+55.9	135.2	68 21.6	+56.5	137.0	67 37.1	+57.2	138.7	55
56	73 07.6	+48.9	122.4	72 34.3	+50.6	125.1	71 58.7	+52.1	127.6	71 21.1	+53.4	129.9	70 41.7	+54.5	132.1	70 00.7	+55.4	134.2	69 18.1	+56.2	136.1	68 34.3	+56.9	137.9	56
57	73 56.5	+47.6	120.3	73 24.9	+49.5	123.2	72 50.8	+51.2	126.0	72 14.5	+52.6	128.5	71 36.2	+53.9	130.8	70 56.1	+54.9	133.0	70 14.3	+55.9	135.1	69 31.2	+56.6	137.0	57
58	74 44.1	+46.1	118.1	74 14.4	+48.3	121.2	73 42.0	+50.2	124.1	73 07.1	+51.8	126.9	72 30.1	+53.2	129.4	71 51.0	+54.4	131.8	71 10.2	+55.4	134.0	70 27.8	+56.2	136.0	58
59	75 30.2	+44.4	115.6	75 02.7	+46.8	119.0	74 32.2	+49.0	122.1	73 58.9	+50.9	125.1	73 23.3	+52.4	127.8	72 45.4	+53.8	130.4	72 05.6	+54.9	132.8	71 24.0	+55.9	134.9	59
60	76 14.6	+42.3	112.8	75 49.5	+45.1	116.5	75 21.2	+47.5	119.9	74 49.8	+49.7	123.1	74 15.7	+51.5	126.1	73 39.2	+53.0	128.9	73 00.5	+54.3	131.4	72 19.9	+55.4	133.8	60
61	76 56.9	+39.9	109.8	76 34.6	+43.2	113.7	76 08.7	+45.9	117.4	75 39.5	+48.3	120.9	75 07.2	+50.4	124.1	74 32.2	+52.2	127.1	73 54.8	+53.7	129.9	73 15.3	+54.9	132.5	61
62	77 36.8	+37.1	106.4	77 17.8	+40.7	110.6	76 54.6	+44.0	114.7	76 27.8	+46.7	118.5	75 57.6	+49.1	122.0	75 24.4	+51.1	125.2	74 48.5	+52.8	128.2	74 10.2	+54.2	131.0	62
63	78 13.9	+33.9	102.6	77 58.5	+37.9	107.2	77 38.6	+41.5	111.6	77 14.5	+44.7	115.7	76 46.7	+47.5	119.5	76 15.5	+49.8	123.1	75 41.3	+51.8	126.4	75 04.4	+53.5	129.4	63
64	78 47.8	+30.1	98.5	78 36.4	+34.7	103.4	78 20.1	+38.8	108.1	77 59.2	+42.5	112.6	77 34.2	+45.6	116.8	77 05.3	+48.4	120.7	76 33.1	+50.6	124.3	75 57.9	+52.5	127.6	64
65	79 17.9	+25.7	93.9	79 11.1	+30.8	99.1	78 58.9	+35.5	104.2	78 41.7	+39.6	109.1	78 19.8	+43.3	113.7	77 53.7	+46.5	117.9	77 23.7	+49.2	121.9	76 50.4	+51.4	125.5	65
66	79 43.6	+20.9	89.0	79 41.9	+26.3	94.5	79 34.4	+31.5	99.9	79 21.3	+36.4	105.1	79 03.1	+40.6	110.1	78 40.2	+44.3	114.8	78 12.9	+47.4	119.2	77 41.8	+50.1	123.2	66
67	80 04.5	+15.4	83.6	80 08.2	+21.3	89.3	80 05.9	+27.0	95.1	79 57.7	+32.3	100.7	79 43.7	+37.3	106.1	79 24.5	+41.5	111.3	79 00.3	+45.3	116.1	78 31.9	+48.3	120.5	67
68	80 19.9	+9.6	77.9	80 29.5	+15.6	83.8	80 32.9	+21.7	89.7	80 30.0	+27.7	95.7	80 21.0	+33.2	101.6	80 06.0	+38.2	107.2	79 45.6	+42.6	112.5	79 20.2	+46.3	117.4	68
69	80 29.5	+3.4	72.0	80 45.1	+9.5	77.8	80 54.6	+15.9	84.0	80 57.7	+22.2	90.2	80 54.2	+28.4	96.5	80 44.2	+34.1	102.6	80 28.2	+39.2	108.4	80 06.5	+43.6	113.9	69
70	80 32.9	−2.9	65.9	80 54.6	+3.1	71.6	81 10.5	+9.4	77.8	81 19.9	+16.1	84.2	81 22.6	+22.7	90.8	81 18.3	+29.2	97.3	81 07.4	+35.1	103.7	80 50.1	+40.4	109.7	70
71	80 30.0	−9.0	59.9	80 57.7	−3.5	65.3	81 19.9	+2.7	71.3	81 36.0	+9.3	77.7	81 45.3	+16.4	84.4	81 47.5	+23.4	91.4	81 42.5	+30.1	98.2	81 30.5	+36.1	104.9	71
72	80 21.0	−15.0	53.9	80 54.2	−10.0	59.0	81 22.6	−4.3	64.6	81 45.3	+2.2	70.9	82 01.7	+9.2	77.6	82 10.9	+16.6	84.7	82 12.6	+23.9	92.0	82 06.6	+31.0	99.3	72
73	80 06.0	−20.4	48.2	80 44.2	−16.0	52.8	81 18.3	−10.9	58.0	81 47.5	−5.0	63.9	82 10.9	+1.7	70.4	82 27.5	+9.0	77.5	82 36.5	+16.9	85.1	82 37.6	+24.7	92.8	73
74	79 45.6	−25.4	42.8	80 28.2	−21.7	46.9	81 07.4	−17.3	51.5	81 42.5	−12.0	56.9	82 12.6	−6.0	63.1	82 36.5	+1.1	69.9	82 53.4	+8.9	77.5	83 02.3	+17.2	85.5	74
75	79 20.2	−29.7	37.8	80 06.5	−26.7	41.3	80 50.1	−23.0	45.4	81 30.5	−18.6	50.2	82 06.6	−13.2	55.8	82 37.6	−6.9	62.1	83 02.3	+0.4	69.4	83 19.5	+8.7	77.4	75
76	78 50.5	−33.6	33.2	79 39.8	−31.1	36.2	80 27.1	−28.1	39.7	81 11.9	−24.5	43.9	81 53.4	−20.0	48.7	82 30.7	−14.6	54.5	83 02.7	−8.1	61.1	83 28.2	−0.4	68.8	76
77	78 16.9	−36.8	29.0	79 08.7	−34.8	31.6	79 59.0	−32.5	34.5	80 47.4	−29.6	38.0	81 33.4	−26.1	42.2	82 16.1	−21.6	47.1	82 54.6	−16.1	53.0	83 27.8	−9.4	60.0	77
78	77 40.1	−39.7	25.3	78 33.9	−38.2	27.4	79 26.5	−36.2	29.8	80 17.8	−34.0	32.7	81 07.3	−31.2	36.2	81 54.5	−27.7	40.4	82 38.5	−23.3	45.4	83 18.4	−17.8	51.4	78
79	77 00.4	−42.2	21.8	77 55.7	−40.9	23.6	78 50.3	−39.5	25.6	79 43.8	−37.7	28.0	80 36.1	−35.5	30.8	81 26.8	−32.9	34.2	82 15.2	−29.6	38.4	83 00.6	−25.3	43.4	79
80	76 18.2	−44.2	18.8	77 14.8	−43.3	20.2	78 10.8	−42.1	21.8	79 06.1	−40.8	23.7	80 00.6	−39.2	26.0	80 53.9	−37.2	28.8	81 45.6	−34.6	32.1	82 35.3	−31.4	36.2	80
81	75 34.0	−46.0	16.0	76 31.5	−45.2	17.1	77 28.7	−44.4	18.4	78 25.3	−43.4	20.0	79 21.4	−42.2	21.8	80 16.7	−40.7	24.0	81 11.0	−38.9	26.6	82 03.9	−36.6	29.8	81
82	74 48.0	−47.5	13.5	75 46.3	−47.0	14.4	76 44.3	−46.3	15.4	77 41.9	−45.5	16.6	78 39.2	−44.7	18.1	79 36.0	−43.6	19.8	80 32.1	−42.3	21.8	81 27.3	−40.6	24.2	82
83	74 00.5	−48.7	11.2	74 59.3	−48.4	11.9	75 58.0	−48.0	12.7	76 56.4	−47.4	13.7	77 54.5	−46.7	14.8	78 52.4	−46.0	16.1	79 49.8	−45.0	17.6	80 46.7	−43.9	19.5	83
84	73 11.8	−50.0	9.1	74 10.9	−49.6	9.7	75 10.0	−49.2	10.3	76 09.0	−48.9	11.0	77 07.8	−48.4	11.9	78 06.4	−47.9	12.8	79 04.8	−47.3	14.0	80 02.8	−46.4	15.4	84
85	72 21.8	−50.8	7.2	73 21.3	−50.6	7.7	74 20.8	−50.5	8.1	75 20.1	−50.1	8.7	76 19.4	−49.9	9.3	77 18.5	−49.4	10.0	78 17.5	−49.0	10.9	79 16.4	−48.5	11.8	85
86	71 31.0	−51.8	5.5	72 30.7	−51.6	5.8	73 30.3	−51.4	6.2	74 30.0	−51.3	6.6	75 29.5	−51.0	7.0	76 29.1	−50.8	7.5	77 28.5	−50.5	8.1	78 27.9	−50.2	8.8	86
87	70 39.2	−52.4	4.0	71 39.1	−52.4	4.2	72 38.9	−52.3	4.4	73 38.7	−52.1	4.7	74 38.5	−52.0	5.0	75 38.3	−51.9	5.3	76 38.0	−51.7	5.7	77 37.7	−51.5	6.1	87
88	69 46.8	−53.1	2.5	70 46.7	−53.0	2.7	71 46.6	−53.0	2.8	72 46.6	−53.0	3.0	73 46.5	−52.9	3.1	74 46.4	−52.8	3.3	75 46.3	−52.7	3.6	76 46.2	−52.7	3.8	88
89	68 53.7	−53.7	1.2	69 53.7	−53.7	1.3	70 53.6	−53.6	1.3	71 53.6	−53.6	1.4	72 53.6	−53.6	1.5	73 53.6	−53.6	1.6	74 53.6	−53.6	1.7	75 53.5	−53.5	1.8	89
90	68 00.0	−54.2	0.0	69 00.0	−54.2	0.0	70 00.0	−54.2	0.0	71 00.0	−54.2	0.0	72 00.0	−54.2	0.0	73 00.0	−54.2	0.0	74 00.0	−54.3	0.0	75 00.0	−54.3	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

26°, 334° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 26°, 334°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	19 40.5	−59.1	152.3	18 47.4	−59.2	152.4	17 54.2	−59.3	152.6	17 00.9	−59.3	152.7	16 07.5	−59.4	152.8	15 14.1	−59.5	153.0	14 20.6	−59.5	153.1	13 27.1	−59.6	153.2	0
1	18 41.4	−59.0	152.4	17 48.2	−59.2	152.6	16 54.9	−59.2	152.7	16 01.6	−59.4	152.9	15 08.1	−59.4	153.0	14 14.6	−59.4	153.1	13 21.1	−59.5	153.2	12 27.5	−59.6	153.3	1
2	17 42.4	−59.2	152.6	16 49.0	−59.2	152.8	15 55.7	−59.3	152.9	15 02.2	−59.3	153.0	14 08.7	−59.4	153.1	13 15.2	−59.5	153.3	12 21.6	−59.6	153.4	11 27.9	−59.6	153.4	2
3	16 43.2	−59.1	152.8	15 49.8	−59.1	152.9	14 56.4	−59.3	153.1	14 02.9	−59.4	153.2	13 09.3	−59.4	153.3	12 15.7	−59.5	153.4	11 22.0	−59.5	153.5	10 28.3	−59.6	153.6	3
4	15 44.1	−59.1	153.0	14 50.7	−59.3	153.1	13 57.1	−59.3	153.2	13 03.5	−59.3	153.3	12 09.9	−59.4	153.4	11 16.2	−59.5	153.5	10 22.5	−59.6	153.6	9 28.7	−59.6	153.7	4
5	14 45.0	−59.1	153.2	13 51.4	−59.2	153.3	12 57.8	−59.3	153.4	12 04.2	−59.4	153.5	11 10.5	−59.5	153.6	10 16.7	−59.5	153.7	9 22.9	−59.5	153.7	8 29.1	−59.6	153.8	5
6	13 45.9	−59.2	153.3	12 52.2	−59.2	153.4	11 58.5	−59.3	153.5	11 04.8	−59.4	153.6	10 11.0	−59.4	153.7	9 17.2	−59.5	153.8	8 23.4	−59.6	153.9	7 29.5	−59.6	153.9	6
7	12 46.7	−59.1	153.5	11 53.0	−59.2	153.6	10 59.2	−59.2	153.7	10 05.4	−59.3	153.8	9 11.6	−59.4	153.8	8 17.7	−59.5	153.9	7 23.8	−59.5	154.0	6 29.9	−59.6	154.0	7
8	11 47.6	−59.2	153.7	10 53.8	−59.2	153.8	10 00.0	−59.4	153.8	9 06.1	−59.4	153.9	8 12.2	−59.5	154.0	7 18.2	−59.5	154.0	6 24.3	−59.6	154.1	5 30.3	−59.6	154.1	8
9	10 48.4	−59.1	153.8	9 54.6	−59.3	153.9	9 00.6	−59.3	154.0	8 06.7	−59.4	154.1	7 12.7	−59.4	154.1	6 18.7	−59.5	154.2	5 24.7	−59.5	154.2	4 30.7	−59.6	154.3	9
10	9 49.3	−59.2	154.0	8 55.3	−59.2	154.1	8 01.3	−59.3	154.2	7 07.3	−59.3	154.2	6 13.3	−59.4	154.3	5 19.2	−59.5	154.3	4 25.2	−59.6	154.3	3 31.1	−59.6	154.4	10
11	8 50.1	−59.2	154.2	7 56.1	−59.3	154.2	7 02.0	−59.3	154.3	6 08.0	−59.4	154.4	5 13.9	−59.5	154.4	4 19.7	−59.5	154.4	3 25.6	−59.6	154.5	2 31.5	−59.7	154.5	11
12	7 50.9	−59.1	154.4	6 56.8	−59.2	154.4	6 02.7	−59.3	154.5	5 08.6	−59.4	154.5	4 14.4	−59.4	154.5	3 20.2	−59.5	154.6	2 26.0	−59.5	154.6	1 31.8	−59.6	154.6	12
13	6 51.8	−59.2	154.5	5 57.6	−59.2	154.6	5 03.4	−59.3	154.6	4 09.2	−59.4	154.6	3 15.0	−59.5	154.7	2 20.7	−59.5	154.7	1 26.5	−59.6	154.7	0 32.2	−59.6	154.7	13
14	5 52.6	−59.2	154.7	4 58.4	−59.3	154.7	4 04.1	−59.3	154.8	3 09.8	−59.4	154.8	2 15.5	−59.4	154.8	1 21.2	−59.5	154.8	0 26.9	−59.5	154.8	0 27.4	+59.6	25.2	14
15	4 53.4	−59.2	154.9	3 59.1	−59.3	154.9	3 04.8	−59.4	154.9	2 10.4	−59.4	154.9	1 16.1	−59.5	154.9	0 21.7	−59.5	154.9	0 32.6	+59.6	25.1	1 27.0	+59.6	25.1	15
16	3 54.2	−59.1	155.0	2 59.8	−59.2	155.0	2 05.4	−59.3	155.1	1 11.0	−59.3	155.1	0 16.6	−59.4	155.1	0 37.8	+59.5	24.9	1 32.2	+59.6	24.9	2 26.6	+59.6	24.9	16
17	2 55.1	−59.2	155.2	2 00.6	−59.3	155.2	1 06.1	−59.3	155.2	0 11.7	−59.4	155.2	0 42.8	+59.5	24.8	1 37.3	+59.5	24.8	2 31.8	+59.5	24.8	3 26.2	+59.6	24.8	17
18	1 55.9	−59.2	155.3	1 01.3	−59.2	155.4	0 06.8	−59.3	155.4	0 47.7	+59.4	24.6	1 42.3	+59.4	24.7	2 36.8	+59.5	24.7	3 31.3	+59.6	24.7	4 25.8	+59.6	24.7	18
19	0 56.7	−59.2	155.5	0 02.1	−59.3	155.5	0 52.5	+59.3	24.5	1 47.1	+59.4	24.5	2 41.7	+59.5	24.5	3 36.3	+59.5	24.5	4 30.9	+59.5	24.6	5 25.4	+59.6	24.6	19
20	0 02.5	+59.2	24.3	0 57.2	+59.2	24.3	1 51.8	+59.4	24.3	2 46.5	+59.4	24.4	3 41.2	+59.4	24.4	4 35.8	+59.5	24.4	5 30.4	+59.6	24.4	6 25.0	+59.6	24.5	20
21	1 01.7	+59.2	24.2	1 56.4	+59.3	24.2	2 51.2	+59.3	24.2	3 45.9	+59.4	24.2	4 40.6	+59.4	24.2	5 35.3	+59.5	24.3	6 30.0	+59.5	24.3	7 24.6	+59.7	24.4	21
22	2 00.9	+59.2	24.0	2 55.7	+59.2	24.0	3 50.5	+59.3	24.0	4 45.3	+59.3	24.1	5 40.0	+59.5	24.1	6 34.8	+59.5	24.2	7 29.5	+59.6	24.2	8 24.3	+59.6	24.3	22
23	3 00.1	+59.1	23.8	3 54.9	+59.3	23.9	4 49.8	+59.3	23.9	5 44.6	+59.4	23.9	6 39.5	+59.4	24.0	7 34.3	+59.5	24.0	8 29.1	+59.5	24.1	9 23.9	+59.6	24.1	23
24	3 59.2	+59.2	23.7	4 54.2	+59.2	23.7	5 49.1	+59.3	23.7	6 44.0	+59.4	23.8	7 38.9	+59.5	23.8	8 33.8	+59.5	23.9	9 28.6	+59.6	24.0	10 23.5	+59.6	24.0	24
25	4 58.4	+59.2	23.5	5 53.4	+59.3	23.5	6 48.4	+59.3	23.6	7 43.4	+59.4	23.6	8 38.4	+59.4	23.7	9 33.3	+59.5	23.8	10 28.2	+59.5	23.8	11 23.1	+59.6	23.9	25
26	5 57.6	+59.2	23.3	6 52.7	+59.2	23.4	7 47.7	+59.3	23.4	8 42.8	+59.3	23.5	9 37.8	+59.4	23.6	10 32.8	+59.5	23.6	11 27.7	+59.6	23.7	12 22.7	+59.5	23.8	26
27	6 56.8	+59.1	23.2	7 51.9	+59.3	23.2	8 47.0	+59.3	23.3	9 42.1	+59.4	23.3	10 37.2	+59.4	23.4	11 32.3	+59.4	23.5	12 27.3	+59.5	23.6	13 22.2	+59.6	23.7	27
28	7 55.9	+59.2	23.0	8 51.2	+59.2	23.1	9 46.3	+59.3	23.1	10 41.5	+59.4	23.2	11 36.6	+59.5	23.3	12 31.7	+59.5	23.4	13 26.8	+59.5	23.5	14 21.8	+59.6	23.5	28
29	8 55.1	+59.2	22.8	9 50.4	+59.2	22.9	10 45.6	+59.3	23.0	11 40.9	+59.3	23.0	12 36.1	+59.4	23.1	13 31.2	+59.5	23.2	14 26.3	+59.6	23.3	15 21.4	+59.6	23.4	29
30	9 54.3	+59.1	22.7	10 49.6	+59.2	22.7	11 44.9	+59.3	22.8	12 40.2	+59.4	22.9	13 35.5	+59.4	23.0	14 30.7	+59.5	23.1	15 25.9	+59.5	23.2	16 21.0	+59.6	23.3	30
31	10 53.4	+59.2	22.5	11 48.8	+59.3	22.6	12 44.2	+59.3	22.7	13 39.6	+59.3	22.7	14 34.9	+59.4	22.8	15 30.2	+59.4	23.0	16 25.4	+59.5	23.1	17 20.6	+59.5	23.2	31
32	11 52.6	+59.1	22.3	12 48.1	+59.2	22.4	13 43.5	+59.3	22.5	14 38.9	+59.4	22.6	15 34.3	+59.4	22.7	16 29.6	+59.5	22.8	17 24.9	+59.5	22.9	18 20.1	+59.6	23.1	32
33	12 51.7	+59.2	22.2	13 47.3	+59.2	22.2	14 42.8	+59.3	22.3	15 38.3	+59.3	22.4	16 33.7	+59.4	22.6	17 29.1	+59.4	22.7	18 24.4	+59.5	22.8	19 19.7	+59.6	22.9	33
34	13 50.9	+59.1	22.0	14 46.5	+59.2	22.1	15 42.1	+59.2	22.2	16 37.6	+59.3	22.3	17 33.1	+59.4	22.4	18 28.5	+59.5	22.5	19 23.9	+59.5	22.7	20 19.3	+59.5	22.8	34
35	14 50.0	+59.1	21.8	15 45.7	+59.2	21.9	16 41.3	+59.3	22.0	17 36.9	+59.4	22.1	18 32.5	+59.4	22.3	19 28.0	+59.4	22.4	20 23.4	+59.5	22.5	21 18.8	+59.6	22.7	35
36	15 49.1	+59.1	21.6	16 44.9	+59.2	21.7	17 40.6	+59.2	21.9	18 36.3	+59.3	22.0	19 31.9	+59.3	22.1	20 27.4	+59.5	22.2	21 22.9	+59.5	22.4	22 18.4	+59.5	22.5	36
37	16 48.2	+59.1	21.5	17 44.1	+59.1	21.6	18 39.8	+59.3	21.7	19 35.6	+59.3	21.8	20 31.2	+59.4	22.0	21 26.9	+59.4	22.1	22 22.4	+59.5	22.2	23 17.9	+59.6	22.4	37
38	17 47.3	+59.1	21.3	18 43.2	+59.2	21.4	19 39.1	+59.2	21.5	20 34.9	+59.3	21.7	21 30.6	+59.4	21.8	22 26.3	+59.4	21.9	23 21.9	+59.5	22.1	24 17.5	+59.5	22.3	38
39	18 46.4	+59.1	21.1	19 42.4	+59.1	21.2	20 38.3	+59.2	21.3	21 34.2	+59.2	21.5	22 30.0	+59.3	21.6	23 25.7	+59.4	21.8	24 21.4	+59.4	22.0	25 17.0	+59.5	22.1	39
40	19 45.5	+59.1	20.9	20 41.5	+59.2	21.0	21 37.5	+59.2	21.2	22 33.4	+59.3	21.3	23 29.3	+59.3	21.5	24 25.1	+59.4	21.6	25 20.8	+59.5	21.8	26 16.5	+59.5	22.0	40
41	20 44.6	+59.1	20.7	21 40.7	+59.1	20.9	22 36.7	+59.2	21.0	23 32.7	+59.3	21.2	24 28.6	+59.4	21.3	25 24.5	+59.4	21.5	26 20.3	+59.5	21.7	27 16.0	+59.5	21.9	41
42	21 43.7	+59.0	20.5	22 39.8	+59.1	20.7	23 35.9	+59.2	20.8	24 32.0	+59.2	21.0	25 28.0	+59.3	21.2	26 23.9	+59.4	21.3	27 19.8	+59.4	21.5	28 15.5	+59.5	21.7	42
43	22 42.7	+59.0	20.3	23 38.9	+59.1	20.5	24 35.1	+59.2	20.6	25 31.2	+59.3	20.8	26 27.3	+59.3	21.0	27 23.3	+59.3	21.2	28 19.2	+59.4	21.4	29 15.0	+59.5	21.6	43
44	23 41.7	+59.1	20.1	24 38.0	+59.1	20.3	25 34.3	+59.1	20.5	26 30.5	+59.2	20.6	27 26.6	+59.3	20.8	28 22.6	+59.4	21.0	29 18.6	+59.4	21.2	30 14.5	+59.5	21.4	44
45	24 40.8	+59.0	19.9	25 37.1	+59.1	20.1	26 33.4	+59.2	20.3	27 29.7	+59.2	20.5	28 25.9	+59.3	20.6	29 22.0	+59.3	20.8	30 18.0	+59.4	21.0	31 14.0	+59.5	21.3	45
46	25 39.8	+59.0	19.7	26 36.2	+59.1	19.9	27 32.6	+59.1	20.1	28 28.9	+59.2	20.3	29 25.2	+59.2	20.5	30 21.3	+59.4	20.7	31 17.4	+59.4	20.9	32 13.5	+59.4	21.1	46
47	26 38.8	+58.9	19.5	27 35.3	+59.0	19.7	28 31.7	+59.1	19.9	29 28.1	+59.2	20.1	30 24.4	+59.3	20.3	31 20.7	+59.3	20.5	32 16.8	+59.4	20.7	33 12.9	+59.4	20.9	47
48	27 37.7	+59.0	19.3	28 34.3	+59.0	19.5	29 30.8	+59.1	19.7	30 27.3	+59.1	19.9	31 23.7	+59.2	20.1	32 20.0	+59.3	20.3	33 16.2	+59.4	20.5	34 12.3	+59.5	20.8	48
49	28 36.7	+58.9	19.1	29 33.3	+59.0	19.3	30 29.9	+59.1	19.5	31 26.4	+59.2	19.7	32 22.9	+59.2	19.9	33 19.3	+59.3	20.1	34 15.6	+59.3	20.4	35 11.8	+59.4	20.6	49
50	29 35.6	+58.9	18.9	30 32.3	+59.0	19.1	31 29.0	+59.1	19.3	32 25.6	+59.1	19.5	33 22.1	+59.2	19.7	34 18.6	+59.2	19.9	35 14.9	+59.3	20.2	36 11.2	+59.4	20.4	50
51	30 34.5	+58.9	18.7	31 31.3	+59.0	18.9	32 28.1	+59.0	19.1	33 24.7	+59.1	19.3	34 21.3	+59.2	19.5	35 17.8	+59.3	19.8	36 14.2	+59.4	20.0	37 10.6	+59.4	20.3	51
52	31 33.4	+58.9	18.5	32 30.3	+58.9	18.7	33 27.1	+59.0	18.9	34 23.8	+59.1	19.1	35 20.5	+59.1	19.3	36 17.1	+59.2	19.6	37 13.6	+59.3	19.8	38 10.0	+59.3	20.1	52
53	32 32.3	+58.8	18.2	33 29.2	+58.9	18.4	34 26.1	+59.0	18.7	35 22.9	+59.1	18.9	36 19.6	+59.2	19.1	37 16.3	+59.2	19.4	38 12.9	+59.2	19.6	39 09.3	+59.4	19.9	53
54	33 31.1	+58.8	18.0	34 28.1	+58.9	18.2	35 25.1	+58.9	18.4	36 22.0	+59.0	18.7	37 18.8	+59.1	18.9	38 15.5	+59.2	19.2	39 12.1	+59.3	19.4	40 08.7	+59.3	19.7	54
55	34 29.9	+58.8	17.8	35 27.0	+58.9	18.0	36 24.0	+59.0	18.2	37 21.0	+59.0	18.4	38 17.9	+59.1	18.7	39 14.7	+59.1	18.9	40 11.4	+59.2	19.2	41 08.0	+59.3	19.5	55
56	35 28.7	+58.7	17.5	36 25.9	+58.8	17.7	37 23.0	+58.9	18.0	38 20.0	+59.0	18.2	39 17.0	+59.0	18.5	40 13.8	+59.2	18.7	41 10.6	+59.2	19.0	42 07.3	+59.3	19.3	56
57	36 27.4	+58.8	17.3	37 24.7	+58.8	17.5	38 21.9	+58.9	17.7	39 19.0	+59.0	18.0	40 16.0	+59.1	18.2	41 13.0	+59.1	18.5	42 09.8	+59.2	18.8	43 06.6	+59.2	19.1	57
58	37 26.2	+58.6	17.0	38 23.5	+58.8	17.2	39 20.8	+58.8	17.5	40 18.0	+58.9	17.7	41 15.1	+59.0	18.0	42 12.1	+59.1	18.3	43 09.0	+59.2	18.6	44 05.8	+59.3	18.9	58
59	38 24.8	+58.7	16.7	39 22.3	+58.7	17.0	40 19.6	+58.8	17.2	41 16.9	+58.9	17.5	42 14.1	+58.9	17.8	43 11.2	+59.0	18.0	44 08.2	+59.1	18.3	45 05.1	+59.2	18.6	59
60	39 23.5	+58.6	16.5	40 21.0	+58.7	16.7	41 18.4	+58.8	17.0	42 15.8	+58.8	17.2	43 13.0	+59.0	17.5	44 10.2	+59.0	17.8	45 07.3	+59.1	18.1	46 04.3	+59.2	18.4	60
61	40 22.1	+58.6	16.2	41 19.7	+58.6	16.4	42 17.2	+58.7	16.7	43 14.6	+58.8	17.0	44 12.0	+58.9	17.2	45 09.2	+59.0	17.5	46 06.4	+59.1	17.9	47 03.5	+59.1	18.2	61
62	41 20.7	+58.5	15.9	42 18.3	+58.7	16.2	43 15.9	+58.7	16.4	44 13.4	+58.8	16.7	45 10.9	+58.8	17.0	46 08.2	+59.0	17.3	47 05.5	+59.0	17.6	48 02.6	+59.1	17.9	62
63	42 19.2	+58.5	15.6	43 17.0	+58.5	15.9	44 14.6	+58.7	16.1	45 12.2	+58.8	16.4	46 09.7	+58.9	16.7	47 07.2	+58.9	17.0	48 04.5	+59.0	17.3	49 01.7	+59.1	17.7	63
64	43 17.7	+58.4	15.3	44 15.5	+58.5	15.6	45 13.3	+58.6	15.8	46 11.0	+58.6	16.1	47 08.6	+58.7	16.4	48 06.1	+58.8	16.7	49 03.5	+58.9	17.1	50 00.8	+59.0	17.4	64
65	44 16.1	+58.4	15.0	45 14.0	+58.5	15.3	46 11.9	+58.5	15.5	47 09.6	+58.7	15.8	48 07.3	+58.8	16.1	49 04.9	+58.8	16.4	50 02.4	+58.9	16.8	50 59.8	+59.0	17.1	65
66	45 14.5	+58.3	14.7	46 12.5	+58.4	14.9	47 10.4	+58.5	15.2	48 08.3	+58.6	15.5	49 06.1	+58.6	15.8	50 03.7	+58.8	16.1	51 01.3	+58.9	16.5	51 58.8	+59.0	16.8	66
67	46 12.8	+58.2	14.3	47 10.9	+58.3	14.6	48 08.9	+58.5	14.9	49 06.9	+58.5	15.2	50 04.7	+58.7	15.5	51 02.5	+58.7	15.8	52 00.2	+58.8	16.2	52 57.8	+58.9	16.5	67
68	47 11.0	+58.2	14.0	48 09.2	+58.3	14.3	49 07.4	+58.3	14.5	50 05.4	+58.5	14.8	51 03.4	+58.5	15.1	52 01.2	+58.7	15.5	52 59.0	+58.8	15.8	53 56.7	+58.8	16.2	68
69	48 09.2	+58.2	13.6	49 07.5	+58.2	13.9	50 05.7	+58.3	14.2	51 03.9	+58.4	14.5	52 01.9	+58.5	14.8	52 59.9	+58.6	15.1	53 57.8	+58.6	15.5	54 55.5	+58.8	15.9	69
70	49 07.4	+58.0	13.2	50 05.7	+58.2	13.5	51 04.0	+58.3	13.8	52 02.3	+58.3	14.1	53 00.4	+58.4	14.4	53 58.5	+58.5	14.8	54 56.4	+58.7	15.1	55 54.3	+58.7	15.5	70
71	50 05.4	+58.0	12.9	51 03.9	+58.0	13.1	52 02.3	+58.1	13.4	53 00.6	+58.2	13.7	53 58.8	+58.4	14.0	54 57.0	+58.4	14.4	55 55.1	+58.5	14.8	56 53.0	+58.7	15.1	71
72	51 03.4	+57.8	12.4	52 01.9	+58.0	12.7	53 00.4	+58.1	13.0	53 58.8	+58.2	13.3	54 57.2	+58.2	13.6	55 55.4	+58.4	14.0	56 53.6	+58.5	14.4	57 51.7	+58.6	14.8	72
73	52 01.2	+57.8	12.0	52 59.9	+57.9	12.3	53 58.5	+57.9	12.6	54 57.0	+58.1	12.9	55 55.4	+58.2	13.2	56 53.8	+58.3	13.6	57 52.1	+58.4	13.9	58 50.3	+58.5	14.3	73
74	52 59.0	+57.7	11.6	53 57.8	+57.7	11.9	54 56.4	+57.9	12.1	55 55.1	+57.9	12.5	56 53.6	+58.1	12.8	57 52.1	+58.2	13.1	58 50.5	+58.3	13.5	59 48.8	+58.4	13.9	74
75	53 56.7	+57.5	11.1	54 55.5	+57.7	11.4	55 54.3	+57.8	11.7	56 53.0	+57.9	12.0	57 51.7	+58.0	12.3	58 50.3	+58.0	12.7	59 48.8	+58.2	13.0	60 47.2	+58.3	13.4	75
76	54 54.2	+57.5	10.6	55 53.2	+57.5	10.9	56 52.1	+57.6	11.2	57 50.9	+57.7	11.5	58 49.7	+57.8	11.8	59 48.3	+58.0	12.2	60 47.0	+58.0	12.5	61 45.5	+58.2	13.0	76
77	55 51.7	+57.3	10.1	56 50.7	+57.4	10.4	57 49.7	+57.5	10.7	58 48.6	+57.6	11.0	59 47.5	+57.7	11.3	60 46.3	+57.8	11.7	61 45.0	+58.0	12.0	62 43.7	+58.0	12.4	77
78	56 49.0	+57.1	9.6	57 48.1	+57.3	9.8	58 47.2	+57.4	10.1	59 46.2	+57.5	10.4	60 45.2	+57.6	10.8	61 44.1	+57.7	11.1	62 43.0	+57.8	11.5	63 41.7	+58.0	11.9	78
79	57 46.1	+57.0	9.0	58 45.4	+57.1	9.3	59 44.6	+57.2	9.6	60 43.7	+57.3	9.9	61 42.8	+57.4	10.2	62 41.8	+57.6	10.5	63 40.8	+57.6	10.9	64 39.7	+57.7	11.3	79
80	58 43.1	+56.9	8.4	59 42.5	+56.9	8.7	60 41.8	+57.0	8.9	61 41.0	+57.1	9.2	62 40.2	+57.2	9.5	63 39.4	+57.3	9.9	64 38.4	+57.5	10.2	65 37.4	+57.6	10.6	80
81	59 40.0	+56.6	7.8	60 39.4	+56.7	8.0	61 38.8	+56.8	8.3	62 38.1	+57.0	8.6	63 37.4	+57.1	8.9	64 36.7	+57.2	9.2	65 35.9	+57.3	9.6	66 35.0	+57.4	9.9	81
82	60 36.6	+56.4	7.1	61 36.1	+56.6	7.4	62 35.6	+56.6	7.6	63 35.1	+56.7	7.9	64 34.5	+56.8	8.2	65 33.9	+56.9	8.5	66 33.2	+57.0	8.8	67 32.4	+57.2	9.2	82
83	61 33.0	+56.3	6.4	62 32.7	+56.2	6.7	63 32.2	+56.4	6.9	64 31.8	+56.5	7.1	65 31.3	+56.6	7.4	66 30.8	+56.7	7.7	67 30.2	+56.8	8.0	68 29.6	+56.9	8.4	83
84	62 29.3	+55.9	5.7	63 28.9	+56.1	5.9	64 28.6	+56.1	6.1	65 28.3	+56.2	6.3	66 27.9	+56.3	6.6	67 27.5	+56.4	6.9	68 27.0	+56.5	7.2	69 26.5	+56.7	7.5	84
85	63 25.2	+55.7	4.9	64 25.0	+55.7	5.1	65 24.7	+55.8	5.3	66 24.5	+55.9	5.5	67 24.2	+56.0	5.7	68 23.9	+56.1	6.0	69 23.5	+56.2	6.2	70 23.2	+56.3	6.5	85
86	64 20.9	+55.3	4.1	65 20.7	+55.4	4.2	66 20.5	+55.5	4.4	67 20.4	+55.5	4.6	68 20.2	+55.6	4.8	69 20.0	+55.7	5.0	70 19.7	+55.8	5.2	71 19.5	+55.9	5.5	86
87	65 16.2	+55.0	3.1	66 16.1	+55.1	3.3	67 16.0	+55.1	3.4	68 15.9	+55.2	3.6	69 15.8	+55.2	3.7	70 15.7	+55.3	3.9	71 15.5	+55.4	4.1	72 15.4	+55.4	4.3	87
88	66 11.2	+54.6	2.2	67 11.2	+54.6	2.3	68 11.1	+54.7	2.4	69 11.1	+54.7	2.5	70 11.0	+54.8	2.6	71 11.0	+54.8	2.7	72 10.9	+54.8	2.9	73 10.8	+54.9	3.0	88
89	67 05.8	+54.2	1.1	68 05.8	+54.2	1.2	69 05.8	+54.2	1.2	70 05.8	+54.2	1.3	71 05.8	+54.2	1.4	72 05.8	+54.2	1.4	73 05.7	+54.3	1.5	74 05.7	+54.3	1.6	89
90	68 00.0	+53.7	0.0	69 00.0	+53.7	0.0	70 00.0	+53.6	0.0	71 00.0	+53.6	0.0	72 00.0	+53.6	0.0	73 00.0	+53.6	0.0	74 00.0	+53.6	0.0	75 00.0	+53.5	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 154°, 206°

27°, 333° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. {L.H.A. greater than 180° .....Zn=Z; L.H.A. less than 180°............Zn=360°–Z}

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°
0	19 29.9	+59.0	151.2	18 37.3	+59.1	151.4	17 44.6	+59.2	151.5	16 51.8	+59.3	151.7
1	20 28.9	+59.0	151.0	19 36.4	+59.1	151.2	18 43.8	+59.1	151.4	17 51.1	+59.2	151.5
2	21 27.9	+59.0	150.8	20 35.5	+59.0	151.0	19 42.9	+59.2	151.2	18 50.3	+59.3	151.4
3	22 26.9	+58.9	150.6	21 34.5	+59.1	150.8	20 42.1	+59.2	151.0	19 49.6	+59.2	151.2
4	23 25.8	+59.0	150.4	22 33.6	+59.1	150.6	21 41.3	+59.1	150.8	20 48.8	+59.3	151.0
5	24 24.8	+58.9	150.2	23 32.7	+59.0	150.4	22 40.4	+59.2	150.6	21 48.1	+59.2	150.8
6	25 23.7	+59.0	150.0	24 31.7	+59.0	150.2	23 39.6	+59.1	150.5	22 47.3	+59.2	150.7
7	26 22.7	+58.9	149.8	25 30.7	+59.0	150.0	24 38.7	+59.1	150.3	23 46.5	+59.2	150.5
8	27 21.6	+58.8	149.6	26 29.7	+59.0	149.8	25 37.8	+59.1	150.1	24 45.7	+59.2	150.3
9	28 20.4	+58.9	149.4	27 28.7	+59.0	149.6	26 36.9	+59.1	149.9	25 44.9	+59.2	150.1
10	29 19.3	+58.8	149.2	28 27.7	+59.0	149.4	27 36.0	+59.0	149.7	26 44.1	+59.2	150.0
11	30 18.1	+58.8	148.9	29 26.7	+58.9	149.2	28 35.0	+59.1	149.5	27 43.3	+59.1	149.8
12	31 16.9	+58.8	148.7	30 25.6	+58.9	149.0	29 34.1	+59.0	149.3	28 42.4	+59.1	149.6
13	32 15.7	+58.8	148.5	31 24.5	+58.9	148.8	30 33.1	+59.0	149.1	29 41.5	+59.2	149.4
14	33 14.5	+58.7	148.2	32 23.4	+58.9	148.6	31 32.1	+59.0	148.9	30 40.7	+59.1	149.2
15	34 13.2	+58.7	148.0	33 22.3	+58.8	148.3	32 31.1	+59.0	148.7	31 39.8	+59.0	149.0
16	35 11.9	+58.7	147.7	34 21.1	+58.8	148.1	33 30.1	+58.9	148.4	32 38.8	+59.1	148.8
17	36 10.6	+58.6	147.5	35 19.9	+58.8	147.8	34 29.0	+58.9	148.2	33 37.9	+59.0	148.6
18	37 09.2	+58.6	147.2	36 18.7	+58.7	147.6	35 27.9	+58.9	148.0	34 36.9	+59.0	148.4
19	38 07.8	+58.6	146.9	37 17.4	+58.7	147.3	36 26.8	+58.9	147.7	35 35.9	+59.0	148.1
20	39 06.4	+58.5	146.6	38 16.1	+58.7	147.1	37 25.7	+58.8	147.5	36 34.9	+59.0	147.9
21	40 04.9	+58.5	146.4	39 14.8	+58.7	146.8	38 24.5	+58.8	147.3	37 33.9	+58.9	147.7
22	41 03.4	+58.4	146.1	40 13.5	+58.6	146.5	39 23.3	+58.7	147.0	38 32.8	+58.9	147.4
23	42 01.8	+58.4	145.8	41 12.1	+58.5	146.3	40 22.0	+58.8	146.7	39 31.7	+58.9	147.2
24	43 00.2	+58.3	145.5	42 10.6	+58.5	146.0	41 20.8	+58.6	146.5	40 30.6	+58.8	146.9
25	43 58.5	+58.3	145.1	43 09.1	+58.5	145.7	42 19.4	+58.7	146.2	41 29.4	+58.8	146.7
26	44 56.8	+58.2	144.8	44 07.6	+58.4	145.4	43 18.1	+58.6	145.9	42 28.2	+58.8	146.4
27	45 55.0	+58.2	144.4	45 06.0	+58.4	145.0	44 16.7	+58.5	145.6	43 27.0	+58.7	146.1
28	46 53.2	+58.0	144.1	46 04.4	+58.3	144.7	45 15.2	+58.5	145.3	44 25.7	+58.7	145.9
29	47 51.2	+58.0	143.7	47 02.7	+58.2	144.4	46 13.7	+58.5	145.0	45 24.4	+58.6	145.6
30	48 49.2	+58.0	143.3	48 00.9	+58.2	144.0	47 12.2	+58.3	144.6	46 23.0	+58.6	145.3
31	49 47.2	+57.8	142.9	48 59.1	+58.0	143.6	48 10.5	+58.4	144.3	47 21.6	+58.5	144.9
32	50 45.0	+57.7	142.5	49 57.1	+58.1	143.2	49 08.9	+58.2	143.9	48 20.1	+58.5	144.6
33	51 42.7	+57.7	142.1	50 55.2	+57.9	142.8	50 07.1	+58.2	143.6	49 18.6	+58.4	144.3
34	52 40.4	+57.5	141.6	51 53.1	+57.8	142.4	51 05.3	+58.1	143.2	50 17.0	+58.4	143.9
35	53 37.9	+57.4	141.2	52 50.9	+57.7	142.0	52 03.4	+58.0	142.8	51 15.4	+58.2	143.5
36	54 35.3	+57.3	140.7	53 48.6	+57.7	141.5	53 01.4	+57.9	142.4	52 13.6	+58.2	143.2
37	55 32.6	+57.2	140.1	54 46.3	+57.5	141.1	53 59.3	+57.8	141.9	53 11.8	+58.1	142.8
38	56 29.8	+57.0	139.6	55 43.8	+57.3	140.6	54 57.1	+57.7	141.5	54 09.9	+58.0	142.3
39	57 26.8	+56.8	139.0	56 41.1	+57.3	140.0	55 54.8	+57.6	141.0	55 07.9	+57.9	141.9
40	58 23.6	+56.7	138.4	57 38.4	+57.1	139.5	56 52.4	+57.5	140.5	56 05.8	+57.8	141.4
41	59 20.3	+56.5	137.8	58 35.5	+56.9	138.9	57 49.9	+57.3	139.9	57 03.6	+57.7	140.9
42	60 16.8	+56.2	137.1	59 32.4	+56.7	138.3	58 47.2	+57.2	139.4	58 01.3	+57.6	140.4
43	61 13.0	+56.0	136.4	60 29.1	+56.5	137.6	59 44.4	+57.0	138.8	58 58.9	+57.4	139.9
44	62 09.0	+55.8	135.6	61 25.6	+56.3	136.9	60 41.4	+56.8	138.2	59 56.3	+57.2	139.3
45	63 04.8	+55.4	134.8	62 21.9	+56.1	136.2	61 38.2	+56.6	137.5	60 53.5	+57.1	138.7
46	64 00.2	+55.1	134.0	63 18.0	+55.8	135.4	62 34.8	+56.3	136.8	61 50.6	+56.9	138.1
47	64 55.3	+54.8	133.1	64 13.8	+55.5	134.6	63 31.1	+56.1	136.0	62 47.5	+56.6	137.4
48	65 50.1	+54.4	132.1	65 09.3	+55.1	133.7	64 27.2	+55.9	135.2	63 44.1	+56.5	136.6
49	66 44.5	+53.9	131.0	66 04.4	+54.8	132.7	65 23.1	+55.5	134.4	64 40.6	+56.1	135.9
50	67 38.4	+53.4	129.9	66 59.2	+54.3	131.7	66 18.6	+55.1	133.4	65 36.7	+55.9	135.0
51	68 31.8	+52.8	128.7	67 53.5	+53.9	130.6	67 13.7	+54.8	132.4	66 32.6	+55.5	134.1
52	69 24.6	+52.2	127.4	68 47.4	+53.3	129.4	68 08.5	+54.3	131.3	67 28.1	+55.2	133.2
53	70 16.8	+51.4	125.9	69 40.7	+52.7	128.1	69 02.8	+53.8	130.2	68 23.3	+54.7	132.1
54	71 08.2	+50.6	124.4	70 33.4	+51.9	126.7	69 56.6	+53.2	128.9	69 18.0	+54.3	131.0
55	71 58.8	+49.6	122.7	71 25.3	+51.2	125.2	70 49.8	+52.5	127.5	70 12.3	+53.7	129.7
56	72 48.4	+48.5	120.8	72 16.5	+50.2	123.5	71 42.3	+51.7	126.0	71 06.0	+53.0	128.4
57	73 36.9	+47.2	118.8	73 06.7	+49.2	121.7	72 34.0	+50.9	124.4	71 59.0	+52.3	126.9
58	74 24.1	+45.7	116.5	73 55.9	+47.8	119.6	73 24.9	+49.8	122.6	72 51.3	+51.5	125.3
59	75 09.8	+43.9	114.1	74 43.7	+46.4	117.4	74 14.7	+48.5	120.6	73 42.8	+50.5	123.5
60	75 53.7	*+41.9*	•111.3	75 30.1	+44.7	114.9	75 03.2	+47.2	118.3	74 33.3	+49.3	121.5
61	76 35.6	*+39.6*	•108.3	76 14.8	*+42.7*	•112.2	75 50.4	+45.5	115.9	75 22.6	+47.9	119.3
62	77 15.2	*+36.8*	•105.0	76 57.5	*+40.4*	•109.2	76 35.9	*+43.5*	•113.1	76 10.5	+46.3	116.9
63	77 52.0	*+33.5*	•101.3	77 37.9	*+37.5*	•105.8	77 19.4	*+41.1*	•110.1	76 56.8	*+44.3*	•114.1
64	78 25.5	*+30.0*	• 97.3	78 15.4	*+34.4*	•102.1	78 00.5	*+38.4*	•106.7	77 41.1	*+42.0*	•111.1
65	78 55.5	*+25.7*	• 92.9	78 49.8	*+30.6*	• 97.9	78 38.9	*+35.2*	•102.9	78 23.1	*+39.3*	•107.6
66	79 21.2	*+21.0*	• 88.1	79 20.4	*+26.3*	• 93.4	79 14.1	*+31.3*	• 98.7	79 02.4	*+36.0*	•103.8
67	79 42.2	*+15.8*	• 82.9	79 46.7	*+21.4*	• 88.4	79 45.4	*+27.0*	• 94.0	79 38.4	*+32.2*	• 99.4
68	79 58.0	*+10.1*	• 77.5	80 08.1	*+16.0*	• 83.1	80 12.4	*+21.8*	• 88.8	80 10.6	*+27.6*	• 94.6
69	80 08.1	*+4.3*	• 71.7	80 24.1	*+10.1*	• 77.4	80 34.2	*+16.3*	• 83.3	80 38.2	*+22.3*	• 89.3
70	80 12.4	*−1.8*	• 65.9	80 34.2	*+4.0*	• 71.4	80 50.5	*+10.0*	• 77.3	81 00.5	*+16.4*	• 83.5
71	80 10.6	*−7.8*	• 60.0	80 38.2	*−2.5*	• 65.3	81 00.5	*+3.5*	• 71.0	81 16.9	*+10.0*	• 77.2
72	80 02.8	*−13.6*	• 54.3	80 35.7	*−8.6*	• 59.2	81 04.0	*−3.1*	• 64.6	81 26.9	*+3.1*	• 70.6
73	79 49.2	*−19.0*	• 48.7	80 27.1	*−14.7*	• 53.1	81 00.9	*−9.6*	• 58.2	81 30.0	*−3.9*	• 63.9
74	79 30.2	*−23.8*	• 43.4	80 12.4	*−20.2*	• 47.4	80 51.3	*−15.8*	• 51.9	81 26.1	*−10.7*	• 57.2
75	79 06.4	*−28.3*	• 38.4	79 52.2	*−25.2*	• 41.9	80 35.5	*−21.6*	• 46.0	81 15.4	*−17.1*	• 50.6
76	78 38.1	*−32.2*	• 33.9	79 27.0	*−29.6*	• 36.9	80 13.9	*−26.6*	• 40.3	80 58.3	*−23.0*	• 44.4
77	78 05.9	*−35.5*	• 29.7	78 57.4	*−33.5*	• 32.2	79 47.3	*−31.1*	• 35.2	80 35.3	*−28.1*	• 38.6
78	77 30.4	*−38.5*	• 25.9	78 23.9	*−36.9*	• 28.0	79 16.2	*−34.9*	• 30.5	80 07.2	*−32.6*	• 33.4
79	76 51.9	*−41.0*	• 22.4	77 47.0	*−39.7*	• 24.2	78 41.3	*−38.2*	• 26.2	79 34.6	*−36.4*	• 28.6
80	76 10.9	*−43.2*	• 19.3	77 07.3	*−42.2*	• 20.7	78 03.1	*−41.0*	• 22.4	78 58.2	*−39.6*	• 24.3
81	75 27.7	−45.0	16.4	76 25.1	−44.2	17.6	77 22.1	*−43.4*	• 19.0	78 18.6	*−42.3*	• 20.5
82	74 42.7	−46.6	13.9	75 40.9	−46.1	14.8	76 38.7	−45.3	15.9	77 36.3	*−44.6*	• 17.1
83	73 56.1	−48.0	11.5	74 54.8	−47.5	12.3	75 53.4	−47.1	13.1	76 51.7	−46.5	14.1
84	73 08.1	−49.1	9.4	74 07.3	−48.9	10.0	75 06.3	−48.5	10.6	76 05.2	−48.1	11.4
85	72 19.0	−50.2	7.5	73 18.4	−50.0	7.9	74 17.8	−49.7	8.4	75 17.1	−49.4	9.0
86	71 28.8	−51.2	5.7	72 28.4	−50.9	6.0	73 28.1	−50.8	6.4	74 27.7	−50.6	6.8
87	70 37.6	−51.8	4.1	71 37.5	−51.8	4.3	72 37.3	−51.7	4.6	73 37.1	−51.6	4.8
88	69 45.8	−52.6	2.6	70 45.7	−52.5	2.8	71 45.6	−52.4	2.9	72 45.5	−52.4	3.1
89	68 53.2	−53.2	1.3	69 53.2	−53.2	1.3	70 53.2	−53.2	1.4	71 53.1	−53.1	1.5
90	68 00.0	−53.7	0.0	69 00.0	−53.7	0.0	70 00.0	−53.7	0.0	71 00.0	−53.8	0.0
	68°			69°			70°			71°		

72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
15 58.9	+59.4	151.8	15 06.0	+59.4	152.0	14 13.0	+59.5	152.1	13 20.0	+59.5	152.2	0
16 58.3	+59.3	151.7	16 05.4	+59.5	151.8	15 12.5	+59.5	151.9	14 19.5	+59.6	152.1	1
17 57.6	+59.4	151.5	17 04.9	+59.4	151.7	16 12.0	+59.5	151.8	15 19.1	+59.5	151.9	2
18 57.0	+59.3	151.4	18 04.3	+59.4	151.5	17 11.5	+59.5	151.7	16 18.6	+59.6	151.8	3
19 56.3	+59.3	151.2	19 03.7	+59.4	151.4	18 11.0	+59.4	151.5	17 18.2	+59.5	151.7	4
20 55.6	+59.3	151.0	20 03.1	+59.4	151.2	19 10.4	+59.5	151.4	18 17.7	+59.6	151.6	5
21 54.9	+59.3	150.9	21 02.5	+59.4	151.1	20 09.9	+59.5	151.3	19 17.3	+59.5	151.4	6
22 54.2	+59.3	150.7	22 01.9	+59.3	150.9	21 09.4	+59.4	151.1	20 16.8	+59.5	151.3	7
23 53.5	+59.3	150.5	23 01.2	+59.4	150.8	22 08.8	+59.5	151.0	21 16.3	+59.5	151.2	8
24 52.8	+59.3	150.4	24 00.6	+59.4	150.6	23 08.3	+59.4	150.8	22 15.8	+59.5	151.0	9
25 52.1	+59.3	150.2	25 00.0	+59.3	150.4	24 07.7	+59.4	150.7	23 15.3	+59.6	150.9	10
26 51.4	+59.2	150.0	25 59.3	+59.3	150.3	25 07.1	+59.5	150.5	24 14.9	+59.4	150.7	11
27 50.6	+59.2	149.9	26 58.6	+59.4	150.1	26 06.6	+59.4	150.4	25 14.3	+59.5	150.6	12
28 49.8	+59.2	149.7	27 58.0	+59.3	149.9	27 06.0	+59.4	150.2	26 13.8	+59.5	150.5	13
29 49.0	+59.3	149.5	28 57.3	+59.3	149.8	28 05.4	+59.4	150.0	27 13.3	+59.5	150.3	14
30 48.3	+59.1	149.3	29 56.6	+59.3	149.6	29 04.8	+59.3	149.9	28 12.8	+59.4	150.2	15
31 47.4	+59.2	149.1	30 55.9	+59.2	149.4	30 04.1	+59.4	149.7	29 12.2	+59.5	150.0	16
32 46.6	+59.2	148.9	31 55.1	+59.3	149.2	31 03.5	+59.3	149.5	30 11.7	+59.4	149.8	17
33 45.8	+59.1	148.7	32 54.4	+59.2	149.1	32 02.8	+59.4	149.4	31 11.1	+59.5	149.7	18
34 44.9	+59.1	148.5	33 53.6	+59.2	148.9	33 02.2	+59.3	149.2	32 10.6	+59.4	149.5	19
35 44.0	+59.1	148.3	34 52.8	+59.2	148.7	34 01.5	+59.3	149.0	33 10.0	+59.4	149.4	20
36 43.1	+59.0	148.1	35 52.0	+59.2	148.5	35 00.8	+59.3	148.8	34 09.4	+59.4	149.2	21
37 42.1	+59.1	147.9	36 51.2	+59.2	148.3	36 00.1	+59.3	148.6	35 08.8	+59.3	149.0	22
38 41.2	+59.0	147.6	37 50.4	+59.1	148.1	36 59.4	+59.2	148.5	36 08.1	+59.4	148.8	23
39 40.2	+59.0	147.4	38 49.5	+59.1	147.8	37 58.6	+59.2	148.3	37 07.5	+59.3	148.7	24
40 39.2	+58.9	147.2	39 48.6	+59.1	147.6	38 57.8	+59.2	148.1	38 06.8	+59.3	148.5	25
41 38.1	+58.9	146.9	40 47.7	+59.1	147.4	39 57.0	+59.2	147.8	39 06.1	+59.3	148.3	26
42 37.0	+58.9	146.7	41 46.8	+59.0	147.1	40 56.2	+59.2	147.6	40 05.4	+59.3	148.1	27
43 35.9	+58.9	146.4	42 45.8	+59.0	146.9	41 55.4	+59.1	147.4	41 04.7	+59.3	147.9	28
44 34.8	+58.8	146.1	43 44.8	+58.9	146.7	42 54.5	+59.1	147.2	42 04.0	+59.2	147.7	29
45 33.6	+58.7	145.8	44 43.7	+59.0	146.4	43 53.6	+59.1	146.9	43 03.2	+59.2	147.4	30
46 32.3	+58.7	145.5	45 42.7	+58.9	146.1	44 52.7	+59.0	146.7	44 02.4	+59.2	147.2	31
47 31.0	+58.7	145.2	46 41.6	+58.8	145.9	45 51.7	+59.0	146.4	45 01.6	+59.1	147.0	32
48 29.7	+58.6	144.9	47 40.4	+58.8	145.6	46 50.7	+59.0	146.2	46 00.7	+59.1	146.8	33
49 28.3	+58.6	144.6	48 39.2	+58.8	145.3	47 49.7	+58.9	145.9	46 59.8	+59.1	146.5	34
50 26.9	+58.5	144.3	49 38.0	+58.7	145.0	48 48.6	+58.9	145.6	47 58.9	+59.1	146.2	35
51 25.4	+58.4	143.9	50 36.7	+58.6	144.6	49 47.5	+58.9	145.3	48 58.0	+59.0	146.0	36
52 23.8	+58.4	143.5	51 35.3	+58.6	144.3	50 46.4	+58.7	145.0	49 57.0	+59.0	145.7	37
53 22.2	+58.2	143.2	52 33.9	+58.5	143.9	51 45.1	+58.8	144.7	50 56.0	+58.9	145.4	38
54 20.4	+58.2	142.8	53 32.4	+58.5	143.6	52 43.9	+58.7	144.4	51 54.9	+58.9	145.1	39
55 18.6	+58.1	142.3	54 30.9	+58.3	143.2	53 42.6	+58.6	144.0	52 53.8	+58.8	144.8	40
56 16.7	+58.0	141.9	55 29.2	+58.3	142.8	54 41.2	+58.5	143.6	53 52.6	+58.8	144.5	41
57 14.7	+57.9	141.4	56 27.5	+58.2	142.4	55 39.7	+58.5	143.3	54 51.4	+58.7	144.1	42
58 12.6	+57.8	140.9	57 25.7	+58.1	141.9	56 38.2	+58.4	142.9	55 50.1	+58.6	143.8	43
59 10.4	+57.6	140.4	58 23.8	+58.0	141.5	57 36.6	+58.2	142.4	56 48.7	+58.6	143.4	44
60 08.0	+57.5	139.9	59 21.8	+57.9	141.0	58 34.8	+58.2	142.0	57 47.3	+58.4	143.0	45
61 05.5	+57.4	139.3	60 19.7	+57.7	140.4	59 33.0	+58.1	141.5	58 45.7	+58.4	142.5	46
62 02.9	+57.1	138.7	61 17.4	+57.6	139.9	60 31.1	+58.0	141.0	59 44.1	+58.3	142.1	47
63 00.0	+57.0	138.0	62 15.0	+57.4	139.3	61 29.1	+57.8	140.5	60 42.4	+58.2	141.6	48
63 57.0	+56.7	137.3	63 12.4	+57.3	138.6	62 26.9	+57.7	139.9	61 40.6	+58.1	141.1	49
64 53.7	+56.5	136.5	64 09.7	+57.0	138.0	63 24.6	+57.5	139.3	62 38.7	+57.9	140.6	50
65 50.2	+56.2	135.7	65 06.7	+56.8	137.2	64 22.1	+57.4	138.7	63 36.6	+57.8	140.0	51
66 46.4	+56.0	134.9	66 03.5	+56.6	136.5	65 19.5	+57.1	138.0	64 34.4	+57.6	139.4	52
67 42.4	+55.5	133.9	67 00.1	+56.3	135.6	66 16.6	+56.9	137.2	65 32.0	+57.5	138.7	53
68 37.9	+55.2	132.9	67 56.4	+55.9	134.7	67 13.5	+56.7	136.4	66 29.5	+57.2	138.0	54
69 33.1	+54.7	131.8	68 52.3	+55.6	133.7	68 10.2	+56.3	135.6	67 26.7	+57.0	137.2	55
70 27.8	+54.2	130.6	69 47.9	+55.2	132.7	69 06.5	+56.0	134.6	68 23.7	+56.7	136.4	56
71 22.0	+53.6	129.3	70 43.1	+54.7	131.5	70 02.5	+55.6	133.6	69 20.4	+56.4	135.5	57
72 15.6	+52.9	127.9	71 37.8	+54.1	130.2	70 58.1	+55.2	132.5	70 16.8	+56.1	134.5	58
73 08.5	+52.1	126.3	72 31.9	+53.5	128.8	71 53.3	+54.7	131.2	71 12.9	+55.6	133.4	59
74 00.6	+51.1	124.5	73 25.4	+52.7	127.3	72 48.0	+54.0	129.9	72 08.5	+55.2	132.2	60
74 51.7	+50.0	122.6	74 18.1	+51.8	125.6	73 42.0	+53.3	128.4	73 03.7	+54.6	130.9	61
75 41.7	+48.7	120.4	75 09.9	+50.7	123.7	74 35.3	+52.5	126.7	73 58.3	+54.0	129.5	62
76 30.4	+47.1	118.0	76 00.6	+49.5	121.5	75 27.8	+51.5	124.8	74 52.3	+53.1	127.8	63
77 17.5	*+45.2*	•115.2	76 50.1	+48.0	119.1	76 19.3	+50.3	122.7	75 45.4	+52.2	126.0	64
78 02.7	*+43.0*	•112.1	77 38.1	*+46.1*	•116.4	77 09.6	+48.8	120.3	76 37.6	+51.1	123.9	65
78 45.7	*+40.2*	•108.7	78 24.2	*+43.8*	•113.3	77 58.4	*+47.0*	•117.6	77 28.7	+49.7	121.6	66
79 25.9	*+36.9*	•104.7	79 08.0	*+41.2*	•109.8	78 45.4	*+44.8*	•114.5	78 18.4	+48.0	118.9	67
80 02.8	*+32.9*	•100.3	79 49.2	*+37.9*	•105.8	79 30.2	*+42.2*	•111.0	79 06.4	*+45.8*	•115.9	68
80 35.7	*+28.3*	• 95.3	80 27.1	*+33.8*	•101.3	80 12.4	*+38.9*	•107.0	79 52.2	*+43.3*	•112.3	69
81 04.0	*+22.9*	• 89.8	81 00.9	*+29.1*	• 96.1	80 51.3	*+34.8*	•102.3	80 35.5	*+39.9*	•108.2	70
81 26.9	*+16.7*	• 83.7	81 30.0	*+23.4*	• 90.4	81 26.1	*+29.9*	• 97.0	81 15.4	*+35.9*	•103.5	71
81 43.6	*+9.8*	• 77.1	81 53.4	*+17.0*	• 84.0	81 56.0	*+24.1*	• 91.0	81 51.3	*+30.8*	• 98.0	72
81 53.4	*+2.6*	• 70.2	82 10.4	*+9.7*	• 77.1	82 20.1	*+17.2*	• 84.3	82 22.1	*+24.7*	• 91.8	73
81 56.0	*−4.7*	• 63.1	82 20.1	*+2.0*	• 69.7	82 37.3	*+9.5*	• 77.0	82 46.8	*+17.5*	• 84.7	74
81 51.3	*−11.9*	• 56.0	82 22.1	*−5.7*	• 62.2	82 46.8	*+1.4*	• 69.2	83 04.3	*+9.4*	• 76.9	75
81 39.4	*−18.6*	• 49.2	82 16.4	*−13.2*	• 54.8	82 48.2	*−6.8*	• 61.3	83 13.7	*+0.6*	• 68.7	76
81 20.8	*−24.5*	• 42.8	82 03.2	*−20.2*	• 47.6	82 41.4	*−14.7*	• 53.4	83 14.3	*−8.1*	• 60.2	77
80 56.3	*−29.7*	• 36.8	81 43.0	*−26.2*	• 40.9	82 26.7	*−21.9*	• 45.9	83 06.2	*−16.4*	• 51.8	78
80 26.6	*−34.2*	• 31.4	81 16.8	*−31.5*	• 34.8	82 04.8	*−28.0*	• 39.0	82 49.8	*−23.7*	• 44.0	79
79 52.4	*−38.0*	• 26.6	80 45.3	*−35.8*	• 29.4	81 36.8	*−33.3*	• 32.7	82 26.1	*−30.0*	• 36.8	80
79 14.4	*−41.0*	• 22.4	80 09.5	*−39.5*	• 24.6	81 03.5	*−37.6*	• 27.2	81 56.1	*−35.2*	• 30.4	81
78 33.4	*−43.7*	• 18.6	79 30.0	*−42.5*	• 20.3	80 25.9	*−41.2*	• 22.3	81 20.9	*−39.4*	• 24.8	82
77 49.7	−45.8	15.2	78 47.5	*−45.0*	• 16.5	79 44.7	*−44.0*	• 18.1	80 41.5	*−42.8*	• 20.0	83
77 03.9	−47.6	12.2	78 02.5	−47.1	13.2	79 00.7	*−46.3*	• 14.4	79 58.7	*−45.6*	• 15.8	84
76 16.3	−49.1	9.6	77 15.4	−48.7	10.3	78 14.4	−48.3	11.2	79 13.1	−47.7	12.2	85
75 27.2	−50.3	7.2	76 26.7	−50.1	7.8	77 26.1	−49.8	8.4	78 25.4	−49.4	9.1	86
74 36.9	−51.5	5.1	75 36.6	−51.3	5.5	76 36.3	−51.1	5.9	77 36.0	−50.9	6.4	87
73 45.4	−52.3	3.2	74 45.3	−52.2	3.5	75 45.2	−52.1	3.7	76 45.1	−52.1	4.0	88
72 53.1	−53.1	1.5	73 53.1	−53.1	1.6	74 53.1	−53.1	1.7	75 53.0	−53.0	1.9	89
72 00.0	−53.8	0.0	73 00.0	−53.8	0.0	74 00.0	−53.8	0.0	75 00.0	−53.8	0.0	90
72°			73°			74°			75°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 27°, 333°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	19 29.9	−59.0	151.2	18 37.3	−59.1	151.4	17 44.6	−59.2	151.5	16 51.8	−59.3	151.7	15 58.9	−59.3	151.8	15 06.0	−59.4	152.0	14 13.0	−59.5	152.1	13 20.0	−59.6	152.2	0
1	18 30.9	−59.1	151.4	17 38.2	−59.2	151.6	16 45.4	−59.3	151.7	15 52.5	−59.3	151.8	14 59.6	−59.4	152.0	14 06.6	−59.5	152.1	13 13.5	−59.5	152.2	12 20.4	−59.6	152.3	1
2	17 31.8	−59.0	151.6	16 39.0	−59.1	151.7	15 46.1	−59.2	151.9	14 53.2	−59.3	152.0	14 00.2	−59.4	152.1	13 07.1	−59.4	152.2	12 14.0	−59.5	152.3	11 20.8	−59.5	152.4	2
3	16 32.8	−59.1	151.8	15 39.9	−59.1	151.9	14 46.9	−59.2	152.0	13 53.9	−59.3	152.2	13 00.8	−59.4	152.3	12 07.7	−59.5	152.4	11 14.5	−59.5	152.5	10 21.3	−59.6	152.6	3
4	15 33.7	−59.0	152.0	14 40.8	−59.2	152.1	13 47.7	−59.2	152.2	12 54.6	−59.3	152.3	12 01.4	−59.3	152.4	11 08.2	−59.4	152.5	10 15.0	−59.5	152.6	9 21.7	−59.6	152.7	4
5	14 34.7	−59.1	152.1	13 41.6	−59.2	152.3	12 48.5	−59.3	152.4	11 55.3	−59.3	152.5	11 02.1	−59.4	152.6	10 08.8	−59.5	152.6	9 15.5	−59.5	152.7	8 22.1	−59.5	152.8	5
6	13 35.6	−59.1	152.3	12 42.4	−59.1	152.4	11 49.2	−59.2	152.5	10 56.0	−59.3	152.6	10 02.7	−59.4	152.7	9 09.3	−59.4	152.8	8 16.0	−59.6	152.9	7 22.6	−59.6	152.9	6
7	12 36.5	−59.1	152.5	11 43.3	−59.2	152.6	10 50.0	−59.3	152.7	9 56.7	−59.4	152.8	9 03.3	−59.4	152.9	8 09.9	−59.5	152.9	7 16.4	−59.5	153.0	6 23.0	−59.6	153.0	7
8	11 37.4	−59.0	152.7	10 44.1	−59.2	152.8	9 50.7	−59.2	152.9	8 57.3	−59.3	152.9	8 03.9	−59.4	153.0	7 10.4	−59.4	153.1	6 16.9	−59.5	153.1	5 23.4	−59.6	153.2	8
9	10 38.4	−59.1	152.9	9 44.9	−59.1	152.9	8 51.5	−59.3	153.0	7 58.0	−59.3	153.1	7 04.5	−59.4	153.1	6 11.0	−59.5	153.2	5 17.4	−59.5	153.2	4 23.8	−59.6	153.3	9
10	9 39.3	−59.1	153.0	8 45.8	−59.2	153.1	7 52.2	−59.2	153.2	6 58.7	−59.4	153.2	6 05.1	−59.4	153.3	5 11.5	−59.5	153.3	4 17.9	−59.6	153.4	3 24.2	−59.5	153.4	10
11	8 40.2	−59.2	153.2	7 46.6	−59.2	153.3	6 53.0	−59.3	153.3	5 59.3	−59.3	153.4	5 05.7	−59.4	153.4	4 12.0	−59.4	153.5	3 18.3	−59.5	153.5	2 24.7	−59.6	153.5	11
12	7 41.0	−59.1	153.4	6 47.4	−59.2	153.4	5 53.7	−59.3	153.5	5 00.0	−59.3	153.5	4 06.3	−59.4	153.6	3 12.6	−59.5	153.6	2 18.8	−59.5	153.6	1 25.1	−59.6	153.6	12
13	6 41.9	−59.1	153.6	5 48.2	−59.2	153.6	4 54.4	−59.2	153.6	4 00.7	−59.4	153.7	3 06.9	−59.4	153.7	2 13.1	−59.5	153.7	1 19.3	−59.5	153.7	0 25.5	−59.6	153.7	13
14	5 42.8	−59.1	153.7	4 49.0	−59.2	153.8	3 55.2	−59.3	153.8	3 01.3	−59.3	153.8	2 07.5	−59.4	153.8	1 13.6	−59.4	153.9	0 19.8	−59.6	153.9	0 34.1	+59.6	26.1	14
15	4 43.7	−59.1	153.9	3 49.8	−59.2	153.9	2 55.9	−59.3	154.0	2 02.0	−59.3	154.0	1 08.1	−59.4	154.0	0 14.2	−59.5	154.0	0 39.8	+59.5	26.0	1 33.7	+59.6	26.0	15
16	3 44.6	−59.1	154.1	2 50.6	−59.2	154.1	1 56.6	−59.2	154.1	1 02.7	−59.4	154.1	0 08.7	−59.4	154.1	0 45.3	+59.5	25.9	1 39.3	+59.5	25.9	2 33.3	+59.6	25.9	16
17	2 45.5	−59.2	154.2	1 51.4	−59.2	154.3	0 57.4	−59.3	154.3	0 03.3	−59.3	154.3	0 50.7	+59.4	25.7	1 44.8	+59.4	25.7	2 38.8	+59.5	25.8	3 32.9	+59.5	25.8	17
18	1 46.3	−59.1	154.4	0 52.2	−59.2	154.4	0 01.9	+59.3	25.6	0 56.0	+59.4	25.6	1 50.1	+59.4	25.6	2 44.2	+59.5	25.6	3 38.3	+59.6	25.6	4 32.4	+59.6	25.7	18
19	0 47.2	−59.1	154.6	0 07.0	+59.2	25.4	1 01.2	+59.2	25.4	1 55.4	+59.3	25.4	2 49.5	+59.4	25.5	3 43.7	+59.5	25.5	4 37.9	+59.5	25.5	5 32.0	+59.6	25.5	19
20	0 11.9	+59.1	25.3	1 06.2	+59.2	25.3	2 00.4	+59.3	25.3	2 54.7	+59.3	25.3	3 48.9	+59.5	25.3	4 43.2	+59.4	25.3	5 37.4	+59.5	25.4	6 31.6	+59.6	25.4	20
21	1 11.0	+59.2	25.1	2 05.4	+59.2	25.1	2 59.7	+59.3	25.1	3 54.0	+59.4	25.1	4 48.4	+59.4	25.2	5 42.6	+59.5	25.2	6 36.9	+59.5	25.3	7 31.2	+59.5	25.3	21
22	2 10.2	+59.1	24.9	3 04.6	+59.2	24.9	3 59.0	+59.3	25.0	4 53.4	+59.3	25.0	5 47.8	+59.4	25.0	6 42.1	+59.5	25.1	7 36.4	+59.6	25.1	8 30.7	+59.6	25.2	22
23	3 09.3	+59.1	24.7	4 03.8	+59.2	24.8	4 58.3	+59.2	24.8	5 52.7	+59.3	24.8	6 47.2	+59.3	24.9	7 41.6	+59.4	24.9	8 36.0	+59.5	25.0	9 30.3	+59.6	25.1	23
24	4 08.4	+59.1	24.6	5 03.0	+59.2	24.6	5 57.5	+59.3	24.6	6 52.0	+59.4	24.7	7 46.5	+59.4	24.7	8 41.0	+59.5	24.8	9 35.5	+59.5	24.9	10 29.9	+59.6	24.9	24
25	5 07.5	+59.2	24.4	6 02.2	+59.2	24.4	6 56.8	+59.2	24.5	7 51.4	+59.3	24.5	8 45.9	+59.4	24.6	9 40.5	+59.4	24.7	10 35.0	+59.5	24.7	11 29.5	+59.5	24.8	25
26	6 06.7	+59.1	24.2	7 01.4	+59.1	24.3	7 56.0	+59.3	24.3	8 50.7	+59.3	24.4	9 45.3	+59.4	24.5	10 39.9	+59.5	24.5	11 34.5	+59.5	24.6	12 29.0	+59.6	24.7	26
27	7 05.8	+59.1	24.1	8 00.5	+59.2	24.1	8 55.3	+59.3	24.2	9 50.0	+59.3	24.2	10 44.7	+59.4	24.3	11 39.4	+59.4	24.4	12 34.0	+59.5	24.5	13 28.6	+59.5	24.6	27
28	8 04.9	+59.1	23.9	8 59.7	+59.2	23.9	9 54.6	+59.2	24.0	10 49.3	+59.4	24.1	11 44.1	+59.4	24.2	12 38.8	+59.5	24.3	13 33.5	+59.5	24.4	14 28.1	+59.6	24.5	28
29	9 04.0	+59.1	23.7	9 58.9	+59.2	23.8	10 53.8	+59.2	23.9	11 48.7	+59.3	23.9	12 43.5	+59.4	24.0	13 38.3	+59.4	24.1	14 33.0	+59.5	24.2	15 27.7	+59.6	24.3	29
30	10 03.1	+59.1	23.5	10 58.1	+59.1	23.6	11 53.0	+59.3	23.7	12 48.0	+59.3	23.8	13 42.9	+59.3	23.9	14 37.7	+59.4	24.0	15 32.5	+59.5	24.1	16 27.3	+59.5	24.2	30
31	11 02.2	+59.1	23.4	11 57.2	+59.2	23.4	12 52.3	+59.2	23.5	13 47.3	+59.3	23.6	14 42.2	+59.4	23.7	15 37.1	+59.5	23.8	16 32.0	+59.5	23.9	17 26.8	+59.5	24.1	31
32	12 01.3	+59.1	23.2	12 56.4	+59.2	23.3	13 51.5	+59.2	23.4	14 46.6	+59.3	23.5	15 41.6	+59.3	23.6	16 36.6	+59.4	23.7	17 31.5	+59.5	23.8	18 26.3	+59.6	23.9	32
33	13 00.4	+59.0	23.0	13 55.6	+59.1	23.1	14 50.7	+59.3	23.2	15 45.9	+59.2	23.3	16 40.9	+59.4	23.4	17 36.0	+59.4	23.5	18 31.0	+59.4	23.7	19 25.9	+59.5	23.8	33
34	13 59.4	+59.1	22.8	14 54.7	+59.2	22.9	15 50.0	+59.2	23.0	16 45.1	+59.3	23.1	17 40.3	+59.3	23.3	18 35.4	+59.4	23.4	19 30.4	+59.5	23.5	20 25.4	+59.5	23.7	34
35	14 58.5	+59.1	22.6	15 53.9	+59.1	22.7	16 49.2	+59.2	22.9	17 44.4	+59.3	23.0	18 39.6	+59.4	23.1	19 34.8	+59.4	23.2	20 29.9	+59.4	23.4	21 24.9	+59.5	23.5	35
36	15 57.6	+59.0	22.5	16 53.0	+59.1	22.6	17 48.4	+59.2	22.7	18 43.7	+59.3	22.8	19 39.0	+59.3	23.0	20 34.2	+59.4	23.1	21 29.3	+59.5	23.2	22 24.4	+59.6	23.4	36
37	16 56.6	+59.0	22.3	17 52.1	+59.1	22.4	18 47.6	+59.1	22.5	19 43.0	+59.2	22.7	20 38.3	+59.3	22.8	21 33.6	+59.4	22.9	22 28.8	+59.4	23.1	23 24.0	+59.5	23.3	37
38	17 55.6	+59.1	22.1	18 51.2	+59.1	22.2	19 46.7	+59.2	22.3	20 42.2	+59.2	22.5	21 37.6	+59.3	22.6	22 33.0	+59.3	22.8	23 28.2	+59.5	23.0	24 23.5	+59.5	23.1	38
39	18 54.7	+59.0	21.9	19 50.3	+59.1	22.0	20 45.9	+59.2	22.2	21 41.4	+59.3	22.3	22 36.9	+59.3	22.5	23 32.3	+59.4	22.6	24 27.7	+59.4	22.8	25 23.0	+59.4	23.0	39
40	19 53.7	+59.0	21.7	20 49.4	+59.1	21.8	21 45.1	+59.1	22.0	22 40.7	+59.2	22.1	23 36.2	+59.3	22.3	24 31.7	+59.3	22.5	25 27.1	+59.4	22.7	26 22.4	+59.5	22.8	40
41	20 52.7	+59.0	21.5	21 48.5	+59.1	21.7	22 44.2	+59.2	21.8	23 39.9	+59.2	22.0	24 35.5	+59.3	22.1	25 31.0	+59.4	22.3	26 26.5	+59.4	22.5	27 21.9	+59.5	22.7	41
42	21 51.7	+59.0	21.3	22 47.6	+59.0	21.5	23 43.4	+59.1	21.6	24 39.1	+59.2	21.8	25 34.8	+59.2	22.0	26 30.4	+59.3	22.1	27 25.9	+59.4	22.3	28 21.4	+59.4	22.5	42
43	22 50.7	+58.9	21.1	23 46.6	+59.0	21.3	24 42.5	+59.1	21.4	25 38.3	+59.2	21.6	26 34.0	+59.3	21.8	27 29.7	+59.3	22.0	28 25.3	+59.4	22.2	29 20.8	+59.5	22.4	43
44	23 49.6	+59.0	20.9	24 45.6	+59.1	21.1	25 41.6	+59.1	21.2	26 37.5	+59.1	21.4	27 33.3	+59.2	21.6	28 29.0	+59.3	21.8	29 24.7	+59.4	22.0	30 20.3	+59.4	22.2	44
45	24 48.6	+58.9	20.7	25 44.7	+59.0	20.9	26 40.7	+59.1	21.1	27 36.6	+59.2	21.2	28 32.5	+59.3	21.4	29 28.3	+59.3	21.6	30 24.1	+59.3	21.9	31 19.7	+59.4	22.1	45
46	25 47.5	+58.9	20.5	26 43.7	+59.0	20.7	27 39.8	+59.0	20.9	28 35.8	+59.1	21.1	29 31.8	+59.2	21.3	30 27.6	+59.3	21.5	31 23.4	+59.4	21.7	32 19.1	+59.5	21.9	46
47	26 46.4	+58.9	20.3	27 42.7	+58.9	20.5	28 38.8	+59.1	20.7	29 34.9	+59.2	20.9	30 31.0	+59.2	21.1	31 26.9	+59.3	21.3	32 22.8	+59.3	21.5	33 18.6	+59.4	21.7	47
48	27 45.3	+58.9	20.1	28 41.6	+59.0	20.3	29 37.9	+59.0	20.5	30 34.1	+59.1	20.7	31 30.2	+59.1	20.9	32 26.2	+59.2	21.1	33 22.1	+59.3	21.3	34 18.0	+59.3	21.6	48
49	28 44.2	+58.8	19.9	29 40.6	+58.9	20.0	30 36.9	+59.0	20.2	31 33.2	+59.0	20.5	32 29.3	+59.2	20.7	33 25.4	+59.2	20.9	34 21.4	+59.3	21.1	35 17.3	+59.4	21.4	49
50	29 43.0	+58.8	19.6	30 39.5	+58.9	19.8	31 35.9	+59.0	20.0	32 32.2	+59.1	20.3	33 28.5	+59.1	20.5	34 24.6	+59.3	20.7	35 20.7	+59.3	21.0	36 16.7	+59.4	21.2	50
51	30 41.8	+58.8	19.4	31 38.4	+58.9	19.6	32 34.9	+58.9	19.8	33 31.3	+59.0	20.0	34 27.6	+59.1	20.3	35 23.9	+59.1	20.5	36 20.0	+59.3	20.8	37 16.1	+59.3	21.0	51
52	31 40.6	+58.8	19.2	32 37.3	+58.8	19.4	33 33.8	+59.0	19.6	34 30.3	+59.0	19.8	35 26.7	+59.1	20.1	36 23.0	+59.2	20.3	37 19.3	+59.2	20.6	38 15.4	+59.3	20.9	52
53	32 39.4	+58.8	18.9	33 36.1	+58.9	19.1	34 32.8	+58.9	19.4	35 29.3	+59.0	19.6	36 25.8	+59.1	19.9	37 22.2	+59.2	20.1	38 18.5	+59.2	20.4	39 14.7	+59.3	20.7	53
54	33 38.2	+58.7	18.7	34 35.0	+58.8	18.9	35 31.7	+58.9	19.1	36 28.3	+59.0	19.4	37 24.9	+59.0	19.6	38 21.4	+59.1	19.9	39 17.7	+59.2	20.2	40 14.0	+59.3	20.5	54
55	34 36.9	+58.7	18.4	35 33.8	+58.7	18.7	36 30.6	+58.8	18.9	37 27.3	+58.9	19.1	38 23.9	+59.1	19.4	39 20.5	+59.1	19.7	40 16.9	+59.2	20.0	41 13.3	+59.2	20.3	55
56	35 35.6	+58.6	18.2	36 32.5	+58.8	18.4	37 29.4	+58.9	18.7	38 26.2	+58.9	18.9	39 23.0	+58.9	19.2	40 19.6	+59.0	19.5	41 16.1	+59.2	19.7	42 12.5	+59.3	20.0	56
57	36 34.2	+58.7	17.9	37 31.3	+58.7	18.2	38 28.3	+58.7	18.4	39 25.1	+58.9	18.7	40 21.9	+59.0	18.9	41 18.6	+59.1	19.2	42 15.3	+59.1	19.5	43 11.8	+59.2	19.8	57
58	37 32.9	+58.5	17.7	38 30.0	+58.7	17.9	39 27.0	+58.8	18.2	40 24.0	+58.9	18.4	41 20.9	+58.9	18.7	42 17.7	+59.0	19.0	43 14.4	+59.1	19.3	44 11.0	+59.1	19.6	58
59	38 31.4	+58.6	17.4	39 28.7	+58.6	17.6	40 25.8	+58.7	17.9	41 22.9	+58.8	18.2	42 19.8	+58.9	18.4	43 16.7	+59.0	18.7	44 13.5	+59.0	19.0	45 10.1	+59.2	19.4	59
60	39 30.0	+58.5	17.1	40 27.3	+58.6	17.4	41 24.5	+58.7	17.6	42 21.7	+58.7	17.9	43 18.7	+58.9	18.2	44 15.7	+58.9	18.5	45 12.5	+59.1	18.8	46 09.3	+59.1	19.1	60
61	40 28.5	+58.5	16.8	41 25.9	+58.5	17.1	42 23.2	+58.6	17.3	43 20.4	+58.8	17.6	44 17.6	+58.8	17.9	45 14.6	+58.9	18.2	46 11.6	+59.0	18.5	47 08.4	+59.1	18.9	61
62	41 27.0	+58.4	16.5	42 24.4	+58.5	16.8	43 21.8	+58.6	17.0	44 19.2	+58.6	17.3	45 16.4	+58.8	17.6	46 13.5	+58.9	17.9	47 10.6	+58.9	18.3	48 07.5	+59.0	18.6	62
63	42 25.4	+58.3	16.2	43 22.9	+58.5	16.5	44 20.4	+58.6	16.7	45 17.8	+58.7	17.0	46 15.2	+58.7	17.3	47 12.4	+58.8	17.7	48 09.5	+58.9	18.0	49 06.5	+59.0	18.4	63
64	43 23.7	+58.3	15.9	44 21.4	+58.4	16.2	45 19.0	+58.5	16.4	46 16.5	+58.6	16.7	47 13.9	+58.7	17.0	48 11.2	+58.8	17.4	49 08.4	+58.9	17.7	50 05.5	+59.0	18.1	64
65	44 22.0	+58.3	15.6	45 19.8	+58.3	15.8	46 17.5	+58.4	16.1	47 15.1	+58.5	16.4	48 12.6	+58.6	16.7	49 10.0	+58.7	17.1	50 07.3	+58.8	17.4	51 04.5	+58.9	17.8	65
66	45 20.3	+58.2	15.2	46 18.1	+58.3	15.5	47 15.9	+58.4	15.8	48 13.6	+58.5	16.1	49 11.2	+58.6	16.4	50 08.7	+58.7	16.7	51 06.1	+58.8	17.1	52 03.4	+58.9	17.5	66
67	46 18.5	+58.1	14.9	47 16.4	+58.2	15.2	48 14.3	+58.3	15.4	49 12.1	+58.4	15.8	50 09.8	+58.5	16.1	51 07.4	+58.6	16.4	52 04.9	+58.7	16.8	53 02.3	+58.8	17.2	67
68	47 16.6	+58.0	14.5	48 14.6	+58.2	14.8	49 12.6	+58.2	15.1	50 10.5	+58.3	15.4	51 08.3	+58.4	15.7	52 06.0	+58.5	16.1	53 03.6	+58.7	16.4	54 01.1	+58.7	16.8	68
69	48 14.6	+58.0	14.1	49 12.8	+58.0	14.4	50 10.8	+58.2	14.7	51 08.8	+58.3	15.0	52 06.7	+58.4	15.4	53 04.5	+58.5	15.7	54 02.3	+58.5	16.1	54 59.8	+58.7	16.5	69
70	49 12.6	+57.9	13.7	50 10.8	+58.0	14.0	51 09.0	+58.1	14.3	52 07.1	+58.2	14.6	53 05.1	+58.3	15.0	54 03.0	+58.4	15.3	55 00.8	+58.6	15.7	55 58.5	+58.7	16.1	70
71	50 10.5	+57.8	13.3	51 08.8	+57.9	13.6	52 07.1	+58.0	13.9	53 05.3	+58.1	14.2	54 03.4	+58.2	14.6	55 01.4	+58.4	14.9	55 59.4	+58.4	15.3	56 57.2	+58.5	15.7	71
72	51 08.3	+57.7	12.9	52 06.7	+57.8	13.2	53 05.1	+57.9	13.5	54 03.4	+58.0	13.8	55 01.6	+58.2	14.2	55 59.8	+58.2	14.5	56 57.8	+58.4	14.9	57 55.7	+58.5	15.3	72
73	52 06.0	+57.6	12.5	53 04.5	+57.8	12.8	54 03.0	+57.8	13.1	55 01.4	+58.0	13.4	55 59.8	+58.0	13.7	56 58.0	+58.2	14.1	57 56.2	+58.2	14.5	58 54.2	+58.4	14.9	73
74	53 03.6	+57.5	12.0	54 02.3	+57.5	12.3	55 00.8	+57.7	12.6	55 59.4	+57.8	12.9	56 57.8	+57.9	13.3	57 56.2	+58.0	13.6	58 54.4	+58.2	14.0	59 52.6	+58.3	14.4	74
75	54 01.1	+57.4	11.5	54 59.8	+57.5	11.8	55 58.5	+57.6	12.1	56 57.2	+57.7	12.4	57 55.7	+57.8	12.8	58 54.2	+57.9	13.2	59 52.6	+58.0	13.5	60 50.9	+58.1	14.0	75
76	54 58.5	+57.2	11.0	55 57.3	+57.4	11.3	56 56.1	+57.5	11.6	57 54.9	+57.5	11.9	58 53.5	+57.7	12.3	59 52.1	+57.8	12.6	60 50.6	+57.9	13.0	61 49.0	+58.1	13.4	76
77	55 55.7	+57.1	10.5	56 54.7	+57.2	10.8	57 53.6	+57.3	11.1	58 52.4	+57.4	11.4	59 51.2	+57.5	11.7	60 49.9	+57.7	12.1	61 48.5	+57.8	12.5	62 47.1	+57.9	12.9	77
78	56 52.8	+56.9	9.9	57 51.9	+57.0	10.2	58 50.9	+57.1	10.5	59 49.8	+57.3	10.8	60 48.7	+57.4	11.2	61 47.6	+57.5	11.5	62 46.3	+57.7	11.9	63 45.0	+57.8	12.3	78
79	57 49.7	+56.8	9.4	58 48.9	+56.9	9.6	59 48.0	+57.0	9.9	60 47.1	+57.1	10.2	61 46.1	+57.2	10.6	62 45.1	+57.3	10.9	63 44.0	+57.4	11.3	64 42.8	+57.6	11.7	79
80	58 46.5	+56.6	8.7	59 45.8	+56.7	9.0	60 45.0	+56.8	9.3	61 44.2	+56.9	9.6	62 43.3	+57.1	9.9	63 42.4	+57.2	10.3	64 41.4	+57.3	10.6	65 40.4	+57.4	11.0	80
81	59 43.1	+56.4	8.1	60 42.5	+56.4	8.3	61 41.8	+56.6	8.6	62 41.1	+56.7	8.9	63 40.4	+56.8	9.2	64 39.6	+56.9	9.6	65 38.7	+57.1	9.9	66 37.8	+57.2	10.3	81
82	60 39.5	+56.1	7.4	61 38.9	+56.3	7.6	62 38.4	+56.3	7.9	63 37.8	+56.5	8.2	64 37.2	+56.5	8.5	65 36.5	+56.7	8.8	66 35.8	+56.8	9.2	67 35.0	+56.9	9.5	82
83	61 35.6	+55.9	6.7	62 35.2	+56.0	6.9	63 34.7	+56.1	7.1	64 34.3	+56.2	7.4	65 33.7	+56.4	7.7	66 33.2	+56.4	8.0	67 32.6	+56.5	8.3	68 31.9	+56.7	8.7	83
84	62 31.5	+55.7	5.9	63 31.2	+55.7	6.1	64 30.8	+55.9	6.3	65 30.5	+55.9	6.6	66 30.1	+56.0	6.8	67 29.6	+56.1	7.1	68 29.1	+56.3	7.4	69 28.6	+56.4	7.8	84
85	63 27.2	+55.3	5.1	64 26.9	+55.4	5.3	65 26.7	+55.4	5.5	66 26.4	+55.5	5.7	67 26.1	+55.6	5.9	68 25.7	+55.8	6.2	69 25.4	+55.8	6.5	70 25.0	+56.0	6.8	85
86	64 22.5	+55.0	4.2	65 22.3	+55.1	4.4	66 22.1	+55.2	4.5	67 21.9	+55.2	4.7	68 21.7	+55.3	4.9	69 21.5	+55.4	5.2	70 21.2	+55.5	5.4	71 21.0	+55.5	5.7	86
87	65 17.5	+54.6	3.3	66 17.4	+54.6	3.4	67 17.3	+54.7	3.5	68 17.1	+54.8	3.7	69 17.0	+54.9	3.9	70 16.9	+54.9	4.0	71 16.7	+55.0	4.2	72 16.5	+55.1	4.5	87
88	66 12.1	+54.2	2.3	67 12.0	+54.3	2.3	68 12.0	+54.3	2.4	69 11.9	+54.3	2.6	70 11.9	+54.3	2.7	71 11.8	+54.4	2.8	72 11.7	+54.5	3.0	73 11.6	+54.6	3.1	88
89	67 06.3	+53.7	1.2	68 06.3	+53.7	1.2	69 06.3	+53.7	1.3	70 06.2	+53.8	1.3	71 06.2	+53.8	1.4	72 06.2	+53.8	1.5	73 06.2	+53.8	1.6	74 06.2	+53.8	1.7	89
90	68 00.0	+53.2	0.0	69 00.0	+53.2	0.0	70 00.0	+53.2	0.0	71 00.0	+53.1	0.0	72 00.0	+53.1	0.0	73 00.0	+53.1	0.0	74 00.0	+53.1	0.0	75 00.0	+53.0	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 153°, 207°

28°, 332° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.....Zn=360°–Z

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	19 18.9	+58.9	150.2	18 26.8	+59.0	150.3	17 34.6	+59.2	150.5	16 42.4	+59.2	150.6	15 50.0	+59.3	150.8	14 57.6	+59.4	150.9	14 05.1	+59.5	151.1	13 12.6	+59.5	151.2	0
1	20 17.8	+59.0	150.0	19 25.8	+59.1	150.1	18 33.8	+59.1	150.3	17 41.6	+59.2	150.5	16 49.3	+59.3	150.6	15 57.0	+59.4	150.8	15 04.6	+59.5	150.9	14 12.1	+59.6	151.0	1
2	21 16.8	+58.9	149.8	20 24.9	+59.0	150.0	19 32.9	+59.1	150.1	18 40.8	+59.2	150.3	17 48.6	+59.3	150.5	16 56.4	+59.4	150.6	16 04.1	+59.4	150.8	15 11.7	+59.5	150.9	2
3	22 15.7	+58.9	149.6	21 23.9	+59.0	149.8	20 32.0	+59.1	150.0	19 40.0	+59.2	150.1	18 47.9	+59.3	150.3	17 55.8	+59.3	150.5	17 03.5	+59.5	150.6	16 11.2	+59.5	150.8	3
4	23 14.6	+58.9	149.4	22 22.9	+59.0	149.6	21 31.1	+59.1	149.8	20 39.2	+59.2	150.0	19 47.2	+59.3	150.2	18 55.1	+59.4	150.3	18 03.0	+59.4	150.5	17 10.7	+59.5	150.6	4
5	24 13.5	+58.8	149.1	23 21.9	+59.0	149.4	22 30.2	+59.1	149.6	21 38.4	+59.2	149.8	20 46.5	+59.3	150.0	19 54.5	+59.3	150.2	19 02.4	+59.4	150.3	18 10.2	+59.5	150.5	5
6	25 12.3	+58.9	148.9	24 20.9	+58.9	149.2	23 29.3	+59.0	149.4	22 37.6	+59.1	149.6	21 45.8	+59.2	149.8	20 53.8	+59.4	150.0	20 01.8	+59.5	150.2	19 09.7	+59.5	150.4	6
7	26 11.2	+58.8	148.7	25 19.8	+59.0	149.0	24 28.3	+59.1	149.2	23 36.7	+59.2	149.4	22 45.0	+59.3	149.6	21 53.2	+59.3	149.9	21 01.3	+59.4	150.1	20 09.2	+59.5	150.2	7
8	27 10.0	+58.8	148.5	26 18.8	+58.9	148.8	25 27.4	+59.0	149.0	24 35.9	+59.1	149.2	23 44.3	+59.2	149.5	22 52.5	+59.3	149.7	22 00.7	+59.4	149.9	21 08.7	+59.5	150.1	8
9	28 08.8	+58.8	148.3	27 17.7	+58.9	148.5	26 26.4	+59.0	148.8	25 35.0	+59.2	149.1	24 43.5	+59.2	149.3	23 51.8	+59.4	149.5	23 00.1	+59.4	149.8	22 08.2	+59.5	150.0	9
10	29 07.6	+58.7	148.0	28 16.6	+58.9	148.3	27 25.4	+59.0	148.6	26 34.2	+59.1	148.9	25 42.7	+59.2	149.1	24 51.2	+59.3	149.4	23 59.5	+59.4	149.6	23 07.7	+59.4	149.8	10
11	30 06.3	+58.8	147.8	29 15.5	+58.8	148.1	28 24.4	+59.0	148.4	27 33.3	+59.1	148.7	26 41.9	+59.2	148.9	25 50.5	+59.3	149.2	24 58.9	+59.3	149.4	24 07.1	+59.5	149.7	11
12	31 05.1	+58.7	147.6	30 14.3	+58.9	147.9	29 23.4	+59.0	148.2	28 32.4	+59.0	148.5	27 41.1	+59.2	148.8	26 49.8	+59.2	149.0	25 58.2	+59.4	149.3	25 06.6	+59.5	149.5	12
13	32 03.8	+58.7	147.3	31 13.2	+58.8	147.7	30 22.4	+58.9	148.0	29 31.4	+59.1	148.3	28 40.3	+59.2	148.6	27 49.0	+59.3	148.9	26 57.6	+59.4	149.1	26 06.1	+59.4	149.4	13
14	33 02.5	+58.6	147.1	32 12.0	+58.8	147.4	31 21.3	+59.0	147.8	30 30.5	+59.0	148.1	29 39.5	+59.1	148.4	28 48.3	+59.3	148.7	27 57.0	+59.3	149.0	27 05.5	+59.4	149.2	14
15	34 01.1	+58.6	146.8	33 10.8	+58.7	147.2	32 20.3	+58.8	147.5	31 29.5	+59.1	147.9	30 38.6	+59.2	148.2	29 47.6	+59.2	148.5	28 56.3	+59.4	148.8	28 04.9	+59.5	149.1	15
16	34 59.7	+58.6	146.6	34 09.5	+58.8	146.9	33 19.1	+58.9	147.3	32 28.6	+58.9	147.7	31 37.8	+59.1	148.0	30 46.8	+59.2	148.3	29 55.7	+59.3	148.6	29 04.4	+59.4	148.9	16
17	35 58.3	+58.6	146.3	35 08.3	+58.7	146.7	34 18.0	+58.9	147.1	33 27.5	+59.0	147.4	32 36.9	+59.1	147.8	31 46.0	+59.2	148.1	30 55.0	+59.3	148.4	30 03.8	+59.4	148.8	17
18	36 56.9	+58.5	146.0	36 07.0	+58.6	146.4	35 16.9	+58.8	146.8	34 26.5	+59.0	147.2	33 36.0	+59.0	147.6	32 45.2	+59.2	147.9	31 54.3	+59.3	148.3	31 03.2	+59.3	148.6	18
19	37 55.4	+58.4	145.8	37 05.6	+58.7	146.2	36 15.7	+58.8	146.6	35 25.5	+58.9	147.0	34 35.0	+59.1	147.4	33 44.4	+59.2	147.7	32 53.6	+59.2	148.1	32 02.5	+59.4	148.4	19
20	38 53.8	+58.5	145.5	38 04.3	+58.6	145.9	37 14.5	+58.7	146.3	36 24.4	+58.9	146.8	35 34.1	+59.0	147.2	34 43.6	+59.1	147.5	33 52.8	+59.3	147.9	33 01.9	+59.4	148.3	20
21	39 52.3	+58.3	145.2	39 02.9	+58.5	145.6	38 13.2	+58.7	146.1	37 23.3	+58.8	146.5	36 33.1	+59.0	146.9	35 42.7	+59.1	147.3	34 52.1	+59.2	147.7	34 01.3	+59.3	148.1	21
22	40 50.6	+58.4	144.9	40 01.4	+58.5	145.4	39 11.9	+58.7	145.8	38 22.1	+58.9	146.3	37 32.1	+59.0	146.7	36 41.8	+59.1	147.1	35 51.3	+59.3	147.5	35 00.6	+59.4	147.9	22
23	41 49.0	+58.3	144.6	40 59.9	+58.5	145.1	40 10.6	+58.6	145.6	39 21.0	+58.8	146.0	38 31.1	+58.9	146.5	37 40.9	+59.1	146.9	36 50.6	+59.2	147.3	36 00.0	+59.3	147.7	23
24	42 47.3	+58.2	144.2	41 58.4	+58.4	144.8	41 09.2	+58.6	145.3	40 19.8	+58.7	145.8	39 30.0	+59.0	146.2	38 40.0	+59.1	146.7	37 49.8	+59.1	147.1	36 59.3	+59.3	147.5	24
25	43 45.5	+58.1	143.9	42 56.8	+58.4	144.5	42 07.8	+58.6	145.0	41 18.5	+58.8	145.5	40 29.0	+58.8	146.0	39 39.1	+59.0	146.5	38 48.9	+59.2	146.9	37 58.6	+59.2	147.3	25
26	44 43.6	+58.1	143.6	43 55.2	+58.3	144.1	43 06.4	+58.5	144.7	42 17.3	+58.7	145.2	41 27.8	+58.9	145.7	40 38.1	+59.0	146.2	39 48.1	+59.1	146.7	38 57.8	+59.3	147.1	26
27	45 41.7	+58.1	143.2	44 53.5	+58.3	143.8	44 04.9	+58.5	144.4	43 16.0	+58.6	144.9	42 26.7	+58.8	145.5	41 37.1	+59.0	146.0	40 47.2	+59.1	146.5	39 57.1	+59.2	146.9	27
28	46 39.8	+57.9	142.8	45 51.8	+58.1	143.5	45 03.4	+58.4	144.1	44 14.6	+58.6	144.6	43 25.5	+58.8	145.2	42 36.1	+58.9	145.7	41 46.3	+59.1	146.2	40 56.3	+59.2	146.7	28
29	47 37.7	+57.9	142.5	46 49.9	+58.2	143.1	46 01.8	+58.3	143.7	45 13.2	+58.5	144.3	44 24.3	+58.7	144.9	43 35.0	+58.9	145.5	42 45.4	+59.1	146.0	41 55.5	+59.2	146.5	29
30	48 35.6	+57.8	142.1	47 48.1	+58.0	142.8	47 00.1	+58.3	143.4	46 11.7	+58.5	144.0	45 23.0	+58.7	144.6	44 33.9	+58.8	145.2	43 44.5	+59.0	145.8	42 54.7	+59.2	146.3	30
31	49 33.4	+57.7	141.7	48 46.1	+58.0	142.4	47 58.4	+58.2	143.1	47 10.2	+58.5	143.7	46 21.7	+58.6	144.3	45 32.7	+58.9	144.9	44 43.5	+58.9	145.5	43 53.9	+59.1	146.1	31
32	50 31.1	+57.6	141.2	49 44.1	+57.9	142.0	48 56.6	+58.1	142.7	48 08.7	+58.3	143.4	47 20.3	+58.6	144.0	46 31.6	+58.7	144.6	45 42.4	+59.0	145.2	44 53.0	+59.1	145.8	32
33	51 28.7	+57.5	140.8	50 42.0	+57.8	141.6	49 54.7	+58.1	142.3	49 07.0	+58.3	143.0	48 18.9	+58.5	143.7	47 30.3	+58.8	144.3	46 41.4	+58.9	145.0	45 52.1	+59.0	145.6	33
34	52 26.2	+57.4	140.3	51 39.8	+57.7	141.1	50 52.8	+58.0	141.9	50 05.3	+58.3	142.7	49 17.4	+58.5	143.4	48 29.1	+58.6	144.0	47 40.3	+58.9	144.7	46 51.1	+59.1	145.3	34
35	53 23.6	+57.3	139.8	52 37.5	+57.6	140.7	51 50.8	+57.9	141.5	51 03.6	+58.1	142.3	50 15.9	+58.4	143.0	49 27.7	+58.6	143.7	48 39.2	+58.8	144.4	47 50.2	+59.0	145.0	35
36	54 20.9	+57.1	139.3	53 35.1	+57.5	140.2	52 48.7	+57.8	141.1	52 01.7	+58.1	141.9	51 14.3	+58.3	142.7	50 26.3	+58.6	143.4	49 38.0	+58.7	144.1	48 49.2	+58.9	144.8	36
37	55 18.0	+57.0	138.8	54 32.6	+57.3	139.7	53 46.5	+57.7	140.6	52 59.8	+58.0	141.5	52 12.6	+58.3	142.3	51 24.9	+58.5	143.0	50 36.7	+58.7	143.8	49 48.1	+58.9	144.5	37
38	56 15.0	+56.8	138.2	55 29.9	+57.2	139.2	54 44.2	+57.5	140.2	53 57.8	+57.9	141.0	53 10.9	+58.1	141.9	52 23.4	+58.4	142.7	51 35.4	+58.7	143.5	50 47.0	+58.9	144.2	38
39	57 11.8	+56.7	137.7	56 27.1	+57.1	138.7	55 41.7	+57.5	139.7	54 55.7	+57.8	140.6	54 09.0	+58.1	141.5	53 21.8	+58.4	142.3	52 34.1	+58.6	143.1	51 45.9	+58.8	143.9	39
40	58 08.5	+56.5	137.0	57 24.2	+56.9	138.1	56 39.2	+57.3	139.1	55 53.5	+57.6	140.1	55 07.1	+58.0	141.0	54 20.2	+58.3	141.9	53 32.7	+58.5	142.8	52 44.7	+58.7	143.6	40
41	59 05.0	+56.3	136.4	58 21.1	+56.8	137.5	57 36.5	+57.2	138.6	56 51.1	+57.6	139.6	56 05.1	+57.9	140.6	55 18.5	+58.1	141.5	54 31.2	+58.5	142.4	53 43.4	+58.7	143.2	41
42	60 01.3	+56.0	135.7	59 17.9	+56.5	136.9	58 33.7	+57.0	138.0	57 48.7	+57.4	139.1	57 03.0	+57.8	140.1	56 16.6	+58.1	141.1	55 29.7	+58.3	142.0	54 42.1	+58.6	142.9	42
43	60 57.3	+55.8	135.0	60 14.4	+56.4	136.2	59 30.7	+56.8	137.4	58 46.1	+57.2	138.5	58 00.8	+57.6	139.6	57 14.7	+58.0	140.6	56 28.0	+58.3	141.6	55 40.7	+58.6	142.5	43
44	61 53.1	+55.5	134.2	61 10.8	+56.1	135.5	60 27.5	+56.6	136.8	59 43.3	+57.1	137.9	58 58.4	+57.5	139.1	58 12.7	+57.9	140.1	57 26.3	+58.2	141.1	56 39.3	+58.5	142.1	44
45	62 48.6	+55.2	133.4	62 06.9	+55.8	134.8	61 24.1	+56.4	136.1	60 40.4	+57.0	137.3	59 55.9	+57.4	138.5	59 10.6	+57.7	139.6	58 24.5	+58.1	140.7	57 37.8	+58.4	141.7	45
46	63 43.8	+54.9	132.5	63 02.7	+55.6	134.0	62 20.5	+56.2	135.4	61 37.4	+56.7	136.7	60 53.3	+57.1	137.9	60 08.3	+57.6	139.1	59 22.6	+58.0	140.2	58 36.2	+58.3	141.2	46
47	64 38.7	+54.5	131.6	63 58.3	+55.2	133.1	63 16.7	+55.9	134.6	62 34.1	+56.4	136.0	61 50.4	+57.0	137.3	61 05.9	+57.5	138.5	60 20.6	+57.8	139.7	59 34.5	+58.1	140.8	47
48	65 33.2	+54.1	130.6	64 53.5	+54.9	132.2	64 12.6	+55.6	133.8	63 30.5	+56.3	135.2	62 47.4	+56.8	136.6	62 03.4	+57.3	137.9	61 18.4	+57.7	139.1	60 32.6	+58.1	140.3	48
49	66 27.3	+53.7	129.6	65 48.4	+54.5	131.3	65 08.2	+55.3	132.9	64 26.8	+56.0	134.4	63 44.2	+56.6	135.9	63 00.7	+57.0	137.3	62 16.1	+57.6	138.6	61 30.7	+58.0	139.8	49
50	67 21.0	+53.1	128.4	66 42.9	+54.1	130.2	66 03.5	+54.9	132.0	65 22.8	+55.6	133.6	64 40.8	+56.3	135.1	63 57.7	+56.9	136.6	63 13.7	+57.4	137.9	62 28.7	+57.8	139.2	50
51	68 14.1	+52.5	127.2	67 37.0	+53.6	129.1	66 58.4	+54.5	130.9	66 18.4	+55.3	132.7	65 37.1	+56.0	134.3	64 54.6	+56.7	135.8	64 11.1	+57.2	137.3	63 26.5	+57.7	138.6	51
52	69 06.6	+51.8	125.8	68 30.6	+53.0	127.9	67 52.9	+54.0	129.9	67 13.7	+54.9	131.7	66 33.1	+55.7	133.4	65 51.3	+56.4	135.0	65 08.3	+56.9	136.6	64 24.2	+57.5	138.0	52
53	69 58.4	+51.1	124.4	69 23.6	+52.4	126.6	68 46.9	+53.5	128.7	68 08.6	+54.5	130.6	67 28.8	+55.4	132.5	66 47.7	+56.1	134.2	66 05.2	+56.8	135.8	65 21.7	+57.2	137.3	53
54	70 49.5	+50.2	122.8	70 16.0	+51.6	125.2	69 40.4	+52.9	127.4	69 03.1	+54.0	129.5	68 24.2	+54.9	131.4	67 43.8	+55.7	133.3	67 02.0	+56.4	135.0	66 18.9	+57.1	136.6	54
55	71 39.7	+49.3	121.1	71 07.6	+50.8	123.6	70 33.3	+52.2	126.0	69 57.1	+53.4	128.2	69 19.1	+54.5	130.3	68 39.5	+55.4	132.3	67 58.4	+56.2	134.1	67 16.0	+56.8	135.8	55
56	72 29.0	+48.1	119.3	71 58.4	+49.9	122.0	71 25.5	+51.4	124.5	70 50.5	+52.8	126.9	70 13.6	+53.9	129.1	69 34.9	+54.9	131.2	68 54.6	+55.8	133.2	68 12.8	+56.6	135.0	56
57	73 17.1	+46.8	117.3	72 48.3	+48.7	120.1	72 16.9	+50.5	122.8	71 43.3	+52.0	125.4	71 07.5	+53.3	127.8	70 29.8	+54.4	130.0	69 50.4	+55.4	132.1	69 09.4	+56.2	134.1	57
58	74 03.9	+45.3	115.0	73 37.0	+47.5	118.1	73 07.4	+49.4	121.0	72 35.3	+51.1	123.8	72 00.8	+52.6	126.3	71 24.2	+53.9	128.7	70 45.8	+54.9	131.0	70 05.6	+55.9	133.1	58
59	74 49.2	+43.5	112.6	74 24.5	+46.0	115.9	73 56.8	+48.2	119.0	73 26.4	+50.1	122.0	72 53.4	+51.7	124.7	72 18.1	+53.2	127.3	71 40.7	+54.4	129.7	71 01.5	+55.4	132.0	59
60	75 32.7	+41.5	109.9	75 10.5	+44.3	113.4	74 45.0	+46.8	116.8	74 16.5	+48.9	120.0	73 45.1	+50.8	123.0	73 11.3	+52.4	125.7	72 35.1	+53.8	128.3	71 56.9	+54.9	130.8	60
61	76 14.2	+39.2	106.9	75 54.8	+42.3	110.7	75 31.8	+45.1	114.4	75 05.4	+47.5	117.8	74 35.9	+49.7	121.0	74 03.7	+51.5	124.0	73 28.9	+53.0	126.8	72 51.8	+54.4	129.4	61
62	76 53.4	+36.5	103.7	76 37.1	+40.0	107.8	76 16.9	+43.1	111.7	75 52.9	+45.9	115.4	75 25.6	+48.3	118.8	74 55.2	+50.4	122.1	74 21.9	+52.2	125.1	73 46.2	+53.7	127.9	62
63	77 29.9	+33.3	100.1	77 17.1	+37.3	104.4	77 00.0	+40.8	108.6	76 38.8	+44.0	112.6	76 13.9	+46.7	116.4	75 45.6	+49.1	120.0	75 14.1	+51.2	123.2	74 39.9	+52.8	126.3	63
64	78 03.2	+29.8	96.2	77 54.4	+34.1	100.8	77 40.8	+38.1	105.3	77 22.8	+41.7	109.6	77 00.6	+44.9	113.7	76 34.7	+47.5	117.6	76 05.3	+49.9	121.1	75 32.7	+51.9	124.5	64
65	78 33.0	+25.7	91.9	78 28.5	+30.4	96.8	78 18.9	+34.9	101.6	78 04.5	+38.9	106.2	77 45.5	+42.5	110.7	77 22.2	+45.8	114.8	76 55.2	+48.4	118.8	76 24.6	+50.8	122.4	65
66	78 58.7	+21.2	87.2	78 58.9	+26.3	92.4	78 53.8	+31.2	97.5	78 43.4	+35.7	102.4	78 28.0	+39.9	107.2	78 08.0	+43.5	111.8	77 43.6	+46.7	116.1	77 15.4	+49.3	120.0	66
67	79 19.9	+16.1	82.3	79 25.2	+21.6	87.6	79 25.0	+26.9	92.9	79 19.1	+32.0	98.2	79 07.9	+36.6	103.4	78 51.5	+40.8	108.3	78 30.3	+44.4	113.0	78 04.7	+47.6	117.4	67
68	79 36.0	+10.8	77.0	79 46.8	+16.4	82.4	79 51.9	+22.0	87.9	79 51.1	+27.5	93.5	79 44.5	+32.8	99.1	79 32.3	+37.5	104.4	79 14.7	+41.8	109.5	78 52.3	+45.5	114.3	68
69	79 46.8	+5.1	71.5	80 03.2	+10.7	76.9	80 13.9	+16.6	82.6	80 18.6	+22.5	88.4	80 17.3	+28.2	94.2	80 09.8	+33.7	100.0	79 56.5	+38.6	105.6	79 37.8	+42.9	110.8	69
70	79 51.9	−0.8	65.8	80 13.9	+4.7	71.1	80 30.5	+10.6	76.8	80 41.1	+16.8	82.8	80 45.5	+23.0	88.9	80 43.5	+29.0	95.0	80 35.1	+34.6	101.0	80 20.7	+39.6	106.8	70
71	79 51.1	−6.6	60.2	80 18.6	−1.3	65.2	80 41.1	+4.4	70.8	80 57.9	+10.6	76.7	81 08.5	+17.0	83.0	81 12.5	+23.5	89.4	81 09.7	+29.8	95.9	81 00.3	+35.6	102.2	71
72	79 44.5	−12.2	54.5	80 17.3	−7.5	59.3	80 45.5	−2.0	64.6	81 08.5	+4.0	70.4	81 25.5	+10.5	76.7	81 36.0	+17.3	83.3	81 39.5	+24.1	90.1	81 35.9	+30.7	96.8	72
73	79 32.3	−17.6	49.1	80 09.8	−13.3	53.5	80 43.5	−8.4	58.4	81 12.5	−2.8	63.9	81 36.0	+3.5	70.0	81 53.3	+10.3	76.6	82 03.6	+17.6	83.6	82 06.6	+24.8	90.8	73
74	79 14.7	−22.4	43.9	79 56.5	−18.7	47.8	80 35.1	−14.4	52.3	81 09.7	−9.4	57.4	81 39.5	−3.6	63.1	82 03.6	+3.0	69.5	82 21.2	+10.2	76.5	82 31.4	+17.8	84.0	74
75	78 52.3	−26.8	39.0	79 37.8	−23.8	42.5	80 20.7	−20.1	46.4	81 00.3	−15.7	51.0	81 35.9	−10.6	56.3	82 06.6	−4.6	62.3	82 31.4	+2.3	69.0	82 49.2	+10.0	76.5	75
76	78 25.5	−30.8	34.5	79 14.0	−28.2	37.4	80 00.6	−25.2	40.9	80 44.6	−21.6	44.9	81 25.3	−17.1	49.6	82 02.0	−11.8	55.0	82 33.7	−5.6	61.3	82 59.2	+1.6	68.5	76
77	77 54.7	−34.2	30.3	78 45.8	−32.1	32.8	79 35.4	−29.7	35.8	80 23.0	−26.6	39.2	81 08.2	−23.1	43.3	81 50.2	−18.7	48.0	82 28.1	−13.4	53.7	83 00.8	−6.8	60.3	77
78	77 20.5	−37.3	26.4	78 13.7	−35.6	28.6	79 05.7	−33.5	31.1	79 56.4	−31.3	34.0	80 45.1	−28.3	37.4	81 31.5	−24.8	41.5	82 14.7	−20.3	46.3	82 54.0	−15.0	52.2	78
79	76 43.2	−39.8	23.0	77 38.1	−38.5	24.7	78 32.2	−37.0	26.8	79 25.1	−35.0	29.2	80 16.8	−32.8	32.0	81 06.7	−30.0	35.4	81 54.4	−26.6	39.5	82 39.0	−22.3	44.4	79
80	76 03.4	−42.1	19.8	76 59.6	−41.1	21.2	77 55.2	−39.9	22.9	78 50.1	−38.5	24.9	79 44.0	−36.7	27.2	80 36.7	−34.6	30.0	81 27.8	−31.9	33.3	82 16.7	−28.5	37.4	80
81	75 21.3	−44.0	16.9	76 18.5	−43.2	18.1	77 15.3	−42.3	19.4	78 11.6	−41.2	21.0	79 07.3	−39.9	22.9	80 02.1	−38.3	25.1	80 55.9	−36.4	27.8	81 48.2	−33.9	31.0	81
82	74 37.3	−45.7	14.3	75 35.3	−45.1	15.2	76 33.0	−44.4	16.3	77 30.4	−43.5	17.6	78 27.4	−42.6	19.1	79 23.8	−41.4	20.8	80 19.5	−40.0	22.9	81 14.3	−38.2	25.4	82
83	73 51.6	−47.2	11.9	74 50.2	−46.7	12.6	75 48.6	−46.1	13.5	76 46.9	−45.6	14.5	77 44.8	−44.9	15.6	78 42.4	−44.0	17.0	79 39.5	−42.9	18.6	80 36.1	−41.7	20.5	83
84	73 04.4	−48.4	9.7	74 03.5	−48.1	10.3	75 02.5	−47.7	11.0	76 01.3	−47.3	11.7	76 59.9	−46.7	12.6	77 58.4	−46.2	13.6	78 56.6	−45.5	14.8	79 54.4	−44.6	16.3	84
85	72 16.0	−49.5	7.7	73 15.4	−49.3	8.2	74 14.8	−49.0	8.7	75 14.0	−48.7	9.2	76 13.2	−48.3	9.9	77 12.2	−47.9	10.6	78 11.1	−47.4	11.5	79 09.8	−46.8	12.6	85
86	71 26.5	−50.5	5.9	72 26.1	−50.3	6.2	73 25.8	−50.2	6.6	74 25.3	−49.9	7.0	75 24.9	−49.7	7.5	76 24.3	−49.4	8.0	77 23.7	−49.1	8.6	78 23.0	−48.8	9.4	86
87	70 36.0	−51.3	4.2	71 35.8	−51.2	4.5	72 35.6	−51.0	4.7	73 35.4	−50.9	5.0	74 35.2	−50.8	5.3	75 34.9	−50.6	5.7	76 34.6	−50.5	6.1	77 34.2	−50.2	6.6	87
88	69 44.7	−52.0	2.7	70 44.6	−51.9	2.8	71 44.6	−52.0	3.0	72 44.5	−51.9	3.2	73 44.4	−51.8	3.4	74 44.3	−51.7	3.6	75 44.1	−51.5	3.8	76 44.0	−51.5	4.1	88
89	68 52.7	−52.7	1.3	69 52.7	−52.7	1.4	70 52.6	−52.6	1.4	71 52.6	−52.6	1.5	72 52.6	−52.6	1.6	73 52.6	−52.6	1.7	74 52.6	−52.6	1.8	75 52.5	−52.5	1.9	89
90	68 00.0	−53.3	0.0	69 00.0	−53.3	0.0	70 00.0	−53.3	0.0	71 00.0	−53.3	0.0	72 00.0	−53.3	0.0	73 00.0	−53.3	0.0	74 00.0	−53.4	0.0	75 00.0	−53.4	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

28°, 332° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 28°, 332°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	19 18.9	−59.0	150.2	18 26.8	−59.1	150.3	17 34.6	−59.1	150.5	16 42.4	−59.3	150.6	15 50.0	−59.3	150.8	14 57.6	−59.4	150.9	14 05.1	−59.4	151.1	13 12.6	−59.5	151.2	0
1	18 19.9	−58.9	150.4	17 27.7	−59.0	150.5	16 35.5	−59.2	150.7	15 43.1	−59.2	150.8	14 50.7	−59.3	150.9	13 58.2	−59.4	151.1	13 05.7	−59.5	151.2	12 13.1	−59.6	151.3	1
2	17 21.0	−59.0	150.6	16 28.7	−59.1	150.7	15 36.3	−59.2	150.8	14 43.9	−59.3	151.0	13 51.4	−59.3	151.1	12 58.8	−59.4	151.2	12 06.2	−59.5	151.3	11 13.5	−59.5	151.4	2
3	16 22.0	−59.0	150.7	15 29.6	−59.1	150.9	14 37.1	−59.1	151.0	13 44.6	−59.2	151.1	12 52.1	−59.4	151.3	11 59.4	−59.4	151.4	11 06.7	−59.4	151.5	10 14.0	−59.5	151.5	3
4	15 23.0	−59.0	150.9	14 30.5	−59.1	151.1	13 38.0	−59.2	151.2	12 45.4	−59.3	151.3	11 52.7	−59.3	151.4	11 00.0	−59.4	151.5	10 07.3	−59.5	151.6	9 14.5	−59.6	151.7	4
5	14 24.0	−59.0	151.1	13 31.4	−59.1	151.2	12 38.8	−59.2	151.4	11 46.1	−59.3	151.5	10 53.4	−59.4	151.6	10 00.6	−59.4	151.6	9 07.8	−59.5	151.7	8 14.9	−59.5	151.8	5
6	13 25.0	−59.0	151.3	12 32.3	−59.1	151.4	11 39.6	−59.2	151.5	10 46.8	−59.2	151.6	9 54.0	−59.3	151.7	9 01.2	−59.4	151.8	8 08.3	−59.5	151.9	7 15.4	−59.6	151.9	6
7	12 26.0	−59.0	151.5	11 33.2	−59.1	151.6	10 40.4	−59.2	151.7	9 47.6	−59.3	151.8	8 54.7	−59.4	151.9	8 01.8	−59.5	151.9	7 08.8	−59.5	152.0	6 15.8	−59.5	152.0	7
8	11 27.0	−59.1	151.7	10 34.1	−59.1	151.8	9 41.2	−59.2	151.9	8 48.3	−59.3	151.9	7 55.3	−59.3	152.0	7 02.3	−59.4	152.1	6 09.3	−59.5	152.1	5 16.3	−59.6	152.2	8
9	10 27.9	−59.0	151.9	9 35.0	−59.1	151.9	8 42.0	−59.2	152.0	7 49.0	−59.3	152.1	6 56.0	−59.4	152.2	6 02.9	−59.4	152.2	5 09.8	−59.5	152.3	4 16.7	−59.5	152.3	9
10	9 28.9	−59.1	152.0	8 35.9	−59.2	152.1	7 42.8	−59.2	152.2	6 49.7	−59.3	152.2	5 56.6	−59.3	152.3	5 03.5	−59.4	152.3	4 10.3	−59.5	152.4	3 17.2	−59.6	152.4	10
11	8 29.8	−59.0	152.2	7 36.7	−59.1	152.3	6 43.6	−59.2	152.4	5 50.4	−59.2	152.4	4 57.3	−59.4	152.4	4 04.1	−59.5	152.5	3 10.8	−59.5	152.5	2 17.6	−59.5	152.5	11
12	7 30.8	−59.0	152.4	6 37.6	−59.1	152.5	5 44.4	−59.2	152.5	4 51.2	−59.3	152.6	3 57.9	−59.4	152.6	3 04.6	−59.4	152.6	2 11.3	−59.4	152.6	1 18.1	−59.6	152.7	12
13	6 31.8	−59.1	152.6	5 38.5	−59.2	152.6	4 45.2	−59.2	152.7	3 51.9	−59.3	152.7	2 58.5	−59.3	152.7	2 05.2	−59.4	152.8	1 11.9	−59.5	152.8	0 18.5	−59.6	152.8	13
14	5 32.7	−59.1	152.8	4 39.3	−59.1	152.8	3 46.0	−59.3	152.8	2 52.6	−59.3	152.9	1 59.2	−59.4	152.9	1 05.8	−59.5	152.9	0 12.4	−59.5	152.9	0 41.1	+59.5	27.1	14
15	4 33.6	−59.0	152.9	3 40.2	−59.1	153.0	2 46.7	−59.2	153.0	1 53.3	−59.3	153.0	0 59.8	−59.4	153.0	0 06.3	−59.4	153.0	0 47.1	+59.5	27.0	1 40.6	+59.6	27.0	15
16	3 34.6	−59.1	153.1	2 41.1	−59.2	153.1	1 47.5	−59.2	153.2	0 54.0	−59.3	153.2	0 00.4	−59.3	153.2	0 53.1	+59.4	26.8	1 46.6	+59.5	26.8	2 40.2	+59.5	26.9	16
17	2 35.5	−59.0	153.3	1 41.9	−59.1	153.3	0 48.3	−59.2	153.3	0 05.3	+59.3	26.7	0 58.9	+59.4	26.7	1 52.5	+59.5	26.7	2 46.1	+59.5	26.7	3 39.7	+59.6	26.7	17
18	1 36.5	−59.1	153.5	0 42.8	−59.2	153.5	0 10.9	+59.2	26.5	1 04.6	+59.3	26.5	1 58.3	+59.3	26.5	2 52.0	+59.4	26.6	3 45.6	+59.5	26.6	4 39.3	+59.5	26.6	18
19	0 37.4	−59.1	153.6	0 16.4	+59.1	26.4	1 10.1	+59.3	26.4	2 03.9	+59.3	26.4	2 57.6	+59.4	26.4	3 51.4	+59.4	26.4	4 45.1	+59.5	26.5	5 38.8	+59.6	26.5	19
20	0 21.7	+59.0	26.2	1 15.5	+59.2	26.2	2 09.4	+59.2	26.2	3 03.2	+59.3	26.2	3 57.0	+59.4	26.2	4 50.8	+59.4	26.3	5 44.6	+59.5	26.3	6 38.4	+59.5	26.4	20
21	1 20.7	+59.1	26.0	2 14.7	+59.1	26.0	3 08.6	+59.2	26.0	4 02.5	+59.3	26.1	4 56.4	+59.3	26.1	5 50.2	+59.5	26.1	6 44.1	+59.5	26.2	7 37.9	+59.6	26.2	21
22	2 19.8	+59.1	25.8	3 13.8	+59.1	25.8	4 07.8	+59.2	25.9	5 01.8	+59.3	25.9	5 55.7	+59.4	26.0	6 49.7	+59.4	26.0	7 43.6	+59.5	26.1	8 37.5	+59.5	26.1	22
23	3 18.9	+59.0	25.7	4 12.9	+59.2	25.7	5 07.0	+59.2	25.7	6 01.1	+59.2	25.8	6 55.1	+59.3	25.8	7 49.1	+59.4	25.9	8 43.1	+59.5	25.9	9 37.0	+59.6	26.0	23
24	4 17.9	+59.1	25.5	5 12.1	+59.1	25.5	6 06.2	+59.2	25.6	7 00.3	+59.3	25.6	7 54.4	+59.4	25.7	8 48.5	+59.4	25.7	9 42.6	+59.4	25.8	10 36.6	+59.5	25.9	24
25	5 17.0	+59.0	25.3	6 11.2	+59.2	25.3	7 05.4	+59.2	25.4	7 59.6	+59.3	25.4	8 53.8	+59.3	25.5	9 47.9	+59.4	25.6	10 42.0	+59.5	25.7	11 36.1	+59.5	25.7	25
26	6 16.0	+59.1	25.1	7 10.4	+59.1	25.2	8 04.6	+59.2	25.2	8 58.9	+59.3	25.3	9 53.1	+59.4	25.4	10 47.3	+59.5	25.4	11 41.5	+59.5	25.5	12 35.6	+59.6	25.6	26
27	7 15.1	+59.0	24.9	8 09.5	+59.1	25.0	9 03.8	+59.2	25.1	9 58.2	+59.3	25.1	10 52.5	+59.3	25.2	11 46.8	+59.4	25.3	12 41.0	+59.4	25.4	13 35.2	+59.5	25.5	27
28	8 14.1	+59.1	24.8	9 08.6	+59.1	24.8	10 03.0	+59.2	24.9	10 57.5	+59.2	25.0	11 51.8	+59.4	25.1	12 46.2	+59.4	25.2	13 40.4	+59.5	25.3	14 34.7	+59.5	25.4	28
29	9 13.2	+59.0	24.6	10 07.7	+59.1	24.7	11 02.2	+59.2	24.7	11 56.7	+59.3	24.8	12 51.2	+59.3	24.9	13 45.6	+59.4	25.0	14 39.9	+59.5	25.1	15 34.2	+59.5	25.2	29
30	10 12.2	+59.0	24.4	11 06.8	+59.2	24.5	12 01.4	+59.2	24.6	12 56.0	+59.2	24.7	13 50.5	+59.3	24.8	14 45.0	+59.3	24.9	15 39.4	+59.4	25.0	16 33.7	+59.5	25.1	30
31	11 11.2	+59.1	24.2	12 06.0	+59.1	24.3	13 00.6	+59.2	24.4	13 55.2	+59.3	24.5	14 49.8	+59.3	24.6	15 44.3	+59.4	24.7	16 38.8	+59.5	24.8	17 33.2	+59.6	25.0	31
32	12 10.3	+59.0	24.0	13 05.1	+59.0	24.1	13 59.8	+59.2	24.2	14 54.5	+59.2	24.3	15 49.1	+59.3	24.4	16 43.7	+59.4	24.6	17 38.3	+59.4	24.7	18 32.8	+59.5	24.8	32
33	13 09.3	+59.0	23.8	14 04.1	+59.1	23.9	14 59.0	+59.1	24.1	15 53.7	+59.3	24.2	16 48.4	+59.3	24.3	17 43.1	+59.4	24.4	18 37.7	+59.4	24.6	19 32.3	+59.5	24.7	33
34	14 08.3	+59.0	23.7	15 03.2	+59.1	23.8	15 58.1	+59.2	23.9	16 53.0	+59.2	24.0	17 47.7	+59.3	24.1	18 42.5	+59.3	24.3	19 37.1	+59.5	24.4	20 31.8	+59.4	24.6	34
35	15 07.3	+59.0	23.5	16 02.3	+59.1	23.6	16 57.3	+59.1	23.7	17 52.2	+59.2	23.8	18 47.0	+59.3	24.0	19 41.8	+59.4	24.1	20 36.6	+59.4	24.3	21 31.2	+59.5	24.4	35
36	16 06.3	+59.0	23.3	17 01.4	+59.0	23.4	17 56.4	+59.2	23.5	18 51.4	+59.2	23.7	19 46.3	+59.3	23.8	20 41.2	+59.3	24.0	21 36.0	+59.4	24.1	22 30.7	+59.5	24.3	36
37	17 05.3	+58.9	23.1	18 00.4	+59.1	23.2	18 55.6	+59.1	23.4	19 50.6	+59.2	23.5	20 45.6	+59.3	23.6	21 40.5	+59.4	23.8	22 35.4	+59.4	24.0	23 30.2	+59.5	24.1	37
38	18 04.2	+59.0	22.9	18 59.5	+59.0	23.0	19 54.7	+59.1	23.2	20 49.8	+59.2	23.3	21 44.9	+59.2	23.5	22 39.9	+59.3	23.6	23 34.8	+59.4	23.8	24 29.7	+59.4	24.0	38
39	19 03.2	+58.9	22.7	19 58.5	+59.0	22.8	20 53.8	+59.1	23.0	21 49.0	+59.2	23.1	22 44.1	+59.3	23.3	23 39.2	+59.3	23.5	24 34.2	+59.4	23.7	25 29.1	+59.5	23.8	39
40	20 02.1	+59.0	22.5	20 57.5	+59.1	22.7	21 52.9	+59.1	22.8	22 48.2	+59.1	23.0	23 43.4	+59.2	23.1	24 38.5	+59.3	23.3	25 33.6	+59.4	23.5	26 28.6	+59.4	23.7	40
41	21 01.1	+58.9	22.3	21 56.6	+59.0	22.5	22 52.0	+59.1	22.6	23 47.3	+59.2	22.8	24 42.6	+59.2	23.0	25 37.8	+59.3	23.1	26 33.0	+59.3	23.3	27 28.0	+59.4	23.5	41
42	22 00.0	+58.9	22.1	22 55.6	+58.9	22.3	23 51.1	+59.0	22.4	24 46.5	+59.1	22.6	25 41.8	+59.3	22.8	26 37.1	+59.3	23.0	27 32.3	+59.4	23.2	28 27.4	+59.5	23.4	42
43	22 58.9	+58.9	21.9	23 54.5	+59.0	22.1	24 50.1	+59.1	22.2	25 45.6	+59.1	22.4	26 41.1	+59.1	22.6	27 36.4	+59.3	22.8	28 31.7	+59.3	23.0	29 26.9	+59.4	23.2	43
44	23 57.8	+58.9	21.7	24 53.5	+59.0	21.9	25 49.2	+59.0	22.0	26 44.7	+59.1	22.2	27 40.2	+59.2	22.4	28 35.7	+59.2	22.6	29 31.0	+59.3	22.8	30 26.3	+59.4	23.1	44
45	24 56.7	+58.8	21.5	25 52.5	+58.9	21.7	26 48.2	+59.0	21.8	27 43.8	+59.1	22.0	28 39.4	+59.2	22.2	29 34.9	+59.3	22.4	30 30.3	+59.4	22.7	31 25.7	+59.3	22.9	45
46	25 55.5	+58.8	21.3	26 51.4	+58.9	21.4	27 47.2	+59.0	21.6	28 42.9	+59.1	21.8	29 38.6	+59.1	22.0	30 34.2	+59.2	22.3	31 29.7	+59.3	22.5	32 25.0	+59.4	22.7	46
47	26 54.3	+58.9	21.0	27 50.3	+58.9	21.2	28 46.2	+59.0	21.4	29 42.0	+59.1	21.6	30 37.7	+59.2	21.8	31 33.4	+59.2	22.1	32 29.0	+59.2	22.3	33 24.4	+59.4	22.6	47
48	27 53.2	+58.7	20.8	28 49.2	+58.9	21.0	29 45.2	+58.9	21.2	30 41.1	+59.0	21.4	31 36.9	+59.1	21.6	32 32.6	+59.2	21.9	33 28.2	+59.3	22.1	34 23.8	+59.3	22.4	48
49	28 51.9	+58.8	20.6	29 48.1	+58.8	20.8	30 44.1	+59.0	21.0	31 40.1	+59.0	21.2	32 36.0	+59.1	21.4	33 31.8	+59.2	21.7	34 27.5	+59.2	21.9	35 23.1	+59.3	22.2	49
50	29 50.7	+58.7	20.4	30 46.9	+58.8	20.6	31 43.1	+58.9	20.8	32 39.1	+59.0	21.0	33 35.1	+59.1	21.2	34 31.0	+59.1	21.5	35 26.7	+59.3	21.7	36 22.4	+59.3	22.0	50
51	30 49.4	+58.8	20.1	31 45.7	+58.8	20.3	32 42.0	+58.9	20.6	33 38.1	+59.0	20.8	34 34.2	+59.0	21.0	35 30.1	+59.1	21.3	36 26.0	+59.2	21.5	37 21.7	+59.3	21.8	51
52	31 48.2	+58.6	19.9	32 44.5	+58.8	20.1	33 40.9	+58.8	20.3	34 37.1	+58.9	20.6	35 33.2	+59.0	20.8	36 29.2	+59.2	21.1	37 25.2	+59.2	21.3	38 21.0	+59.3	21.6	52
53	32 46.8	+58.7	19.6	33 43.3	+58.8	19.9	34 39.7	+58.8	20.1	35 36.0	+58.9	20.3	36 32.2	+59.0	20.6	37 28.4	+59.0	20.9	38 24.4	+59.1	21.1	39 20.3	+59.2	21.4	53
54	33 45.5	+58.6	19.4	34 42.1	+58.7	19.6	35 38.5	+58.8	19.8	36 34.9	+58.9	20.1	37 31.2	+59.0	20.4	38 27.4	+59.1	20.6	39 23.5	+59.2	20.9	40 19.5	+59.2	21.2	54
55	34 44.1	+58.6	19.1	35 40.8	+58.7	19.4	36 37.3	+58.8	19.6	37 33.8	+58.9	19.9	38 30.2	+59.0	20.1	39 26.5	+59.0	20.4	40 22.7	+59.1	20.7	41 18.7	+59.2	21.0	55
56	35 42.7	+58.6	18.9	36 39.5	+58.6	19.1	37 36.1	+58.8	19.4	38 32.7	+58.8	19.6	39 29.2	+58.9	19.9	40 25.5	+59.0	20.2	41 21.8	+59.1	20.5	42 17.9	+59.2	20.8	56
57	36 41.3	+58.5	18.6	37 38.1	+58.6	18.8	38 34.9	+58.7	19.1	39 31.5	+58.8	19.4	40 28.1	+58.9	19.6	41 24.5	+59.0	19.9	42 20.9	+59.0	20.2	43 17.1	+59.2	20.6	57
58	37 39.8	+58.5	18.3	38 36.7	+58.6	18.6	39 33.6	+58.6	18.8	40 30.3	+58.8	19.1	41 27.0	+58.8	19.4	42 23.5	+58.9	19.7	43 19.9	+59.1	20.0	44 16.3	+59.1	20.3	58
59	38 38.3	+58.4	18.0	39 35.3	+58.5	18.3	40 32.2	+58.6	18.6	41 29.1	+58.7	18.8	42 25.8	+58.8	19.1	43 22.4	+58.9	19.4	44 19.0	+59.0	19.8	45 15.4	+59.1	20.1	59
60	39 36.7	+58.4	17.7	40 33.8	+58.5	18.0	41 30.8	+58.6	18.3	42 27.8	+58.7	18.6	43 24.6	+58.8	18.9	44 21.3	+58.9	19.2	45 18.0	+58.9	19.5	46 14.5	+59.0	19.8	60
61	40 35.1	+58.4	17.4	41 32.3	+58.5	17.7	42 29.4	+58.6	18.0	43 26.5	+58.6	18.3	44 23.4	+58.7	18.6	45 20.2	+58.8	18.9	46 16.9	+58.9	19.2	47 13.5	+59.0	19.6	61
62	41 33.5	+58.3	17.1	42 30.8	+58.3	17.4	43 28.0	+58.5	17.7	44 25.1	+58.6	18.0	45 22.1	+58.7	18.3	46 19.0	+58.8	18.6	47 15.8	+58.9	19.0	48 12.5	+59.0	19.3	62
63	42 31.8	+58.2	16.8	43 29.1	+58.4	17.1	44 26.5	+58.4	17.4	45 23.7	+58.5	17.7	46 20.8	+58.6	18.0	47 17.8	+58.7	18.3	48 14.7	+58.8	18.7	49 11.5	+58.9	19.0	63
64	43 30.0	+58.2	16.5	44 27.5	+58.3	16.8	45 24.9	+58.4	17.0	46 22.2	+58.5	17.4	47 19.4	+58.6	17.7	48 16.5	+58.7	18.0	49 13.5	+58.8	18.4	50 10.4	+58.9	18.7	64
65	44 28.2	+58.1	16.1	45 25.8	+58.2	16.4	46 23.3	+58.3	16.7	47 20.7	+58.4	17.0	48 18.0	+58.5	17.4	49 15.2	+58.7	17.7	50 12.3	+58.8	18.1	51 09.3	+58.9	18.4	65
66	45 26.3	+58.0	15.8	46 24.0	+58.1	16.1	47 21.6	+58.3	16.4	48 19.1	+58.4	16.7	49 16.5	+58.5	17.0	50 13.9	+58.5	17.4	51 11.1	+58.6	17.7	52 08.2	+58.7	18.1	66
67	46 24.3	+58.0	15.4	47 22.1	+58.1	15.7	48 19.9	+58.1	16.0	49 17.5	+58.3	16.3	50 15.0	+58.4	16.7	51 12.4	+58.5	17.0	52 09.7	+58.7	17.4	53 06.9	+58.8	17.8	67
68	47 22.3	+57.9	15.1	48 20.2	+58.0	15.3	49 18.0	+58.2	15.6	50 15.8	+58.2	16.0	51 13.4	+58.3	16.3	52 10.9	+58.5	16.7	53 08.4	+58.5	17.0	54 05.7	+58.6	17.5	68
69	48 20.2	+57.8	14.7	49 18.2	+58.0	15.0	50 16.2	+58.0	15.3	51 14.0	+58.1	15.6	52 11.7	+58.3	15.9	53 09.4	+58.4	16.3	54 06.9	+58.5	16.7	55 04.3	+58.6	17.1	69
70	49 18.0	+57.8	14.3	50 16.2	+57.8	14.5	51 14.2	+57.9	14.9	52 12.1	+58.1	15.2	53 10.0	+58.2	15.5	54 07.8	+58.2	15.9	55 05.4	+58.4	16.3	56 02.9	+58.6	16.7	70
71	50 15.8	+57.6	13.8	51 14.0	+57.7	14.1	52 12.1	+57.9	14.4	53 10.2	+58.0	14.8	54 08.2	+58.1	15.1	55 06.0	+58.2	15.5	56 03.8	+58.3	15.9	57 01.5	+58.4	16.3	71
72	51 13.4	+57.5	13.4	52 11.7	+57.7	13.7	53 10.0	+57.8	14.0	54 08.2	+57.8	14.3	55 06.3	+57.9	14.7	56 04.2	+58.2	15.1	57 02.1	+58.3	15.5	57 59.9	+58.4	15.9	72
73	52 10.9	+57.5	12.9	53 09.4	+57.5	13.2	54 07.8	+57.6	13.5	55 06.0	+57.8	13.9	56 04.2	+57.9	14.2	57 02.4	+58.0	14.6	58 00.4	+58.1	15.0	58 58.3	+58.2	15.4	73
74	53 08.4	+57.3	12.5	54 06.9	+57.4	12.8	55 05.4	+57.5	13.1	56 03.8	+57.7	13.4	57 02.1	+57.8	13.8	58 00.4	+57.9	14.1	58 58.5	+58.0	14.5	59 56.5	+58.2	15.0	74
75	54 05.7	+57.1	12.0	55 04.3	+57.3	12.3	56 02.9	+57.4	12.6	57 01.5	+57.5	12.9	57 59.9	+57.6	13.3	58 58.3	+57.7	13.6	59 56.5	+57.9	14.0	60 54.7	+58.0	14.5	75
76	55 02.8	+57.1	11.4	56 01.6	+57.2	11.7	57 00.3	+57.3	12.0	57 59.0	+57.4	12.4	58 57.5	+57.5	12.7	59 56.0	+57.7	13.1	60 54.4	+57.8	13.5	61 52.7	+57.9	13.9	76
77	55 59.9	+56.8	10.9	56 58.8	+56.9	11.2	57 57.6	+57.1	11.5	58 56.4	+57.2	11.8	59 55.0	+57.4	12.2	60 53.7	+57.4	12.5	61 52.2	+57.6	12.9	62 50.6	+57.8	13.4	77
78	56 56.7	+56.8	10.3	57 55.7	+56.9	10.6	58 54.7	+56.9	10.9	59 53.6	+57.0	11.2	60 52.4	+57.2	11.6	61 51.1	+57.4	11.9	62 49.8	+57.5	12.3	63 48.4	+57.6	12.8	78
79	57 53.5	+56.5	9.7	58 52.6	+56.6	10.0	59 51.6	+56.8	10.3	60 50.6	+56.9	10.6	61 49.6	+57.0	10.9	62 48.5	+57.1	11.3	63 47.3	+57.2	11.7	64 46.0	+57.4	12.1	79
80	58 50.0	+56.3	9.1	59 49.2	+56.4	9.3	60 48.4	+56.5	9.6	61 47.5	+56.7	9.9	62 46.6	+56.8	10.3	63 45.6	+56.9	10.6	64 44.5	+57.1	11.0	65 43.4	+57.2	11.4	80
81	59 46.3	+56.1	8.4	60 45.6	+56.3	8.6	61 44.9	+56.4	8.9	62 44.2	+56.4	9.2	63 43.4	+56.6	9.5	64 42.5	+56.7	9.9	65 41.6	+56.8	10.3	66 40.6	+57.0	10.7	81
82	60 42.4	+55.9	7.7	61 41.9	+55.9	7.9	62 41.3	+56.0	8.2	63 40.6	+56.2	8.5	64 40.0	+56.3	8.8	65 39.2	+56.5	9.1	66 38.4	+56.6	9.5	67 37.6	+56.7	9.9	82
83	61 38.3	+55.6	6.9	62 37.8	+55.7	7.1	63 37.3	+55.8	7.4	64 36.8	+55.9	7.7	65 36.3	+56.0	8.0	66 35.7	+56.1	8.3	67 35.0	+56.3	8.6	68 34.3	+56.4	9.0	83
84	62 33.9	+55.3	6.1	63 33.5	+55.4	6.3	64 33.1	+55.5	6.6	65 32.7	+55.6	6.8	66 32.3	+55.7	7.1	67 31.8	+55.8	7.4	68 31.3	+56.0	7.7	69 30.7	+56.1	8.1	84
85	63 29.2	+55.0	5.3	64 28.9	+55.1	5.5	65 28.6	+55.2	5.7	66 28.3	+55.3	5.9	67 28.0	+55.4	6.1	68 27.6	+55.5	6.4	69 27.3	+55.5	6.7	70 26.8	+55.7	7.0	85
86	64 24.2	+54.6	4.3	65 24.0	+54.7	4.5	66 23.8	+54.8	4.7	67 23.6	+54.8	4.9	68 23.4	+54.9	5.1	69 23.1	+55.0	5.3	70 22.8	+55.2	5.6	71 22.5	+55.3	5.9	86
87	65 18.8	+54.2	3.4	66 18.7	+54.2	3.5	67 18.6	+54.3	3.7	68 18.4	+54.4	3.8	69 18.3	+54.5	4.0	70 18.1	+54.6	4.2	71 18.0	+54.6	4.4	72 17.8	+54.7	4.6	87
88	66 13.0	+53.7	2.3	67 12.9	+53.8	2.4	68 12.9	+53.8	2.5	69 12.8	+53.9	2.6	70 12.8	+53.9	2.8	71 12.7	+54.0	2.9	72 12.6	+54.0	3.1	73 12.5	+54.1	3.3	88
89	67 06.7	+53.3	1.2	68 06.7	+53.3	1.3	69 06.7	+53.3	1.3	70 06.7	+53.3	1.4	71 06.7	+53.3	1.5	72 06.7	+53.3	1.5	73 06.6	+53.4	1.6	74 06.6	+53.4	1.7	89
90	68 00.0	+52.7	0.0	69 00.0	+52.7	0.0	70 00.0	+52.6	0.0	71 00.0	+52.6	0.0	72 00.0	+52.6	0.0	73 00.0	+52.6	0.0	74 00.0	+52.6	0.0	75 00.0	+52.5	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 152°, 208°

29°, 331° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.....Zn=360°–Z

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	19 07.5	+58.9	149.1	18 16.0	+59.0	149.3	17 24.3	+59.1	149.5	16 32.6	+59.2	149.6	15 40.8	+59.3	149.8	14 49.0	+59.3	149.9	13 57.0	+59.4	150.0	13 05.0	+59.5	150.2	0
1	20 06.4	+58.9	148.9	19 15.0	+58.9	149.1	18 23.4	+59.1	149.3	17 31.8	+59.2	149.4	16 40.1	+59.3	149.6	15 48.3	+59.3	149.7	14 56.4	+59.5	149.9	14 04.5	+59.5	150.0	1
2	21 05.3	+58.8	148.7	20 13.9	+59.0	148.9	19 22.5	+59.1	149.1	18 31.0	+59.1	149.3	17 39.4	+59.2	149.4	16 47.6	+59.4	149.6	15 55.9	+59.4	149.7	15 04.0	+59.5	149.9	2
3	22 04.1	+58.8	148.5	21 12.9	+58.9	148.7	20 21.6	+59.0	148.9	19 30.1	+59.2	149.1	18 38.6	+59.2	149.3	17 47.0	+59.3	149.4	16 55.3	+59.4	149.6	16 03.5	+59.5	149.7	3
4	23 02.9	+58.8	148.3	22 11.8	+59.0	148.5	21 20.6	+59.0	148.7	20 29.3	+59.1	148.9	19 37.8	+59.3	149.1	18 46.3	+59.3	149.3	17 54.7	+59.4	149.5	17 03.0	+59.4	149.6	4
5	24 01.7	+58.8	148.1	23 10.8	+58.9	148.3	22 19.6	+59.1	148.5	21 28.4	+59.1	148.7	20 37.1	+59.2	148.9	19 45.6	+59.3	149.1	18 54.1	+59.4	149.3	18 02.4	+59.5	149.5	5
6	25 00.5	+58.8	147.9	24 09.7	+58.9	148.1	23 18.7	+59.0	148.3	22 27.5	+59.2	148.6	21 36.3	+59.2	148.8	20 44.9	+59.3	149.0	19 53.5	+59.4	149.2	19 01.9	+59.5	149.3	6
7	25 59.3	+58.8	147.6	25 08.6	+58.8	147.9	24 17.7	+59.0	148.1	23 26.7	+59.0	148.4	22 35.5	+59.2	148.6	21 44.2	+59.3	148.8	20 52.9	+59.3	149.0	20 01.4	+59.4	149.2	7
8	26 58.1	+58.7	147.4	26 07.4	+58.9	147.7	25 16.7	+58.9	147.9	24 25.7	+59.1	148.2	23 34.7	+59.2	148.4	22 43.5	+59.3	148.6	21 52.2	+59.4	148.8	21 00.8	+59.5	149.0	8
9	27 56.8	+58.7	147.2	27 06.3	+58.8	147.5	26 15.6	+59.0	147.7	25 24.8	+59.1	148.0	24 33.9	+59.2	148.2	23 42.8	+59.3	148.5	22 51.6	+59.4	148.7	22 00.3	+59.4	148.9	9
10	28 55.5	+58.7	146.9	28 05.1	+58.8	147.2	27 14.6	+58.9	147.5	26 23.9	+59.1	147.8	25 33.1	+59.1	148.0	24 42.1	+59.2	148.3	23 51.0	+59.3	148.5	22 59.7	+59.5	148.8	10
11	29 54.2	+58.6	146.7	29 03.9	+58.8	147.0	28 13.5	+58.9	147.3	27 23.0	+59.0	147.6	26 32.2	+59.2	147.9	25 41.3	+59.3	148.1	24 50.3	+59.4	148.4	23 59.2	+59.4	148.6	11
12	30 52.8	+58.7	146.5	30 02.7	+58.8	146.8	29 12.4	+58.9	147.1	28 22.0	+59.0	147.4	27 31.4	+59.1	147.7	26 40.6	+59.2	147.9	25 49.7	+59.3	148.2	24 58.6	+59.4	148.5	12
13	31 51.5	+58.6	146.2	31 01.5	+58.7	146.5	30 11.3	+58.9	146.9	29 21.0	+59.0	147.2	28 30.5	+59.1	147.5	27 39.8	+59.2	147.8	26 49.0	+59.3	148.0	25 58.0	+59.4	148.3	13
14	32 50.1	+58.5	146.0	32 00.2	+58.8	146.3	31 10.2	+58.9	146.6	30 20.0	+59.0	147.0	29 29.6	+59.1	147.3	28 39.0	+59.2	147.6	27 48.3	+59.3	147.9	26 57.4	+59.4	148.1	14
15	33 48.6	+58.6	145.7	32 59.0	+58.6	146.1	32 09.1	+58.8	146.4	31 19.0	+58.9	146.8	30 28.7	+59.1	147.1	29 38.2	+59.2	147.4	28 47.6	+59.3	147.7	27 56.8	+59.4	148.0	15
16	34 47.2	+58.5	145.4	33 57.6	+58.7	145.8	33 07.9	+58.8	146.2	32 17.9	+59.0	146.5	31 27.8	+59.0	146.9	30 37.4	+59.2	147.2	29 46.9	+59.3	147.5	28 56.2	+59.4	147.8	16
17	35 45.7	+58.4	145.2	34 56.3	+58.6	145.6	34 06.7	+58.8	145.9	33 16.9	+58.9	146.3	32 26.8	+59.1	146.7	31 36.6	+59.2	147.0	30 46.2	+59.2	147.3	29 55.6	+59.3	147.7	17
18	36 44.1	+58.4	144.9	35 54.9	+58.6	145.3	35 05.5	+58.7	145.7	34 15.8	+58.9	146.1	33 25.9	+59.0	146.5	32 35.8	+59.1	146.8	31 45.4	+59.3	147.2	30 54.9	+59.4	147.5	18
19	37 42.5	+58.4	144.6	36 53.5	+58.5	145.0	36 04.2	+58.7	145.5	35 14.7	+58.8	145.9	34 24.9	+59.0	146.2	33 34.9	+59.1	146.6	32 44.7	+59.2	147.0	31 54.3	+59.3	147.3	19
20	38 40.9	+58.3	144.3	37 52.0	+58.6	144.8	37 02.9	+58.7	145.2	36 13.5	+58.8	145.6	35 23.9	+58.9	146.0	34 34.0	+59.1	146.4	33 43.9	+59.2	146.8	32 53.6	+59.3	147.1	20
21	39 39.2	+58.3	144.0	38 50.6	+58.4	144.5	38 01.6	+58.6	144.9	37 12.3	+58.8	145.4	36 22.8	+59.0	145.8	35 33.1	+59.1	146.2	34 43.1	+59.2	146.6	33 52.9	+59.3	147.0	21
22	40 37.5	+58.3	143.7	39 49.0	+58.4	144.2	39 00.2	+58.6	144.7	38 11.1	+58.8	145.1	37 21.8	+58.9	145.6	36 32.2	+59.0	146.0	35 42.3	+59.2	146.4	34 52.2	+59.3	146.8	22
23	41 35.8	+58.1	143.4	40 47.4	+58.4	143.9	39 58.8	+58.6	144.4	39 09.9	+58.7	144.9	38 20.7	+58.9	145.3	37 31.2	+59.0	145.8	36 41.5	+59.1	146.2	35 51.5	+59.3	146.6	23
24	42 33.9	+58.1	143.0	41 45.8	+58.3	143.6	40 57.4	+58.5	144.1	40 08.6	+58.7	144.6	39 19.6	+58.8	145.1	38 30.2	+59.0	145.5	37 40.6	+59.2	146.0	36 50.8	+59.2	146.4	24
25	43 32.0	+58.1	142.7	42 44.1	+58.3	143.3	41 55.9	+58.5	143.8	41 07.3	+58.7	144.3	40 18.4	+58.8	144.8	39 29.2	+59.0	145.3	38 39.8	+59.1	145.8	37 50.0	+59.3	146.2	25
26	44 30.1	+58.0	142.3	43 42.4	+58.2	142.9	42 54.4	+58.4	143.5	42 06.0	+58.6	144.0	41 17.2	+58.8	144.6	40 28.2	+58.9	145.1	39 38.9	+59.1	145.5	38 49.3	+59.2	146.0	26
27	45 28.1	+57.9	142.0	44 40.6	+58.2	142.6	43 52.8	+58.3	143.2	43 04.6	+58.5	143.7	42 16.0	+58.8	144.3	41 27.1	+58.9	144.8	40 38.0	+59.0	145.3	39 48.5	+59.2	145.8	27
28	46 26.0	+57.8	141.6	45 38.8	+58.1	142.2	44 51.1	+58.3	142.9	44 03.1	+58.5	143.4	43 14.8	+58.6	144.0	42 26.0	+58.9	144.6	41 37.0	+59.0	145.1	40 47.7	+59.1	145.6	28
29	47 23.8	+57.8	141.2	46 36.9	+58.0	141.9	45 49.4	+58.3	142.5	45 01.6	+58.5	143.1	44 13.4	+58.7	143.7	43 24.9	+58.8	144.3	42 36.0	+59.0	144.8	41 46.8	+59.1	145.3	29
30	48 21.6	+57.7	140.8	47 34.9	+57.9	141.5	46 47.7	+58.2	142.2	46 00.1	+58.4	142.8	45 12.1	+58.6	143.4	44 23.7	+58.8	144.0	43 35.0	+59.0	144.6	42 45.9	+59.2	145.1	30
31	49 19.3	+57.5	140.4	48 32.8	+57.9	141.1	47 45.9	+58.1	141.8	46 58.5	+58.3	142.5	46 10.7	+58.6	143.1	45 22.5	+58.8	143.7	44 34.0	+58.9	144.3	43 45.1	+59.0	144.9	31
32	50 16.8	+57.5	140.0	49 30.7	+57.7	140.7	48 44.0	+58.0	141.4	47 56.8	+58.3	142.1	47 09.3	+58.5	142.8	46 21.3	+58.7	143.4	45 32.9	+58.9	144.0	44 44.1	+59.1	144.6	32
33	51 14.3	+57.4	139.5	50 28.4	+57.7	140.3	49 42.0	+58.0	141.1	48 55.1	+58.2	141.8	48 07.8	+58.4	142.5	47 20.0	+58.6	143.1	46 31.8	+58.8	143.8	45 43.2	+59.0	144.4	33
34	52 11.7	+57.2	139.0	51 26.1	+57.6	139.9	50 40.0	+57.8	140.6	49 53.3	+58.2	141.4	49 06.2	+58.4	142.1	48 18.6	+58.6	142.8	47 30.6	+58.8	143.5	46 42.2	+58.9	144.1	34
35	53 08.9	+57.1	138.5	52 23.7	+57.4	139.4	51 37.8	+57.8	140.2	50 51.5	+58.0	141.0	50 04.6	+58.3	141.8	49 17.2	+58.5	142.5	48 29.4	+58.7	143.2	47 41.1	+59.0	143.8	35
36	54 06.0	+57.0	138.0	53 21.1	+57.4	138.9	52 35.6	+57.7	139.8	51 49.5	+58.0	140.6	51 02.9	+58.2	141.4	50 15.7	+58.5	142.2	49 28.1	+58.7	142.9	48 40.1	+58.9	143.6	36
37	55 03.0	+56.9	137.5	54 18.5	+57.2	138.4	53 33.3	+57.5	139.3	52 47.5	+57.8	140.2	52 01.1	+58.2	141.0	51 14.2	+58.4	141.8	50 26.8	+58.7	142.6	49 39.0	+58.8	143.3	37
38	55 59.9	+56.6	136.9	55 15.7	+57.1	137.9	54 30.8	+57.5	138.8	53 45.3	+57.8	139.7	52 59.3	+58.0	140.6	52 12.6	+58.4	141.4	51 25.5	+58.5	142.2	50 37.8	+58.8	143.0	38
39	56 56.5	+56.5	136.3	56 12.8	+56.9	137.4	55 28.3	+57.3	138.3	54 43.1	+57.7	139.3	53 57.3	+58.0	140.2	53 11.0	+58.2	141.0	52 24.0	+58.5	141.9	51 36.6	+58.7	142.6	39
40	57 53.0	+56.3	135.7	57 09.7	+56.7	136.8	56 25.6	+57.1	137.8	55 40.8	+57.5	138.8	54 55.3	+57.9	139.7	54 09.2	+58.2	140.6	53 22.5	+58.5	141.5	52 35.3	+58.7	142.3	40
41	58 49.3	+56.1	135.0	58 06.4	+56.6	136.2	57 22.7	+57.1	137.3	56 38.3	+57.4	138.3	55 53.2	+57.7	139.3	55 07.4	+58.1	140.2	54 21.0	+58.3	141.1	53 34.0	+58.6	142.0	41
42	59 45.4	+55.8	134.3	59 03.0	+56.4	135.5	58 19.8	+56.8	136.7	57 35.7	+57.3	137.8	56 50.9	+57.7	138.8	56 05.5	+57.9	139.8	55 19.3	+58.3	140.7	54 32.6	+58.5	141.6	42
43	60 41.2	+55.6	133.6	59 59.4	+56.1	134.9	59 16.6	+56.7	136.1	58 33.0	+57.1	137.2	57 48.6	+57.5	138.3	57 03.4	+57.9	139.3	56 17.6	+58.2	140.3	55 31.1	+58.5	141.2	43
44	61 36.8	+55.3	132.8	60 55.5	+55.9	134.1	60 13.3	+56.4	135.4	59 30.1	+56.9	136.6	58 46.1	+57.4	137.7	58 01.3	+57.8	138.8	57 15.8	+58.1	139.8	56 29.6	+58.4	140.8	44
45	62 32.1	+55.0	132.0	61 51.4	+55.7	133.4	61 09.7	+56.2	134.7	60 27.0	+56.8	136.0	59 43.5	+57.2	137.2	58 59.1	+57.6	138.3	58 13.9	+58.0	139.4	57 28.0	+58.3	140.4	45
46	63 27.1	+54.6	131.1	62 47.1	+55.3	132.6	62 05.9	+56.0	134.0	61 23.8	+56.5	135.3	60 40.7	+57.0	136.6	59 56.7	+57.5	137.7	59 11.9	+57.8	138.9	58 26.3	+58.2	140.0	46
47	64 21.7	+54.3	130.2	63 42.4	+55.0	131.7	63 01.9	+55.7	133.2	62 20.3	+56.3	134.6	61 37.7	+56.8	135.9	60 54.2	+57.3	137.2	60 09.7	+57.8	138.4	59 24.5	+58.1	139.5	47
48	65 16.0	+53.8	129.2	64 37.4	+54.7	130.8	63 57.6	+55.4	132.4	63 16.6	+56.1	133.8	62 34.5	+56.7	135.2	61 51.5	+57.1	136.5	61 07.5	+57.5	137.8	60 22.6	+58.0	139.0	48
49	66 09.8	+53.4	128.1	65 32.1	+54.3	129.8	64 53.0	+55.1	131.5	64 12.7	+55.7	133.0	63 31.2	+56.4	134.5	62 48.6	+56.9	135.9	62 05.0	+57.5	137.2	61 20.6	+57.8	138.5	49
50	67 03.2	+52.8	126.9	66 26.4	+53.8	128.8	65 48.1	+54.6	130.5	65 08.4	+55.5	132.2	64 27.6	+56.1	133.7	63 45.5	+56.8	135.2	63 02.5	+57.2	136.6	62 18.4	+57.7	137.9	50
51	67 56.0	+52.2	125.7	67 20.2	+53.2	127.6	66 42.7	+54.3	129.5	66 03.9	+55.1	131.2	65 23.7	+55.8	132.9	64 42.3	+56.4	134.4	63 59.7	+57.0	135.9	63 16.1	+57.5	137.3	51
52	68 48.2	+51.5	124.4	68 13.4	+52.8	126.4	67 37.0	+53.7	128.4	66 59.0	+54.7	130.2	66 19.5	+55.5	132.0	65 38.7	+56.2	133.6	64 56.7	+56.9	135.2	64 13.6	+57.4	136.6	52
53	69 39.7	+50.8	122.9	69 06.2	+52.0	125.1	68 30.7	+53.3	127.2	67 53.7	+54.2	129.2	67 15.0	+55.1	131.0	66 34.9	+55.9	132.8	65 53.6	+56.5	134.4	65 11.0	+57.1	136.0	53
54	70 30.5	+49.9	121.3	69 58.2	+51.3	123.7	69 24.0	+52.6	125.9	68 47.9	+53.7	128.0	68 10.1	+54.7	130.0	67 30.8	+55.6	131.8	66 50.1	+56.3	133.6	66 08.1	+57.0	135.2	54
55	71 20.4	+48.8	119.6	70 49.5	+50.5	122.2	70 16.6	+51.9	124.5	69 41.6	+53.1	126.7	69 04.8	+54.2	128.8	68 26.4	+55.1	130.8	67 46.4	+56.0	132.7	67 05.1	+56.6	134.4	55
56	72 09.2	+47.8	117.8	71 40.0	+49.5	120.5	71 08.5	+51.0	123.0	70 34.7	+52.5	125.4	69 59.0	+53.7	127.6	69 21.5	+54.7	129.7	68 42.4	+55.6	131.7	68 01.7	+56.4	133.6	56
57	72 57.0	+46.4	115.8	72 29.5	+48.4	118.6	71 59.5	+50.2	121.3	71 27.2	+51.7	123.9	70 52.7	+53.0	126.3	70 16.2	+54.2	128.5	69 38.0	+55.2	130.7	68 58.1	+56.0	132.6	57
58	73 43.4	+44.9	113.6	73 17.9	+47.2	116.6	72 49.7	+49.1	119.5	72 18.9	+50.8	122.3	71 45.7	+52.3	124.8	71 10.4	+53.6	127.2	70 33.2	+54.7	129.5	69 54.1	+55.7	131.6	58
59	74 28.3	+43.2	111.1	74 05.1	+45.6	114.4	73 38.8	+47.8	117.5	73 09.7	+49.7	120.5	72 38.0	+51.5	123.2	72 04.0	+52.9	125.8	71 27.9	+54.1	128.2	70 49.8	+55.2	130.5	59
60	75 11.5	+41.1	108.5	74 50.7	+43.9	112.0	74 26.6	+46.4	115.3	73 59.4	+48.6	118.5	73 29.5	+50.4	121.5	72 56.9	+52.1	124.2	72 22.0	+53.5	126.8	71 45.0	+54.7	129.3	60
61	75 52.6	+38.9	105.6	75 34.6	+42.0	109.3	75 13.0	+44.7	112.9	74 48.0	+47.2	116.3	74 19.9	+49.3	119.5	73 49.0	+51.2	122.5	73 15.5	+52.8	125.3	72 39.7	+54.1	127.9	61
62	76 31.5	+36.2	102.4	76 16.6	+39.6	106.4	75 57.7	+42.8	110.2	75 35.2	+45.5	113.9	75 09.2	+48.0	117.3	74 40.2	+50.0	120.6	74 08.3	+51.9	123.6	73 33.8	+53.4	126.4	62
63	77 07.7	+33.2	98.9	76 56.2	+37.0	103.1	76 40.5	+40.5	107.3	76 20.7	+43.6	111.2	75 57.2	+46.4	114.9	75 30.2	+48.8	118.4	75 00.2	+50.8	121.7	74 27.2	+52.6	124.8	63
64	77 40.9	+29.6	95.1	77 33.2	+33.9	99.6	77 21.0	+37.7	104.0	77 04.3	+41.3	108.2	76 43.6	+44.4	112.2	76 19.0	+47.2	116.0	75 51.0	+49.6	119.6	75 19.8	+51.6	122.9	64
65	78 10.5	+25.8	90.9	78 07.1	+30.3	95.7	77 58.7	+34.7	100.3	77 45.6	+38.7	104.9	77 28.0	+42.2	109.2	77 06.2	+45.4	113.4	76 40.6	+48.1	117.2	76 11.4	+50.4	120.9	65
66	78 36.3	+21.3	86.4	78 37.4	+26.3	91.4	78 33.4	+31.1	96.3	78 24.3	+35.5	101.2	78 10.2	+39.6	105.9	77 51.6	+43.1	110.3	77 28.7	+46.3	114.6	77 01.8	+49.0	118.5	66
67	78 57.6	+16.6	81.6	79 03.7	+21.8	86.7	79 04.5	+26.9	91.9	78 59.8	+31.8	97.1	78 49.8	+36.3	102.1	78 34.7	+40.5	106.9	78 15.0	+44.1	111.5	77 50.8	+47.3	115.9	67
68	79 14.2	+11.3	76.5	79 25.5	+16.7	81.7	79 31.4	+22.1	87.1	79 31.6	+27.5	92.5	79 26.1	+32.7	97.9	79 15.2	+37.3	103.1	78 59.1	+41.5	108.1	78 38.1	+45.1	112.8	68
69	79 25.5	+5.9	71.2	79 42.2	+11.3	76.4	79 53.5	+17.0	81.9	79 59.1	+22.6	87.5	79 58.8	+28.2	93.2	79 52.5	+33.5	98.8	79 40.6	+38.2	104.2	79 23.2	+42.5	109.4	69
70	79 31.4	+0.2	65.8	79 53.5	+5.6	70.9	80 10.5	+11.2	76.3	80 21.7	+17.2	82.1	80 27.0	+23.1	88.0	80 26.0	+28.9	93.9	80 18.8	+34.4	99.8	80 05.7	+39.4	105.4	70
71	79 31.6	−5.5	60.3	79 59.1	−0.3	65.2	80 21.7	+5.3	70.5	80 38.9	+11.2	76.3	80 50.1	+17.4	82.3	80 54.9	+23.7	88.5	80 53.2	+29.8	94.7	80 45.1	+35.4	100.9	71
72	79 26.1	−10.9	54.8	79 58.8	−6.3	59.4	80 27.0	−1.0	64.5	80 50.1	+4.8	70.1	81 07.5	+11.1	76.2	81 18.6	+17.6	82.5	81 23.0	+24.2	89.1	81 20.5	+30.6	95.7	72
73	79 15.2	−16.1	49.5	79 52.5	−11.9	53.7	80 26.0	−7.2	58.5	80 54.9	−1.7	63.9	81 18.6	+4.4	69.7	81 36.2	+11.0	76.1	81 47.2	+17.9	82.8	81 51.1	+24.8	89.8	73
74	78 59.1	−21.0	44.4	79 40.6	−17.4	48.2	80 18.8	−13.1	52.6	80 53.2	−8.1	57.5	81 23.0	−2.5	63.1	81 47.2	+3.9	69.3	82 05.1	+10.8	76.0	82 15.9	+18.2	83.2	74
75	78 38.1	−25.5	39.5	79 23.2	−22.3	42.9	80 05.7	−18.6	46.8	80 45.1	−14.4	51.3	81 20.5	−9.3	56.5	81 51.1	−3.5	62.3	82 15.9	+3.3	68.8	82 34.1	+10.7	76.0	75
76	78 12.6	−29.4	35.0	79 00.9	−26.8	38.0	79 47.1	−23.8	41.4	80 30.7	−20.1	45.4	81 11.2	−15.8	49.9	81 47.6	−10.5	55.3	82 19.2	−4.5	61.4	82 44.8	+2.6	68.3	76
77	77 43.2	−32.9	30.8	78 34.1	−30.8	33.4	79 23.3	−28.2	36.3	80 10.6	−25.2	39.7	80 55.4	−21.6	43.7	81 37.1	−17.3	48.4	82 14.7	−12.0	53.9	82 47.4	−5.7	60.3	77
78	77 10.3	−35.9	27.0	78 03.3	−34.3	29.1	78 55.1	−32.3	31.6	79 45.4	−29.9	34.5	80 33.8	−26.9	37.9	81 19.8	−23.3	42.0	82 02.7	−18.9	46.8	82 41.7	−13.6	52.4	78
79	76 34.4	−38.7	23.5	77 29.0	−37.3	25.3	78 22.8	−35.7	27.3	79 15.5	−33.8	29.8	80 06.9	−31.5	32.6	80 56.5	−28.7	36.0	81 43.8	−25.2	40.0	82 28.1	−20.8	44.9	79
80	75 55.7	−41.0	20.3	76 51.7	−39.9	21.7	77 47.1	−38.7	23.4	78 41.7	−37.1	25.4	79 35.4	−35.4	27.8	80 27.8	−33.2	30.5	81 18.6	−30.5	33.9	82 07.3	−27.2	37.9	80
81	75 14.7	−43.0	17.3	76 11.8	−42.2	18.5	77 08.4	−41.2	19.9	78 04.6	−40.1	21.5	79 00.0	−38.7	23.4	79 54.6	−37.1	25.7	80 48.1	−35.1	28.3	81 40.1	−32.5	31.6	81
82	74 31.7	−44.8	14.7	75 29.6	−44.2	15.6	76 27.2	−43.4	16.7	77 24.5	−42.6	18.0	78 21.3	−41.6	19.5	79 17.5	−40.3	21.3	80 13.0	−38.8	23.4	81 07.6	−37.0	25.9	82
83	73 46.9	−46.3	12.2	74 45.4	−45.8	13.0	75 43.8	−45.3	13.9	76 41.9	−44.6	14.9	77 39.7	−43.9	16.1	78 37.2	−43.0	17.4	79 34.2	−41.9	19.0	80 30.6	−40.6	21.0	83
84	73 00.6	−47.7	10.0	73 59.6	−47.3	10.6	74 58.5	−46.9	11.3	75 57.3	−46.4	12.1	76 55.8	−45.8	13.0	77 54.2	−45.2	14.0	78 52.3	−44.5	15.2	79 50.0	−43.6	16.7	84
85	72 12.9	−48.8	8.0	73 12.3	−48.5	8.4	74 11.6	−48.2	8.9	75 10.9	−48.0	9.5	76 10.0	−47.6	10.2	77 09.0	−47.2	11.0	78 07.8	−46.6	11.9	79 06.4	−46.0	12.9	85
86	71 24.1	−49.8	6.1	72 23.8	−49.7	6.4	73 23.4	−49.5	6.8	74 22.9	−49.2	7.2	75 22.4	−49.0	7.7	76 21.8	−48.6	8.2	77 21.2	−48.4	8.9	78 20.4	−48.0	9.6	86
87	70 34.3	−50.7	4.4	71 34.1	−50.5	4.6	72 33.9	−50.4	4.9	73 33.7	−50.3	5.1	74 33.4	−50.1	5.5	75 33.2	−50.0	5.8	76 32.8	−49.8	6.3	77 32.4	−49.5	6.8	87
88	69 43.6	−51.4	2.8	70 43.6	−51.5	2.9	71 43.5	−51.4	3.1	72 43.4	−51.3	3.3	73 43.3	−51.2	3.5	74 43.2	−51.1	3.7	75 43.0	−51.0	3.9	76 42.9	−50.9	4.2	88
89	68 52.2	−52.2	1.3	69 52.1	−52.1	1.4	70 52.1	−52.1	1.5	71 52.1	−52.1	1.6	72 52.1	−52.1	1.6	73 52.1	−52.1	1.7	74 52.0	−52.0	1.9	75 52.0	−52.0	2.0	89
90	68 00.0	−52.8	0.0	69 00.0	−52.8	0.0	70 00.0	−52.8	0.0	71 00.0	−52.8	0.0	72 00.0	−52.8	0.0	73 00.0	−52.9	0.0	74 00.0	−52.9	0.0	75 00.0	−52.9	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

29°, 331° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 29°, 331°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	19 07.5	−58.9	149.1	18 16.0	−59.0	149.3	17 24.3	−59.0	149.5	16 32.6	−59.2	149.6	15 40.8	−59.2	149.8	14 49.0	−59.4	149.9	13 57.0	−59.4	150.0	13 05.0	−59.5	150.2	0
1	18 08.6	−58.9	149.3	17 17.0	−59.0	149.5	16 25.3	−59.1	149.6	15 33.4	−59.1	149.8	14 41.6	−59.3	149.9	13 49.6	−59.4	150.1	12 57.6	−59.5	150.2	12 05.5	−59.5	150.3	1
2	17 09.7	−58.9	149.5	16 18.0	−59.0	149.7	15 26.2	−59.2	149.8	14 34.3	−59.3	150.0	13 42.3	−59.3	150.1	12 50.2	−59.3	150.2	11 58.1	−59.4	150.3	11 06.0	−59.5	150.4	2
3	16 10.8	−58.9	149.7	15 19.0	−59.0	149.9	14 27.0	−59.1	150.0	13 35.0	−59.2	150.1	12 43.0	−59.3	150.2	11 50.9	−59.4	150.4	10 58.7	−59.4	150.5	10 06.5	−59.5	150.5	3
4	15 11.9	−58.9	149.9	14 20.0	−59.1	150.1	13 27.9	−59.1	150.2	12 35.8	−59.2	150.3	11 43.7	−59.3	150.4	10 51.5	−59.4	150.5	9 59.3	−59.5	150.6	9 07.0	−59.5	150.7	4
5	14 13.0	−59.0	150.1	13 20.9	−59.0	150.2	12 28.8	−59.1	150.4	11 36.6	−59.2	150.5	10 44.4	−59.3	150.6	9 52.1	−59.3	150.6	8 59.8	−59.4	150.7	8 07.5	−59.6	150.8	5
6	13 14.0	−58.9	150.3	12 21.9	−59.1	150.4	11 29.7	−59.2	150.5	10 37.4	−59.2	150.6	9 45.1	−59.3	150.7	8 52.8	−59.4	150.8	8 00.4	−59.5	150.9	7 07.9	−59.5	150.9	6
7	12 15.1	−59.0	150.5	11 22.8	−59.0	150.6	10 30.5	−59.1	150.7	9 38.2	−59.2	150.8	8 45.8	−59.3	150.9	7 53.4	−59.4	150.9	7 00.9	−59.4	151.0	6 08.4	−59.5	151.1	7
8	11 16.1	−58.9	150.7	10 23.8	−59.1	150.8	9 31.4	−59.2	150.9	8 39.0	−59.3	150.9	7 46.5	−59.3	151.0	6 54.0	−59.4	151.1	6 01.5	−59.5	151.1	5 08.9	−59.5	151.2	8
9	10 17.2	−59.0	150.9	9 24.7	−59.0	151.0	8 32.2	−59.1	151.0	7 39.7	−59.2	151.1	6 47.2	−59.3	151.2	5 54.6	−59.4	151.2	5 02.0	−59.5	151.3	4 09.4	−59.5	151.3	9
10	9 18.2	−59.0	151.1	8 25.7	−59.1	151.1	7 33.1	−59.2	151.2	6 40.5	−59.2	151.3	5 47.9	−59.4	151.3	4 55.2	−59.4	151.4	4 02.5	−59.4	151.4	3 09.9	−59.6	151.4	10
11	8 19.2	−59.0	151.3	7 26.6	−59.1	151.3	6 33.9	−59.1	151.4	5 41.3	−59.3	151.4	4 48.5	−59.3	151.5	3 55.8	−59.4	151.5	3 03.1	−59.5	151.5	2 10.3	−59.5	151.6	11
12	7 20.2	−59.0	151.4	6 27.5	−59.1	151.5	5 34.8	−59.2	151.5	4 42.0	−59.2	151.6	3 49.2	−59.3	151.6	2 56.4	−59.4	151.7	2 03.6	−59.4	151.7	1 10.8	−59.5	151.7	12
13	6 21.2	−59.0	151.6	5 28.4	−59.0	151.7	4 35.6	−59.2	151.7	3 42.8	−59.3	151.7	2 49.9	−59.3	151.8	1 57.0	−59.4	151.8	1 04.2	−59.5	151.8	0 11.3	−59.5	151.8	13
14	5 22.2	−59.0	151.8	4 29.4	−59.1	151.8	3 36.4	−59.1	151.9	2 43.5	−59.2	151.9	1 50.6	−59.3	151.9	0 57.6	−59.4	151.9	0 04.7	−59.5	151.9	0 48.2	+59.6	28.1	14
15	4 23.2	−58.9	152.0	3 30.3	−59.1	152.0	2 37.3	−59.2	152.0	1 44.3	−59.3	152.1	0 51.3	−59.4	152.1	0 01.8	+59.3	27.9	0 54.8	+59.4	27.9	1 47.8	+59.5	27.9	15
16	3 24.3	−59.0	152.2	2 31.2	−59.1	152.2	1 38.1	−59.2	152.2	0 45.0	−59.2	152.2	0 08.1	+59.3	27.8	1 01.1	+59.4	27.8	1 54.2	+59.5	27.8	2 47.3	+59.5	27.8	16
17	2 25.3	−59.0	152.4	1 32.1	−59.1	152.4	0 38.9	−59.1	152.4	0 14.2	+59.3	27.6	1 07.4	+59.3	27.6	2 00.5	+59.4	27.6	2 53.7	+59.4	27.7	3 46.8	+59.5	27.7	17
18	1 26.3	−59.1	152.5	0 33.0	−59.1	152.5	0 20.2	+59.2	27.5	1 13.5	+59.2	27.5	2 06.7	+59.3	27.5	2 59.9	+59.4	27.5	3 53.1	+59.5	27.5	4 46.3	+59.6	27.6	18
19	0 27.2	−59.0	152.7	0 26.1	+59.1	27.3	1 19.4	+59.2	27.3	2 12.7	+59.3	27.3	3 06.0	+59.3	27.3	3 59.3	+59.4	27.4	4 52.6	+59.5	27.4	5 45.9	+59.5	27.4	19
20	0 31.8	+59.0	27.1	1 25.2	+59.0	27.1	2 18.6	+59.1	27.1	3 12.0	+59.2	27.1	4 05.3	+59.4	27.2	4 58.7	+59.4	27.2	5 52.1	+59.4	27.3	6 45.4	+59.5	27.3	20
21	1 30.8	+59.0	26.9	2 24.2	+59.1	26.9	3 17.7	+59.2	27.0	4 11.2	+59.2	27.0	5 04.7	+59.3	27.0	5 58.1	+59.4	27.1	6 51.5	+59.5	27.1	7 44.9	+59.5	27.2	21
22	2 29.8	+59.0	26.7	3 23.3	+59.1	26.8	4 16.9	+59.2	26.8	5 10.4	+59.3	26.8	6 04.0	+59.3	26.9	6 57.5	+59.4	26.9	7 51.0	+59.4	27.0	8 44.4	+59.5	27.1	22
23	3 28.8	+59.0	26.6	4 22.4	+59.1	26.6	5 16.1	+59.1	26.6	6 09.7	+59.2	26.7	7 03.3	+59.3	26.7	7 56.9	+59.4	26.8	8 50.4	+59.5	26.8	9 43.9	+59.5	26.9	23
24	4 27.8	+58.9	26.4	5 21.5	+59.1	26.4	6 15.2	+59.2	26.5	7 08.9	+59.3	26.5	8 02.6	+59.3	26.6	8 56.3	+59.3	26.6	9 49.9	+59.4	26.7	10 43.4	+59.6	26.8	24
25	5 26.7	+59.0	26.2	6 20.6	+59.0	26.2	7 14.4	+59.1	26.3	8 08.2	+59.2	26.4	9 01.9	+59.3	26.4	9 55.6	+59.4	26.5	10 49.3	+59.5	26.6	11 43.0	+59.5	26.7	25
26	6 25.7	+59.0	26.0	7 19.6	+59.1	26.1	8 13.5	+59.2	26.1	9 07.4	+59.2	26.2	10 01.2	+59.3	26.3	10 55.0	+59.4	26.3	11 48.8	+59.4	26.4	12 42.5	+59.5	26.5	26
27	7 24.7	+59.0	25.8	8 18.7	+59.1	25.9	9 12.7	+59.1	26.0	10 06.6	+59.2	26.0	11 00.5	+59.3	26.1	11 54.4	+59.3	26.2	12 48.2	+59.4	26.3	13 42.0	+59.5	26.4	27
28	8 23.7	+59.0	25.6	9 17.8	+59.0	25.7	10 11.8	+59.2	25.8	11 05.8	+59.3	25.9	11 59.8	+59.3	26.0	12 53.7	+59.4	26.0	13 47.6	+59.4	26.2	14 41.5	+59.4	26.3	28
29	9 22.7	+59.0	25.5	10 16.8	+59.1	25.5	11 11.0	+59.1	25.6	12 05.1	+59.2	25.7	12 59.1	+59.3	25.8	13 53.1	+59.4	25.9	14 47.0	+59.5	26.0	15 40.9	+59.5	26.1	29
30	10 21.7	+58.9	25.3	11 15.9	+59.0	25.3	12 10.1	+59.1	25.4	13 04.3	+59.2	25.5	13 58.4	+59.3	25.6	14 52.5	+59.3	25.7	15 46.5	+59.4	25.9	16 40.4	+59.5	26.0	30
31	11 20.6	+59.0	25.1	12 14.9	+59.1	25.2	13 09.2	+59.2	25.3	14 03.5	+59.2	25.4	14 57.7	+59.2	25.5	15 51.8	+59.3	25.6	16 45.9	+59.4	25.7	17 39.9	+59.5	25.9	31
32	12 19.6	+58.9	24.9	13 14.0	+59.0	25.0	14 08.4	+59.1	25.1	15 02.7	+59.2	25.2	15 56.9	+59.3	25.3	16 51.1	+59.4	25.4	17 45.3	+59.4	25.6	18 39.4	+59.5	25.7	32
33	13 18.5	+59.0	24.7	14 13.0	+59.0	24.8	15 07.5	+59.1	24.9	16 01.9	+59.1	25.0	16 56.2	+59.3	25.2	17 50.5	+59.3	25.3	18 44.7	+59.4	25.4	19 38.9	+59.4	25.6	33
34	14 17.5	+58.9	24.5	15 12.0	+59.1	24.6	16 06.6	+59.1	24.7	17 01.0	+59.2	24.9	17 55.5	+59.2	25.0	18 49.8	+59.3	25.1	19 44.1	+59.4	25.3	20 38.3	+59.5	25.4	34
35	15 16.4	+58.9	24.3	16 11.1	+59.0	24.4	17 05.7	+59.0	24.6	18 00.2	+59.2	24.7	18 54.7	+59.2	24.8	19 49.1	+59.3	25.0	20 43.5	+59.4	25.1	21 37.8	+59.4	25.3	35
36	16 15.3	+58.9	24.1	17 10.1	+59.0	24.2	18 04.7	+59.1	24.4	18 59.4	+59.1	24.5	19 53.9	+59.3	24.7	20 48.4	+59.3	24.8	21 42.9	+59.3	25.0	22 37.2	+59.5	25.1	36
37	17 14.2	+58.9	23.9	18 09.1	+58.9	24.0	19 03.8	+59.1	24.2	19 58.5	+59.2	24.3	20 53.2	+59.2	24.5	21 47.7	+59.3	24.6	22 42.2	+59.4	24.8	23 36.7	+59.4	25.0	37
38	18 13.1	+58.9	23.7	19 08.0	+59.0	23.9	20 02.9	+59.0	24.0	20 57.7	+59.1	24.1	21 52.4	+59.2	24.3	22 47.0	+59.3	24.5	23 41.6	+59.3	24.7	24 36.1	+59.4	24.8	38
39	19 12.0	+58.9	23.5	20 07.0	+59.0	23.7	21 01.9	+59.1	23.8	21 56.8	+59.1	24.0	22 51.6	+59.2	24.1	23 46.3	+59.3	24.3	24 40.9	+59.4	24.5	25 35.5	+59.4	24.7	39
40	20 10.9	+58.9	23.3	21 06.0	+58.9	23.5	22 01.0	+59.0	23.6	22 55.9	+59.1	23.8	23 50.8	+59.2	24.0	24 45.6	+59.2	24.1	25 40.3	+59.3	24.3	26 34.9	+59.4	24.5	40
41	21 09.8	+58.8	23.1	22 04.9	+58.9	23.3	23 00.0	+59.0	23.4	23 55.0	+59.1	23.6	24 50.0	+59.1	23.8	25 44.8	+59.3	24.0	26 39.6	+59.3	24.2	27 34.3	+59.4	24.4	41
42	22 08.6	+58.8	22.9	23 03.8	+59.0	23.1	23 59.0	+59.0	23.2	24 54.1	+59.1	23.4	25 49.1	+59.2	23.6	26 44.1	+59.2	23.8	27 38.9	+59.3	24.0	28 33.7	+59.4	24.2	42
43	23 07.4	+58.8	22.7	24 02.8	+58.8	22.8	24 58.0	+59.0	23.0	25 53.2	+59.1	23.2	26 48.3	+59.1	23.4	27 43.3	+59.2	23.6	28 38.2	+59.3	23.8	29 33.1	+59.4	24.1	43
44	24 06.2	+58.8	22.5	25 01.6	+58.9	22.6	25 57.0	+59.0	22.8	26 52.3	+59.0	23.0	27 47.4	+59.2	23.2	28 42.5	+59.2	23.4	29 37.5	+59.3	23.7	30 32.5	+59.3	23.9	44
45	25 05.0	+58.8	22.2	26 00.5	+58.9	22.4	26 56.0	+58.9	22.6	27 51.3	+59.0	22.8	28 46.6	+59.1	23.0	29 41.7	+59.2	23.2	30 36.8	+59.3	23.5	31 31.8	+59.3	23.7	45
46	26 03.8	+58.7	22.0	26 59.4	+58.8	22.2	27 54.9	+58.9	22.4	28 50.3	+59.0	22.6	29 45.7	+59.1	22.8	30 40.9	+59.2	23.1	31 36.1	+59.2	23.3	32 31.1	+59.4	23.5	46
47	27 02.5	+58.8	21.8	27 58.2	+58.8	22.0	28 53.8	+58.9	22.2	29 49.3	+59.0	22.4	30 44.8	+59.0	22.6	31 40.1	+59.1	22.9	32 35.3	+59.3	23.1	33 30.5	+59.3	23.4	47
48	28 01.3	+58.7	21.6	28 57.0	+58.8	21.8	29 52.7	+58.9	22.0	30 48.3	+59.0	22.2	31 43.8	+59.1	22.4	32 39.2	+59.2	22.7	33 34.6	+59.2	22.9	34 29.8	+59.3	23.2	48
49	29 00.0	+58.7	21.3	29 55.8	+58.8	21.5	30 51.6	+58.9	21.7	31 47.3	+58.9	22.0	32 42.9	+59.0	22.2	33 38.4	+59.1	22.5	34 33.8	+59.2	22.7	35 29.1	+59.2	23.0	49
50	29 58.7	+58.6	21.1	30 54.6	+58.7	21.3	31 50.5	+58.8	21.5	32 46.2	+59.0	21.8	33 41.9	+59.0	22.0	34 37.5	+59.1	22.3	35 33.0	+59.2	22.5	36 28.3	+59.3	22.8	50
51	30 57.3	+58.6	20.8	31 53.3	+58.8	21.1	32 49.3	+58.8	21.3	33 45.2	+58.9	21.5	34 40.9	+59.0	21.8	35 36.6	+59.1	22.0	36 32.2	+59.1	22.3	37 27.6	+59.2	22.6	51
52	31 55.9	+58.6	20.6	32 52.1	+58.7	20.8	33 48.1	+58.8	21.1	34 44.1	+58.8	21.3	35 39.9	+59.0	21.6	36 35.7	+59.0	21.8	37 31.3	+59.1	22.1	38 26.8	+59.2	22.4	52
53	32 54.5	+58.6	20.3	33 50.8	+58.6	20.6	34 46.9	+58.7	20.8	35 42.9	+58.9	21.1	36 38.9	+58.9	21.3	37 34.7	+59.0	21.6	38 30.4	+59.1	21.9	39 26.0	+59.2	22.2	53
54	33 53.1	+58.5	20.1	34 49.4	+58.6	20.3	35 45.6	+58.7	20.6	36 41.8	+58.8	20.8	37 37.8	+58.9	21.1	38 33.7	+59.0	21.4	39 29.5	+59.1	21.7	40 25.2	+59.2	22.0	54
55	34 51.6	+58.5	19.8	35 48.0	+58.6	20.1	36 44.3	+58.7	20.3	37 40.6	+58.8	20.6	38 36.7	+58.9	20.8	39 32.7	+59.0	21.1	40 28.6	+59.1	21.4	41 24.4	+59.1	21.8	55
56	35 50.1	+58.5	19.5	36 46.6	+58.6	19.8	37 43.0	+58.7	20.0	38 39.4	+58.7	20.3	39 35.6	+58.8	20.6	40 31.7	+58.9	20.9	41 27.7	+59.0	21.2	42 23.5	+59.2	21.5	56
57	36 48.6	+58.4	19.3	37 45.2	+58.5	19.5	38 41.7	+58.6	19.8	39 38.1	+58.7	20.1	40 34.4	+58.8	20.3	41 30.6	+58.9	20.6	42 26.7	+59.0	21.0	43 22.7	+59.0	21.3	57
58	37 47.0	+58.4	19.0	38 43.7	+58.5	19.2	39 40.3	+58.6	19.5	40 36.8	+58.7	19.8	41 33.2	+58.8	20.1	42 29.5	+58.9	20.4	43 25.7	+58.9	20.7	44 21.7	+59.1	21.1	58
59	38 45.4	+58.3	18.7	39 42.2	+58.4	18.9	40 38.9	+58.5	19.2	41 35.5	+58.6	19.5	42 32.0	+58.7	19.8	43 28.4	+58.8	20.1	44 24.6	+59.0	20.5	45 20.8	+59.0	20.8	59
60	39 43.7	+58.3	18.4	40 40.6	+58.4	18.6	41 37.4	+58.5	18.9	42 34.1	+58.6	19.2	43 30.7	+58.7	19.5	44 27.2	+58.8	19.9	45 23.6	+58.9	20.2	46 19.8	+59.0	20.6	60
61	40 42.0	+58.2	18.1	41 39.0	+58.3	18.3	42 35.9	+58.4	18.6	43 32.7	+58.5	18.9	44 29.4	+58.6	19.2	45 26.0	+58.7	19.6	46 22.5	+58.8	19.9	47 18.8	+58.9	20.3	61
62	41 40.2	+58.2	17.7	42 37.3	+58.3	18.0	43 34.3	+58.4	18.3	44 31.2	+58.5	18.6	45 28.0	+58.6	18.9	46 24.7	+58.7	19.3	47 21.3	+58.8	19.6	48 17.7	+58.9	20.0	62
63	42 38.4	+58.1	17.4	43 35.6	+58.2	17.7	44 32.7	+58.3	18.0	45 29.7	+58.4	18.3	46 26.6	+58.6	18.6	47 23.4	+58.7	19.0	48 20.1	+58.7	19.3	49 16.6	+58.9	19.7	63
64	43 36.5	+58.0	17.1	44 33.8	+58.1	17.4	45 31.0	+58.3	17.7	46 28.1	+58.4	18.0	47 25.2	+58.4	18.3	48 22.1	+58.6	18.7	49 18.8	+58.7	19.0	50 15.5	+58.8	19.4	64
65	44 34.5	+58.0	16.7	45 31.9	+58.1	17.0	46 29.3	+58.2	17.3	47 26.5	+58.3	17.6	48 23.6	+58.5	18.0	49 20.7	+58.5	18.3	50 17.5	+58.7	18.7	51 14.3	+58.8	19.1	65
66	45 32.5	+57.9	16.4	46 30.0	+58.1	16.6	47 27.5	+58.1	17.0	48 24.8	+58.3	17.3	49 22.1	+58.3	17.6	50 19.2	+58.5	18.0	51 16.2	+58.6	18.4	52 13.1	+58.7	18.8	66
67	46 30.4	+57.9	16.0	47 28.1	+57.9	16.3	48 25.6	+58.1	16.6	49 23.1	+58.1	16.9	50 20.4	+58.3	17.3	51 17.7	+58.4	17.6	52 14.8	+58.5	18.0	53 11.8	+58.6	18.4	67
68	47 28.3	+57.7	15.6	48 26.0	+57.9	15.9	49 23.7	+57.9	16.2	50 21.2	+58.1	16.5	51 18.7	+58.2	16.9	52 16.1	+58.3	17.3	53 13.3	+58.4	17.7	54 10.4	+58.6	18.1	68
69	48 26.0	+57.7	15.2	49 23.9	+57.7	15.5	50 21.6	+57.9	15.8	51 19.3	+58.0	16.1	52 16.9	+58.1	16.5	53 14.4	+58.2	16.9	54 11.7	+58.4	17.3	55 09.0	+58.5	17.7	69
70	49 23.7	+57.5	14.8	50 21.6	+57.7	15.1	51 19.5	+57.8	15.4	52 17.3	+58.0	15.7	53 15.0	+58.1	16.1	54 12.6	+58.2	16.5	55 10.1	+58.3	16.9	56 07.5	+58.4	17.3	70
71	50 21.2	+57.5	14.3	51 19.3	+57.6	14.6	52 17.3	+57.7	15.0	53 15.3	+57.8	15.3	54 13.1	+57.9	15.7	55 10.8	+58.1	16.0	56 08.4	+58.2	16.5	57 05.9	+58.3	16.9	71
72	51 18.7	+57.4	13.9	52 16.9	+57.5	14.2	53 15.0	+57.6	14.5	54 13.1	+57.7	14.8	55 11.0	+57.9	15.2	56 08.9	+58.0	15.6	57 06.6	+58.1	16.0	58 04.2	+58.3	16.5	72
73	52 16.1	+57.2	13.4	53 14.4	+57.3	13.7	54 12.6	+57.5	14.0	55 10.8	+57.6	14.4	56 08.9	+57.7	14.7	57 06.9	+57.8	15.1	58 04.7	+58.0	15.5	59 02.5	+58.1	16.0	73
74	53 13.3	+57.1	12.9	54 11.7	+57.3	13.2	55 10.1	+57.4	13.5	56 08.4	+57.5	13.9	57 06.6	+57.6	14.2	58 04.7	+57.8	14.6	59 02.7	+57.9	15.1	60 00.6	+58.0	15.5	74
75	54 10.4	+57.0	12.4	55 09.0	+57.1	12.7	56 07.5	+57.2	13.0	57 05.9	+57.3	13.4	58 04.2	+57.5	13.7	59 02.5	+57.6	14.1	60 00.6	+57.7	14.5	60 58.6	+57.9	15.0	75
76	55 07.4	+56.8	11.8	56 06.1	+56.9	12.1	57 04.7	+57.0	12.5	58 03.2	+57.2	12.8	59 01.7	+57.3	13.2	60 00.1	+57.4	13.6	60 58.3	+57.7	14.0	61 56.5	+57.8	14.4	76
77	56 04.2	+56.6	11.3	57 03.0	+56.8	11.6	58 01.7	+56.9	11.9	59 00.4	+57.0	12.2	59 59.0	+57.2	12.6	60 57.5	+57.3	13.0	61 56.0	+57.4	13.4	62 54.3	+57.6	13.9	77
78	57 00.8	+56.5	10.7	57 59.8	+56.6	11.0	58 58.6	+56.8	11.3	59 57.4	+56.9	11.6	60 56.2	+57.0	12.0	61 54.8	+57.2	12.4	62 53.4	+57.3	12.8	63 51.9	+57.4	13.2	78
79	57 57.3	+56.3	10.0	58 56.4	+56.4	10.3	59 55.4	+56.5	10.6	60 54.3	+56.6	11.0	61 53.2	+56.8	11.3	62 52.0	+56.9	11.7	63 50.7	+57.0	12.1	64 49.3	+57.2	12.6	79
80	58 53.6	+56.0	9.4	59 52.8	+56.1	9.7	60 51.9	+56.3	10.0	61 50.9	+56.5	10.3	62 50.0	+56.5	10.6	63 48.9	+56.7	11.0	64 47.7	+56.9	11.4	65 46.5	+57.0	11.8	80
81	59 49.6	+55.9	8.7	60 48.9	+56.0	8.9	61 48.2	+56.0	9.2	62 47.4	+56.2	9.5	63 46.5	+56.3	9.9	64 45.6	+56.5	10.2	65 44.6	+56.6	10.6	66 43.5	+56.8	11.1	81
82	60 45.5	+55.5	7.9	61 44.9	+55.6	8.2	62 44.2	+55.8	8.5	63 43.6	+55.9	8.8	64 42.8	+56.1	9.1	65 42.1	+56.1	9.4	66 41.2	+56.3	9.8	67 40.3	+56.5	10.2	82
83	61 41.0	+55.3	7.2	62 40.5	+55.4	7.4	63 40.0	+55.5	7.7	64 39.5	+55.6	7.9	65 38.9	+55.7	8.2	66 38.2	+55.9	8.6	67 37.5	+56.1	8.9	68 36.8	+56.2	9.3	83
84	62 36.3	+55.0	6.3	63 35.9	+55.1	6.5	64 35.5	+55.2	6.8	65 35.1	+55.3	7.0	66 34.6	+55.4	7.3	67 34.1	+55.5	7.6	68 33.6	+55.6	8.0	69 33.0	+55.8	8.3	84
85	63 31.3	+54.6	5.4	64 31.0	+54.7	5.6	65 30.7	+54.8	5.9	66 30.4	+54.9	6.1	67 30.0	+55.0	6.3	68 29.6	+55.2	6.6	69 29.2	+55.3	6.9	70 28.8	+55.3	7.3	85
86	64 25.9	+54.2	4.5	65 25.7	+54.3	4.7	66 25.5	+54.4	4.9	67 25.3	+54.4	5.1	68 25.0	+54.6	5.3	69 24.8	+54.6	5.5	70 24.5	+54.8	5.8	71 24.1	+55.0	6.1	86
87	65 20.1	+53.8	3.5	66 20.0	+53.9	3.6	67 19.9	+53.9	3.8	68 19.7	+54.0	3.9	69 19.6	+54.1	4.1	70 19.4	+54.2	4.3	71 19.3	+54.2	4.5	72 19.1	+54.3	4.8	87
88	66 13.9	+53.3	2.4	67 13.9	+53.3	2.5	68 13.8	+53.4	2.6	69 13.7	+53.5	2.7	70 13.7	+53.5	2.9	71 13.6	+53.5	3.0	72 13.5	+53.6	3.2	73 13.4	+53.7	3.4	88
89	67 07.2	+52.8	1.2	68 07.2	+52.8	1.3	69 07.2	+52.8	1.4	70 07.2	+52.8	1.4	71 07.2	+52.8	1.5	72 07.1	+52.9	1.6	73 07.1	+52.9	1.7	74 07.1	+52.9	1.8	89
90	68 00.0	+52.2	0.0	69 00.0	+52.1	0.0	70 00.0	+52.1	0.0	71 00.0	+52.1	0.0	72 00.0	+52.1	0.0	73 00.0	+52.1	0.0	74 00.0	+52.0	0.0	75 00.0	+52.0	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 151°, 209°

Dec. °	68° Hc ° ′	68° d ′	68° Z °	69° Hc ° ′	69° d ′	69° Z °	70° Hc ° ′	70° d ′	70° Z °	71° Hc ° ′	71° d ′	71° Z °
0	18 55.8	+58.8	148.1	18 04.8	+59.0	148.3	17 13.8	+59.0	148.4	16 22.6	+59.1	148.6
1	19 54.6	+58.8	147.9	19 03.8	+58.9	148.1	18 12.8	+59.0	148.2	17 21.7	+59.1	148.4
2	20 53.4	+58.8	147.7	20 02.7	+58.9	147.9	19 11.8	+59.0	148.1	18 20.8	+59.1	148.2
3	21 52.2	+58.7	147.4	21 01.6	+58.8	147.7	20 10.8	+59.0	147.9	19 19.9	+59.1	148.1
4	22 50.9	+58.8	147.2	22 00.4	+58.9	147.5	21 09.8	+59.0	147.7	20 19.0	+59.1	147.9
5	23 49.7	+58.7	147.0	22 59.3	+58.8	147.2	22 08.8	+58.9	147.5	21 18.1	+59.1	147.7
6	24 48.4	+58.7	146.8	23 58.1	+58.9	147.0	23 07.7	+59.0	147.3	22 17.2	+59.1	147.5
7	25 47.1	+58.7	146.6	24 57.0	+58.8	146.8	24 06.7	+58.9	147.1	23 16.3	+59.0	147.3
8	26 45.8	+58.6	146.3	25 55.8	+58.8	146.6	25 05.6	+58.9	146.9	24 15.3	+59.0	147.1
9	27 44.4	+58.7	146.1	26 54.6	+58.7	146.4	26 04.5	+58.9	146.6	25 14.3	+59.0	146.9
10	28 43.1	+58.6	145.8	27 53.3	+58.8	146.1	27 03.4	+58.9	146.4	26 13.3	+59.0	146.7
11	29 41.7	+58.5	145.6	28 52.1	+58.7	145.9	28 02.3	+58.8	146.2	27 12.3	+59.0	146.5
12	30 40.2	+58.6	145.3	29 50.8	+58.7	145.7	29 01.1	+58.9	146.0	28 11.3	+59.0	146.3
13	31 38.8	+58.5	145.1	30 49.5	+58.6	145.4	30 00.0	+58.8	145.8	29 10.3	+58.9	146.1
14	32 37.3	+58.5	144.8	31 48.1	+58.7	145.2	30 58.8	+58.8	145.5	30 09.2	+58.9	145.9
15	33 35.8	+58.4	144.6	32 46.8	+58.6	144.9	31 57.6	+58.7	145.3	31 08.1	+58.9	145.7
16	34 34.2	+58.4	144.3	33 45.4	+58.6	144.7	32 56.3	+58.7	145.1	32 07.0	+58.9	145.4
17	35 32.6	+58.4	144.0	34 44.0	+58.5	144.4	33 55.0	+58.7	144.8	33 05.9	+58.8	145.2
18	36 31.0	+58.3	143.7	35 42.5	+58.5	144.2	34 53.7	+58.7	144.6	34 04.7	+58.8	145.0
19	37 29.3	+58.3	143.4	36 41.0	+58.5	143.9	35 52.4	+58.6	144.3	35 03.5	+58.8	144.7
20	38 27.6	+58.2	143.1	37 39.5	+58.4	143.6	36 51.0	+58.6	144.0	36 02.3	+58.8	144.5
21	39 25.8	+58.2	142.8	38 37.9	+58.4	143.3	37 49.6	+58.6	143.8	37 01.1	+58.7	144.2
22	40 24.0	+58.2	142.5	39 36.3	+58.3	143.0	38 48.2	+58.5	143.5	37 59.8	+58.7	144.0
23	41 22.2	+58.0	142.2	40 34.6	+58.3	142.7	39 46.7	+58.5	143.2	38 58.5	+58.6	143.7
24	42 20.2	+58.0	141.8	41 32.9	+58.2	142.4	40 45.2	+58.4	142.9	39 57.1	+58.7	143.4
25	43 18.2	+58.0	141.5	42 31.1	+58.2	142.1	41 43.6	+58.4	142.6	40 55.8	+58.5	143.1
26	44 16.2	+57.9	141.1	43 29.3	+58.1	141.7	42 42.0	+58.3	142.3	41 54.3	+58.6	142.9
27	45 14.1	+57.8	140.8	44 27.4	+58.0	141.4	43 40.3	+58.3	142.0	42 52.9	+58.4	142.6
28	46 11.9	+57.7	140.4	45 25.4	+58.0	141.0	44 38.6	+58.2	141.6	43 51.3	+58.5	142.2
29	47 09.6	+57.6	140.0	46 23.4	+57.9	140.7	45 36.8	+58.1	141.3	44 49.8	+58.3	141.9
30	48 07.2	+57.6	139.6	47 21.3	+57.8	140.3	46 34.9	+58.1	140.9	45 48.1	+58.3	141.6
31	49 04.8	+57.4	139.1	48 19.1	+57.8	139.9	47 33.0	+58.0	140.6	46 46.4	+58.3	141.3
32	50 02.2	+57.3	138.7	49 16.9	+57.6	139.5	48 31.0	+57.9	140.2	47 44.7	+58.2	140.9
33	50 59.5	+57.3	138.2	50 14.5	+57.6	139.0	49 28.9	+57.9	139.8	48 42.9	+58.1	140.5
34	51 56.8	+57.1	137.7	51 12.1	+57.4	138.6	50 26.8	+57.7	139.4	49 41.0	+58.0	140.2
35	52 53.9	+56.9	137.2	52 09.5	+57.3	138.1	51 24.5	+57.7	139.0	50 39.0	+57.9	139.8
36	53 50.8	+56.8	136.7	53 06.8	+57.2	137.6	52 22.2	+57.5	138.5	51 36.9	+57.9	139.3
37	54 47.6	+56.7	136.2	54 04.0	+57.1	137.1	53 19.7	+57.5	138.0	52 34.8	+57.8	138.9
38	55 44.3	+56.5	135.6	55 01.1	+56.9	136.6	54 17.2	+57.3	137.5	53 32.6	+57.6	138.5
39	56 40.8	+56.3	135.0	55 58.0	+56.8	136.0	55 14.5	+57.1	137.0	54 30.2	+57.5	138.0
40	57 37.1	+56.1	134.3	56 54.8	+56.6	135.4	56 11.6	+57.0	136.5	55 27.7	+57.5	137.5
41	58 33.2	+55.9	133.7	57 51.4	+56.3	134.8	57 08.6	+56.9	135.9	56 25.2	+57.2	137.0
42	59 29.1	+55.7	133.0	58 47.7	+56.2	134.2	58 05.5	+56.7	135.3	57 22.4	+57.1	136.4
43	60 24.8	+55.3	132.2	59 43.9	+56.0	133.5	59 02.2	+56.5	134.7	58 19.5	+57.0	135.9
44	61 20.1	+55.1	131.4	60 39.9	+55.7	132.8	59 58.7	+56.3	134.0	59 16.5	+56.8	135.3
45	62 15.2	+54.8	130.6	61 35.6	+55.5	132.0	60 55.0	+56.0	133.3	60 13.3	+56.6	134.6
46	63 10.0	+54.4	129.7	62 31.1	+55.1	131.2	61 51.0	+55.8	132.6	61 09.9	+56.3	133.9
47	64 04.4	+54.0	128.7	63 26.2	+54.8	130.3	62 46.8	+55.5	131.8	62 06.2	+56.2	133.2
48	64 58.4	+53.6	127.7	64 21.0	+54.4	129.4	63 42.3	+55.2	131.0	63 02.4	+55.8	132.4
49	65 52.0	+53.0	126.7	65 15.4	+54.0	128.4	64 37.5	+54.8	130.1	63 58.2	+55.6	131.6
50	66 45.0	+52.6	125.5	66 09.4	+53.6	127.3	65 32.3	+54.4	129.1	64 53.8	+55.2	130.8
51	67 37.6	+51.9	124.2	67 03.0	+53.0	126.2	66 26.7	+54.0	128.1	65 49.0	+54.9	129.8
52	68 29.5	+51.2	122.9	67 56.0	+52.4	125.0	67 20.7	+53.5	126.9	66 43.9	+54.5	128.8
53	69 20.7	+50.4	121.5	68 48.4	+51.8	123.7	68 14.2	+53.0	125.7	67 38.4	+53.9	127.7
54	70 11.1	+49.6	119.9	69 40.2	+51.0	122.2	69 07.2	+52.3	124.5	68 32.3	+53.5	126.6
55	71 00.7	+48.5	118.2	70 31.2	+50.1	120.7	69 59.5	+51.6	123.1	69 25.8	+52.9	125.3
56	71 49.2	+47.4	116.3	71 21.3	+49.2	119.0	70 51.1	+50.8	121.5	70 18.7	+52.1	123.9
57	72 36.6	+46.1	114.3	72 10.5	+48.1	117.2	71 41.9	+49.8	119.9	71 10.8	+51.4	122.4
58	73 22.7	+44.5	112.1	72 58.6	+46.8	115.2	72 31.7	+48.8	118.1	72 02.2	+50.5	120.8
59	74 07.2	+42.9	109.7	73 45.4	+45.3	113.0	73 20.5	+47.5	116.1	72 52.7	+49.5	119.0
60	74 50.1	+40.8	•107.1	74 30.7	+43.6	110.6	74 08.0	+46.0	113.9	73 42.2	+48.2	117.0
61	75 30.9	+38.6	•104.3	75 14.3	+41.6	•108.0	74 54.0	+44.4	111.5	74 30.4	+46.8	114.8
62	76 09.5	+36.0	•101.1	75 55.9	+39.3	•105.1	75 38.4	+42.4	•108.8	75 17.2	+45.2	112.4
63	76 45.5	+32.9	•97.7	76 35.2	+36.8	•101.9	76 20.8	+40.2	•105.9	76 02.4	+43.3	•109.8
64	77 18.4	+29.7	•94.0	77 12.0	+33.7	•98.4	77 01.0	+37.5	•102.7	76 45.7	+41.0	•106.8
65	77 48.1	+25.8	•90.0	77 45.7	+30.2	•94.6	77 38.5	+34.5	•99.1	77 26.7	+38.4	•103.6
66	78 13.9	+21.5	•85.6	78 15.9	+26.4	•90.4	78 13.0	+30.9	•95.2	78 05.1	+35.3	•99.9
67	78 35.4	+16.9	•81.0	78 42.3	+21.9	•85.9	78 43.9	+27.0	•90.9	78 40.4	+31.7	•95.9
68	78 52.3	+11.9	•76.0	79 04.2	+17.2	•81.1	79 10.9	+22.3	•86.3	79 12.1	+27.5	•91.5
69	79 04.2	+6.7	•70.9	79 21.4	+11.8	•76.0	79 33.2	+17.4	•81.2	79 39.6	+22.8	•86.6
70	79 10.9	+1.2	•65.7	79 33.2	+6.4	•70.6	79 50.6	+11.8	•75.9	80 02.4	+17.6	•81.4
71	79 12.1	−4.3	•60.3	79 39.6	+0.6	•65.1	80 02.4	+6.0	•70.3	80 20.0	+11.7	•75.8
72	79 07.8	−9.7	•55.0	79 40.2	−5.1	•59.5	80 08.4	+0.1	•64.5	80 31.7	+5.7	•69.9
73	78 58.1	−14.8	•49.8	79 35.1	−10.6	•54.0	80 08.5	−6.0	•58.6	80 37.4	−0.7	•63.8
74	78 43.3	−19.6	•44.8	79 24.5	−16.0	•48.6	80 02.5	−11.8	•52.8	80 36.7	−6.9	•57.7
75	78 23.7	−24.0	•40.0	79 08.5	−20.9	•43.4	79 50.7	−17.3	•47.2	80 29.8	−13.0	•51.6
76	77 59.7	−28.1	•35.6	78 47.6	−25.4	•38.5	79 33.4	−22.3	•41.9	80 16.8	−18.7	•45.8
77	77 31.6	−31.6	•31.4	78 22.2	−29.5	•33.9	79 11.1	−26.9	•36.8	79 58.1	−23.9	•40.2
78	77 00.0	−34.7	•27.5	77 52.7	−32.9	•29.7	78 44.2	−30.9	•32.2	79 34.2	−28.4	•35.0
79	76 25.3	−37.5	•24.0	77 19.8	−36.1	•25.8	78 13.3	−34.4	•27.9	79 05.8	−32.5	•30.3
80	75 47.8	−39.9	•20.7	76 43.7	−38.8	•22.2	77 38.9	−37.5	•23.9	78 33.3	−36.0	•25.9
81	75 07.9	−42.0	17.7	76 04.9	−41.2	•19.0	77 01.4	−40.2	•20.4	77 57.3	−39.0	•22.0
82	74 25.9	−43.8	15.0	75 23.7	−43.2	16.0	76 21.2	−42.4	•17.2	77 18.3	−41.5	•18.5
83	73 42.1	−45.5	12.5	74 40.5	−44.9	13.3	75 38.8	−44.4	14.2	76 36.8	−43.7	•15.3
84	72 56.6	−46.8	10.3	73 55.6	−46.5	10.9	74 54.4	−46.0	11.6	75 53.1	−45.5	12.4
85	72 09.8	−48.1	8.2	73 09.1	−47.8	8.6	74 08.4	−47.5	9.2	75 07.6	−47.2	9.8
86	71 21.7	−49.1	6.3	72 21.3	−48.9	6.6	73 20.9	−48.7	7.0	74 20.4	−48.5	7.4
87	70 32.6	−50.1	4.5	71 32.4	−50.0	4.7	72 32.2	−49.9	5.0	73 31.9	−49.6	5.3
88	69 42.5	−50.9	2.9	70 42.4	−50.8	3.0	71 42.3	−50.7	3.2	72 42.3	−50.7	3.4
89	68 51.6	−51.6	1.4	69 51.6	−51.6	1.5	70 51.6	−51.6	1.5	71 51.6	−51.6	1.6
90	68 00.0	−52.3	0.0	69 00.0	−52.3	0.0	70 00.0	−52.3	0.0	71 00.0	−52.3	0.0

Dec. °	72° Hc ° ′	72° d ′	72° Z °	73° Hc ° ′	73° d ′	73° Z °	74° Hc ° ′	74° d ′	74° Z °	75° Hc ° ′	75° d ′	75° Z °
0	15 31.3	+59.3	148.7	14 40.0	+59.3	148.9	13 48.6	+59.4	149.0	12 57.2	+59.4	149.1
1	16 30.6	+59.2	148.6	15 39.3	+59.3	148.7	14 48.0	+59.4	148.9	13 56.6	+59.5	149.0
2	17 29.8	+59.2	148.4	16 38.6	+59.3	148.6	15 47.4	+59.4	148.7	14 56.1	+59.4	148.9
3	18 29.0	+59.2	148.2	17 37.9	+59.3	148.4	16 46.8	+59.3	148.6	15 55.5	+59.5	148.7
4	19 28.2	+59.2	148.1	18 37.2	+59.3	148.2	17 46.1	+59.4	148.4	16 55.0	+59.4	148.6
5	20 27.4	+59.1	147.9	19 36.5	+59.3	148.1	18 45.5	+59.4	148.3	17 54.4	+59.5	148.4
6	21 26.5	+59.2	147.7	20 35.8	+59.2	147.9	19 44.9	+59.3	148.1	18 53.9	+59.4	148.3
7	22 25.7	+59.1	147.5	21 35.0	+59.3	147.7	20 44.2	+59.4	148.0	19 53.3	+59.4	148.1
8	23 24.8	+59.2	147.3	22 34.3	+59.2	147.6	21 43.6	+59.3	147.8	20 52.7	+59.4	148.0
9	24 24.0	+59.1	147.2	23 33.5	+59.2	147.4	22 42.9	+59.3	147.6	21 52.1	+59.5	147.8
10	25 23.1	+59.1	147.0	24 32.7	+59.2	147.2	23 42.2	+59.3	147.5	22 51.6	+59.4	147.7
11	26 22.2	+59.1	146.8	25 31.9	+59.2	147.0	24 41.5	+59.3	147.3	23 51.0	+59.4	147.5
12	27 21.3	+59.1	146.6	26 31.1	+59.2	146.9	25 40.8	+59.3	147.1	24 50.4	+59.3	147.4
13	28 20.4	+59.0	146.4	27 30.3	+59.2	146.7	26 40.1	+59.3	147.0	25 49.7	+59.4	147.2
14	29 19.4	+59.1	146.2	28 29.5	+59.2	146.5	27 39.4	+59.2	146.8	26 49.1	+59.4	147.1
15	30 18.5	+59.0	146.0	29 28.7	+59.1	146.3	28 38.6	+59.3	146.6	27 48.5	+59.3	146.9
16	31 17.5	+59.0	145.8	30 27.8	+59.1	146.1	29 37.9	+59.2	146.4	28 47.8	+59.3	146.7
17	32 16.5	+59.0	145.6	31 26.9	+59.1	145.9	30 37.1	+59.2	146.2	29 47.1	+59.4	146.6
18	33 15.5	+58.9	145.3	32 26.0	+59.1	145.7	31 36.3	+59.2	146.1	30 46.5	+59.3	146.4
19	34 14.4	+59.0	145.1	33 25.1	+59.1	145.5	32 35.5	+59.2	145.9	31 45.8	+59.3	146.2
20	35 13.4	+58.9	144.9	34 24.2	+59.0	145.3	33 34.7	+59.2	145.7	32 45.1	+59.3	146.0
21	36 12.3	+58.8	144.7	35 23.2	+59.0	145.1	34 33.9	+59.1	145.5	33 44.4	+59.2	145.9
22	37 11.1	+58.9	144.4	36 22.2	+59.0	144.8	35 33.0	+59.2	145.3	34 43.6	+59.3	145.7
23	38 10.0	+58.8	144.2	37 21.2	+59.0	144.6	36 32.2	+59.1	145.1	35 42.9	+59.2	145.5
24	39 08.8	+58.8	143.9	38 20.2	+58.9	144.4	37 31.3	+59.0	144.8	36 42.1	+59.2	145.3
25	40 07.6	+58.7	143.7	39 19.1	+58.9	144.1	38 30.3	+59.1	144.6	37 41.3	+59.2	145.1
26	41 06.3	+58.7	143.4	40 18.0	+58.9	143.9	39 29.4	+59.0	144.4	38 40.5	+59.1	144.9
27	42 05.0	+58.7	143.1	41 16.9	+58.8	143.6	40 28.4	+59.0	144.2	39 39.6	+59.2	144.6
28	43 03.7	+58.6	142.8	42 15.7	+58.8	143.4	41 27.4	+59.0	143.9	40 38.8	+59.1	144.4
29	44 02.3	+58.6	142.5	43 14.5	+58.8	143.1	42 26.4	+58.9	143.7	41 37.9	+59.0	144.2
30	45 00.9	+58.5	142.2	44 13.3	+58.7	142.8	43 25.3	+58.9	143.4	42 36.9	+59.1	144.0
31	45 59.4	+58.5	141.9	45 12.0	+58.7	142.5	44 24.2	+58.8	143.1	43 36.0	+59.0	143.7
32	46 57.9	+58.4	141.6	46 10.7	+58.6	142.2	45 23.0	+58.8	142.9	44 35.0	+59.0	143.5
33	47 56.3	+58.4	141.2	47 09.3	+58.6	141.9	46 21.8	+58.8	142.6	45 34.0	+58.9	143.2
34	48 54.7	+58.2	140.9	48 07.9	+58.5	141.6	47 20.6	+58.7	142.3	46 32.9	+58.9	142.9
35	49 52.9	+58.3	140.5	49 06.4	+58.4	141.3	48 19.3	+58.7	142.0	47 31.8	+58.9	142.7
36	50 51.2	+58.1	140.2	50 04.8	+58.4	140.9	49 18.0	+58.6	141.7	48 30.7	+58.8	142.4
37	51 49.3	+58.0	139.8	51 03.2	+58.3	140.6	50 16.6	+58.6	141.3	49 29.5	+58.8	142.1
38	52 47.3	+58.0	139.3	52 01.5	+58.3	140.2	51 15.2	+58.5	141.0	50 28.3	+58.7	141.8
39	53 45.3	+57.9	138.9	52 59.8	+58.1	139.8	52 13.7	+58.4	140.6	51 27.0	+58.7	141.4
40	54 43.2	+57.7	138.5	53 57.9	+58.1	139.4	53 12.1	+58.4	140.3	52 25.7	+58.6	141.1
41	55 40.9	+57.7	138.0	54 56.0	+58.0	138.9	54 10.5	+58.2	139.9	53 24.3	+58.5	140.7
42	56 38.6	+57.5	137.5	55 54.0	+57.9	138.5	55 08.7	+58.2	139.4	54 22.8	+58.5	140.4
43	57 36.1	+57.4	137.0	56 51.9	+57.7	138.0	56 06.9	+58.1	139.0	55 21.3	+58.4	140.0
44	58 33.5	+57.2	136.4	57 49.6	+57.6	137.5	57 05.0	+58.0	138.6	56 19.7	+58.3	139.6
45	59 30.7	+57.1	135.8	58 47.2	+57.5	137.0	58 03.0	+57.9	138.1	57 18.0	+58.2	139.1
46	60 27.8	+56.8	135.2	59 44.7	+57.4	136.4	59 00.9	+57.7	137.6	58 16.2	+58.1	138.7
47	61 24.6	+56.7	134.6	60 42.1	+57.1	135.8	59 58.6	+57.6	137.0	59 14.3	+58.0	138.2
48	62 21.3	+56.5	133.9	61 39.2	+57.0	135.2	60 56.2	+57.5	136.5	60 12.3	+57.8	137.7
49	63 17.8	+56.2	133.1	62 36.2	+56.8	134.5	61 53.7	+57.3	135.9	61 10.1	+57.8	137.1
50	64 14.0	+55.9	132.3	63 33.0	+56.6	133.8	62 51.0	+57.1	135.2	62 07.9	+57.5	136.6
51	65 09.9	+55.7	131.5	64 29.6	+56.3	133.1	63 48.1	+56.8	134.5	63 05.4	+57.4	136.0
52	66 05.6	+55.3	130.6	65 25.9	+56.0	132.2	64 44.9	+56.7	133.8	64 02.8	+57.3	135.3
53	67 00.9	+54.9	129.6	66 21.9	+55.7	131.4	65 41.6	+56.4	133.0	65 00.1	+57.0	134.6
54	67 55.8	+54.4	128.5	67 17.6	+55.4	130.4	66 38.0	+56.1	132.2	65 57.1	+56.7	133.8
55	68 50.2	+54.0	127.4	68 13.0	+54.9	129.4	67 34.1	+55.8	131.3	66 53.8	+56.5	133.0
56	69 44.2	+53.4	126.2	69 07.9	+54.5	128.3	68 29.9	+55.4	130.3	67 50.3	+56.2	132.2
57	70 37.6	+52.8	124.8	70 02.4	+53.9	127.1	69 25.3	+55.0	129.2	68 46.5	+55.9	131.2
58	71 30.4	+52.0	123.4	70 56.3	+53.3	125.8	70 20.3	+54.4	128.1	69 42.4	+55.5	130.2
59	72 22.4	+51.1	121.7	71 49.6	+52.7	124.3	71 14.7	+54.0	126.8	70 37.9	+55.0	129.1
60	73 13.5	+50.2	120.0	72 42.3	+51.8	122.8	72 08.7	+53.2	125.4	71 32.9	+54.5	127.8
61	74 03.7	+49.0	118.0	73 34.1	+50.9	121.0	73 01.9	+52.5	123.8	72 27.4	+53.8	126.5
62	74 52.7	+47.6	115.9	74 25.0	+49.7	119.1	73 54.4	+51.6	122.1	73 21.2	+53.2	125.0
63	75 40.3	+46.0	113.5	75 14.7	+48.5	117.0	74 46.0	+50.5	120.2	74 14.4	+52.3	123.3
64	76 26.3	+44.2	•110.8	76 03.2	+46.8	114.6	75 36.5	+49.3	118.1	75 06.7	+51.3	121.5
65	77 10.5	+41.9	•107.8	76 50.0	+45.1	•111.9	76 25.8	+47.7	115.8	75 58.0	+50.1	119.4
66	77 52.4	+39.2	•104.5	77 35.1	+42.8	•108.9	77 13.5	+46.0	113.1	76 48.1	+48.7	117.0
67	78 31.6	+36.2	•100.8	78 17.9	+40.2	•105.6	77 59.5	+43.8	•110.1	77 36.8	+46.9	114.4
68	79 07.8	+32.4	•96.7	78 58.1	+37.0	•101.8	78 43.3	+41.2	•106.7	78 23.7	+44.8	•111.4
69	79 40.2	+28.2	•92.1	79 35.1	+33.4	•97.6	79 24.5	+38.0	•102.9	79 08.5	+42.2	•108.0
70	80 08.4	+23.3	•87.1	80 08.5	+28.9	•92.9	80 02.5	+34.2	•98.5	79 50.7	+39.1	•104.1
71	80 31.7	+17.8	•81.6	80 37.4	+23.8	•87.6	80 36.7	+29.7	•93.7	80 29.8	+35.2	•99.6
72	80 49.5	+11.7	•75.7	81 01.2	+18.0	•81.8	81 06.4	+24.4	•88.2	81 05.0	+30.5	•94.6
73	81 01.2	+5.2	•69.5	81 19.2	+11.6	•75.6	81 30.8	+18.3	•82.1	81 35.5	+25.0	•88.8
74	81 06.4	−1.4	•63.1	81 30.8	+4.7	•69.0	81 49.1	+11.4	•75.6	82 00.5	+18.6	•82.5
75	81 05.0	−8.1	•56.6	81 35.5	−2.3	•62.3	82 00.5	+4.2	•68.6	82 19.1	+11.3	•75.5
76	80 56.9	−14.3	•50.3	81 33.2	−9.3	•55.4	82 04.7	−3.4	•61.4	82 30.4	+3.5	•68.0
77	80 42.6	−20.3	•44.2	81 23.9	−15.9	•48.8	82 01.3	−10.6	•54.1	82 33.9	−4.6	•60.4
78	80 22.3	−25.5	•38.4	81 08.0	−21.9	•42.4	81 50.7	−17.6	•47.1	82 29.3	−12.2	•52.7
79	79 56.8	−30.1	•33.1	80 46.1	−27.3	•36.5	81 33.1	−23.8	•40.5	82 17.1	−19.4	•45.3
80	79 26.7	−34.1	•28.3	80 18.8	−31.9	•31.1	81 09.3	−29.1	•34.4	81 57.7	−25.8	•38.4
81	78 52.6	−37.6	•23.9	79 46.9	−35.8	•26.2	80 40.2	−33.8	•28.8	81 31.9	−31.2	•32.1
82	78 15.0	−40.4	•20.0	79 11.1	−39.2	•21.8	80 06.4	−37.7	•23.9	81 00.7	−35.7	•26.4
83	77 34.6	−43.0	•16.5	78 31.9	−42.0	•17.8	79 28.7	−40.8	•19.5	80 25.0	−39.6	•21.5
84	76 51.6	−45.0	13.3	77 49.9	−44.3	•14.4	78 47.9	−43.6	•15.6	79 45.4	−42.5	•17.1
85	76 06.6	−46.7	10.5	77 05.6	−46.3	11.3	78 04.3	−45.7	•12.2	79 02.9	−45.1	•13.3
86	75 19.9	−48.2	7.9	76 19.3	−48.0	8.5	77 18.6	−47.6	9.1	78 17.8	−47.2	9.9
87	74 31.7	−49.6	5.6	75 31.3	−49.3	6.0	76 31.0	−49.1	6.4	77 30.6	−48.9	6.9
88	73 42.1	−50.6	3.6	74 42.0	−50.5	3.8	75 41.9	−50.4	4.1	76 41.7	−50.3	4.3
89	72 51.5	−51.5	1.7	73 51.5	−51.5	1.8	74 51.5	−51.5	1.9	75 51.4	−51.4	2.0
90	72 00.0	−52.3	0.0	73 00.0	−52.4	0.0	74 00.0	−52.4	0.0	75 00.0	−52.4	0.0

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 30°, 330°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	18 55.8	−58.8	148.1	18 04.8	−58.9	148.3	17 13.8	−59.1	148.4	16 22.6	−59.1	148.6	15 31.3	−59.2	148.7	14 40.0	−59.3	148.9	13 48.6	−59.4	149.0	12 57.2	−59.5	149.1	0
1	17 57.0	−58.8	148.3	17 05.9	−58.9	148.5	16 14.7	−59.0	148.6	15 23.5	−59.2	148.8	14 32.1	−59.2	148.9	13 40.7	−59.3	149.0	12 49.2	−59.4	149.2	11 57.7	−59.5	149.3	1
2	16 58.2	−58.9	148.5	16 07.0	−59.0	148.7	15 15.7	−59.1	148.8	14 24.3	−59.1	148.9	13 32.9	−59.3	149.1	12 41.4	−59.3	149.2	11 49.8	−59.4	149.3	10 58.2	−59.5	149.4	2
3	15 59.3	−58.8	148.7	15 08.0	−58.9	148.9	14 16.6	−59.0	149.0	13 25.2	−59.2	149.1	12 33.6	−59.2	149.2	11 42.1	−59.4	149.3	10 50.4	−59.4	149.4	9 58.7	−59.5	149.5	3
4	15 00.5	−58.9	148.9	14 09.1	−59.0	149.0	13 17.6	−59.1	149.2	12 26.0	−59.1	149.3	11 34.4	−59.3	149.4	10 42.7	−59.3	149.5	9 51.0	−59.4	149.6	8 59.2	−59.4	149.7	4
5	14 01.6	−58.9	149.1	13 10.1	−59.0	149.2	12 18.5	−59.1	149.3	11 26.9	−59.2	149.5	10 35.1	−59.2	149.6	9 43.4	−59.3	149.6	8 51.6	−59.4	149.7	7 59.8	−59.5	149.8	5
6	13 02.7	−58.9	149.3	12 11.1	−59.0	149.4	11 19.4	−59.1	149.5	10 27.7	−59.2	149.6	9 35.9	−59.3	149.7	8 44.1	−59.4	149.8	7 52.2	−59.4	149.9	7 00.3	−59.5	149.9	6
7	12 03.8	−58.8	149.5	11 12.1	−59.0	149.6	10 20.3	−59.1	149.7	9 28.5	−59.2	149.8	8 36.6	−59.2	149.9	7 44.7	−59.3	149.9	6 52.8	−59.5	150.0	6 00.8	−59.5	150.1	7
8	11 05.0	−58.9	149.7	10 13.1	−59.0	149.8	9 21.2	−59.0	149.9	8 29.3	−59.2	150.0	7 37.4	−59.3	150.0	6 45.4	−59.4	150.1	5 53.3	−59.4	150.1	5 01.3	−59.5	150.2	8
9	10 06.1	−59.0	149.9	9 14.1	−59.0	150.0	8 22.2	−59.1	150.1	7 30.1	−59.1	150.1	6 38.1	−59.3	150.2	5 46.0	−59.3	150.2	4 53.9	−59.4	150.3	4 01.8	−59.5	150.3	9
10	9 07.1	−58.9	150.1	8 15.1	−59.0	150.2	7 23.1	−59.2	150.2	6 31.0	−59.2	150.3	5 38.8	−59.2	150.3	4 46.7	−59.4	150.4	3 54.5	−59.4	150.4	3 02.3	−59.5	150.5	10
11	8 08.2	−58.9	150.3	7 16.1	−59.0	150.3	6 23.9	−59.1	150.4	5 31.8	−59.2	150.5	4 39.6	−59.3	150.5	3 47.3	−59.3	150.5	2 55.1	−59.4	150.6	2 02.8	−59.5	150.6	11
12	7 09.3	−58.9	150.5	6 17.1	−59.0	150.5	5 24.8	−59.1	150.6	4 32.6	−59.2	150.6	3 40.3	−59.3	150.7	2 48.0	−59.4	150.7	1 55.7	−59.5	150.7	1 03.3	−59.5	150.7	12
13	6 10.4	−58.9	150.7	5 18.1	−59.0	150.7	4 25.7	−59.1	150.7	3 33.4	−59.2	150.8	2 41.0	−59.3	150.8	1 48.6	−59.3	150.8	0 56.2	−59.4	150.8	0 03.8	−59.5	150.8	13
14	5 11.5	−59.0	150.8	4 19.1	−59.1	150.9	3 26.6	−59.1	150.9	2 34.2	−59.2	150.9	1 41.7	−59.3	151.0	0 49.3	−59.4	151.0	0 03.2	+59.4	29.0	0 55.7	+59.5	29.0	14
15	4 12.5	−58.9	151.0	3 20.0	−59.0	151.1	2 27.5	−59.1	151.1	1 35.0	−59.2	151.1	0 42.4	−59.2	151.1	0 10.1	+59.3	28.9	1 02.6	+59.5	28.9	1 55.2	+59.5	28.9	15
16	3 13.6	−58.9	151.2	2 21.0	−59.0	151.2	1 28.4	−59.1	151.3	0 35.8	−59.2	151.3	0 16.8	+59.3	28.7	1 09.4	+59.4	28.7	2 02.1	+59.4	28.7	2 54.7	+59.5	28.8	16
17	2 14.7	−59.0	151.4	1 22.0	−59.1	151.4	0 29.3	−59.1	151.4	0 23.4	+59.2	28.6	1 16.1	+59.3	28.6	2 08.8	+59.4	28.6	3 01.5	+59.4	28.6	3 54.2	+59.4	28.6	17
18	1 15.7	−58.9	151.6	0 22.9	−59.0	151.6	0 29.8	+59.2	28.4	1 22.6	+59.2	28.4	2 15.4	+59.3	28.4	3 08.2	+59.3	28.4	4 00.9	+59.4	28.5	4 53.6	+59.5	28.5	18
19	0 16.8	−59.0	151.8	0 36.1	+59.0	28.2	1 29.0	+59.1	28.2	2 21.8	+59.2	28.2	3 14.7	+59.2	28.3	4 07.5	+59.4	28.3	5 00.3	+59.5	28.3	5 53.1	+59.5	28.4	19
20	0 42.2	+58.9	28.0	1 35.1	+59.0	28.0	2 28.1	+59.1	28.1	3 21.0	+59.2	28.1	4 13.9	+59.3	28.1	5 06.9	+59.3	28.1	5 59.8	+59.4	28.2	6 52.6	+59.5	28.2	20
21	1 41.1	+58.9	27.8	2 34.1	+59.1	27.9	3 27.2	+59.1	27.9	4 20.2	+59.2	27.9	5 13.2	+59.3	28.0	6 06.2	+59.4	28.0	6 59.2	+59.4	28.1	7 52.1	+59.5	28.1	21
22	2 40.0	+59.0	27.7	3 33.2	+59.0	27.7	4 26.3	+59.1	27.7	5 19.4	+59.2	27.7	6 12.5	+59.3	27.8	7 05.6	+59.3	27.9	7 58.6	+59.4	27.9	8 51.6	+59.5	28.0	22
23	3 39.0	+58.9	27.5	4 32.2	+59.0	27.5	5 25.4	+59.1	27.5	6 18.6	+59.2	27.6	7 11.8	+59.2	27.6	8 04.9	+59.3	27.7	8 58.0	+59.4	27.8	9 51.1	+59.5	27.8	23
24	4 37.9	+58.9	27.3	5 31.2	+59.0	27.3	6 24.5	+59.1	27.4	7 17.8	+59.2	27.4	8 11.0	+59.3	27.5	9 04.2	+59.4	27.6	9 57.4	+59.4	27.6	10 50.6	+59.4	27.7	24
25	5 36.8	+59.0	27.1	6 30.2	+59.0	27.1	7 23.6	+59.1	27.2	8 17.0	+59.2	27.3	9 10.3	+59.3	27.3	10 03.6	+59.3	27.4	10 56.8	+59.4	27.5	11 50.0	+59.5	27.6	25
26	6 35.8	+58.9	26.9	7 29.2	+59.1	27.0	8 22.7	+59.1	27.0	9 16.2	+59.1	27.1	10 09.6	+59.2	27.2	11 02.9	+59.3	27.3	11 56.2	+59.4	27.3	12 49.5	+59.5	27.4	26
27	7 34.7	+58.9	26.7	8 28.3	+59.0	26.8	9 21.8	+59.1	26.8	10 15.3	+59.2	26.9	11 08.8	+59.3	27.0	12 02.2	+59.4	27.1	12 55.6	+59.4	27.2	13 49.0	+59.4	27.3	27
28	8 33.6	+58.9	26.5	9 27.3	+59.0	26.6	10 20.9	+59.1	26.7	11 14.5	+59.2	26.8	12 08.1	+59.2	26.8	13 01.6	+59.3	26.9	13 55.0	+59.4	27.1	14 48.4	+59.5	27.2	28
29	9 32.5	+58.9	26.3	10 26.3	+59.0	26.4	11 20.0	+59.1	26.5	12 13.7	+59.1	26.6	13 07.3	+59.2	26.7	14 00.9	+59.3	26.8	14 54.4	+59.4	26.9	15 47.9	+59.4	27.0	29
30	10 31.4	+58.9	26.1	11 25.3	+58.9	26.2	12 19.1	+59.0	26.3	13 12.8	+59.2	26.4	14 06.5	+59.3	26.5	15 00.2	+59.3	26.6	15 53.8	+59.4	26.8	16 47.3	+59.5	26.9	30
31	11 30.3	+58.9	25.9	12 24.2	+59.0	26.0	13 18.1	+59.1	26.1	14 12.0	+59.1	26.2	15 05.8	+59.2	26.4	15 59.5	+59.3	26.5	16 53.2	+59.3	26.6	17 46.8	+59.4	26.7	31
32	12 29.2	+58.9	25.7	13 23.2	+59.0	25.8	14 17.2	+59.0	25.9	15 11.1	+59.2	26.1	16 05.0	+59.2	26.2	16 58.8	+59.3	26.3	17 52.5	+59.4	26.5	18 46.2	+59.5	26.6	32
33	13 28.1	+58.8	25.5	14 22.2	+58.9	25.7	15 16.2	+59.1	25.8	16 10.3	+59.1	25.9	17 04.2	+59.2	26.0	17 58.1	+59.3	26.2	18 51.9	+59.4	26.3	19 45.7	+59.4	26.5	33
34	14 26.9	+58.9	25.3	15 21.1	+59.0	25.5	16 15.3	+59.0	25.6	17 09.4	+59.1	25.7	18 03.4	+59.2	25.8	18 57.4	+59.2	26.0	19 51.3	+59.3	26.1	20 45.1	+59.4	26.3	34
35	15 25.8	+58.9	25.1	16 20.1	+58.9	25.3	17 14.3	+59.1	25.4	18 08.5	+59.1	25.5	19 02.6	+59.2	25.7	19 56.6	+59.3	25.8	20 50.6	+59.4	26.0	21 44.5	+59.4	26.2	35
36	16 24.7	+58.8	24.9	17 19.0	+59.0	25.1	18 13.4	+59.0	25.2	19 07.6	+59.1	25.3	20 01.8	+59.2	25.5	20 55.9	+59.3	25.7	21 50.0	+59.3	25.8	22 43.9	+59.4	26.0	36
37	17 23.5	+58.8	24.7	18 18.0	+58.9	24.9	19 12.4	+59.0	25.0	20 06.7	+59.1	25.2	21 01.0	+59.1	25.3	21 55.2	+59.2	25.5	22 49.3	+59.3	25.7	23 43.3	+59.4	25.9	37
38	18 22.3	+58.8	24.5	19 16.9	+58.9	24.7	20 11.4	+59.0	24.8	21 05.8	+59.1	25.0	22 00.1	+59.2	25.1	22 54.4	+59.2	25.3	23 48.6	+59.3	25.5	24 42.7	+59.4	25.7	38
39	19 21.1	+58.8	24.3	20 15.8	+58.9	24.5	21 10.4	+58.9	24.6	22 04.9	+59.0	24.8	22 59.3	+59.1	25.0	23 53.6	+59.3	25.2	24 47.9	+59.3	25.3	25 42.1	+59.4	25.5	39
40	20 19.9	+58.8	24.1	21 14.7	+58.8	24.3	22 09.3	+59.0	24.4	23 03.9	+59.1	24.6	23 58.4	+59.2	24.8	24 52.9	+59.2	25.0	25 47.2	+59.3	25.2	26 41.5	+59.3	25.4	40
41	21 18.7	+58.8	23.9	22 13.5	+58.9	24.1	23 08.3	+58.9	24.2	24 03.0	+59.0	24.4	24 57.6	+59.1	24.6	25 52.1	+59.2	24.8	26 46.5	+59.3	25.0	27 40.8	+59.4	25.2	41
42	22 17.5	+58.7	23.7	23 12.4	+58.8	23.8	24 07.2	+59.0	24.0	25 02.0	+59.0	24.2	25 56.7	+59.1	24.4	26 51.3	+59.2	24.6	27 45.8	+59.2	24.8	28 40.2	+59.3	25.1	42
43	23 16.2	+58.8	23.5	24 11.2	+58.9	23.6	25 06.2	+58.9	23.8	26 01.0	+59.0	24.0	26 55.8	+59.1	24.2	27 50.5	+59.1	24.4	28 45.0	+59.3	24.7	29 39.5	+59.3	24.9	43
44	24 15.0	+58.7	23.2	25 10.1	+58.8	23.4	26 05.1	+58.9	23.6	27 00.0	+59.0	23.8	27 54.9	+59.0	24.0	28 49.6	+59.2	24.2	29 44.3	+59.2	24.5	30 38.8	+59.4	24.7	44
45	25 13.7	+58.7	23.0	26 08.9	+58.7	23.2	27 04.0	+58.8	23.4	27 59.0	+59.0	23.6	28 53.9	+59.1	23.8	29 48.8	+59.1	24.0	30 43.5	+59.2	24.3	31 38.2	+59.2	24.5	45
46	26 12.4	+58.6	22.8	27 07.6	+58.8	23.0	28 02.8	+58.9	23.2	28 58.0	+58.9	23.4	29 53.0	+59.0	23.6	30 47.9	+59.1	23.9	31 42.7	+59.2	24.1	32 37.4	+59.3	24.4	46
47	27 11.0	+58.7	22.5	28 06.4	+58.7	22.7	29 01.7	+58.8	23.0	29 56.9	+58.9	23.2	30 52.0	+59.0	23.4	31 47.0	+59.1	23.7	32 41.9	+59.2	23.9	33 36.7	+59.3	24.2	47
48	28 09.7	+58.6	22.3	29 05.1	+58.8	22.5	30 00.5	+58.8	22.7	30 55.8	+58.9	23.0	31 51.0	+59.0	23.2	32 46.1	+59.1	23.4	33 41.1	+59.2	23.7	34 36.0	+59.2	24.0	48
49	29 08.3	+58.6	22.1	30 03.9	+58.6	22.3	30 59.3	+58.8	22.5	31 54.7	+58.9	22.7	32 50.0	+59.0	23.0	33 45.2	+59.0	23.2	34 40.3	+59.1	23.5	35 35.2	+59.3	23.8	49
50	30 06.9	+58.5	21.8	31 02.5	+58.7	22.0	31 58.1	+58.8	22.3	32 53.6	+58.8	22.5	33 49.0	+58.9	22.8	34 44.2	+59.1	23.0	35 39.4	+59.1	23.3	36 34.5	+59.2	23.6	50
51	31 05.4	+58.6	21.6	32 01.2	+58.6	21.8	32 56.9	+58.7	22.0	33 52.4	+58.9	22.3	34 47.9	+58.9	22.5	35 43.3	+59.0	22.8	36 38.5	+59.1	23.1	37 33.7	+59.1	23.4	51
52	32 04.0	+58.5	21.3	32 59.8	+58.6	21.5	33 55.6	+58.7	21.8	34 51.3	+58.8	22.0	35 46.8	+58.9	22.3	36 42.3	+59.0	22.6	37 37.6	+59.1	22.9	38 32.8	+59.2	23.2	52
53	33 02.5	+58.4	21.0	33 58.4	+58.6	21.3	34 54.3	+58.7	21.5	35 50.1	+58.7	21.8	36 45.7	+58.9	22.1	37 41.3	+58.9	22.3	38 36.7	+59.0	22.6	39 32.0	+59.1	23.0	53
54	34 00.9	+58.5	20.8	34 57.0	+58.5	21.0	35 53.0	+58.6	21.3	36 48.8	+58.7	21.5	37 44.6	+58.8	21.8	38 40.2	+58.9	22.1	39 35.7	+59.1	22.4	40 31.1	+59.2	22.7	54
55	34 59.4	+58.4	20.5	35 55.5	+58.5	20.7	36 51.6	+58.6	21.0	37 47.5	+58.7	21.3	38 43.4	+58.8	21.6	39 39.1	+58.9	21.9	40 34.8	+59.0	22.2	41 30.3	+59.0	22.5	55
56	35 57.8	+58.3	20.2	36 54.0	+58.5	20.5	37 50.2	+58.5	20.7	38 46.2	+58.7	21.0	39 42.2	+58.8	21.3	40 38.0	+58.9	21.6	41 33.8	+58.9	21.9	42 29.3	+59.1	22.3	56
57	36 56.1	+58.3	19.9	37 52.5	+58.4	20.2	38 48.7	+58.6	20.5	39 44.9	+58.6	20.7	40 41.0	+58.7	21.0	41 36.9	+58.8	21.4	42 32.7	+58.9	21.7	43 28.4	+59.0	22.0	57
58	37 54.4	+58.3	19.6	38 50.9	+58.4	19.9	39 47.3	+58.4	20.2	40 43.5	+58.6	20.5	41 39.7	+58.7	20.8	42 35.7	+58.8	21.1	43 31.6	+58.9	21.4	44 27.4	+59.0	21.8	58
59	38 52.7	+58.2	19.3	39 49.3	+58.3	19.6	40 45.7	+58.5	19.9	41 42.1	+58.5	20.2	42 38.4	+58.6	20.5	43 34.5	+58.8	20.8	44 30.5	+58.9	21.2	45 26.4	+59.0	21.5	59
60	39 50.9	+58.2	19.0	40 47.6	+58.2	19.3	41 44.2	+58.3	19.6	42 40.6	+58.5	19.9	43 37.0	+58.6	20.2	44 33.3	+58.7	20.5	45 29.4	+58.8	20.9	46 25.4	+58.9	21.3	60
61	40 49.1	+58.1	18.7	41 45.8	+58.3	19.0	42 42.5	+58.4	19.3	43 39.1	+58.5	19.6	44 35.6	+58.5	19.9	45 32.0	+58.6	20.2	46 28.2	+58.7	20.6	47 24.3	+58.8	21.0	61
62	41 47.2	+58.0	18.3	42 44.1	+58.1	18.6	43 40.9	+58.2	18.9	44 37.6	+58.3	19.3	45 34.1	+58.5	19.6	46 30.6	+58.6	19.9	47 26.9	+58.8	20.3	48 23.1	+58.9	20.7	62
63	42 45.2	+58.0	18.0	43 42.2	+58.1	18.3	44 39.1	+58.2	18.6	45 35.9	+58.4	18.9	46 32.6	+58.5	19.3	47 29.2	+58.6	19.6	48 25.7	+58.6	20.0	49 22.0	+58.7	20.4	63
64	43 43.2	+57.9	17.7	44 40.3	+58.0	18.0	45 37.3	+58.2	18.3	46 34.3	+58.2	18.6	47 31.1	+58.4	18.9	48 27.8	+58.5	19.3	49 24.3	+58.6	19.7	50 20.7	+58.8	20.1	64
65	44 41.1	+57.8	17.3	45 38.3	+58.0	17.6	46 35.5	+58.1	17.9	47 32.5	+58.2	18.2	48 29.5	+58.3	18.6	49 26.3	+58.4	19.0	50 22.9	+58.6	19.4	51 19.5	+58.6	19.8	65
66	45 38.9	+57.8	16.9	46 36.3	+57.9	17.2	47 33.6	+58.0	17.5	48 30.7	+58.1	17.9	49 27.8	+58.2	18.2	50 24.7	+58.4	18.6	51 21.5	+58.5	19.0	52 18.1	+58.7	19.4	66
67	46 36.7	+57.7	16.5	47 34.2	+57.8	16.8	48 31.6	+57.9	17.2	49 28.8	+58.1	17.5	50 26.0	+58.2	17.9	51 23.1	+58.3	18.2	52 20.0	+58.4	18.6	53 16.8	+58.5	19.1	67
68	47 34.4	+57.6	16.1	48 32.0	+57.7	16.4	49 29.5	+57.8	16.8	50 26.9	+58.0	17.1	51 24.2	+58.1	17.5	52 21.4	+58.2	17.9	53 18.4	+58.3	18.3	54 15.3	+58.5	18.7	68
69	48 32.0	+57.5	15.7	49 29.7	+57.6	16.0	50 27.3	+57.8	16.3	51 24.9	+57.8	16.7	52 22.3	+58.0	17.1	53 19.6	+58.1	17.5	54 16.7	+58.3	17.9	55 13.8	+58.4	18.3	69
70	49 29.5	+57.4	15.3	50 27.3	+57.6	15.6	51 25.1	+57.6	15.9	52 22.7	+57.8	16.3	53 20.3	+57.9	16.6	54 17.7	+58.0	17.0	55 15.0	+58.2	17.5	56 12.2	+58.3	17.9	70
71	50 26.9	+57.3	14.8	51 24.9	+57.4	15.1	52 22.7	+57.6	15.5	53 20.5	+57.7	15.8	54 18.2	+57.8	16.2	55 15.7	+58.0	16.6	56 13.2	+58.1	17.0	57 10.5	+58.2	17.5	71
72	51 24.2	+57.2	14.3	52 22.3	+57.3	14.7	53 20.3	+57.4	15.0	54 18.2	+57.5	15.4	55 16.0	+57.7	15.7	56 13.7	+57.8	16.1	57 11.3	+57.9	16.6	58 08.7	+58.1	17.0	72
73	52 21.4	+57.0	13.8	53 19.6	+57.1	14.2	54 17.7	+57.3	14.5	55 15.7	+57.5	14.9	56 13.7	+57.6	15.2	57 11.5	+57.7	15.7	58 09.2	+57.9	16.1	59 06.8	+58.0	16.5	73
74	53 18.4	+56.9	13.3	54 16.7	+57.1	13.7	55 15.0	+57.2	14.0	56 13.2	+57.3	14.4	57 11.3	+57.4	14.7	58 09.2	+57.6	15.1	59 07.1	+57.7	15.6	60 04.8	+57.9	16.0	74
75	54 15.3	+56.8	12.8	55 13.8	+56.9	13.1	56 12.2	+57.0	13.5	57 10.5	+57.1	13.8	58 08.7	+57.3	14.2	59 06.8	+57.5	14.6	60 04.8	+57.6	15.0	61 02.7	+57.7	15.5	75
76	55 12.1	+56.5	12.2	56 10.7	+56.7	12.6	57 09.2	+56.8	12.9	58 07.6	+57.0	13.2	59 06.0	+57.1	13.6	60 04.3	+57.2	14.0	61 02.4	+57.4	14.5	62 00.4	+57.6	14.9	76
77	56 08.6	+56.5	11.6	57 07.4	+56.5	12.0	58 06.0	+56.7	12.3	59 04.6	+56.8	12.6	60 03.1	+57.0	13.0	61 01.5	+57.2	13.4	61 59.8	+57.3	13.9	62 58.0	+57.5	14.3	77
78	57 05.1	+56.2	11.0	58 03.9	+56.4	11.3	59 02.7	+56.5	11.7	60 01.4	+56.7	12.0	61 00.1	+56.8	12.4	61 58.7	+56.9	12.8	62 57.1	+57.1	13.2	63 55.5	+57.2	13.7	78
79	58 01.3	+56.0	10.4	59 00.3	+56.1	10.7	59 59.2	+56.3	11.0	60 58.1	+56.4	11.3	61 56.9	+56.5	11.7	62 55.6	+56.7	12.1	63 54.2	+56.9	12.5	64 52.7	+57.1	13.0	79
80	58 57.3	+55.8	9.7	59 56.4	+55.9	10.0	60 55.5	+56.0	10.3	61 54.5	+56.2	10.6	62 53.4	+56.3	11.0	63 52.3	+56.5	11.4	64 51.1	+56.6	11.8	65 49.8	+56.8	12.2	80
81	59 53.1	+55.5	9.0	60 52.3	+55.7	9.2	61 51.5	+55.8	9.5	62 50.7	+55.9	9.9	63 49.7	+56.1	10.2	64 48.8	+56.2	10.6	65 47.7	+56.4	11.0	66 46.6	+56.5	11.4	81
82	60 48.6	+55.3	8.2	61 48.0	+55.4	8.5	62 47.3	+55.5	8.8	63 46.6	+55.6	9.1	64 45.8	+55.8	9.4	65 45.0	+55.9	9.8	66 44.1	+56.0	10.1	67 43.1	+56.2	10.6	82
83	61 43.9	+54.9	7.4	62 43.4	+55.0	7.6	63 42.8	+55.2	7.9	64 42.2	+55.3	8.2	65 41.6	+55.4	8.5	66 40.9	+55.6	8.9	67 40.1	+55.8	9.2	68 39.3	+55.9	9.6	83
84	62 38.8	+54.6	6.5	63 38.4	+54.7	6.8	64 38.0	+54.8	7.0	65 37.5	+55.0	7.3	66 37.0	+55.1	7.6	67 36.5	+55.2	7.9	68 35.9	+55.3	8.2	69 35.2	+55.6	8.6	84
85	63 33.4	+54.3	5.6	64 33.1	+54.4	5.8	65 32.8	+54.5	6.0	66 32.5	+54.5	6.3	67 32.1	+54.7	6.5	68 31.7	+54.8	6.8	69 31.2	+55.0	7.2	70 30.8	+55.0	7.5	85
86	64 27.7	+53.8	4.6	65 27.5	+53.9	4.8	66 27.3	+54.0	5.0	67 27.0	+54.1	5.2	68 26.8	+54.2	5.4	69 26.5	+54.3	5.7	70 26.2	+54.4	6.0	71 25.8	+54.6	6.3	86
87	65 21.5	+53.4	3.6	66 21.4	+53.4	3.7	67 21.3	+53.5	3.9	68 21.1	+53.6	4.1	69 21.0	+53.6	4.3	70 20.8	+53.7	4.5	71 20.6	+53.8	4.7	72 20.4	+53.9	4.9	87
88	66 14.9	+52.8	2.5	67 14.8	+52.9	2.6	68 14.8	+52.9	2.7	69 14.7	+53.0	2.8	70 14.6	+53.1	3.0	71 14.5	+53.1	3.1	72 14.4	+53.2	3.3	73 14.3	+53.3	3.5	88
89	67 07.7	+52.3	1.3	68 07.7	+52.3	1.3	69 07.7	+52.3	1.4	70 07.7	+52.3	1.5	71 07.7	+52.3	1.5	72 07.6	+52.4	1.6	73 07.6	+52.4	1.7	74 07.6	+52.4	1.8	89
90	68 00.0	+51.6	0.0	69 00.0	+51.6	0.0	70 00.0	+51.6	0.0	71 00.0	+51.6	0.0	72 00.0	+51.5	0.0	73 00.0	+51.5	0.0	74 00.0	+51.5	0.0	75 00.0	+51.4	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 150°, 210°

Dec.	68°			69°			70°			71°			72°			73°			74°			75°			Dec.
	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	18 43.8	+58.7	147.1	17 53.4	+58.8	147.2	17 02.9	+58.9	147.4	16 12.3	+59.0	147.6	15 21.6	+59.2	147.7	14 30.8	+59.3	147.9	13 40.0	+59.3	148.0	12 49.1	+59.4	148.1	0
1	19 42.5	+58.7	146.8	18 52.2	+58.9	147.0	18 01.8	+59.0	147.2	17 11.3	+59.1	147.4	16 20.8	+59.1	147.5	15 30.1	+59.2	147.7	14 39.3	+59.4	147.8	13 48.5	+59.4	148.0	1
2	20 41.2	+58.7	146.6	19 51.1	+58.8	146.8	19 00.8	+58.9	147.0	18 10.4	+59.1	147.2	17 19.9	+59.2	147.4	16 29.3	+59.3	147.5	15 38.7	+59.3	147.7	14 47.9	+59.5	147.8	2
3	21 39.9	+58.7	146.4	20 49.9	+58.8	146.6	19 59.7	+59.0	146.8	19 09.5	+59.0	147.0	18 19.1	+59.1	147.2	17 28.6	+59.2	147.4	16 38.0	+59.4	147.5	15 47.4	+59.4	147.7	3
4	22 38.6	+58.7	146.2	21 48.7	+58.8	146.4	20 58.7	+58.9	146.6	20 08.5	+59.0	146.8	19 18.2	+59.2	147.0	18 27.8	+59.3	147.2	17 37.4	+59.3	147.4	16 46.8	+59.4	147.5	4
5	23 37.3	+58.6	145.9	22 47.5	+58.8	146.2	21 57.6	+58.9	146.4	21 07.5	+59.0	146.6	20 17.4	+59.1	146.8	19 27.1	+59.2	147.0	18 36.7	+59.3	147.2	17 46.2	+59.4	147.4	5
6	24 35.9	+58.6	145.7	23 46.3	+58.7	146.0	22 56.5	+58.9	146.2	22 06.5	+59.0	146.4	21 16.5	+59.1	146.7	20 26.3	+59.2	146.9	19 36.0	+59.3	147.1	18 45.6	+59.4	147.3	6
7	25 34.5	+58.6	145.5	24 45.0	+58.8	145.7	23 55.4	+58.8	146.0	23 05.5	+59.0	146.2	22 15.6	+59.1	146.5	21 25.5	+59.2	146.7	20 35.3	+59.3	146.9	19 45.0	+59.4	147.1	7
8	26 33.1	+58.6	145.2	25 43.8	+58.7	145.5	24 54.2	+58.9	145.8	24 04.5	+59.0	146.0	23 14.7	+59.1	146.3	22 24.7	+59.2	146.5	21 34.6	+59.3	146.7	20 44.4	+59.4	147.0	8
9	27 31.7	+58.6	145.0	26 42.5	+58.7	145.3	25 53.1	+58.8	145.6	25 03.5	+59.0	145.8	24 13.8	+59.1	146.1	23 23.9	+59.2	146.3	22 33.9	+59.3	146.6	21 43.8	+59.3	146.8	9
10	28 30.3	+58.5	144.7	27 41.2	+58.6	145.1	26 51.9	+58.8	145.3	26 02.5	+58.9	145.6	25 12.9	+59.0	145.9	24 23.1	+59.2	146.2	23 33.2	+59.3	146.4	22 43.1	+59.4	146.6	10
11	29 28.8	+58.5	144.5	28 39.8	+58.7	144.8	27 50.7	+58.8	145.1	27 01.4	+58.9	145.4	26 11.9	+59.1	145.7	25 22.3	+59.1	146.0	24 32.5	+59.2	146.2	23 42.5	+59.4	146.5	11
12	30 27.3	+58.4	144.2	29 38.5	+58.6	144.6	28 49.5	+58.8	144.9	28 00.3	+58.9	145.2	27 11.0	+59.0	145.5	26 21.4	+59.2	145.8	25 31.7	+59.3	146.1	24 41.9	+59.3	146.3	12
13	31 25.7	+58.5	144.0	30 37.1	+58.6	144.3	29 48.3	+58.7	144.7	28 59.2	+58.9	145.0	28 10.0	+59.0	145.3	27 20.6	+59.1	145.6	26 31.0	+59.2	145.9	25 41.2	+59.3	146.2	13
14	32 24.2	+58.4	143.7	31 35.7	+58.6	144.1	30 47.0	+58.7	144.4	29 58.1	+58.8	144.8	29 09.0	+59.0	145.1	28 19.7	+59.1	145.4	27 30.2	+59.2	145.7	26 40.5	+59.4	146.0	14
15	33 22.6	+58.3	143.4	32 34.3	+58.5	143.8	31 45.7	+58.7	144.2	30 56.9	+58.9	144.5	30 08.0	+58.9	144.9	29 18.8	+59.1	145.2	28 29.4	+59.2	145.5	27 39.9	+59.3	145.8	15
16	34 20.9	+58.3	143.2	33 32.8	+58.5	143.6	32 44.4	+58.6	143.9	31 55.8	+58.8	144.3	31 06.9	+59.0	144.7	30 17.9	+59.0	145.0	29 28.6	+59.2	145.3	28 39.2	+59.3	145.7	16
17	35 19.2	+58.3	142.9	34 31.3	+58.4	143.3	33 43.0	+58.7	143.7	32 54.6	+58.8	144.1	32 05.9	+58.9	144.5	31 16.9	+59.1	144.8	30 27.8	+59.2	145.2	29 38.5	+59.3	145.5	17
18	36 17.5	+58.3	142.6	35 29.7	+58.4	143.0	34 41.7	+58.6	143.4	33 53.4	+58.7	143.8	33 04.8	+58.9	144.2	32 16.0	+59.0	144.6	31 27.0	+59.1	145.0	30 37.8	+59.2	145.3	18
19	37 15.8	+58.1	142.3	36 28.1	+58.4	142.7	35 40.3	+58.5	143.2	34 52.1	+58.7	143.6	34 03.7	+58.9	144.0	33 15.0	+59.0	144.4	32 26.1	+59.2	144.8	31 37.0	+59.3	145.1	19
20	38 13.9	+58.2	142.0	37 26.5	+58.4	142.4	36 38.8	+58.5	142.9	35 50.8	+58.7	143.3	35 02.6	+58.8	143.8	34 14.0	+59.0	144.2	33 25.3	+59.1	144.6	32 36.3	+59.2	144.9	20
21	39 12.1	+58.1	141.6	38 24.9	+58.2	142.1	37 37.3	+58.5	142.6	36 49.5	+58.7	143.1	36 01.4	+58.8	143.5	35 13.0	+59.0	143.9	34 24.4	+59.1	144.4	33 35.5	+59.2	144.7	21
22	40 10.2	+58.0	141.3	39 23.1	+58.3	141.8	38 35.8	+58.4	142.3	37 48.2	+58.6	142.8	37 00.2	+58.8	143.3	36 12.0	+58.9	143.7	35 23.5	+59.1	144.1	34 34.7	+59.2	144.5	22
23	41 08.2	+58.0	141.0	40 21.4	+58.2	141.5	39 34.2	+58.4	142.0	38 46.8	+58.5	142.5	37 59.0	+58.7	143.0	37 10.9	+58.9	143.5	36 22.6	+59.0	143.9	35 33.9	+59.2	144.4	23
24	42 06.2	+57.9	140.6	41 19.6	+58.1	141.2	40 32.6	+58.4	141.7	39 45.3	+58.6	142.3	38 57.7	+58.7	142.8	38 09.8	+58.9	143.2	37 21.6	+59.0	143.7	36 33.1	+59.2	144.1	24
25	43 04.1	+57.8	140.3	42 17.7	+58.1	140.9	41 31.0	+58.3	141.4	40 43.9	+58.5	142.0	39 56.4	+58.7	142.5	39 08.7	+58.8	143.0	38 20.6	+59.0	143.5	37 32.3	+59.1	143.9	25
26	44 01.9	+57.8	139.9	43 15.8	+58.0	140.5	42 29.3	+58.2	141.1	41 42.4	+58.4	141.7	40 55.1	+58.7	142.2	40 07.5	+58.8	142.7	39 19.6	+59.0	143.2	38 31.4	+59.1	143.7	26
27	44 59.7	+57.6	139.5	44 13.8	+57.9	140.2	43 27.5	+58.2	140.8	42 40.8	+58.4	141.4	41 53.8	+58.5	141.9	41 06.3	+58.8	142.5	40 18.6	+58.9	143.0	39 30.5	+59.1	143.5	27
28	45 57.3	+57.6	139.1	45 11.7	+57.9	139.8	44 25.7	+58.1	140.4	43 39.2	+58.3	141.1	42 52.3	+58.6	141.6	42 05.1	+58.7	142.2	41 17.5	+58.9	142.8	40 29.6	+59.0	143.3	28
29	46 54.9	+57.5	138.7	46 09.6	+57.8	139.4	45 23.8	+58.0	140.1	44 37.5	+58.3	140.7	43 50.9	+58.5	141.3	43 03.8	+58.7	141.9	42 16.4	+58.9	142.5	41 28.6	+59.1	143.0	29
30	47 52.4	+57.5	138.3	47 07.4	+57.7	139.0	46 21.8	+58.0	139.7	45 35.8	+58.2	140.4	44 49.4	+58.4	141.0	44 02.5	+58.7	141.6	43 15.3	+58.8	142.2	42 27.7	+59.0	142.8	30
31	48 49.9	+57.3	137.9	48 05.1	+57.6	138.6	47 19.8	+57.9	139.4	46 34.0	+58.2	140.0	45 47.8	+58.4	140.7	45 01.2	+58.6	141.4	44 14.1	+58.8	142.0	43 26.7	+58.9	142.6	31
32	49 47.2	+57.2	137.4	49 02.7	+57.5	138.2	48 17.7	+57.8	139.0	47 32.2	+58.1	139.7	46 46.2	+58.3	140.4	45 59.8	+58.5	141.0	45 12.9	+58.8	141.7	44 25.6	+59.0	142.3	32
33	50 44.4	+57.1	137.0	50 00.2	+57.5	137.8	49 15.5	+57.8	138.6	48 30.3	+58.0	139.3	47 44.5	+58.3	140.0	46 58.3	+58.5	140.7	46 11.7	+58.7	141.4	45 24.6	+58.9	142.0	33
34	51 41.5	+56.9	136.5	50 57.7	+57.3	137.3	50 13.3	+57.6	138.1	49 28.3	+57.9	138.9	48 42.8	+58.2	139.7	47 56.8	+58.5	140.4	47 10.4	+58.6	141.1	46 23.5	+58.8	141.8	34
35	52 38.4	+56.8	136.0	51 55.0	+57.2	136.8	51 10.9	+57.5	137.7	50 26.2	+57.9	138.5	49 41.0	+58.1	139.3	48 55.3	+58.3	140.1	48 09.0	+58.6	140.8	47 22.3	+58.8	141.5	35
36	53 35.2	+56.7	135.4	52 52.2	+57.0	136.3	52 08.4	+57.4	137.2	51 24.1	+57.7	138.1	50 39.1	+58.1	138.9	49 53.6	+58.3	139.7	49 07.6	+58.6	140.5	48 21.1	+58.8	141.2	36
37	54 31.9	+56.5	134.9	53 49.2	+56.9	135.8	53 05.8	+57.3	136.8	52 21.8	+57.6	137.7	51 37.2	+57.9	138.5	50 51.9	+58.3	139.3	50 06.2	+58.4	140.1	49 19.9	+58.7	140.9	37
38	55 28.4	+56.3	134.3	54 46.1	+56.8	135.3	54 03.1	+57.2	136.3	53 19.4	+57.6	137.2	52 35.1	+57.9	138.1	51 50.2	+58.1	138.9	51 04.6	+58.4	139.8	50 18.6	+58.6	140.5	38
39	56 24.7	+56.2	133.7	55 42.9	+56.6	134.7	55 00.3	+57.0	135.7	54 17.0	+57.4	136.7	53 33.0	+57.7	137.6	52 48.3	+58.1	138.5	52 03.0	+58.4	139.4	51 17.2	+58.6	140.2	39
40	57 20.9	+55.9	133.0	56 39.5	+56.4	134.1	55 57.3	+56.9	135.2	55 14.4	+57.3	136.2	54 30.7	+57.7	137.2	53 46.4	+57.9	138.1	53 01.4	+58.3	139.0	52 15.8	+58.5	139.9	40
41	58 16.8	+55.7	132.3	57 35.9	+56.3	133.5	56 54.2	+56.7	134.6	56 11.7	+57.1	135.7	55 28.4	+57.5	136.7	54 44.3	+57.9	137.7	53 59.7	+58.1	138.6	53 14.3	+58.5	139.5	41
42	59 12.5	+55.4	131.6	58 32.2	+56.0	132.8	57 50.9	+56.5	134.0	57 08.8	+57.0	135.1	56 25.9	+57.4	136.2	55 42.2	+57.8	137.2	54 57.8	+58.1	138.2	54 12.8	+58.4	139.1	42
43	60 07.9	+55.2	130.9	59 28.2	+55.7	132.1	58 47.4	+56.4	133.4	58 05.8	+56.8	134.5	57 23.3	+57.2	135.7	56 40.0	+57.6	136.7	55 55.9	+58.0	137.7	55 11.2	+58.3	138.7	43
44	61 03.1	+54.9	130.1	60 23.9	+55.6	131.4	59 43.8	+56.1	132.7	59 02.6	+56.6	133.9	58 20.5	+57.1	135.1	57 37.6	+57.5	136.2	56 53.9	+57.9	137.3	56 09.5	+58.2	138.3	44
45	61 58.0	+54.5	129.2	61 19.5	+55.2	130.6	60 39.9	+55.8	132.0	59 59.2	+56.4	133.3	59 17.6	+56.9	134.5	58 35.1	+57.4	135.7	57 51.8	+57.8	136.8	57 07.7	+58.1	137.9	45
46	62 52.5	+54.2	128.3	62 14.7	+54.9	129.8	61 35.7	+55.6	131.2	60 55.6	+56.2	132.6	60 14.5	+56.8	133.9	59 32.5	+57.2	135.1	58 49.6	+57.6	136.3	58 05.8	+58.0	137.4	46
47	63 46.7	+53.8	127.3	63 09.6	+54.6	128.9	62 31.3	+55.3	130.4	61 51.8	+56.0	131.9	61 11.3	+56.5	133.2	60 29.7	+57.0	134.5	59 47.2	+57.5	135.7	59 03.8	+57.9	136.9	47
48	64 40.5	+53.3	126.3	64 04.2	+54.2	128.0	63 26.6	+55.0	129.6	62 47.8	+55.7	131.1	62 07.8	+56.3	132.5	61 26.7	+56.9	133.9	60 44.7	+57.3	135.2	60 01.7	+57.7	136.4	48
49	65 33.8	+52.8	125.2	64 58.4	+53.8	127.0	64 21.6	+54.6	128.7	63 43.5	+55.3	130.2	63 04.1	+56.0	131.8	62 23.6	+56.6	133.2	61 42.0	+57.2	134.5	60 59.4	+57.7	135.8	49
50	66 26.6	+52.2	124.1	65 52.2	+53.3	125.9	65 16.2	+54.2	127.7	64 38.8	+55.1	129.4	64 00.1	+55.8	131.0	63 20.2	+56.4	132.5	62 39.2	+56.9	133.9	61 57.1	+57.4	135.2	50
51	67 18.8	+51.7	122.8	66 45.5	+52.7	124.8	66 10.4	+53.8	126.6	65 33.9	+54.6	128.4	64 55.9	+55.4	130.1	64 16.6	+56.2	131.7	63 36.1	+56.8	133.2	62 54.5	+57.3	134.6	51
52	68 10.5	+50.9	121.5	67 38.2	+52.2	123.6	67 04.2	+53.2	125.5	66 28.5	+54.3	127.4	65 51.3	+55.1	129.2	65 12.8	+55.8	130.9	64 32.9	+56.5	132.5	63 51.8	+57.1	134.0	52
53	69 01.4	+50.1	120.0	68 30.4	+51.4	122.2	67 57.4	+52.7	124.3	67 22.8	+53.7	126.3	66 46.4	+54.7	128.2	66 08.6	+55.5	130.0	65 29.4	+56.2	131.7	64 48.9	+56.8	133.2	53
54	69 51.5	+49.2	118.5	69 21.8	+50.8	120.8	68 50.1	+52.1	123.0	68 16.5	+53.2	125.1	67 41.1	+54.3	127.1	67 04.1	+55.2	129.0	66 25.6	+56.0	130.8	65 45.7	+56.7	132.5	54
55	70 40.7	+48.3	116.8	70 12.6	+49.8	119.2	69 42.2	+51.3	121.6	69 09.7	+52.6	123.9	68 35.4	+53.7	126.0	67 59.3	+54.7	128.0	67 21.6	+55.5	129.9	66 42.4	+56.3	131.7	55
56	71 29.0	+47.0	114.9	71 02.4	+48.9	117.6	70 33.5	+50.4	120.1	70 02.3	+51.9	122.5	69 29.1	+53.2	124.7	68 54.0	+54.2	126.9	68 17.1	+55.3	128.9	67 38.7	+56.0	130.8	56
57	72 16.0	+45.8	112.9	71 51.3	+47.7	115.7	71 23.9	+49.6	118.4	70 54.2	+51.1	121.0	70 22.3	+52.4	123.4	69 48.2	+53.8	125.7	69 12.4	+54.7	127.8	68 34.7	+55.7	129.8	57
58	73 01.8	+44.2	110.8	72 39.0	+46.5	113.8	72 13.5	+48.4	116.6	71 45.3	+50.2	119.3	71 14.7	+51.8	121.9	70 42.0	+53.0	124.3	70 07.1	+54.3	126.6	69 30.4	+55.3	128.8	58
59	73 46.0	+42.5	108.4	73 25.5	+44.9	111.6	73 01.9	+47.2	114.6	72 35.5	+49.1	117.5	72 06.5	+50.8	120.3	71 35.0	+52.4	122.9	71 01.4	+53.7	125.3	70 25.7	+54.8	127.6	59
60	74 28.5	+40.6 •	105.8	74 10.4	+43.3	109.2	73 49.1	+45.7	112.5	73 24.6	+48.0	115.6	72 57.3	+49.9	118.5	72 27.4	+51.5	121.3	71 55.1	+53.0	123.9	71 20.5	+54.2	126.4	60
61	75 09.1	+38.3 •	103.0	74 53.7	+41.4 •	106.6	74 34.8	+44.1	110.1	74 12.6	+46.5	113.4	73 47.2	+48.7	116.6	73 18.9	+50.6	119.6	72 48.1	+52.2	122.4	72 14.7	+53.7	125.0	61
62	75 47.4	+35.8 •	99.9	75 35.1	+39.1 •	103.8	75 18.9	+42.1 •	107.5	74 59.1	+44.9	111.0	74 35.9	+47.3	114.4	74 09.5	+49.5	117.7	73 40.3	+51.3	120.7	73 08.4	+52.9	123.5	62
63	76 23.2	+32.8 •	96.6	76 14.2	+36.5 •	100.7	76 01.0	+39.9 •	104.6	75 44.0	+42.9 •	108.4	75 23.2	+45.7	112.1	74 59.0	+48.1	115.5	74 31.6	+50.2	118.8	74 01.3	+52.0	121.9	63
64	76 56.0	+29.6 •	93.0	76 50.7	+33.5 •	97.2	76 40.9	+37.3 •	101.4	76 26.9	+40.8 •	105.5	76 08.9	+43.8 •	109.4	75 47.1	+46.6	113.2	75 21.8	+49.0	116.7	74 53.3	+51.1	120.0	64
65	77 25.6	+25.9 •	89.0	77 24.2	+30.2 •	93.5	77 18.2	+34.3 •	98.0	77 07.7	+38.1 •	102.3	76 52.7	+41.7 •	106.5	76 33.7	+44.7 •	110.5	76 10.8	+47.4	114.3	75 44.4	+49.8	117.9	65
66	77 51.5	+21.7 •	84.8	77 54.4	+26.5 •	89.5	77 52.5	+30.9 •	94.1	77 45.8	+35.1 •	98.7	77 34.4	+39.0 •	103.2	77 18.4	+42.5 •	107.6	76 58.2	+45.7	111.7	76 34.2	+48.3	115.6	66
67	78 13.2	+17.3 •	80.3	78 20.9	+22.1 •	85.1	78 23.4	+27.0 •	90.0	78 20.9	+31.6 •	94.8	78 13.4	+35.9 •	99.6	78 00.9	+40.0 •	104.3	77 43.9	+43.5 •	108.7	77 22.5	+46.7	113.0	67
68	78 30.5	+12.5 •	75.6	78 43.0	+17.5 •	80.4	78 50.4	+22.6 •	85.4	78 52.5	+27.6 •	90.5	78 49.3	+32.4 •	95.6	78 40.9	+36.8 •	100.6	78 27.4	+40.9 •	105.4	78 09.2	+44.5 •	110.0	68
69	78 43.0	+7.4 •	70.6	79 00.5	+12.5 •	75.5	79 13.0	+17.7 •	80.6	79 20.1	+23.0 •	85.8	79 21.7	+28.2 •	91.1	79 17.7	+33.2 •	96.4	79 08.3	+37.8 •	101.6	78 53.7	+41.9 •	106.6	69
70	78 50.4	+2.1 •	65.5	79 13.0	+7.1 •	70.3	79 30.7	+12.4 •	75.4	79 43.1	+17.9 •	80.7	79 49.9	+23.5 •	86.2	79 50.9	+29.0 •	91.8	79 46.1	+34.1 •	97.4	79 35.6	+38.8 •	102.8	70
71	78 52.5	−3.2 •	60.3	79 20.1	+1.6 •	65.0	79 43.1	+6.8 •	70.0	80 01.0	+12.4 •	75.3	80 13.4	+18.2 •	80.9	80 19.9	+24.0 •	86.7	80 20.2	+29.7 •	92.6	80 14.4	+35.1 •	98.4	71
72	78 49.3	−8.4 •	55.2	79 21.7	−4.0 •	59.6	79 49.9	+1.0 •	64.4	80 13.4	+6.5 •	69.6	80 31.6	+12.3 •	75.2	80 43.9	+18.3 •	81.2	80 49.9	+24.5 •	87.3	80 49.5	+30.5 •	93.5	72
73	78 40.9	−13.5 •	50.1	79 17.7	−9.4 •	54.2	79 50.9	−4.8 •	58.7	80 19.9	+0.3 •	63.7	80 43.9	+6.0 •	69.2	81 02.2	+12.2 •	75.1	81 14.4	+18.7 •	81.4	81 20.0	+25.2 •	87.9	73
74	78 27.4	−18.2 •	45.2	79 08.3	−14.6 •	48.9	79 46.1	−10.5 •	53.1	80 20.2	−5.8 •	57.8	80 49.9	−0.4 •	63.0	81 14.4	+5.6 •	68.8	81 33.1	+12.1 •	75.1	81 45.2	+18.9 •	81.8	74
75	78 09.2	−22.7 •	40.5	78 53.7	−19.6 •	43.8	79 35.6	−15.9 •	47.6	80 14.4	−11.7 •	51.8	80 49.5	−6.9 •	56.7	81 20.0	−1.3 •	62.2	81 45.2	+5.0 •	68.3	82 04.1	+11.9 •	75.0	75
76	77 46.5	−26.7 •	36.0	78 34.1	−24.0 •	39.0	79 19.7	−21.0 •	42.3	80 02.7	−17.3 •	46.1	80 42.6	−13.0 •	50.5	81 18.7	−8.0 •	55.6	81 50.2	−2.3 •	61.3	82 16.0	+4.4 •	67.8	76
77	77 19.8	−30.2 •	31.9	78 10.1	−28.1 •	34.4	78 58.7	−25.5 •	37.3	79 45.4	−22.5 •	40.7	80 29.6	−18.9 •	44.5	81 10.7	−14.6 •	49.1	81 47.9	−9.4 •	54.3	82 20.4	−3.4 •	60.4	77
78	76 49.6	−33.5 •	28.0	77 42.0	−31.7 •	30.2	78 33.2	−29.6 •	32.7	79 22.9	−27.1 •	35.5	80 10.7	−24.1 •	38.9	80 56.1	−20.5 •	42.8	81 38.5	−16.2 •	47.4	82 17.0	−11.0 •	52.9	78
79	76 16.1	−36.3 •	24.5	77 10.3	−34.9 •	26.3	78 03.6	−33.1 •	28.4	78 55.8	−31.1 •	30.8	79 46.6	−28.8 •	33.6	80 35.6	−25.9 •	37.0	81 22.3	−22.4 •	40.9	82 06.0	−18.0 •	45.6	79
80	75 39.8	−38.8 •	21.2	76 35.4	−37.6 •	22.7	77 30.5	−36.4 •	24.4	78 24.7	−34.8 •	26.4	79 17.8	−32.8 •	28.8	80 09.7	−30.6 •	31.6	80 59.9	−27.8 •	34.9	81 48.0	−24.4 •	38.8	80
81	75 01.0	−41.0 •	18.2	75 57.8	−40.1 •	19.4	76 54.1	−39.0 •	20.8	77 49.9	−37.8 •	22.5	78 45.0	−36.4 •	24.4	79 39.1	−34.6 •	26.7	80 32.1	−32.5 •	29.3	81 23.6	−29.9 •	32.6	81
82	74 20.0	−42.9	15.4	75 17.7	−42.2	16.4	76 15.1	−41.4 •	17.6	77 12.1	−40.5 •	18.9	78 08.6	−39.4 •	20.4	79 04.5	−38.0 •	22.2	79 59.6	−36.4 •	24.4	80 53.7	−34.5 •	26.9	82
83	73 37.1	−44.6	12.9	74 35.5	−44.0	13.7	75 33.7	−43.4	14.6	76 31.6	−42.7 •	15.6	77 29.2	−41.9 •	16.8	78 26.5	−41.0 •	18.3	79 23.2	−39.8 •	19.9	80 19.2	−38.4 •	21.9	83
84	72 52.5	−46.0	10.5	73 51.5	−45.7	11.2	74 50.3	−45.2	11.9	75 48.9	−44.7	12.7	76 47.3	−44.1 •	13.6	77 45.5	−43.4 •	14.7	78 43.4	−42.6 •	16.0	79 40.8	−41.5 •	17.5	84
85	72 06.5	−47.3	8.4	73 05.8	−47.0	8.9	74 05.1	−46.7	9.4	75 04.2	−46.3	10.0	76 03.2	−45.9	10.7	77 02.1	−45.4	11.5	78 00.8	−44.9 •	12.5	78 59.3	−44.2 •	13.6	85
86	71 19.2	−48.4	6.4	72 18.8	−48.2	6.8	73 18.4	−48.0	7.2	74 17.9	−47.8	7.6	75 17.3	−47.5	8.1	76 16.7	−47.2	8.7	77 15.9	−46.8	9.4	78 15.1	−46.4 •	10.2	86
87	70 30.8	−49.4	4.6	71 30.6	−49.3	4.9	72 30.4	−49.2	5.1	73 30.1	−49.0	5.4	74 29.8	−48.8	5.8	75 29.5	−48.7	6.2	76 29.1	−48.4	6.6	77 28.7	−48.2	7.1	87
88	69 41.4	−50.3	3.0	70 41.3	−50.2	3.1	71 41.2	−50.2	3.3	72 41.1	−50.1	3.5	73 41.0	−50.0	3.7	74 40.8	−49.8	3.9	75 40.7	−49.8	4.2	76 40.5	−49.6	4.5	88
89	68 51.1	−51.1	1.4	69 51.1	−51.1	1.5	70 51.0	−51.0	1.6	71 51.0	−51.0	1.7	72 51.0	−51.0	1.7	73 51.0	−51.0	1.9	74 50.9	−50.9	2.0	75 50.9	−50.9	2.1	89
90	68 00.0	−51.8	0.0	69 00.0	−51.8	0.0	70 00.0	−51.8	0.0	71 00.0	−51.8	0.0	72 00.0	−51.8	0.0	73 00.0	−51.9	0.0	74 00.0	−51.9	0.0	75 00.0	−51.9	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 31°, 329°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	18 43.8	−58.8	147.1	17 53.4	−58.9	147.2	17 02.9	−59.0	147.4	16 12.3	−59.1	147.6	15 21.6	−59.2	147.7	14 30.8	−59.3	147.9	13 40.0	−59.4	148.0	12 49.1	−59.5	148.1	0
1	17 45.0	−58.7	147.3	16 54.5	−58.9	147.4	16 03.9	−59.0	147.6	15 13.2	−59.1	147.7	14 22.4	−59.2	147.9	13 31.5	−59.2	148.0	12 40.6	−59.3	148.1	11 49.6	−59.4	148.3	1
2	16 46.3	−58.8	147.5	15 55.6	−58.9	147.6	15 04.9	−59.0	147.8	14 14.1	−59.1	147.9	13 23.2	−59.2	148.1	12 32.3	−59.3	148.2	11 41.3	−59.4	148.3	10 50.2	−59.5	148.4	2
3	15 47.5	−58.8	147.7	14 56.7	−58.9	147.8	14 05.9	−59.0	148.0	13 15.0	−59.1	148.1	12 24.0	−59.2	148.2	11 33.0	−59.3	148.3	10 41.9	−59.4	148.4	9 50.7	−59.4	148.5	3
4	14 48.7	−58.8	147.9	13 57.8	−58.9	148.0	13 06.9	−59.0	148.2	12 15.9	−59.1	148.3	11 24.8	−59.2	148.4	10 33.7	−59.3	148.5	9 42.5	−59.4	148.6	8 51.3	−59.5	148.7	4
5	13 49.9	−58.8	148.1	12 58.9	−58.9	148.2	12 07.9	−59.0	148.3	11 16.8	−59.1	148.5	10 25.6	−59.2	148.6	9 34.4	−59.3	148.6	8 43.1	−59.3	148.7	7 51.8	−59.4	148.8	5
6	12 51.1	−58.8	148.3	12 00.0	−58.9	148.4	11 08.9	−59.1	148.5	10 17.7	−59.2	148.6	9 26.4	−59.2	148.7	8 35.1	−59.3	148.8	7 43.8	−59.4	148.9	6 52.4	−59.5	148.9	6
7	11 52.3	−58.9	148.5	11 01.1	−59.0	148.6	10 09.8	−59.0	148.7	9 18.5	−59.1	148.8	8 27.2	−59.2	148.9	7 35.8	−59.3	149.0	6 44.4	−59.4	149.0	5 52.9	−59.4	149.1	7
8	10 53.4	−58.8	148.7	10 02.1	−58.9	148.8	9 10.8	−59.0	148.9	8 19.4	−59.1	149.0	7 28.0	−59.3	149.0	6 36.5	−59.3	149.1	5 45.0	−59.4	149.2	4 53.5	−59.5	149.2	8
9	9 54.6	−58.8	148.9	9 03.2	−58.9	149.0	8 11.8	−59.1	149.1	7 20.3	−59.2	149.1	6 28.7	−59.2	149.2	5 37.2	−59.3	149.3	4 45.6	−59.4	149.3	3 54.0	−59.5	149.3	9
10	8 55.8	−58.9	149.1	8 04.3	−59.0	149.2	7 12.7	−59.0	149.3	6 21.1	−59.1	149.3	5 29.5	−59.2	149.4	4 37.9	−59.3	149.4	3 46.2	−59.4	149.4	2 54.5	−59.4	149.5	10
11	7 56.9	−58.8	149.3	7 05.3	−58.9	149.4	6 13.7	−59.1	149.4	5 22.0	−59.2	149.5	4 30.3	−59.2	149.5	3 38.6	−59.3	149.6	2 46.8	−59.4	149.6	1 55.1	−59.5	149.6	11
12	6 58.1	−58.9	149.5	6 06.4	−59.0	149.6	5 14.6	−59.0	149.6	4 22.8	−59.1	149.7	3 31.1	−59.3	149.7	2 39.3	−59.4	149.7	1 47.4	−59.4	149.7	0 55.6	−59.5	149.7	12
13	5 59.2	−58.9	149.7	5 07.4	−59.0	149.7	4 15.6	−59.1	149.8	3 23.7	−59.2	149.8	2 31.8	−59.2	149.8	1 39.9	−59.3	149.9	0 48.0	−59.3	149.9	0 03.9	+59.4	30.1	13
14	5 00.3	−58.8	149.9	4 08.4	−58.9	149.9	3 16.5	−59.1	150.0	2 24.5	−59.1	150.0	1 32.6	−59.2	150.0	0 40.6	−59.3	150.0	0 11.3	+59.4	30.0	1 03.3	+59.5	30.0	14
15	4 01.5	−58.9	150.1	3 09.5	−59.0	150.1	2 17.4	−59.0	150.1	1 25.4	−59.2	150.2	0 33.4	−59.3	150.2	0 18.7	+59.3	29.8	1 10.7	+59.4	29.8	2 02.8	+59.4	29.9	15
16	3 02.6	−58.9	150.3	2 10.5	−59.0	150.3	1 18.4	−59.1	150.3	0 26.2	−59.1	150.3	0 25.9	+59.2	29.7	1 18.0	+59.3	29.7	2 10.1	+59.4	29.7	3 02.2	+59.5	29.7	16
17	2 03.7	−58.8	150.5	1 11.5	−58.9	150.5	0 19.3	−59.0	150.5	0 32.9	+59.2	29.5	1 25.1	+59.3	29.5	2 17.3	+59.3	29.5	3 09.5	+59.4	29.6	4 01.7	+59.5	29.6	17
18	1 04.9	−58.9	150.7	0 12.6	−59.0	150.7	0 39.7	+59.1	29.3	1 32.1	+59.1	29.3	2 24.4	+59.2	29.4	3 16.6	+59.4	29.4	4 08.9	+59.4	29.4	5 01.2	+59.4	29.5	18
19	0 06.0	−58.9	150.9	0 46.4	+59.0	29.1	1 38.8	+59.1	29.2	2 31.2	+59.1	29.2	3 23.6	+59.2	29.2	4 16.0	+59.3	29.2	5 08.3	+59.4	29.3	6 00.6	+59.5	29.3	19
20	0 52.9	+58.8	28.9	1 45.4	+58.9	29.0	2 37.9	+59.0	29.0	3 30.3	+59.2	29.0	4 22.8	+59.2	29.0	5 15.3	+59.3	29.1	6 07.7	+59.4	29.1	7 00.1	+59.4	29.2	20
21	1 51.7	+58.9	28.8	2 44.3	+59.0	28.8	3 36.9	+59.1	28.8	4 29.5	+59.1	28.8	5 22.0	+59.3	28.9	6 14.6	+59.3	28.9	7 07.1	+59.4	29.0	7 59.5	+59.5	29.0	21
22	2 50.6	+58.9	28.6	3 43.3	+59.0	28.6	4 36.0	+59.0	28.6	5 28.6	+59.2	28.7	6 21.3	+59.2	28.7	7 13.9	+59.3	28.8	8 06.5	+59.3	28.8	8 59.0	+59.4	28.9	22
23	3 49.5	+58.9	28.4	4 42.3	+58.9	28.4	5 35.0	+59.1	28.4	6 27.8	+59.1	28.5	7 20.5	+59.2	28.6	8 13.2	+59.3	28.6	9 05.8	+59.4	28.7	9 58.4	+59.5	28.8	23
24	4 48.4	+58.8	28.2	5 41.2	+59.0	28.2	6 34.1	+59.0	28.3	7 26.9	+59.2	28.3	8 19.7	+59.2	28.4	9 12.5	+59.3	28.5	10 05.2	+59.4	28.5	10 57.9	+59.4	28.6	24
25	5 47.2	+58.9	28.0	6 40.2	+58.9	28.0	7 33.1	+59.1	28.1	8 26.1	+59.1	28.2	9 18.9	+59.2	28.2	10 11.8	+59.3	28.3	11 04.6	+59.3	28.4	11 57.3	+59.5	28.5	25
26	6 46.1	+58.8	27.8	7 39.1	+59.0	27.8	8 32.2	+59.0	27.9	9 25.2	+59.1	28.0	10 18.1	+59.3	28.1	11 11.1	+59.3	28.2	12 03.9	+59.4	28.3	12 56.8	+59.4	28.4	26
27	7 44.9	+58.9	27.6	8 38.1	+58.9	27.7	9 31.2	+59.0	27.7	10 24.3	+59.1	27.8	11 17.4	+59.2	27.9	12 10.4	+59.2	28.0	13 03.3	+59.4	28.1	13 56.2	+59.4	28.2	27
28	8 43.8	+58.8	27.4	9 37.0	+59.0	27.5	10 30.2	+59.1	27.5	11 23.4	+59.1	27.6	12 16.6	+59.1	27.7	13 09.6	+59.3	27.8	14 02.7	+59.3	28.0	14 55.6	+59.5	28.1	28
29	9 42.6	+58.9	27.2	10 36.0	+58.9	27.3	11 29.3	+59.0	27.4	12 22.5	+59.1	27.5	13 15.7	+59.2	27.6	14 08.9	+59.3	27.7	15 02.0	+59.4	27.8	15 55.1	+59.4	27.9	29
30	10 41.5	+58.8	27.0	11 34.9	+58.9	27.1	12 28.3	+59.0	27.2	13 21.6	+59.1	27.3	14 14.9	+59.2	27.4	15 08.2	+59.2	27.5	16 01.4	+59.3	27.6	16 54.5	+59.4	27.8	30
31	11 40.3	+58.8	26.8	12 33.8	+58.9	26.9	13 27.3	+59.0	27.0	14 20.7	+59.1	27.1	15 14.1	+59.2	27.2	16 07.4	+59.3	27.4	17 00.7	+59.3	27.5	17 53.9	+59.4	27.6	31
32	12 39.1	+58.8	26.6	13 32.7	+58.9	26.7	14 26.3	+59.0	26.8	15 19.8	+59.1	26.9	16 13.3	+59.2	27.1	17 06.7	+59.2	27.2	18 00.0	+59.4	27.3	18 53.3	+59.4	27.5	32
33	13 37.9	+58.8	26.4	14 31.6	+58.9	26.5	15 25.3	+59.0	26.6	16 18.9	+59.1	26.7	17 12.5	+59.1	26.9	18 05.9	+59.3	27.0	18 59.4	+59.3	27.2	19 52.7	+59.4	27.3	33
34	14 36.7	+58.8	26.2	15 30.5	+58.9	26.3	16 24.3	+59.0	26.4	17 18.0	+59.0	26.6	18 11.6	+59.2	26.7	19 05.2	+59.2	26.9	19 58.7	+59.3	27.0	20 52.1	+59.4	27.2	34
35	15 35.5	+58.8	26.0	16 29.4	+58.9	26.1	17 23.3	+58.9	26.2	18 17.0	+59.1	26.4	19 10.8	+59.1	26.5	20 04.4	+59.2	26.7	20 58.0	+59.3	26.9	21 51.5	+59.3	27.0	35
36	16 34.3	+58.7	25.8	17 28.3	+58.8	25.9	18 22.2	+59.0	26.0	19 16.1	+59.0	26.2	20 09.9	+59.1	26.4	21 03.6	+59.2	26.5	21 57.3	+59.3	26.7	22 50.8	+59.4	26.9	36
37	17 33.0	+58.8	25.6	18 27.1	+58.9	25.7	19 21.2	+58.9	25.8	20 15.1	+59.1	26.0	21 09.0	+59.1	26.2	22 02.8	+59.2	26.3	22 56.6	+59.2	26.5	23 50.2	+59.4	26.7	37
38	18 31.8	+58.7	25.3	19 26.0	+58.8	25.5	20 20.1	+58.9	25.6	21 14.2	+59.0	25.8	22 08.1	+59.1	26.0	23 02.0	+59.2	26.2	23 55.8	+59.3	26.4	24 49.6	+59.3	26.6	38
39	19 30.5	+58.8	25.1	20 24.8	+58.8	25.3	21 19.0	+58.9	25.4	22 13.2	+59.0	25.6	23 07.2	+59.1	25.8	24 01.2	+59.2	26.0	24 55.1	+59.3	26.2	25 48.9	+59.3	26.4	39
40	20 29.3	+58.7	24.9	21 23.6	+58.8	25.1	22 17.9	+58.9	25.2	23 12.2	+59.0	25.4	24 06.3	+59.1	25.6	25 00.4	+59.1	25.8	25 54.4	+59.2	26.0	26 48.2	+59.4	26.2	40
41	21 28.0	+58.6	24.7	22 22.4	+58.8	24.9	23 16.8	+58.9	25.0	24 11.2	+58.9	25.2	25 05.4	+59.1	25.4	25 59.5	+59.2	25.6	26 53.6	+59.2	25.8	27 47.6	+59.3	26.1	41
42	22 26.6	+58.7	24.5	23 21.2	+58.8	24.6	24 15.7	+58.9	24.8	25 10.1	+59.0	25.0	26 04.5	+59.0	25.2	26 58.7	+59.1	25.4	27 52.8	+59.2	25.7	28 46.9	+59.3	25.9	42
43	23 25.3	+58.7	24.2	24 20.0	+58.7	24.4	25 14.6	+58.8	24.6	26 09.1	+58.9	24.8	27 03.5	+59.0	25.0	27 57.8	+59.1	25.2	28 52.0	+59.2	25.5	29 46.2	+59.2	25.7	43
44	24 24.0	+58.6	24.0	25 18.7	+58.8	24.2	26 13.4	+58.8	24.4	27 08.0	+58.9	24.6	28 02.5	+59.0	24.8	28 56.9	+59.1	25.0	29 51.2	+59.2	25.3	30 45.4	+59.3	25.5	44
45	25 22.6	+58.6	23.8	26 17.5	+58.7	24.0	27 12.2	+58.8	24.2	28 06.9	+58.9	24.4	29 01.5	+59.0	24.6	29 56.0	+59.1	24.9	30 50.4	+59.2	25.1	31 44.7	+59.3	25.4	45
46	26 21.2	+58.6	23.5	27 16.2	+58.6	23.7	28 11.0	+58.8	23.9	29 05.8	+58.9	24.2	30 00.5	+59.0	24.4	30 55.1	+59.1	24.6	31 49.6	+59.1	24.9	32 44.0	+59.2	25.2	46
47	27 19.8	+58.5	23.3	28 14.8	+58.7	23.5	29 09.8	+58.8	23.7	30 04.7	+58.9	23.9	30 59.5	+58.9	24.2	31 54.2	+59.0	24.4	32 48.7	+59.2	24.7	33 43.2	+59.2	25.0	47
48	28 18.3	+58.6	23.0	29 13.5	+58.6	23.3	30 08.6	+58.7	23.5	31 03.6	+58.8	23.7	31 58.4	+59.0	24.0	32 53.2	+59.0	24.2	33 47.9	+59.1	24.5	34 42.4	+59.2	24.8	48
49	29 16.9	+58.5	22.8	30 12.1	+58.6	23.0	31 07.3	+58.7	23.2	32 02.4	+58.8	23.5	32 57.4	+58.9	23.7	33 52.2	+59.0	24.0	34 47.0	+59.1	24.3	35 41.6	+59.2	24.6	49
50	30 15.4	+58.4	22.5	31 10.7	+58.6	22.8	32 06.0	+58.7	23.0	33 01.2	+58.8	23.3	33 56.3	+58.8	23.5	34 51.2	+59.0	23.8	35 46.1	+59.0	24.1	36 40.8	+59.1	24.4	50
51	31 13.8	+58.5	22.3	32 09.3	+58.5	22.5	33 04.7	+58.6	22.8	34 00.0	+58.7	23.0	34 55.1	+58.9	23.3	35 50.2	+58.9	23.6	36 45.1	+59.1	23.9	37 39.9	+59.2	24.2	51
52	32 12.3	+58.4	22.0	33 07.8	+58.6	22.2	34 03.3	+58.6	22.5	34 58.7	+58.7	22.8	35 54.0	+58.8	23.0	36 49.1	+58.9	23.3	37 44.2	+59.0	23.6	38 39.1	+59.1	24.0	52
53	33 10.7	+58.3	21.7	34 06.4	+58.4	22.0	35 01.9	+58.6	22.2	35 57.4	+58.7	22.5	36 52.8	+58.8	22.8	37 48.0	+58.9	23.1	38 43.2	+59.0	23.4	39 38.2	+59.0	23.7	53
54	34 09.0	+58.4	21.5	35 04.8	+58.5	21.7	36 00.5	+58.6	22.0	36 56.1	+58.7	22.3	37 51.6	+58.7	22.5	38 46.9	+58.9	22.9	39 42.2	+58.9	23.2	40 37.2	+59.1	23.5	54
55	35 07.4	+58.2	21.2	36 03.3	+58.4	21.4	36 59.1	+58.5	21.7	37 54.8	+58.6	22.0	38 50.3	+58.7	22.3	39 45.8	+58.8	22.6	40 41.1	+58.9	22.9	41 36.3	+59.0	23.3	55
56	36 05.6	+58.3	20.9	37 01.7	+58.3	21.1	37 57.6	+58.4	21.4	38 53.4	+58.5	21.7	39 49.0	+58.7	22.0	40 44.6	+58.8	22.3	41 40.0	+58.9	22.7	42 35.3	+59.0	23.0	56
57	37 03.9	+58.2	20.6	38 00.0	+58.3	20.9	38 56.0	+58.4	21.1	39 51.9	+58.6	21.4	40 47.7	+58.7	21.7	41 43.4	+58.7	22.1	42 38.9	+58.9	22.4	43 34.3	+59.0	22.8	57
58	38 02.1	+58.1	20.3	38 58.3	+58.3	20.6	39 54.4	+58.4	20.8	40 50.5	+58.4	21.1	41 46.4	+58.6	21.5	42 42.1	+58.7	21.8	43 37.8	+58.8	22.2	44 33.3	+58.9	22.5	58
59	39 00.2	+58.1	20.0	39 56.6	+58.2	20.2	40 52.8	+58.3	20.5	41 48.9	+58.5	20.8	42 45.0	+58.5	21.2	43 40.8	+58.7	21.5	44 36.6	+58.8	21.9	45 32.2	+58.9	22.3	59
60	39 58.3	+58.1	19.6	40 54.8	+58.1	19.9	41 51.1	+58.3	20.2	42 47.4	+58.4	20.5	43 43.5	+58.5	20.9	44 39.5	+58.6	21.2	45 35.4	+58.7	21.6	46 31.1	+58.8	22.0	60
61	40 56.4	+57.9	19.3	41 52.9	+58.1	19.6	42 49.4	+58.2	19.9	43 45.8	+58.3	20.2	44 42.0	+58.5	20.6	45 38.1	+58.6	20.9	46 34.1	+58.7	21.3	47 29.9	+58.8	21.7	61
62	41 54.3	+58.0	19.0	42 51.0	+58.1	19.3	43 47.6	+58.2	19.6	44 44.1	+58.3	19.9	45 40.5	+58.4	20.2	46 36.7	+58.5	20.6	47 32.8	+58.6	21.0	48 28.7	+58.8	21.4	62
63	42 52.3	+57.8	18.6	43 49.1	+57.9	18.9	44 45.8	+58.1	19.2	45 42.4	+58.2	19.6	46 38.9	+58.3	19.9	47 35.2	+58.5	20.3	48 31.4	+58.6	20.7	49 27.5	+58.7	21.1	63
64	43 50.1	+57.8	18.2	44 47.0	+57.9	18.5	45 43.9	+58.0	18.9	46 40.6	+58.1	19.2	47 37.2	+58.3	19.6	48 33.7	+58.4	19.9	49 30.0	+58.5	20.3	50 26.2	+58.6	20.8	64
65	44 47.9	+57.7	17.9	45 44.9	+57.9	18.2	46 41.9	+57.9	18.5	47 38.7	+58.1	18.8	48 35.5	+58.2	19.2	49 32.1	+58.3	19.6	50 28.5	+58.5	20.0	51 24.8	+58.6	20.4	65
66	45 45.6	+57.6	17.5	46 42.8	+57.7	17.8	47 39.8	+57.9	18.1	48 36.8	+58.0	18.5	49 33.7	+58.1	18.8	50 30.4	+58.2	19.2	51 27.0	+58.3	19.6	52 23.4	+58.5	20.1	66
67	46 43.2	+57.5	17.1	47 40.5	+57.7	17.4	48 37.7	+57.8	17.7	49 34.8	+57.9	18.1	50 31.8	+58.0	18.5	51 28.6	+58.2	18.9	52 25.3	+58.4	19.3	53 21.9	+58.5	19.7	67
68	47 40.7	+57.5	16.7	48 38.2	+57.5	17.0	49 35.5	+57.7	17.3	50 32.7	+57.9	17.7	51 29.8	+58.0	18.1	52 26.8	+58.1	18.5	53 23.7	+58.2	18.9	54 20.4	+58.3	19.3	68
69	48 38.2	+57.3	16.2	49 35.7	+57.5	16.5	50 33.2	+57.6	16.9	51 30.6	+57.7	17.3	52 27.8	+57.9	17.6	53 24.9	+58.0	18.0	54 21.9	+58.1	18.5	55 18.7	+58.3	18.9	69
70	49 35.5	+57.2	15.8	50 33.2	+57.4	16.1	51 30.8	+57.5	16.4	52 28.3	+57.6	16.8	53 25.7	+57.7	17.2	54 22.9	+57.9	17.6	55 20.0	+58.1	18.0	56 17.0	+58.2	18.5	70
71	50 32.7	+57.1	15.3	51 30.6	+57.2	15.6	52 28.3	+57.4	16.0	53 25.9	+57.5	16.3	54 23.4	+57.7	16.7	55 20.8	+57.8	17.2	56 18.1	+57.9	17.6	57 15.2	+58.1	18.1	71
72	51 29.8	+57.0	14.8	52 27.8	+57.1	15.1	53 25.7	+57.2	15.5	54 23.4	+57.4	15.9	55 21.1	+57.5	16.3	56 18.6	+57.7	16.7	57 16.0	+57.9	17.1	58 13.3	+58.0	17.6	72
73	52 26.8	+56.9	14.3	53 24.9	+57.0	14.6	54 22.9	+57.1	15.0	55 20.8	+57.3	15.4	56 18.6	+57.4	15.8	57 16.3	+57.6	16.2	58 13.9	+57.7	16.6	59 11.3	+57.9	17.1	73
74	53 23.7	+56.7	13.8	54 21.9	+56.8	14.1	55 20.0	+57.0	14.5	56 18.1	+57.1	14.8	57 16.0	+57.3	15.2	58 13.9	+57.4	15.6	59 11.6	+57.6	16.1	60 09.2	+57.7	16.6	74
75	54 20.4	+56.5	13.2	55 18.7	+56.7	13.5	56 17.0	+56.8	13.9	57 15.2	+57.0	14.3	58 13.3	+57.1	14.7	59 11.3	+57.3	15.1	60 09.2	+57.4	15.5	61 06.9	+57.6	16.0	75
76	55 16.9	+56.4	12.6	56 15.4	+56.5	13.0	57 13.8	+56.7	13.3	58 12.2	+56.8	13.7	59 10.4	+57.0	14.1	60 08.6	+57.1	14.5	61 06.6	+57.3	14.9	62 04.5	+57.4	15.4	76
77	56 13.3	+56.1	12.0	57 11.9	+56.3	12.3	58 10.5	+56.4	12.7	59 09.0	+56.6	13.1	60 07.4	+56.7	13.4	61 05.7	+56.9	13.9	62 03.9	+57.1	14.3	63 01.9	+57.3	14.8	77
78	57 09.4	+56.0	11.4	58 08.2	+56.1	11.7	59 06.9	+56.3	12.0	60 05.6	+56.4	12.4	61 04.1	+56.6	12.8	62 02.6	+56.7	13.2	63 01.0	+56.8	13.7	63 59.2	+57.1	14.1	78
79	58 05.4	+55.7	10.7	59 04.3	+55.9	11.0	60 03.2	+56.0	11.4	61 02.0	+56.1	11.7	62 00.7	+56.3	12.1	62 59.3	+56.5	12.5	63 57.8	+56.7	12.9	64 56.3	+56.8	13.4	79
80	59 01.1	+55.5	10.0	60 00.2	+55.6	10.3	60 59.2	+55.8	10.6	61 58.1	+56.0	11.0	62 57.0	+56.1	11.3	63 55.8	+56.2	11.7	64 54.5	+56.4	12.2	65 53.1	+56.6	12.6	80
81	59 56.6	+55.3	9.3	60 55.8	+55.4	9.5	61 55.0	+55.5	9.9	62 54.1	+55.6	10.2	63 53.1	+55.8	10.5	64 52.0	+56.0	10.9	65 50.9	+56.1	11.4	66 49.7	+56.3	11.8	81
82	60 51.9	+54.9	8.5	61 51.2	+55.1	8.7	62 50.5	+55.2	9.0	63 49.7	+55.3	9.4	64 48.9	+55.5	9.7	65 48.0	+55.6	10.1	66 47.0	+55.8	10.5	67 46.0	+56.0	10.9	82
83	61 46.8	+54.6	7.6	62 46.3	+54.7	7.9	63 45.7	+54.8	8.2	64 45.0	+55.0	8.5	65 44.4	+55.1	8.8	66 43.6	+55.3	9.1	67 42.8	+55.5	9.5	68 42.0	+55.6	10.0	83
84	62 41.4	+54.3	6.7	63 41.0	+54.4	7.0	64 40.5	+54.5	7.2	65 40.0	+54.6	7.5	66 39.5	+54.7	7.8	67 38.9	+54.9	8.1	68 38.3	+55.0	8.5	69 37.6	+55.2	8.9	84
85	63 35.7	+53.8	5.8	64 35.4	+53.9	6.0	65 35.0	+54.1	6.2	66 34.6	+54.2	6.5	67 34.2	+54.3	6.8	68 33.8	+54.4	7.1	69 33.3	+54.6	7.4	70 32.8	+54.8	7.7	85
86	64 29.5	+53.4	4.8	65 29.3	+53.5	5.0	66 29.1	+53.6	5.2	67 28.8	+53.7	5.4	68 28.5	+53.8	5.6	69 28.2	+54.0	5.9	70 27.9	+54.1	6.2	71 27.6	+54.1	6.5	86
87	65 22.9	+53.0	3.7	66 22.8	+53.0	3.9	67 22.7	+53.0	4.0	68 22.5	+53.2	4.2	69 22.3	+53.3	4.4	70 22.2	+53.3	4.6	71 22.0	+53.4	4.8	72 21.7	+53.6	5.1	87
88	66 15.9	+52.3	2.6	67 15.8	+52.4	2.7	68 15.7	+52.5	2.8	69 15.7	+52.5	2.9	70 15.6	+52.6	3.1	71 15.5	+52.6	3.2	72 15.4	+52.7	3.4	73 15.3	+52.8	3.6	88
89	67 08.2	+51.8	1.3	68 08.2	+51.8	1.4	69 08.2	+51.8	1.4	70 08.2	+51.8	1.5	71 08.2	+51.8	1.6	72 08.1	+51.9	1.7	73 08.1	+51.9	1.8	74 08.1	+51.9	1.9	89
90	68 00.0	+51.1	0.0	69 00.0	+51.1	0.0	70 00.0	+51.0	0.0	71 00.0	+51.0	0.0	72 00.0	+51.0	0.0	73 00.0	+51.0	0.0	74 00.0	+50.9	0.0	75 00.0	+50.9	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 149°, 211°

32°, 328° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.....Zn=360°–Z

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	18 31.4	+58.6	146.0	17 41.6	+58.8	146.2	16 51.7	+58.9	146.4	16 01.6	+59.1	146.5	15 11.5	+59.2	146.7	14 21.4	+59.2	146.8	13 31.1	+59.3	147.0	12 40.7	+59.5	147.1	0
1	19 30.0	+58.7	145.8	18 40.4	+58.7	146.0	17 50.6	+58.9	146.2	17 00.7	+59.0	146.4	16 10.7	+59.1	146.5	15 20.6	+59.2	146.7	14 30.4	+59.3	146.8	13 40.2	+59.3	147.0	1
2	20 28.7	+58.6	145.6	19 39.1	+58.8	145.8	18 49.5	+58.8	146.0	17 59.7	+59.0	146.2	17 09.8	+59.1	146.3	16 19.8	+59.2	146.5	15 29.7	+59.3	146.7	14 39.5	+59.4	146.8	2
3	21 27.3	+58.6	145.3	20 37.9	+58.7	145.6	19 48.3	+58.9	145.8	18 58.7	+59.0	146.0	18 08.9	+59.1	146.2	17 19.0	+59.2	146.3	16 29.0	+59.3	146.5	15 38.9	+59.4	146.7	3
4	22 25.9	+58.6	145.1	21 36.6	+58.8	145.3	20 47.2	+58.9	145.6	19 57.7	+58.9	145.8	19 08.0	+59.1	146.0	18 18.2	+59.2	146.2	17 28.3	+59.3	146.3	16 38.3	+59.4	146.5	4
5	23 24.5	+58.6	144.9	22 35.4	+58.7	145.1	21 46.1	+58.8	145.4	20 56.6	+59.0	145.6	20 07.1	+59.1	145.8	19 17.4	+59.2	146.0	18 27.6	+59.3	146.2	17 37.7	+59.4	146.4	5
6	24 23.1	+58.5	144.6	23 34.1	+58.7	144.9	22 44.9	+58.8	145.1	21 55.6	+58.9	145.4	21 06.2	+59.0	145.6	20 16.6	+59.2	145.8	19 26.9	+59.3	146.0	18 37.1	+59.3	146.2	6
7	25 21.6	+58.5	144.4	24 32.8	+58.6	144.7	23 43.7	+58.8	144.9	22 54.5	+59.0	145.2	22 05.2	+59.1	145.4	21 15.8	+59.1	145.6	20 26.2	+59.2	145.9	19 36.4	+59.4	146.1	7
8	26 20.1	+58.5	144.2	25 31.4	+58.7	144.4	24 42.5	+58.8	144.7	23 53.5	+58.9	145.0	23 04.3	+59.0	145.2	22 14.9	+59.2	145.5	21 25.4	+59.3	145.7	20 35.8	+59.3	145.9	8
9	27 18.6	+58.5	143.9	26 30.1	+58.6	144.2	25 41.3	+58.8	144.5	24 52.4	+58.9	144.8	24 03.3	+59.0	145.0	23 14.1	+59.1	145.3	22 24.7	+59.2	145.5	21 35.1	+59.4	145.7	9
10	28 17.1	+58.5	143.7	27 28.7	+58.6	144.0	26 40.1	+58.7	144.3	25 51.3	+58.9	144.6	25 02.3	+59.0	144.8	24 13.2	+59.1	145.1	23 23.9	+59.2	145.3	22 34.5	+59.3	145.6	10
11	29 15.6	+58.4	143.4	28 27.3	+58.6	143.7	27 38.8	+58.7	144.0	26 50.2	+58.8	144.3	26 01.3	+59.0	144.6	25 12.3	+59.1	144.9	24 23.1	+59.3	145.2	23 33.8	+59.3	145.4	11
12	30 14.0	+58.3	143.1	29 25.9	+58.5	143.5	28 37.5	+58.7	143.8	27 49.0	+58.9	144.1	27 00.3	+59.0	144.4	26 11.4	+59.1	144.7	25 22.4	+59.2	145.0	24 33.1	+59.3	145.3	12
13	31 12.3	+58.4	142.9	30 24.4	+58.5	143.2	29 36.2	+58.7	143.6	28 47.9	+58.8	143.9	27 59.3	+58.9	144.2	27 10.5	+59.1	144.5	26 21.6	+59.2	144.8	25 32.4	+59.3	145.1	13
14	32 10.7	+58.3	142.6	31 22.9	+58.5	143.0	30 34.9	+58.6	143.3	29 46.7	+58.8	143.7	28 58.2	+59.0	144.0	28 09.6	+59.0	144.3	27 20.8	+59.1	144.6	26 31.7	+59.3	144.9	14
15	33 09.0	+58.3	142.3	32 21.4	+58.4	142.7	31 33.5	+58.7	143.1	30 45.5	+58.7	143.4	29 57.2	+58.9	143.8	29 08.6	+59.1	144.1	28 19.9	+59.2	144.4	27 31.0	+59.3	144.7	15
16	34 07.3	+58.2	142.0	33 19.8	+58.5	142.4	32 32.2	+58.5	142.8	31 44.2	+58.8	143.2	30 56.1	+58.8	143.6	30 07.7	+59.0	143.9	29 19.1	+59.1	144.3	28 30.3	+59.3	144.6	16
17	35 05.5	+58.2	141.7	34 18.3	+58.3	142.2	33 30.7	+58.6	142.6	32 43.0	+58.7	143.0	31 54.9	+58.9	143.3	31 06.7	+59.0	143.7	30 18.2	+59.2	144.1	29 29.6	+59.2	144.4	17
18	36 03.7	+58.1	141.4	35 16.6	+58.4	141.9	34 29.3	+58.5	142.3	33 41.7	+58.7	142.7	32 53.8	+58.8	143.1	32 05.7	+59.0	143.5	31 17.4	+59.1	143.9	30 28.8	+59.2	144.2	18
19	37 01.8	+58.1	141.1	36 15.0	+58.2	141.6	35 27.8	+58.5	142.0	34 40.4	+58.6	142.5	33 52.6	+58.9	142.9	33 04.7	+58.9	143.3	32 16.5	+59.1	143.7	31 28.0	+59.2	144.0	19
20	37 59.9	+58.1	140.8	37 13.2	+58.3	141.3	36 26.3	+58.4	141.8	35 39.0	+58.6	142.2	34 51.5	+58.7	142.6	34 03.6	+59.0	143.1	33 15.6	+59.0	143.5	32 27.2	+59.2	143.8	20
21	38 58.0	+57.9	140.5	38 11.5	+58.2	141.0	37 24.7	+58.4	141.5	36 37.6	+58.6	141.9	35 50.2	+58.8	142.4	35 02.6	+58.9	142.8	34 14.6	+59.1	143.2	33 26.4	+59.2	143.6	21
22	39 55.9	+58.0	140.2	39 09.7	+58.1	140.7	38 23.1	+58.4	141.2	37 36.2	+58.5	141.7	36 49.0	+58.7	142.1	36 01.5	+58.8	142.6	35 13.7	+59.0	143.0	34 25.6	+59.2	143.4	22
23	40 53.9	+57.8	139.8	40 07.8	+58.1	140.4	39 21.5	+58.3	140.9	38 34.7	+58.5	141.4	37 47.7	+58.7	141.9	37 00.3	+58.9	142.4	36 12.7	+59.0	142.8	35 24.8	+59.1	143.2	23
24	41 51.7	+57.8	139.5	41 05.9	+58.1	140.0	40 19.8	+58.2	140.6	39 33.2	+58.5	141.1	38 46.4	+58.6	141.6	37 59.2	+58.8	142.1	37 11.7	+58.9	142.6	36 23.9	+59.1	143.0	24
25	42 49.5	+57.7	139.1	42 04.0	+57.9	139.7	41 18.0	+58.2	140.3	40 31.7	+58.4	140.8	39 45.0	+58.6	141.3	38 58.0	+58.8	141.9	38 10.6	+59.0	142.3	37 23.0	+59.1	142.8	25
26	43 47.2	+57.7	138.7	43 01.9	+57.9	139.3	42 16.2	+58.2	139.9	41 30.1	+58.4	140.5	40 43.6	+58.6	141.1	39 56.8	+58.7	141.6	39 09.6	+58.9	142.1	38 22.1	+59.0	142.6	26
27	44 44.9	+57.6	138.3	43 59.8	+57.9	139.0	43 14.4	+58.0	139.6	42 28.5	+58.3	140.2	41 42.2	+58.5	140.8	40 55.5	+58.7	141.3	40 08.5	+58.9	141.9	39 21.1	+59.1	142.4	27
28	45 42.5	+57.4	137.9	44 57.7	+57.7	138.6	44 12.4	+58.1	139.3	43 26.8	+58.2	139.9	42 40.7	+58.5	140.5	41 54.2	+58.7	141.0	41 07.4	+58.8	141.6	40 20.2	+59.0	142.1	28
29	46 39.9	+57.4	137.5	45 55.4	+57.7	138.2	45 10.5	+57.9	138.9	44 25.0	+58.2	139.5	43 39.2	+58.4	140.2	42 52.9	+58.6	140.8	42 06.2	+58.8	141.3	41 19.2	+59.0	141.9	29
30	47 37.3	+57.3	137.1	46 53.1	+57.6	137.8	46 08.4	+57.9	138.5	45 23.2	+58.1	139.2	44 37.6	+58.3	139.8	43 51.5	+58.6	140.5	43 05.0	+58.8	141.1	42 18.2	+58.9	141.6	30
31	48 34.6	+57.2	136.6	47 50.7	+57.5	137.4	47 06.3	+57.8	138.1	46 21.3	+58.1	138.8	45 35.9	+58.3	139.5	44 50.1	+58.5	140.2	44 03.8	+58.7	140.8	43 17.1	+58.9	141.4	31
32	49 31.8	+57.1	136.2	48 48.2	+57.4	137.0	48 04.1	+57.7	137.7	47 19.4	+58.0	138.5	46 34.2	+58.3	139.2	45 48.6	+58.5	139.9	45 02.5	+58.7	140.5	44 16.0	+58.9	141.1	32
33	50 28.9	+56.9	135.7	49 45.6	+57.3	136.5	49 01.8	+57.6	137.3	48 17.4	+57.9	138.1	47 32.5	+58.2	138.8	46 47.1	+58.4	139.5	46 01.2	+58.6	140.2	45 14.9	+58.8	140.9	33
34	51 25.8	+56.8	135.2	50 42.9	+57.2	136.1	49 59.4	+57.5	136.9	49 15.3	+57.8	137.7	48 30.7	+58.1	138.5	47 45.5	+58.3	139.2	46 59.8	+58.6	139.9	46 13.7	+58.8	140.6	34
35	52 22.6	+56.7	134.7	51 40.1	+57.0	135.6	50 56.9	+57.4	136.4	50 13.1	+57.8	137.3	49 28.8	+58.0	138.1	48 43.8	+58.3	138.8	47 58.4	+58.5	139.6	47 12.5	+58.7	140.3	35
36	53 19.3	+56.5	134.1	52 37.1	+57.0	135.1	51 54.3	+57.3	136.0	51 10.9	+57.6	136.9	50 26.8	+57.9	137.7	49 42.1	+58.3	138.5	48 56.9	+58.5	139.2	48 11.2	+58.7	140.0	36
37	54 15.8	+56.3	133.6	53 34.1	+56.7	134.6	52 51.6	+57.2	135.5	52 08.5	+57.5	136.4	51 24.7	+57.9	137.3	50 40.4	+58.1	138.1	49 55.4	+58.4	138.9	49 09.9	+58.7	139.7	37
38	55 12.1	+56.2	133.0	54 30.8	+56.7	134.0	53 48.8	+57.0	135.0	53 06.0	+57.4	135.9	52 22.6	+57.7	136.8	51 38.5	+58.0	137.7	50 53.8	+58.3	138.5	50 08.6	+58.6	139.3	38
39	56 08.3	+55.9	132.3	55 27.5	+56.4	133.4	54 45.8	+56.9	134.5	54 03.4	+57.3	135.4	53 20.3	+57.7	136.4	52 36.5	+58.0	137.3	51 52.1	+58.3	138.2	51 07.2	+58.5	139.0	39
40	57 04.2	+55.8	131.7	56 23.9	+56.3	132.8	55 42.7	+56.7	133.9	55 00.7	+57.2	134.9	54 18.0	+57.5	135.9	53 34.5	+57.9	136.9	52 50.4	+58.2	137.8	52 05.7	+58.4	138.6	40
41	58 00.0	+55.5	131.0	57 20.2	+56.0	132.2	56 39.4	+56.6	133.3	55 57.9	+57.0	134.4	55 15.5	+57.4	135.4	54 32.4	+57.8	136.4	53 48.6	+58.1	137.4	53 04.1	+58.4	138.3	41
42	58 55.5	+55.3	130.3	58 16.2	+55.9	131.5	57 36.0	+56.4	132.7	56 54.9	+56.8	133.8	56 12.9	+57.3	134.9	55 30.2	+57.6	135.9	54 46.7	+58.0	136.9	54 02.5	+58.3	137.9	42
43	59 50.8	+54.9	129.5	59 12.1	+55.6	130.8	58 32.4	+56.1	132.0	57 51.7	+56.7	133.2	57 10.2	+57.1	134.4	56 27.8	+57.5	135.5	55 44.7	+57.9	136.5	55 00.8	+58.2	137.5	43
44	60 45.7	+54.7	128.7	60 07.7	+55.3	130.1	59 28.5	+55.9	131.4	58 48.4	+56.4	132.6	58 07.3	+57.0	133.8	57 25.3	+57.4	134.9	56 42.6	+57.7	136.0	55 59.0	+58.1	137.0	44
45	61 40.4	+54.3	127.8	61 03.0	+55.0	129.3	60 24.4	+55.7	130.6	59 44.8	+56.3	131.9	59 04.3	+56.7	133.2	58 22.7	+57.3	134.4	57 40.3	+57.7	135.5	56 57.1	+58.1	136.6	45
46	62 34.7	+54.0	126.9	61 58.0	+54.7	128.4	61 20.1	+55.4	129.9	60 41.1	+56.0	131.2	60 01.0	+56.6	132.6	59 20.0	+57.1	133.8	58 38.0	+57.5	135.0	57 55.2	+57.9	136.1	46
47	63 28.7	+53.5	126.0	62 52.7	+54.4	127.6	62 15.5	+55.2	129.1	61 37.1	+55.8	130.5	60 57.6	+56.4	131.9	60 17.1	+56.9	133.2	59 35.5	+57.4	134.4	58 53.1	+57.7	135.6	47
48	64 22.2	+53.1	124.9	63 47.1	+54.0	126.6	63 10.7	+54.7	128.2	62 32.9	+55.5	129.7	61 54.0	+56.1	131.2	61 14.0	+56.7	132.5	60 32.9	+57.2	133.9	59 50.8	+57.7	135.1	48
49	65 15.3	+52.5	123.8	64 41.1	+53.5	125.6	64 05.4	+54.4	127.3	63 28.4	+55.2	128.9	62 50.1	+55.9	130.4	62 10.7	+56.4	131.9	61 30.1	+57.0	133.2	60 48.5	+57.5	134.5	49
50	66 07.8	+52.0	122.7	65 34.6	+53.0	124.5	64 59.8	+54.0	126.3	64 23.6	+54.8	128.0	63 46.0	+55.6	129.6	63 07.1	+56.3	131.1	62 27.1	+56.8	132.6	61 46.0	+57.3	133.9	50
51	66 59.8	+51.4	121.4	66 27.6	+52.5	123.4	65 53.8	+53.5	125.3	65 18.4	+54.5	127.0	64 41.6	+55.2	128.7	64 03.4	+56.0	130.3	63 23.9	+56.6	131.9	62 43.3	+57.2	133.3	51
52	67 51.2	+50.6	120.1	67 20.1	+51.9	122.1	66 47.3	+53.1	124.1	66 12.9	+54.0	126.0	65 36.8	+54.9	127.8	64 59.4	+55.6	129.5	64 20.5	+56.4	131.1	63 40.5	+56.9	132.6	52
53	68 41.8	+49.8	118.6	68 12.0	+51.2	120.8	67 40.4	+52.4	122.9	67 06.9	+53.5	124.9	66 31.7	+54.5	126.8	65 55.0	+55.4	128.6	65 16.9	+56.1	130.3	64 37.4	+56.8	131.9	53
54	69 31.6	+49.0	117.1	69 03.2	+50.5	119.4	68 32.8	+51.8	121.6	68 00.4	+53.0	123.7	67 26.2	+54.0	125.7	66 50.4	+54.9	127.6	66 13.0	+55.7	129.4	65 34.2	+56.4	131.1	54
55	70 20.6	+47.9	115.4	69 53.7	+49.5	117.8	69 24.6	+51.0	120.2	68 53.4	+52.3	122.4	68 20.2	+53.5	124.6	67 45.3	+54.5	126.6	67 08.7	+55.5	128.5	66 30.6	+56.2	130.3	55
56	71 08.5	+46.7	113.5	70 43.2	+48.6	116.2	70 15.6	+50.2	118.7	69 45.7	+51.6	121.1	69 13.7	+52.9	123.3	68 39.8	+54.1	125.5	68 04.2	+55.0	127.5	67 26.8	+55.9	129.4	56
57	71 55.2	+45.4	111.6	71 31.8	+47.4	114.4	71 05.8	+49.2	117.0	70 37.3	+50.9	119.6	70 06.6	+52.3	122.0	69 33.9	+53.4	124.2	68 59.2	+54.5	126.4	68 22.7	+55.5	128.4	57
58	72 40.6	+44.0	109.4	72 19.2	+46.2	112.4	71 55.0	+48.2	115.2	71 28.2	+49.9	117.9	70 58.9	+51.5	120.5	70 27.3	+52.9	122.9	69 53.7	+54.1	125.2	69 18.2	+55.1	127.4	58
59	73 24.6	+42.2	107.1	73 05.4	+44.7	110.2	72 43.2	+46.8	113.3	72 18.1	+48.8	116.1	71 50.4	+50.5	118.9	71 20.2	+52.1	121.5	70 47.8	+53.4	123.9	70 13.3	+54.6	126.2	59
60	74 06.8	+40.3	104.5	73 50.1	+43.0	107.9	73 30.0	+45.5	111.1	73 06.9	+47.7	114.2	72 40.9	+49.6	117.1	72 12.3	+51.3	119.9	71 41.2	+52.8	122.5	71 07.9	+54.0	125.0	60
61	74 47.1	+38.1	101.8	74 33.1	+41.0	105.3	74 15.5	+43.7	108.8	73 54.6	+46.2	112.0	73 30.5	+48.4	115.2	73 03.6	+50.3	118.1	72 34.0	+51.9	121.0	72 01.9	+53.4	123.6	61
62	75 25.2	+35.6	98.8	75 14.1	+38.9	102.5	74 59.2	+41.9	106.2	74 40.8	+44.6	109.7	74 18.9	+47.0	113.0	73 53.9	+49.2	116.2	73 25.9	+51.1	119.3	72 55.3	+52.7	122.1	62
63	76 00.8	+32.8	95.5	75 53.0	+36.3	99.5	75 41.1	+39.7	103.3	75 25.4	+42.7	107.1	75 05.9	+45.5	110.7	74 43.1	+47.8	114.1	74 17.0	+50.0	117.4	73 48.0	+51.8	120.4	63
64	76 33.6	+29.5	92.0	76 29.3	+33.5	96.1	76 20.8	+37.1	100.2	76 08.1	+40.4	104.2	75 51.4	+43.5	108.1	75 30.9	+46.3	111.8	75 07.0	+48.6	115.3	74 39.8	+50.7	118.6	64
65	77 03.1	+26.0	88.2	77 02.8	+30.1	92.5	76 57.9	+34.2	96.8	76 48.5	+38.0	101.1	76 34.9	+41.4	105.2	76 17.2	+44.4	109.1	75 55.6	+47.2	112.9	75 30.5	+49.6	116.5	65
66	77 29.1	+22.0	84.1	77 32.9	+26.5	88.6	77 32.1	+30.8	93.1	77 26.5	+34.9	97.6	77 16.3	+38.8	102.0	77 01.6	+42.3	106.2	76 42.8	+45.4	110.3	76 20.1	+48.1	114.2	66
67	77 51.1	+17.7	79.7	77 59.4	+22.4	84.3	78 02.9	+27.1	89.0	78 01.4	+31.6	93.8	77 55.1	+35.8	98.4	77 43.9	+39.7	103.0	77 28.2	+43.2	107.4	77 08.2	+46.3	111.6	67
68	78 08.8	+13.0	75.1	78 21.8	+17.9	79.8	78 30.0	+22.8	84.7	78 33.0	+27.6	89.6	78 30.9	+32.3	94.5	78 23.6	+36.7	99.4	78 11.4	+40.7	104.1	77 54.5	+44.2	108.6	68
69	78 21.8	+8.2	70.3	78 39.7	+13.1	75.0	78 52.8	+18.1	79.9	79 00.6	+23.3	85.0	79 03.2	+28.2	90.2	79 00.3	+33.1	95.3	78 52.1	+37.6	100.4	78 38.7	+41.7	105.3	69
70	78 30.0	+3.0	65.4	78 52.8	+7.8	70.0	79 10.9	+13.0	74.9	79 23.9	+18.3	80.1	79 31.4	+23.7	85.4	79 33.4	+29.0	90.8	79 29.7	+34.0	96.2	79 20.4	+38.7	101.5	70
71	78 33.0	−2.1	60.4	79 00.6	+2.6	64.8	79 23.9	+7.5	69.7	79 42.2	+12.9	74.8	79 55.1	+18.6	80.3	80 02.4	+24.1	85.9	80 03.7	+29.7	91.6	79 59.1	+34.9	97.3	71
72	78 30.9	−7.3	55.3	79 03.2	−2.9	59.6	79 31.4	+2.0	64.2	79 55.1	+7.3	69.3	80 13.7	+12.8	74.7	80 26.5	+18.8	80.5	80 33.4	+24.7	86.4	80 34.0	+30.5	92.4	72
73	78 23.6	−12.2	50.4	79 00.3	−8.2	54.3	79 33.4	−3.7	58.7	80 02.4	+1.3	63.6	80 26.5	+6.9	68.9	80 45.3	+12.8	74.7	80 58.1	+19.0	80.7	81 04.5	+25.3	87.0	73
74	78 11.4	−16.9	45.5	78 52.1	−13.4	49.2	79 29.7	−9.3	53.2	80 03.7	−4.6	57.8	80 33.4	+0.6	62.9	80 58.1	+6.4	68.5	81 17.1	+12.7	74.6	81 29.8	+19.3	81.0	74
75	77 54.5	−21.3	40.9	78 38.7	−18.2	44.2	79 20.4	−14.6	47.9	79 59.1	−10.5	52.1	80 34.0	−5.7	56.8	81 04.5	−0.2	62.1	81 29.8	+5.9	68.1	81 49.1	+12.5	74.5	75
76	77 33.2	−25.3	36.5	78 20.5	−22.6	39.4	79 05.8	−19.6	42.7	79 48.6	−16.0	46.4	80 28.3	−11.8	50.8	81 04.3	−6.9	55.7	81 35.7	−1.2	61.3	82 01.6	+5.3	67.6	76
77	77 07.9	−29.0	32.4	77 57.9	−26.8	34.9	78 46.2	−24.1	37.7	79 32.6	−21.1	41.1	80 16.5	−17.5	44.9	80 57.4	−13.2	49.3	81 34.5	−8.2	54.4	82 06.9	−2.3	60.3	77
78	76 38.9	−32.2	28.5	77 31.1	−30.4	30.6	78 22.1	−28.3	33.1	79 11.5	−25.7	36.0	79 59.0	−22.7	39.3	80 44.2	−19.2	43.2	81 26.3	−14.9	47.7	82 04.6	−9.7	53.1	78
79	76 06.7	−35.1	24.9	77 00.7	−33.6	26.7	77 53.8	−31.9	28.8	78 45.8	−29.9	31.3	79 36.3	−27.5	34.1	80 25.0	−24.5	37.4	81 11.4	−21.0	41.3	81 54.9	−16.7	46.0	79
80	75 31.6	−37.7	21.6	76 27.1	−36.5	23.1	77 21.9	−35.1	24.9	78 15.9	−33.5	26.9	79 08.8	−31.6	29.3	80 00.5	−29.3	32.0	80 50.4	−26.4	35.3	81 38.2	−23.0	39.2	80
81	74 53.9	−39.9	18.6	75 50.6	−39.0	19.8	76 46.8	−38.0	21.3	77 42.4	−36.7	22.9	78 37.2	−35.1	24.8	79 31.2	−33.4	27.1	80 24.0	−31.3	29.8	81 15.2	−28.6	33.0	81
82	74 14.0	−42.0	15.7	75 11.6	−41.2	16.8	76 08.8	−40.3	17.9	77 05.7	−39.4	19.3	78 02.1	−38.3	20.8	78 57.8	−36.9	22.7	79 52.7	−35.2	24.8	80 46.6	−33.2	27.4	82
83	73 32.0	−43.6	13.2	74 30.4	−43.1	14.0	75 28.5	−42.5	14.9	76 26.3	−41.7	16.0	77 23.8	−40.9	17.2	78 20.9	−39.9	18.6	79 17.5	−38.7	20.3	80 13.4	−37.3	22.4	83
84	72 48.4	−45.2	10.8	73 47.3	−44.8	11.4	74 46.0	−44.3	12.2	75 44.6	−43.8	13.0	76 42.9	−43.2	13.9	77 41.0	−42.4	15.1	78 38.8	−41.6	16.3	79 36.1	−40.5	17.9	84
85	72 03.2	−46.5	8.6	73 02.5	−46.3	9.1	74 01.7	−45.9	9.7	75 00.8	−45.6	10.3	75 59.7	−45.0	11.0	76 58.6	−44.6	11.8	77 57.2	−44.0	12.8	78 55.6	−43.3	13.9	85
86	71 16.7	−47.8	6.6	72 16.2	−47.5	7.0	73 15.8	−47.3	7.4	74 15.2	−47.0	7.8	75 14.7	−46.8	8.3	76 14.0	−46.4	8.9	77 13.2	−46.0	9.6	78 12.3	−45.6	10.4	86
87	70 28.9	−48.7	4.8	71 28.7	−48.6	5.0	72 28.5	−48.5	5.3	73 28.2	−48.3	5.6	74 27.9	−48.1	5.9	75 27.6	−48.0	6.3	76 27.2	−47.7	6.8	77 26.7	−47.4	7.3	87
88	69 40.2	−49.7	3.1	70 40.1	−49.6	3.2	71 40.0	−49.5	3.4	72 39.9	−49.5	3.6	73 39.8	−49.4	3.8	74 39.6	−49.2	4.0	75 39.5	−49.2	4.3	76 39.3	−49.0	4.6	88
89	68 50.5	−50.5	1.5	69 50.5	−50.5	1.5	70 50.5	−50.5	1.6	71 50.4	−50.4	1.7	72 50.4	−50.4	1.8	73 50.4	−50.4	1.9	74 50.3	−50.3	2.0	75 50.3	−50.3	2.2	89
90	68 00.0	−51.2	0.0	69 00.0	−51.3	0.0	70 00.0	−51.3	0.0	71 00.0	−51.3	0.0	72 00.0	−51.3	0.0	73 00.0	−51.3	0.0	74 00.0	−51.4	0.0	75 00.0	−51.4	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

32°, 328° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 32°, 328°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	18 31.4	−58.7	146.0	17 41.6	−58.8	146.2	16 51.7	−59.0	146.4	16 01.6	−59.0	146.5	15 11.5	−59.1	146.7	14 21.4	−59.3	146.8	13 31.1	−59.3	147.0	12 40.7	−59.4	147.1	0
1	17 32.7	−58.7	146.2	16 42.8	−58.8	146.4	15 52.7	−58.9	146.6	15 02.6	−59.0	146.7	14 12.4	−59.1	146.9	13 22.1	−59.2	147.0	12 31.8	−59.4	147.1	11 41.3	−59.4	147.2	1
2	16 34.0	−58.7	146.5	15 44.0	−58.9	146.6	14 53.8	−58.9	146.8	14 03.6	−59.1	146.9	13 13.3	−59.2	147.0	12 22.9	−59.3	147.2	11 32.4	−59.3	147.3	10 41.9	−59.4	147.4	2
3	15 35.3	−58.7	146.7	14 45.1	−58.8	146.8	13 54.9	−59.0	147.0	13 04.5	−59.0	147.1	12 14.1	−59.1	147.2	11 23.6	−59.2	147.3	10 33.1	−59.3	147.4	9 42.5	−59.4	147.5	3
4	14 36.6	−58.7	146.9	13 46.3	−58.9	147.0	12 55.9	−58.9	147.2	12 05.5	−59.1	147.3	11 15.0	−59.2	147.4	10 24.4	−59.3	147.5	9 33.8	−59.4	147.6	8 43.1	−59.4	147.7	4
5	13 37.9	−58.8	147.1	12 47.4	−58.8	147.2	11 57.0	−59.0	147.3	11 06.4	−59.1	147.5	10 15.8	−59.2	147.6	9 25.1	−59.2	147.6	8 34.4	−59.3	147.7	7 43.7	−59.4	147.8	5
6	12 39.1	−58.7	147.3	11 48.6	−58.9	147.4	10 58.0	−59.0	147.5	10 07.3	−59.0	147.6	9 16.6	−59.1	147.7	8 25.9	−59.3	147.8	7 35.1	−59.4	147.9	6 44.3	−59.5	147.9	6
7	11 40.4	−58.8	147.5	10 49.7	−58.9	147.6	9 59.0	−59.0	147.7	9 08.3	−59.1	147.8	8 17.5	−59.2	147.9	7 26.6	−59.2	148.0	6 35.7	−59.3	148.0	5 44.8	−59.4	148.1	7
8	10 41.6	−58.8	147.7	9 50.8	−58.8	147.8	9 00.0	−58.9	147.9	8 09.2	−59.1	148.0	7 18.3	−59.2	148.1	6 27.4	−59.3	148.1	5 36.4	−59.4	148.2	4 45.4	−59.4	148.2	8
9	9 42.8	−58.7	147.9	8 52.0	−58.9	148.0	8 01.1	−59.0	148.1	7 10.1	−59.1	148.2	6 19.1	−59.2	148.2	5 28.1	−59.3	148.3	4 37.0	−59.3	148.3	3 46.0	−59.5	148.4	9
10	8 44.1	−58.8	148.1	7 53.1	−58.9	148.2	7 02.1	−59.0	148.3	6 11.0	−59.1	148.3	5 19.9	−59.2	148.4	4 28.8	−59.2	148.4	3 37.7	−59.4	148.5	2 46.5	−59.4	148.5	10
11	7 45.3	−58.8	148.3	6 54.2	−58.9	148.4	6 03.1	−59.0	148.5	5 11.9	−59.1	148.5	4 20.7	−59.1	148.6	3 29.6	−59.3	148.6	2 38.3	−59.3	148.6	1 47.1	−59.4	148.6	11
12	6 46.5	−58.8	148.5	5 55.3	−58.9	148.6	5 04.1	−59.0	148.6	4 12.8	−59.1	148.7	3 21.6	−59.2	148.7	2 30.3	−59.3	148.7	1 39.0	−59.4	148.8	0 47.7	−59.5	148.8	12
13	5 47.7	−58.8	148.7	4 56.4	−58.9	148.8	4 05.1	−59.0	148.8	3 13.7	−59.1	148.9	2 22.4	−59.2	148.9	1 31.0	−59.3	148.9	0 39.6	−59.3	148.9	0 11.8	+59.4	31.1	13
14	4 48.9	−58.8	148.9	3 57.5	−58.9	149.0	3 06.1	−59.0	149.0	2 14.6	−59.1	149.0	1 23.2	−59.2	149.0	0 31.7	−59.2	149.1	0 19.7	+59.4	30.9	1 11.2	+59.4	30.9	14
15	3 50.1	−58.8	149.1	2 58.6	−58.9	149.2	2 07.1	−59.0	149.2	1 15.5	−59.1	149.2	0 24.0	−59.2	149.2	0 27.5	+59.3	30.8	1 19.1	+59.3	30.8	2 10.6	+59.5	30.8	15
16	2 51.3	−58.8	149.3	1 59.7	−58.9	149.4	1 08.1	−59.0	149.4	0 16.4	−59.1	149.4	0 35.2	+59.2	30.6	1 26.8	+59.3	30.6	2 18.4	+59.4	30.7	3 10.1	+59.4	30.7	16
17	1 52.5	−58.8	149.5	1 00.8	−58.9	149.5	0 09.1	−59.0	149.6	0 42.7	+59.1	30.5	1 34.4	+59.2	30.5	2 26.1	+59.3	30.5	3 17.8	+59.4	30.5	4 09.5	+59.4	30.5	17
18	0 53.7	−58.8	149.7	0 01.9	−58.9	149.7	0 49.9	+59.0	30.3	1 41.8	+59.1	30.3	2 33.6	+59.2	30.3	3 25.4	+59.2	30.3	4 17.2	+59.3	30.4	5 08.9	+59.4	30.4	18
19	0 05.1	+58.8	30.1	0 57.0	+58.9	30.1	1 48.9	+59.1	30.1	2 40.9	+59.1	30.1	3 32.8	+59.1	30.1	4 24.6	+59.3	30.2	5 16.5	+59.4	30.2	6 08.3	+59.5	30.3	19
20	1 03.9	+58.8	29.9	1 55.9	+58.9	29.9	2 48.0	+59.0	29.9	3 40.0	+59.1	29.9	4 31.9	+59.2	30.0	5 23.9	+59.3	30.0	6 15.9	+59.3	30.1	7 07.8	+59.4	30.1	20
21	2 02.7	+58.8	29.7	2 54.8	+58.9	29.7	3 47.0	+59.0	29.7	4 39.1	+59.0	29.8	5 31.1	+59.2	29.8	6 23.2	+59.2	29.9	7 15.2	+59.3	29.9	8 07.2	+59.4	30.0	21
22	3 01.5	+58.8	29.5	3 53.7	+58.9	29.5	4 46.0	+59.0	29.5	5 38.1	+59.1	29.6	6 30.3	+59.2	29.6	7 22.4	+59.3	29.7	8 14.5	+59.4	29.8	9 06.6	+59.4	29.8	22
23	4 00.3	+58.8	29.3	4 52.6	+58.9	29.3	5 45.0	+58.9	29.4	6 37.2	+59.1	29.4	7 29.5	+59.2	29.5	8 21.7	+59.3	29.5	9 13.9	+59.3	29.6	10 06.0	+59.4	29.7	23
24	4 59.1	+58.8	29.1	5 51.5	+58.9	29.1	6 43.9	+59.0	29.2	7 36.3	+59.1	29.2	8 28.7	+59.1	29.3	9 21.0	+59.2	29.4	10 13.2	+59.4	29.5	11 05.4	+59.5	29.6	24
25	5 57.9	+58.8	28.9	6 50.4	+58.9	28.9	7 42.9	+59.0	29.0	8 35.4	+59.1	29.1	9 27.8	+59.2	29.1	10 20.2	+59.3	29.2	11 12.6	+59.3	29.3	12 04.9	+59.4	29.4	25
26	6 56.7	+58.8	28.7	7 49.3	+58.9	28.7	8 41.9	+59.0	28.8	9 34.5	+59.1	28.9	10 27.0	+59.2	29.0	11 19.5	+59.2	29.1	12 11.9	+59.3	29.2	13 04.3	+59.4	29.3	26
27	7 55.5	+58.8	28.5	8 48.2	+58.9	28.5	9 40.9	+59.0	28.6	10 33.6	+59.0	28.7	11 26.2	+59.1	28.8	12 18.7	+59.2	28.9	13 11.2	+59.3	29.0	14 03.7	+59.3	29.1	27
28	8 54.3	+58.7	28.3	9 47.1	+58.9	28.3	10 39.9	+58.9	28.4	11 32.6	+59.1	28.5	12 25.3	+59.2	28.6	13 17.9	+59.3	28.7	14 10.5	+59.3	28.9	15 03.0	+59.4	29.0	28
29	9 53.0	+58.8	28.1	10 46.0	+58.8	28.2	11 38.8	+59.0	28.2	12 31.7	+59.0	28.3	13 24.5	+59.1	28.5	14 17.2	+59.2	28.6	15 09.8	+59.3	28.7	16 02.4	+59.4	28.8	29
30	10 51.8	+58.8	27.9	11 44.8	+58.9	28.0	12 37.8	+59.0	28.1	13 30.7	+59.1	28.2	14 23.6	+59.1	28.3	15 16.4	+59.2	28.4	16 09.1	+59.3	28.5	17 01.8	+59.4	28.7	30
31	11 50.6	+58.7	27.7	12 43.7	+58.8	27.8	13 36.8	+58.9	27.9	14 29.8	+59.0	28.0	15 22.7	+59.2	28.1	16 15.6	+59.2	28.2	17 08.4	+59.3	28.4	18 01.2	+59.4	28.5	31
32	12 49.3	+58.8	27.4	13 42.5	+58.9	27.6	14 35.7	+58.9	27.7	15 28.8	+59.0	27.8	16 21.9	+59.1	27.9	17 14.8	+59.2	28.1	18 07.7	+59.3	28.2	19 00.6	+59.3	28.4	32
33	13 48.1	+58.7	27.2	14 41.4	+58.8	27.4	15 34.6	+59.0	27.5	16 27.8	+59.1	27.6	17 21.0	+59.1	27.7	18 14.0	+59.2	27.9	19 07.0	+59.3	28.1	19 59.9	+59.4	28.2	33
34	14 46.8	+58.7	27.0	15 40.2	+58.8	27.1	16 33.6	+58.9	27.3	17 26.9	+59.0	27.4	18 20.1	+59.1	27.6	19 13.2	+59.2	27.7	20 06.3	+59.3	27.9	20 59.3	+59.3	28.1	34
35	15 45.5	+58.7	26.8	16 39.0	+58.8	26.9	17 32.5	+58.9	27.1	18 25.9	+59.0	27.2	19 19.2	+59.1	27.4	20 12.4	+59.2	27.6	21 05.6	+59.2	27.7	21 58.6	+59.4	27.9	35
36	16 44.2	+58.7	26.6	17 37.8	+58.8	26.7	18 31.4	+58.9	26.9	19 24.9	+58.9	27.0	20 18.3	+59.0	27.2	21 11.6	+59.1	27.4	22 04.8	+59.3	27.6	22 58.0	+59.3	27.8	36
37	17 42.9	+58.7	26.4	18 36.6	+58.8	26.5	19 30.3	+58.8	26.7	20 23.8	+59.0	26.8	21 17.3	+59.1	27.0	22 10.7	+59.2	27.2	23 04.1	+59.2	27.4	23 57.3	+59.3	27.6	37
38	18 41.6	+58.6	26.2	19 35.4	+58.7	26.3	20 29.1	+58.9	26.5	21 22.8	+59.0	26.6	22 16.4	+59.0	26.8	23 09.9	+59.1	27.0	24 03.3	+59.2	27.2	24 56.6	+59.3	27.4	38
39	19 40.2	+58.7	25.9	20 34.1	+58.8	26.1	21 28.0	+58.8	26.3	22 21.8	+58.9	26.4	23 15.4	+59.1	26.6	24 09.0	+59.1	26.8	25 02.5	+59.2	27.0	25 55.9	+59.3	27.3	39
40	20 38.9	+58.6	25.7	21 32.9	+58.7	25.9	22 26.8	+58.9	26.1	23 20.7	+58.9	26.2	24 14.5	+59.0	26.4	25 08.1	+59.2	26.6	26 01.7	+59.2	26.9	26 55.2	+59.3	27.1	40
41	21 37.5	+58.6	25.5	22 31.6	+58.7	25.7	23 25.7	+58.8	25.8	24 19.6	+58.9	26.0	25 13.5	+59.0	26.2	26 07.3	+59.0	26.5	27 00.9	+59.2	26.7	27 54.5	+59.2	26.9	41
42	22 36.1	+58.6	25.2	23 30.3	+58.7	25.4	24 24.5	+58.8	25.6	25 18.5	+58.9	25.8	26 12.5	+59.0	26.0	27 06.3	+59.1	26.3	28 00.1	+59.2	26.5	28 53.7	+59.3	26.7	42
43	23 34.7	+58.5	25.0	24 29.0	+58.7	25.2	25 23.3	+58.7	25.4	26 17.4	+58.9	25.6	27 11.5	+58.9	25.8	28 05.4	+59.1	26.1	28 59.3	+59.1	26.3	29 53.0	+59.2	26.6	43
44	24 33.2	+58.6	24.8	25 27.7	+58.6	25.0	26 22.0	+58.8	25.2	27 16.3	+58.8	25.4	28 10.4	+59.0	25.6	29 04.5	+59.0	25.9	29 58.4	+59.1	26.1	30 52.2	+59.3	26.4	44
45	25 31.8	+58.5	24.5	26 26.3	+58.7	24.7	27 20.8	+58.7	25.0	28 15.1	+58.9	25.2	29 09.4	+58.9	25.4	30 03.5	+59.0	25.7	30 57.5	+59.2	25.9	31 51.5	+59.2	26.2	45
46	26 30.3	+58.5	24.3	27 25.0	+58.6	24.5	28 19.5	+58.7	24.7	29 14.0	+58.8	25.0	30 08.3	+58.9	25.2	31 02.5	+59.0	25.4	31 56.7	+59.1	25.7	32 50.7	+59.1	26.0	46
47	27 28.8	+58.5	24.0	28 23.6	+58.5	24.3	29 18.2	+58.7	24.5	30 12.8	+58.7	24.7	31 07.2	+58.9	25.0	32 01.5	+59.0	25.2	32 55.8	+59.0	25.5	33 49.8	+59.2	25.8	47
48	28 27.3	+58.4	23.8	29 22.1	+58.6	24.0	30 16.9	+58.6	24.2	31 11.5	+58.8	24.5	32 06.1	+58.8	24.7	33 00.5	+59.0	25.0	33 54.8	+59.1	25.3	34 49.0	+59.2	25.6	48
49	29 25.7	+58.4	23.5	30 20.7	+58.5	23.8	31 15.5	+58.7	24.0	32 10.3	+58.7	24.3	33 04.9	+58.9	24.5	33 59.5	+58.9	24.8	34 53.9	+59.0	25.1	35 48.2	+59.1	25.4	49
50	30 24.1	+58.4	23.3	31 19.2	+58.5	23.5	32 14.2	+58.5	23.7	33 09.0	+58.7	24.0	34 03.8	+58.8	24.3	34 58.4	+58.9	24.6	35 52.9	+59.0	24.9	36 47.3	+59.1	25.2	50
51	31 22.5	+58.3	23.0	32 17.7	+58.4	23.2	33 12.7	+58.6	23.5	34 07.7	+58.7	23.8	35 02.6	+58.7	24.0	35 57.3	+58.9	24.3	36 51.9	+59.0	24.6	37 46.4	+59.1	25.0	51
52	32 20.8	+58.3	22.7	33 16.1	+58.4	23.0	34 11.3	+58.5	23.2	35 06.4	+58.6	23.5	36 01.3	+58.8	23.8	36 56.2	+58.8	24.1	37 50.9	+58.9	24.4	38 45.5	+59.0	24.7	52
53	33 19.1	+58.3	22.4	34 14.5	+58.4	22.7	35 09.8	+58.5	23.0	36 05.0	+58.6	23.2	37 00.1	+58.7	23.5	37 55.0	+58.8	23.8	38 49.8	+59.0	24.2	39 44.5	+59.0	24.5	53
54	34 17.4	+58.2	22.1	35 12.9	+58.3	22.4	36 08.3	+58.5	22.7	37 03.6	+58.6	23.0	37 58.8	+58.7	23.3	38 53.8	+58.8	23.6	39 48.8	+58.9	23.9	40 43.5	+59.0	24.3	54
55	35 15.6	+58.2	21.9	36 11.2	+58.3	22.1	37 06.8	+58.4	22.4	38 02.2	+58.5	22.7	38 57.5	+58.6	23.0	39 52.6	+58.8	23.3	40 47.7	+58.8	23.7	41 42.5	+59.0	24.0	55
56	36 13.8	+58.1	21.6	37 09.5	+58.3	21.8	38 05.2	+58.3	22.1	39 00.7	+58.5	22.4	39 56.1	+58.6	22.7	40 51.4	+58.7	23.1	41 46.5	+58.8	23.4	42 41.5	+58.9	23.8	56
57	37 11.9	+58.1	21.2	38 07.8	+58.2	21.5	39 03.5	+58.4	21.8	39 59.2	+58.4	22.1	40 54.7	+58.6	22.5	41 50.1	+58.7	22.8	42 45.3	+58.8	23.1	43 40.4	+58.9	23.5	57
58	38 10.0	+58.0	20.9	39 06.0	+58.1	21.2	40 01.9	+58.2	21.5	40 57.6	+58.4	21.8	41 53.3	+58.5	22.2	42 48.8	+58.6	22.5	43 44.1	+58.7	22.9	44 39.3	+58.9	23.3	58
59	39 08.0	+58.0	20.6	40 04.1	+58.1	20.9	41 00.1	+58.2	21.2	41 56.0	+58.3	21.5	42 51.8	+58.4	21.9	43 47.4	+58.6	22.2	44 42.8	+58.7	22.6	45 38.2	+58.8	23.0	59
60	40 06.0	+57.9	20.3	41 02.2	+58.1	20.6	41 58.3	+58.2	20.9	42 54.3	+58.3	21.2	43 50.2	+58.4	21.6	44 46.0	+58.5	21.9	45 41.5	+58.7	22.3	46 37.0	+58.8	22.7	60
61	41 03.9	+57.9	19.9	42 00.3	+57.9	20.2	42 56.5	+58.1	20.5	43 52.6	+58.3	20.9	44 48.6	+58.4	21.2	45 44.5	+58.5	21.6	46 40.2	+58.6	22.0	47 35.8	+58.7	22.4	61
62	42 01.8	+57.7	19.6	42 58.2	+58.0	19.9	43 54.6	+58.0	20.2	44 50.9	+58.1	20.5	45 47.0	+58.3	20.9	46 43.0	+58.4	21.3	47 38.8	+58.5	21.7	48 34.5	+58.6	22.1	62
63	42 59.5	+57.8	19.2	43 56.2	+57.8	19.5	44 52.6	+58.0	19.8	45 49.0	+58.1	20.2	46 45.3	+58.2	20.6	47 41.4	+58.3	20.9	48 37.3	+58.5	21.3	49 33.1	+58.7	21.8	63
64	43 57.3	+57.6	18.8	44 54.0	+57.8	19.1	45 50.6	+57.9	19.5	46 47.1	+58.0	19.8	47 43.5	+58.2	20.2	48 39.7	+58.3	20.6	49 35.8	+58.4	21.0	50 31.8	+58.5	21.4	64
65	44 54.9	+57.5	18.4	45 51.8	+57.6	18.8	46 48.5	+57.8	19.1	47 45.1	+58.0	19.5	48 41.7	+58.0	19.8	49 38.0	+58.2	20.2	50 34.2	+58.4	20.6	51 30.3	+58.5	21.1	65
66	45 52.4	+57.5	18.0	46 49.4	+57.6	18.4	47 46.3	+57.8	18.7	48 43.1	+57.9	19.1	49 39.7	+58.1	19.5	50 36.2	+58.2	19.9	51 32.6	+58.3	20.3	52 28.8	+58.4	20.7	66
67	46 49.9	+57.4	17.6	47 47.0	+57.5	17.9	48 44.1	+57.6	18.3	49 41.0	+57.8	18.7	50 37.8	+57.9	19.1	51 34.4	+58.1	19.5	52 30.9	+58.2	19.9	53 27.2	+58.4	20.3	67
68	47 47.3	+57.2	17.2	48 44.5	+57.5	17.5	49 41.7	+57.6	17.9	50 38.8	+57.6	18.2	51 35.7	+57.8	18.6	52 32.5	+57.9	19.1	53 29.1	+58.1	19.5	54 25.6	+58.2	20.0	68
69	48 44.5	+57.2	16.7	49 42.0	+57.3	17.1	50 39.3	+57.4	17.4	51 36.4	+57.6	17.8	52 33.5	+57.7	18.2	53 30.4	+57.9	18.6	54 27.2	+58.0	19.1	55 23.8	+58.2	19.5	69
70	49 41.7	+57.1	16.3	50 39.3	+57.1	16.6	51 36.7	+57.3	17.0	52 34.0	+57.5	17.3	53 31.2	+57.7	17.7	54 28.3	+57.8	18.2	55 25.2	+58.0	18.6	56 22.0	+58.1	19.1	70
71	50 38.8	+56.9	15.8	51 36.4	+57.1	16.1	52 34.0	+57.2	16.5	53 31.5	+57.4	16.9	54 28.9	+57.5	17.3	55 26.1	+57.6	17.7	56 23.2	+57.8	18.2	57 20.1	+58.0	18.6	71
72	51 35.7	+56.8	15.3	52 33.5	+56.9	15.6	53 31.2	+57.1	16.0	54 28.9	+57.2	16.4	55 26.4	+57.3	16.8	56 23.7	+57.6	17.2	57 21.0	+57.7	17.7	58 18.1	+57.8	18.2	72
73	52 32.5	+56.6	14.8	53 30.4	+56.8	15.1	54 28.3	+56.9	15.5	55 26.1	+57.1	15.8	56 23.7	+57.3	16.3	57 21.3	+57.4	16.7	58 18.7	+57.6	17.2	59 15.9	+57.8	17.6	73
74	53 29.1	+56.5	14.2	54 27.2	+56.6	14.6	55 25.2	+56.8	14.9	56 23.2	+56.9	15.3	57 21.0	+57.1	15.7	58 18.7	+57.2	16.1	59 16.3	+57.4	16.6	60 13.7	+57.6	17.1	74
75	54 25.6	+56.3	13.6	55 23.8	+56.5	14.0	56 22.0	+56.6	14.3	57 20.1	+56.8	14.7	58 18.1	+56.9	15.1	59 15.9	+57.1	15.6	60 13.7	+57.2	16.0	61 11.3	+57.4	16.5	75
76	55 21.9	+56.1	13.0	56 20.3	+56.3	13.4	57 18.6	+56.5	13.7	58 16.9	+56.6	14.1	59 15.0	+56.8	14.5	60 13.0	+56.9	15.0	61 10.9	+57.1	15.4	62 08.7	+57.3	15.9	76
77	56 18.0	+55.9	12.4	57 16.6	+56.1	12.7	58 15.1	+56.2	13.1	59 13.5	+56.3	13.5	60 11.8	+56.5	13.9	61 09.9	+56.8	14.3	62 08.0	+56.9	14.8	63 06.0	+57.1	15.3	77
78	57 13.9	+55.7	11.7	58 12.7	+55.8	12.1	59 11.3	+56.0	12.4	60 09.8	+56.2	12.8	61 08.3	+56.3	13.2	62 06.7	+56.5	13.6	63 04.9	+56.7	14.1	64 03.1	+56.8	14.6	78
79	58 09.6	+55.5	11.1	59 08.5	+55.6	11.4	60 07.3	+55.8	11.7	61 06.0	+55.9	12.1	62 04.6	+56.1	12.5	63 03.2	+56.2	12.9	64 01.6	+56.4	13.3	64 59.9	+56.7	13.8	79
80	59 05.1	+55.2	10.3	60 04.1	+55.4	10.6	61 03.1	+55.5	11.0	62 01.9	+55.7	11.3	63 00.7	+55.8	11.7	63 59.4	+56.0	12.1	64 58.0	+56.2	12.6	65 56.6	+56.3	13.0	80
81	60 00.3	+54.9	9.5	60 59.5	+55.0	9.8	61 58.6	+55.2	10.2	62 57.6	+55.3	10.5	63 56.5	+55.6	10.9	64 55.4	+55.7	11.3	65 54.2	+55.9	11.7	66 52.9	+56.1	12.2	81
82	60 55.2	+54.6	8.7	61 54.5	+54.8	9.0	62 53.8	+54.8	9.3	63 52.9	+55.1	9.6	64 52.1	+55.1	10.0	65 51.1	+55.4	10.4	66 50.1	+55.5	10.8	67 49.0	+55.7	11.3	82
83	61 49.8	+54.3	7.9	62 49.3	+54.3	8.1	63 48.6	+54.6	8.4	64 48.0	+54.6	8.7	65 47.2	+54.9	9.1	66 46.5	+54.9	9.4	67 45.6	+55.2	9.8	68 44.7	+55.3	10.3	83
84	62 44.1	+53.9	6.9	63 43.6	+54.0	7.2	64 43.2	+54.1	7.5	65 42.6	+54.3	7.7	66 42.1	+54.4	8.1	67 41.4	+54.6	8.4	68 40.8	+54.7	8.8	69 40.0	+54.9	9.2	84
85	63 38.0	+53.4	6.0	64 37.6	+53.6	6.2	65 37.3	+53.7	6.4	66 36.9	+53.8	6.7	67 36.5	+53.9	7.0	68 36.0	+54.1	7.3	69 35.5	+54.2	7.6	70 34.9	+54.4	8.0	85
86	64 31.4	+53.0	4.9	65 31.2	+53.1	5.1	66 31.0	+53.1	5.3	67 30.7	+53.3	5.5	68 30.4	+53.4	5.8	69 30.1	+53.5	6.1	70 29.7	+53.7	6.4	71 29.3	+53.8	6.7	86
87	65 24.4	+52.5	3.8	66 24.3	+52.5	4.0	67 24.1	+52.6	4.1	68 24.0	+52.7	4.3	69 23.8	+52.8	4.5	70 23.6	+52.9	4.7	71 23.4	+53.0	5.0	72 23.1	+53.2	5.3	87
88	66 16.9	+51.9	2.6	67 16.8	+51.9	2.7	68 16.7	+52.0	2.9	69 16.7	+52.0	3.0	70 16.6	+52.1	3.1	71 16.5	+52.2	3.3	72 16.4	+52.2	3.5	73 16.3	+52.3	3.7	88
89	67 08.8	+51.2	1.4	68 08.7	+51.3	1.4	69 08.7	+51.3	1.5	70 08.7	+51.3	1.6	71 08.7	+51.3	1.6	72 08.7	+51.3	1.7	73 08.6	+51.4	1.8	74 08.6	+51.4	1.9	89
90	68 00.0	+50.5	0.0	69 00.0	+50.5	0.0	70 00.0	+50.5	0.0	71 00.0	+50.4	0.0	72 00.0	+50.4	0.0	73 00.0	+50.4	0.0	74 00.0	+50.3	0.0	75 00.0	+50.3	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 148°, 212°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°
0	18 18.6	+58.6	145.0	17 29.4	+58.8	145.2	16 40.1	+58.9	145.4	15 50.7	+59.0	145.5
1	19 17.2	+58.6	144.8	18 28.2	+58.7	145.0	17 39.0	+58.8	145.1	16 49.7	+59.0	145.3
2	20 15.8	+58.6	144.5	19 26.9	+58.7	144.7	18 37.8	+58.8	144.9	17 48.7	+58.9	145.1
3	21 14.4	+58.5	144.3	20 25.6	+58.6	144.5	19 36.6	+58.9	144.7	18 47.6	+58.9	144.9
4	22 12.9	+58.5	144.1	21 24.2	+58.7	144.3	20 35.5	+58.7	144.5	19 46.5	+58.9	144.7
5	23 11.4	+58.5	143.8	22 22.9	+58.6	144.1	21 34.2	+58.8	144.3	20 45.4	+59.0	144.5
6	24 09.9	+58.5	143.6	23 21.5	+58.7	143.8	22 33.0	+58.8	144.1	21 44.4	+58.8	144.3
7	25 08.4	+58.4	143.3	24 20.2	+58.6	143.6	23 31.8	+58.7	143.9	22 43.2	+58.9	144.1
8	26 06.8	+58.4	143.1	25 18.8	+58.5	143.4	24 30.5	+58.7	143.6	23 42.1	+58.9	143.9
9	27 05.2	+58.4	142.8	26 17.3	+58.6	143.1	25 29.2	+58.7	143.4	24 41.0	+58.8	143.7
10	28 03.6	+58.4	142.6	27 15.9	+58.5	142.9	26 27.9	+58.7	143.2	25 39.8	+58.8	143.5
11	29 02.0	+58.3	142.3	28 14.4	+58.5	142.6	27 26.6	+58.7	143.0	26 38.6	+58.8	143.3
12	30 00.3	+58.3	142.0	29 12.9	+58.5	142.4	28 25.3	+58.6	142.7	27 37.4	+58.8	143.0
13	30 58.6	+58.3	141.8	30 11.4	+58.4	142.1	29 23.9	+58.6	142.5	28 36.2	+58.7	142.8
14	31 56.9	+58.2	141.5	31 09.8	+58.4	141.9	30 22.5	+58.6	142.2	29 34.9	+58.8	142.6
15	32 55.1	+58.2	141.2	32 08.2	+58.4	141.6	31 21.1	+58.5	142.0	30 33.7	+58.7	142.3
16	33 53.3	+58.1	140.9	33 06.6	+58.3	141.3	32 19.6	+58.5	141.7	31 32.4	+58.6	142.1
17	34 51.4	+58.1	140.6	34 04.9	+58.3	141.0	33 18.1	+58.5	141.5	32 31.0	+58.7	141.9
18	35 49.5	+58.0	140.3	35 03.2	+58.2	140.7	34 16.6	+58.4	141.2	33 29.7	+58.6	141.6
19	36 47.5	+58.0	140.0	36 01.4	+58.2	140.5	35 15.0	+58.4	140.9	34 28.3	+58.6	141.3
20	37 45.5	+58.0	139.7	36 59.6	+58.2	140.1	36 13.4	+58.4	140.6	35 26.9	+58.5	141.1
21	38 43.5	+57.9	139.3	37 57.8	+58.1	139.8	37 11.8	+58.3	140.3	36 25.4	+58.5	140.8
22	39 41.4	+57.8	139.0	38 55.9	+58.1	139.5	38 10.1	+58.3	140.0	37 23.9	+58.5	140.5
23	40 39.2	+57.7	138.6	39 54.0	+57.9	139.2	39 08.4	+58.2	139.7	38 22.4	+58.4	140.2
24	41 36.9	+57.7	138.3	40 51.9	+58.0	138.9	40 06.6	+58.1	139.4	39 20.8	+58.4	140.0
25	42 34.6	+57.6	137.9	41 49.9	+57.9	138.5	41 04.7	+58.1	139.1	40 19.2	+58.3	139.7
26	43 32.2	+57.6	137.5	42 47.8	+57.8	138.2	42 02.8	+58.1	138.8	41 17.5	+58.3	139.3
27	44 29.8	+57.4	137.1	43 45.6	+57.7	137.8	43 00.9	+58.0	138.4	42 15.8	+58.2	139.0
28	45 27.2	+57.4	136.7	44 43.3	+57.6	137.4	43 58.9	+57.9	138.1	43 14.0	+58.2	138.7
29	46 24.6	+57.2	136.3	45 40.9	+57.6	137.0	44 56.8	+57.9	137.7	44 12.2	+58.1	138.4
30	47 21.8	+57.2	135.9	46 38.5	+57.5	136.6	45 54.7	+57.7	137.3	45 10.3	+58.0	138.0
31	48 19.0	+57.1	135.4	47 36.0	+57.4	136.2	46 52.4	+57.7	136.9	46 08.3	+58.0	137.6
32	49 16.1	+56.9	134.9	48 33.4	+57.3	135.7	47 50.1	+57.6	136.5	47 06.3	+57.9	137.3
33	50 13.0	+56.8	134.5	49 30.7	+57.1	135.3	48 47.7	+57.5	136.1	48 04.2	+57.8	136.9
34	51 09.8	+56.7	133.9	50 27.8	+57.1	134.8	49 45.2	+57.4	135.7	49 02.0	+57.7	136.5
35	52 06.5	+56.5	133.4	51 24.9	+56.9	134.3	50 42.6	+57.3	135.2	49 59.7	+57.6	136.1
36	53 03.0	+56.3	132.9	52 21.8	+56.8	133.8	51 39.9	+57.2	134.7	50 57.3	+57.6	135.6
37	53 59.3	+56.2	132.3	53 18.6	+56.6	133.3	52 37.1	+57.0	134.2	51 54.9	+57.4	135.2
38	54 55.5	+56.0	131.7	54 15.2	+56.5	132.7	53 34.1	+56.9	133.7	52 52.3	+57.3	134.7
39	55 51.5	+55.8	131.0	55 11.7	+56.3	132.1	54 31.0	+56.8	133.2	53 49.6	+57.1	134.2
40	56 47.3	+55.6	130.4	56 08.0	+56.1	131.5	55 27.8	+56.5	132.6	54 46.7	+57.1	133.7
41	57 42.9	+55.3	129.7	57 04.1	+55.9	130.9	56 24.3	+56.4	132.0	55 43.8	+56.8	133.1
42	58 38.2	+55.0	129.0	58 00.0	+55.6	130.2	57 20.7	+56.3	131.4	56 40.6	+56.7	132.5
43	59 33.2	+54.8	128.2	58 55.6	+55.4	129.5	58 17.0	+56.0	130.7	57 37.3	+56.5	131.9
44	60 28.0	+54.5	127.4	59 51.0	+55.2	128.7	59 13.0	+55.7	130.0	58 33.8	+56.4	131.3
45	61 22.5	+54.1	126.5	60 46.2	+54.8	127.9	60 08.7	+55.5	129.3	59 30.2	+56.1	130.6
46	62 16.6	+53.7	125.6	61 41.0	+54.5	127.1	61 04.2	+55.3	128.5	60 26.3	+55.8	129.9
47	63 10.3	+53.3	124.6	62 35.5	+54.2	126.2	61 59.5	+54.9	127.7	61 22.1	+55.6	129.2
48	64 03.6	+52.8	123.6	63 29.7	+53.7	125.3	62 54.4	+54.6	126.9	62 17.7	+55.4	128.4
49	64 56.4	+52.4	122.5	64 23.4	+53.3	124.2	63 49.0	+54.1	125.9	63 13.1	+55.0	127.5
50	65 48.8	+51.7	121.3	65 16.7	+52.9	123.2	64 43.1	+53.8	124.9	64 08.1	+54.6	126.6
51	66 40.5	+51.1	120.0	66 09.6	+52.2	122.0	65 36.9	+53.3	123.9	65 02.7	+54.2	125.7
52	67 31.6	+50.3	118.7	67 01.8	+51.6	120.8	66 30.2	+52.8	122.8	65 56.9	+53.8	124.6
53	68 21.9	+49.6	117.2	67 53.4	+51.0	119.4	67 23.0	+52.2	121.5	66 50.7	+53.3	123.5
54	69 11.5	+48.6	115.7	68 44.4	+50.1	118.0	68 15.2	+51.5	120.2	67 44.0	+52.7	122.3
55	70 00.1	+47.7	114.0	69 34.5	+49.3	116.5	69 06.7	+50.8	118.8	68 36.7	+52.1	121.1
56	70 47.8	+46.4	112.2	70 23.8	+48.3	114.8	69 57.5	+49.9	117.3	69 28.8	+51.4	119.7
57	71 34.2	+45.2	110.2	71 12.1	+47.2	113.0	70 47.4	+48.9	115.6	70 20.2	+50.6	118.2
58	72 19.4	+43.6	108.1	71 59.3	+45.8	111.0	71 36.3	+47.9	113.8	71 10.8	+49.6	116.5
59	73 03.0	+42.0	105.8	72 45.1	+44.4	108.9	72 24.2	+46.6	111.9	72 00.4	+48.6	114.8
60	73 45.0	+40.1	•103.3	73 29.5	+42.8	106.6	73 10.8	+45.2	109.8	72 49.0	+47.4	112.8
61	74 25.1	+37.9	•100.6	74 12.3	+40.8	•104.1	73 56.0	+43.5	107.4	73 36.4	+45.9	110.7
62	75 03.0	+35.4	• 97.6	74 53.1	+38.6	•101.3	74 39.5	+41.6	•104.9	74 22.3	+44.3	108.4
63	75 38.4	+32.7	• 94.5	75 31.7	+36.2	• 98.3	75 21.1	+39.4	•102.1	75 06.6	+42.5	•105.8
64	76 11.1	+29.6	• 91.0	76 07.9	+33.4	• 95.1	76 00.5	+37.0	• 99.1	75 49.1	+40.2	•103.0
65	76 40.7	+26.0	• 87.3	76 41.3	+30.2	• 91.5	76 37.5	+34.1	• 95.7	76 29.3	+37.8	• 99.9
66	77 06.7	+22.3	• 83.3	77 11.5	+26.6	• 87.7	77 11.6	+30.8	• 92.1	77 07.1	+34.8	• 96.5
67	77 29.0	+18.1	• 79.1	77 38.1	+22.6	• 83.6	77 42.4	+27.1	• 88.1	77 41.9	+31.6	• 92.7
68	77 47.1	+13.6	• 74.6	78 00.7	+18.3	• 79.2	78 09.5	+23.1	• 83.9	78 13.5	+27.7	• 88.7
69	78 00.7	+8.8	• 70.0	78 19.0	+13.6	• 74.5	78 32.6	+18.5	• 79.3	78 41.2	+23.4	• 84.2
70	78 09.5	+4.0	• 65.2	78 32.6	+8.6	• 69.7	78 51.1	+13.5	• 74.4	79 04.6	+18.7	• 79.4
71	78 13.5	−1.1	• 60.3	78 41.2	+3.4	• 64.7	79 04.6	+8.4	• 69.4	79 23.3	+13.6	• 74.4
72	78 12.4	−6.1	• 55.4	78 44.6	−1.8	• 59.6	79 13.0	+2.9	• 64.1	79 36.9	+8.0	• 69.0
73	78 06.3	−11.0	• 50.6	78 42.8	−7.0	• 54.5	79 15.9	−2.7	• 58.7	79 44.9	+2.3	• 63.5
74	77 55.3	−15.6	• 45.8	78 35.8	−12.1	• 49.4	79 13.2	−8.0	• 53.4	79 47.2	−3.6	• 57.8
75	77 39.7	−19.9	• 41.3	78 23.7	−16.9	• 44.5	79 05.2	−13.3	• 48.1	79 43.6	−9.2	• 52.2
76	77 19.8	−24.0	• 36.9	78 06.8	−21.3	• 39.8	78 51.9	−18.3	• 43.0	79 34.4	−14.7	• 46.7
77	76 55.8	−27.7	• 32.8	77 45.5	−25.4	• 35.3	78 33.6	−22.8	• 38.1	79 19.7	−19.7	• 41.4
78	76 28.1	−30.9	• 28.9	77 20.1	−29.1	• 31.1	78 10.8	−27.0	• 33.6	79 00.0	−24.4	• 36.4
79	75 57.2	−34.0	• 25.4	76 51.0	−32.4	• 27.2	77 43.8	−30.6	• 29.3	78 35.6	−28.6	• 31.7
80	75 23.2	−36.5	• 22.0	76 18.6	−35.4	• 23.6	77 13.2	−33.9	• 25.3	78 07.0	−32.3	• 27.3
81	74 46.7	−38.9	• 18.9	75 43.2	−37.9	• 20.2	76 39.3	−36.8	• 21.7	77 34.7	−35.5	• 23.3
82	74 07.8	−40.9	16.1	75 05.3	−40.2	• 17.1	76 02.5	−39.4	• 18.3	76 59.2	−38.3	• 19.7
83	73 26.9	−42.8	13.5	74 25.1	−42.2	14.3	75 23.1	−41.5	• 15.3	76 20.9	−40.8	• 16.3
84	72 44.1	−44.3	11.1	73 42.9	−43.9	11.7	74 41.6	−43.4	12.5	75 40.1	−42.9	13.3
85	71 59.8	−45.8	8.8	72 59.0	−45.4	9.3	73 58.2	−45.1	9.9	74 57.2	−44.6	10.5
86	71 14.0	−46.9	6.8	72 13.6	−46.8	7.1	73 13.1	−46.5	7.6	74 12.6	−46.3	8.0
87	70 27.1	−48.1	4.9	71 26.8	−47.9	5.1	72 26.6	−47.8	5.4	73 26.3	−47.6	5.7
88	69 39.0	−49.1	3.1	70 38.9	−49.0	3.3	71 38.8	−48.9	3.5	72 38.7	−48.9	3.7
89	68 49.9	−49.9	1.5	69 49.9	−49.9	1.6	70 49.9	−49.9	1.7	71 49.8	−49.8	1.7
90	68 00.0	−50.7	0.0	69 00.0	−50.7	0.0	70 00.0	−50.7	0.0	71 00.0	−50.8	0.0
	68°			69°			70°			71°		

Dec.	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°
0	15 01.2	+59.1	145.7	14 11.6	+59.2	145.8	13 22.0	+59.2	146.0	12 32.2	+59.4	146.1
1	16 00.3	+59.1	145.5	15 10.8	+59.2	145.7	14 21.2	+59.3	145.8	13 31.6	+59.3	145.9
2	16 59.4	+59.0	145.3	16 10.0	+59.2	145.5	15 20.5	+59.3	145.6	14 30.9	+59.4	145.8
3	17 58.4	+59.1	145.1	17 09.2	+59.1	145.3	16 19.8	+59.2	145.5	15 30.3	+59.3	145.6
4	18 57.5	+59.0	144.9	18 08.3	+59.2	145.1	17 19.0	+59.3	145.3	16 29.6	+59.4	145.5
5	19 56.5	+59.0	144.7	19 07.5	+59.1	145.0	18 18.3	+59.2	145.1	17 29.0	+59.3	145.3
6	20 55.5	+59.1	144.6	20 06.6	+59.1	144.8	19 17.5	+59.2	145.0	18 28.3	+59.4	145.2
7	21 54.6	+58.9	144.4	21 05.7	+59.1	144.6	20 16.7	+59.3	144.8	19 27.7	+59.3	145.0
8	22 53.5	+59.0	144.2	22 04.8	+59.1	144.4	21 16.0	+59.2	144.6	20 27.0	+59.3	144.9
9	23 52.5	+59.0	144.0	23 03.9	+59.1	144.2	22 15.2	+59.2	144.5	21 26.3	+59.3	144.7
10	24 51.5	+58.9	143.8	24 03.0	+59.1	144.0	23 14.4	+59.2	144.3	22 25.6	+59.3	144.5
11	25 50.4	+59.0	143.6	25 02.1	+59.1	143.8	24 13.6	+59.1	144.1	23 24.9	+59.3	144.4
12	26 49.4	+58.9	143.3	26 01.2	+59.0	143.6	25 12.7	+59.2	143.9	24 24.2	+59.2	144.2
13	27 48.3	+58.9	143.1	27 00.2	+59.0	143.4	26 11.9	+59.2	143.7	25 23.4	+59.3	144.0
14	28 47.2	+58.9	142.9	27 59.2	+59.0	143.2	27 11.1	+59.1	143.6	26 22.7	+59.2	143.9
15	29 46.1	+58.8	142.7	28 58.2	+59.0	143.0	28 10.2	+59.1	143.4	27 21.9	+59.3	143.7
16	30 44.9	+58.8	142.5	29 57.2	+59.0	142.8	29 09.3	+59.1	143.2	28 21.2	+59.2	143.5
17	31 43.7	+58.8	142.2	30 56.2	+58.9	142.6	30 08.4	+59.1	143.0	29 20.4	+59.2	143.3
18	32 42.5	+58.8	142.0	31 55.1	+59.0	142.4	31 07.5	+59.0	142.8	30 19.6	+59.2	143.1
19	33 41.3	+58.8	141.8	32 54.1	+58.8	142.2	32 06.5	+59.1	142.6	31 18.8	+59.1	142.9
20	34 40.1	+58.7	141.5	33 52.9	+58.9	141.9	33 05.6	+59.0	142.3	32 17.9	+59.2	142.7
21	35 38.8	+58.7	141.3	34 51.8	+58.9	141.7	34 04.6	+59.0	142.1	33 17.1	+59.1	142.5
22	36 37.5	+58.6	141.0	35 50.7	+58.8	141.5	35 03.6	+59.0	141.9	34 16.2	+59.1	142.3
23	37 36.1	+58.6	140.7	36 49.5	+58.8	141.2	36 02.6	+58.9	141.7	35 15.3	+59.1	142.1
24	38 34.7	+58.6	140.5	37 48.3	+58.7	141.0	37 01.5	+58.9	141.4	36 14.4	+59.1	141.9
25	39 33.3	+58.5	140.2	38 47.0	+58.7	140.7	38 00.4	+58.9	141.2	37 13.5	+59.0	141.7
26	40 31.8	+58.5	139.9	39 45.7	+58.7	140.4	38 59.3	+58.9	141.0	38 12.5	+59.0	141.5
27	41 30.3	+58.4	139.6	40 44.4	+58.7	140.2	39 58.2	+58.8	140.7	39 11.5	+59.0	141.2
28	42 28.7	+58.4	139.3	41 43.1	+58.6	139.9	40 57.0	+58.8	140.5	40 10.5	+59.0	141.0
29	43 27.1	+58.4	139.0	42 41.7	+58.5	139.6	41 55.8	+58.7	140.2	41 09.5	+58.9	140.8
30	44 25.5	+58.3	138.7	43 40.2	+58.5	139.3	42 54.5	+58.7	139.9	42 08.4	+58.9	140.5
31	45 23.8	+58.2	138.3	44 38.7	+58.5	139.0	43 53.2	+58.7	139.6	43 07.3	+58.8	140.2
32	46 22.0	+58.1	138.0	45 37.2	+58.4	138.7	44 51.9	+58.6	139.3	44 06.1	+58.9	140.0
33	47 20.1	+58.1	137.6	46 35.6	+58.3	138.3	45 50.5	+58.6	139.0	45 05.0	+58.7	139.7
34	48 18.2	+58.0	137.3	47 33.9	+58.3	138.0	46 49.1	+58.5	138.7	46 03.7	+58.8	139.4
35	49 16.2	+58.0	136.9	48 32.2	+58.2	137.6	47 47.6	+58.4	138.4	47 02.5	+58.6	139.1
36	50 14.2	+57.8	136.5	49 30.4	+58.1	137.3	48 46.0	+58.4	138.0	48 01.1	+58.7	138.8
37	51 12.0	+57.7	136.0	50 28.5	+58.0	136.9	49 44.4	+58.3	137.7	48 59.8	+58.5	138.5
38	52 09.7	+57.7	135.6	51 26.5	+58.0	136.5	50 42.7	+58.3	137.3	49 58.3	+58.5	138.1
39	53 07.4	+57.5	135.1	52 24.5	+57.9	136.1	51 41.0	+58.2	136.9	50 56.8	+58.5	137.8
40	54 04.9	+57.4	134.7	53 22.4	+57.8	135.6	52 39.2	+58.1	136.5	51 55.3	+58.4	137.4
41	55 02.3	+57.3	134.2	54 20.2	+57.6	135.2	53 37.3	+58.0	136.1	52 53.7	+58.3	137.1
42	55 59.6	+57.2	133.6	55 17.8	+57.6	134.7	54 35.3	+57.9	135.7	53 52.0	+58.2	136.7
43	56 56.8	+57.0	133.1	56 15.4	+57.4	134.2	55 33.2	+57.7	135.2	54 50.2	+58.1	136.2
44	57 53.8	+56.8	132.5	57 12.8	+57.3	133.7	56 30.9	+57.7	134.8	55 48.3	+58.0	135.8
45	58 50.6	+56.6	131.9	58 10.1	+57.1	133.1	57 28.6	+57.6	134.2	56 46.3	+58.0	135.3
46	59 47.2	+56.5	131.2	59 07.2	+56.9	132.5	58 26.2	+57.4	133.7	57 44.3	+57.8	134.9
47	60 43.7	+56.2	130.6	60 04.1	+56.8	131.9	59 23.6	+57.2	133.2	58 42.1	+57.7	134.4
48	61 39.9	+56.0	129.8	61 00.9	+56.6	131.2	60 20.8	+57.1	132.6	59 39.8	+57.5	133.8
49	62 35.9	+55.7	129.1	61 57.5	+56.3	130.5	61 17.9	+56.9	131.9	60 37.3	+57.4	133.3
50	63 31.6	+55.4	128.2	62 53.8	+56.1	129.8	62 14.8	+56.7	131.3	61 34.7	+57.2	132.6
51	64 27.0	+55.0	127.4	63 49.9	+55.8	129.0	63 11.5	+56.5	130.5	62 31.9	+57.0	132.0
52	65 22.0	+54.7	126.4	64 45.7	+55.5	128.1	64 08.0	+56.2	129.8	63 28.9	+56.9	131.3
53	66 16.7	+54.3	125.4	65 41.2	+55.1	127.2	65 04.2	+55.9	129.0	64 25.8	+56.6	130.6
54	67 11.0	+53.8	124.4	66 36.3	+54.8	126.3	66 00.1	+55.6	128.1	65 22.4	+56.3	129.8
55	68 04.8	+53.3	123.2	67 31.1	+54.3	125.2	66 55.7	+55.2	127.1	66 18.7	+56.0	129.0
56	68 58.1	+52.7	121.9	68 25.4	+53.8	124.1	67 50.9	+54.8	126.1	67 14.7	+55.7	128.1
57	69 50.8	+52.0	120.6	69 19.2	+53.3	122.9	68 45.7	+54.4	125.0	68 10.4	+55.3	127.1
58	70 42.8	+51.2	119.1	70 12.5	+52.6	121.5	69 40.1	+53.8	123.8	69 05.7	+54.9	126.0
59	71 34.0	+50.3	117.5	71 05.1	+51.9	120.1	70 33.9	+53.3	122.5	70 00.6	+54.4	124.9
60	72 24.3	+49.3	115.7	71 57.0	+51.0	118.5	71 27.2	+52.5	121.1	70 55.0	+53.9	123.6
61	73 13.6	+48.2	113.8	72 48.0	+50.1	116.8	72 19.7	+51.7	119.6	71 48.9	+53.2	122.2
62	74 01.8	+46.7	111.7	73 38.1	+48.9	114.8	73 11.4	+50.8	117.9	72 42.1	+52.4	120.7
63	74 48.5	+45.2	109.3	74 27.0	+47.5	112.7	74 02.2	+49.7	116.0	73 34.5	+51.6	119.0
64	75 33.7	+43.3	•106.8	75 14.5	+46.0	110.4	74 51.9	+48.4	113.9	74 26.1	+50.5	117.2
65	76 17.0	+41.1	•103.9	76 00.5	+44.2	107.8	75 40.3	+46.9	111.5	75 16.6	+49.2	115.1
66	76 58.1	+38.6	•100.8	76 44.7	+42.1	•104.9	76 27.2	+45.1	109.0	76 05.8	+47.9	112.8
67	77 36.7	+35.7	• 97.3	77 26.8	+39.5	•101.7	77 12.3	+43.0	•106.1	76 53.7	+46.0	110.2
68	78 12.4	+32.2	• 93.4	78 06.3	+36.5	• 98.2	77 55.3	+40.5	•102.8	77 39.7	+44.0	•107.3
69	78 44.6	+28.4	• 89.2	78 42.8	+33.1	• 94.2	78 35.8	+37.4	• 99.2	78 23.7	+41.5	•104.0
70	79 13.0	+23.9	• 84.6	79 15.9	+29.0	• 89.9	79 13.2	+34.0	• 95.1	79 05.2	+38.4	•100.3
71	79 36.9	+18.9	• 79.6	79 44.9	+24.4	• 85.1	79 47.2	+29.7	• 90.6	79 43.6	+34.9	• 96.1
72	79 55.8	+13.5	• 74.3	80 09.3	+19.1	• 79.8	80 16.9	+24.9	• 85.6	80 18.5	+30.5	• 91.4
73	80 09.3	+7.6	• 68.6	80 28.4	+13.4	• 74.2	80 41.8	+19.4	• 80.1	80 49.0	+25.5	• 86.2
74	80 16.9	+1.6	• 62.8	80 41.8	+7.2	• 68.2	81 01.2	+13.3	• 74.1	81 14.5	+19.6	• 80.4
75	80 18.5	−4.6	• 56.9	80 49.0	+0.8	• 62.0	81 14.5	+6.7	• 67.8	81 34.1	+13.2	• 74.0
76	80 13.9	−10.5	• 51.0	80 49.8	−5.7	• 55.8	81 21.2	−0.2	• 61.2	81 47.3	+6.1	• 67.3
77	80 03.4	−16.2	• 45.2	80 44.1	−12.0	• 49.5	81 21.0	−7.0	• 54.6	81 53.4	−1.2	• 60.3
78	79 47.2	−21.4	• 39.7	80 32.1	−17.8	• 43.5	81 14.0	−13.5	• 48.0	81 52.2	−8.5	• 53.2
79	79 25.8	−26.1	• 34.5	80 14.3	−23.2	• 37.8	81 00.5	−19.7	• 41.7	81 43.7	−15.4	• 46.2
80	78 59.7	−30.3	• 29.7	79 51.1	−28.0	• 32.5	80 40.8	−25.1	• 35.7	81 28.3	−21.6	• 39.6
81	78 29.4	−34.0	• 25.3	79 23.1	−32.1	• 27.6	80 15.7	−30.0	• 30.2	81 06.7	−27.3	• 33.5
82	77 55.4	−37.1	• 21.2	78 51.0	−35.8	• 23.1	79 45.7	−34.0	• 25.2	80 39.4	−32.0	• 27.8
83	77 18.3	−39.9	• 17.6	78 15.2	−38.8	• 19.0	79 11.7	−37.6	• 20.7	80 07.4	−36.1	• 22.8
84	76 38.4	−42.2	• 14.3	77 36.4	−41.5	• 15.4	78 34.1	−40.6	• 16.7	79 31.3	−39.5	• 18.2
85	75 56.2	−44.3	11.3	76 54.9	−43.7	• 12.1	77 53.5	−43.1	• 13.1	78 51.8	−42.4	• 14.2
86	75 11.9	−45.9	8.6	76 11.2	−45.6	9.2	77 10.4	−45.2	9.9	78 09.4	−44.7	• 10.7
87	74 26.0	−47.5	6.1	75 25.6	−47.2	6.5	76 25.2	−47.0	7.0	77 24.7	−46.7	7.5
88	73 38.5	−48.7	3.9	74 38.4	−48.6	4.1	75 38.2	−48.5	4.4	76 38.0	−48.3	4.7
89	72 49.8	−49.8	1.8	73 49.8	−49.8	2.0	74 49.7	−49.7	2.1	75 49.7	−49.7	2.2
90	72 00.0	−50.8	0.0	73 00.0	−50.8	0.0	74 00.0	−50.8	0.0	75 00.0	−50.9	0.0
	72°			73°			74°			75°		

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 33°, 327°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	18 18.6	−58.6	145.0	17 29.4	−58.7	145.2	16 40.1	−58.8	145.4	15 50.7	−58.9	145.5	15 01.2	−59.1	145.7	14 11.6	−59.2	145.8	13 22.0	−59.3	146.0	12 32.2	−59.4	146.1	0
1	17 20.0	−58.6	145.2	16 30.7	−58.7	145.4	15 41.3	−58.9	145.6	14 51.8	−59.0	145.7	14 02.1	−59.1	145.9	13 12.4	−59.2	146.0	12 22.7	−59.3	146.1	11 32.8	−59.4	146.2	1
2	16 21.4	−58.6	145.4	15 32.0	−58.8	145.6	14 42.4	−58.9	145.8	13 52.8	−59.0	145.9	13 03.0	−59.1	146.0	12 13.2	−59.2	146.2	11 23.4	−59.3	146.3	10 33.4	−59.3	146.4	2
3	15 22.8	−58.7	145.7	14 33.2	−58.8	145.8	13 43.5	−58.9	146.0	12 53.8	−59.0	146.1	12 03.9	−59.1	146.2	11 14.0	−59.2	146.3	10 24.1	−59.3	146.4	9 34.1	−59.4	146.5	3
4	14 24.1	−58.6	145.9	13 34.4	−58.8	146.0	12 44.6	−58.9	146.1	11 54.8	−59.0	146.3	11 04.8	−59.1	146.4	10 14.8	−59.2	146.5	9 24.8	−59.3	146.6	8 34.7	−59.4	146.7	4
5	13 25.5	−58.7	146.1	12 35.6	−58.7	146.2	11 45.7	−58.9	146.3	10 55.8	−59.1	146.5	10 05.7	−59.1	146.6	9 15.6	−59.2	146.7	8 25.5	−59.3	146.7	7 35.3	−59.4	146.8	5
6	12 26.8	−58.7	146.3	11 36.9	−58.8	146.4	10 46.8	−58.9	146.5	9 56.7	−59.0	146.6	9 06.6	−59.1	146.7	8 16.4	−59.2	146.8	7 26.2	−59.3	146.9	6 35.9	−59.4	147.0	6
7	11 28.1	−58.7	146.5	10 38.1	−58.9	146.6	9 47.9	−58.9	146.7	8 57.7	−59.0	146.8	8 07.5	−59.1	146.9	7 17.2	−59.2	147.0	6 26.9	−59.3	147.0	5 36.5	−59.4	147.1	7
8	10 29.4	−58.7	146.7	9 39.2	−58.8	146.8	8 49.0	−58.9	146.9	7 58.7	−59.0	147.0	7 08.4	−59.2	147.1	6 18.0	−59.3	147.1	5 27.6	−59.4	147.2	4 37.1	−59.4	147.2	8
9	9 30.7	−58.7	146.9	8 40.4	−58.8	147.0	7 50.1	−59.0	147.1	6 59.7	−59.1	147.2	6 09.2	−59.1	147.2	5 18.7	−59.2	147.3	4 28.2	−59.3	147.3	3 37.7	−59.4	147.4	9
10	8 32.0	−58.7	147.2	7 41.6	−58.8	147.2	6 51.1	−58.9	147.3	6 00.6	−59.0	147.4	5 10.1	−59.2	147.4	4 19.5	−59.2	147.5	3 28.9	−59.3	147.5	2 38.3	−59.4	147.5	10
11	7 33.3	−58.7	147.4	6 42.8	−58.9	147.4	5 52.2	−58.9	147.5	5 01.6	−59.1	147.5	4 10.9	−59.1	147.6	3 20.3	−59.2	147.6	2 29.6	−59.3	147.6	1 38.9	−59.4	147.7	11
12	6 34.6	−58.7	147.6	5 43.9	−58.8	147.6	4 53.3	−59.0	147.7	4 02.5	−59.0	147.7	3 11.8	−59.1	147.8	2 21.1	−59.3	147.8	1 30.3	−59.3	147.8	0 39.5	−59.4	147.8	12
13	5 35.9	−58.7	147.8	4 45.1	−58.8	147.8	3 54.3	−58.9	147.9	3 03.5	−59.1	147.9	2 12.7	−59.2	147.9	1 21.8	−59.2	147.9	0 31.0	−59.4	147.9	0 19.9	+59.4	32.1	13
14	4 37.2	−58.8	148.0	3 46.3	−58.9	148.0	2 55.4	−59.0	148.1	2 04.4	−59.0	148.1	1 13.5	−59.1	148.1	0 22.6	−59.3	148.1	0 28.4	+59.3	31.9	1 19.3	+59.4	31.9	14
15	3 38.4	−58.7	148.2	2 47.4	−58.8	148.2	1 56.4	−58.9	148.2	1 05.4	−59.1	148.3	0 14.4	−59.2	148.3	0 36.7	+59.2	31.7	1 27.7	+59.3	31.8	2 18.7	+59.4	31.8	15
16	2 39.7	−58.7	148.4	1 48.6	−58.9	148.4	0 57.5	−59.0	148.4	0 06.3	−59.0	148.4	0 44.8	+59.1	31.6	1 35.9	+59.2	31.6	2 27.0	+59.3	31.6	3 18.1	+59.4	31.6	16
17	1 41.0	−58.8	148.6	0 49.7	−58.8	148.6	0 01.5	+58.9	31.4	0 52.7	+59.0	31.4	1 43.9	+59.2	31.4	2 35.1	+59.3	31.4	3 26.3	+59.3	31.5	4 17.5	+59.4	31.5	17
18	0 42.2	−58.7	148.8	0 09.1	+58.9	31.2	1 00.4	+59.0	31.2	1 51.7	+59.1	31.2	2 43.1	+59.1	31.2	3 34.4	+59.2	31.3	4 25.6	+59.3	31.3	5 16.9	+59.4	31.3	18
19	0 16.5	+58.8	31.0	1 08.0	+58.8	31.0	1 59.4	+58.9	31.0	2 50.8	+59.0	31.0	3 42.2	+59.1	31.1	4 33.6	+59.2	31.1	5 24.9	+59.4	31.1	6 16.3	+59.4	31.2	19
20	1 15.3	+58.7	30.8	2 06.8	+58.8	30.8	2 58.3	+59.0	30.8	3 49.8	+59.1	30.9	4 41.3	+59.2	30.9	5 32.8	+59.2	30.9	6 24.3	+59.3	31.0	7 15.7	+59.4	31.1	20
21	2 14.0	+58.7	30.6	3 05.6	+58.9	30.6	3 57.3	+58.9	30.6	4 48.9	+59.0	30.7	5 40.5	+59.1	30.7	6 32.0	+59.3	30.8	7 23.6	+59.3	30.8	8 15.1	+59.3	30.9	21
22	3 12.7	+58.8	30.4	4 04.5	+58.8	30.4	4 56.2	+59.0	30.5	5 47.9	+59.1	30.5	6 39.6	+59.1	30.6	7 31.3	+59.2	30.6	8 22.9	+59.3	30.7	9 14.4	+59.4	30.8	22
23	4 11.5	+58.7	30.2	5 03.3	+58.9	30.2	5 55.2	+58.9	30.3	6 47.0	+59.0	30.3	7 38.7	+59.2	30.4	8 30.5	+59.2	30.5	9 22.2	+59.3	30.5	10 13.8	+59.4	30.6	23
24	5 10.2	+58.7	30.0	6 02.2	+58.8	30.0	6 54.1	+58.9	30.1	7 46.0	+59.0	30.1	8 37.9	+59.1	30.2	9 29.7	+59.2	30.3	10 21.5	+59.3	30.4	11 13.2	+59.4	30.5	24
25	6 08.9	+58.7	29.8	7 01.0	+58.8	29.8	7 53.0	+59.0	29.9	8 45.0	+59.1	30.0	9 37.0	+59.1	30.0	10 28.9	+59.2	30.1	11 20.8	+59.3	30.2	12 12.6	+59.4	30.3	25
26	7 07.6	+58.8	29.6	7 59.8	+58.8	29.6	8 52.0	+58.9	29.7	9 44.1	+59.0	29.8	10 36.1	+59.1	29.9	11 28.1	+59.2	30.0	12 20.1	+59.2	30.1	13 12.0	+59.3	30.2	26
27	8 06.4	+58.7	29.4	8 58.6	+58.8	29.4	9 50.9	+58.9	29.5	10 43.1	+59.0	29.6	11 35.2	+59.1	29.7	12 27.3	+59.2	29.8	13 19.3	+59.3	29.9	14 11.3	+59.4	30.0	27
28	9 05.1	+58.7	29.1	9 57.4	+58.9	29.2	10 49.8	+58.9	29.3	11 42.1	+59.0	29.4	12 34.3	+59.1	29.5	13 26.5	+59.2	29.6	14 18.6	+59.3	29.8	15 10.7	+59.3	29.9	28
29	10 03.8	+58.7	28.9	10 56.3	+58.8	29.0	11 48.7	+58.9	29.1	12 41.1	+59.0	29.2	13 33.4	+59.1	29.3	14 25.7	+59.2	29.5	15 17.9	+59.3	29.6	16 10.0	+59.4	29.7	29
30	11 02.5	+58.6	28.7	11 55.1	+58.7	28.8	12 47.6	+58.9	28.9	13 40.1	+59.0	29.0	14 32.5	+59.1	29.2	15 24.9	+59.1	29.3	16 17.2	+59.2	29.4	17 09.4	+59.3	29.6	30
31	12 01.1	+58.7	28.5	12 53.8	+58.8	28.6	13 46.5	+58.9	28.7	14 39.1	+58.9	28.9	15 31.6	+59.1	29.0	16 24.0	+59.2	29.1	17 16.4	+59.3	29.3	18 08.7	+59.4	29.4	31
32	12 59.8	+58.7	28.3	13 52.6	+58.8	28.4	14 45.4	+58.8	28.5	15 38.0	+59.0	28.7	16 30.7	+59.0	28.8	17 23.2	+59.2	28.9	18 15.7	+59.2	29.1	19 08.1	+59.3	29.3	32
33	13 58.5	+58.6	28.1	14 51.4	+58.8	28.2	15 44.2	+58.9	28.3	16 37.0	+59.0	28.5	17 29.7	+59.1	28.6	18 22.4	+59.1	28.8	19 14.9	+59.2	28.9	20 07.4	+59.3	29.1	33
34	14 57.1	+58.7	27.9	15 50.2	+58.7	28.0	16 43.1	+58.8	28.1	17 36.0	+58.9	28.3	18 28.8	+59.0	28.4	19 21.5	+59.1	28.6	20 14.1	+59.3	28.8	21 06.7	+59.3	28.9	34
35	15 55.8	+58.6	27.6	16 48.9	+58.7	27.8	17 41.9	+58.9	27.9	18 34.9	+59.0	28.1	19 27.8	+59.1	28.2	20 20.6	+59.2	28.4	21 13.4	+59.2	28.6	22 06.0	+59.3	28.8	35
36	16 54.4	+58.6	27.4	17 47.6	+58.7	27.6	18 40.8	+58.8	27.7	19 33.9	+58.9	27.9	20 26.9	+59.0	28.1	21 19.8	+59.1	28.2	22 12.6	+59.2	28.4	23 05.3	+59.3	28.6	36
37	17 53.0	+58.6	27.2	18 46.3	+58.8	27.3	19 39.6	+58.8	27.5	20 32.8	+58.9	27.7	21 25.9	+59.0	27.9	22 18.9	+59.1	28.0	23 11.8	+59.2	28.2	24 04.6	+59.3	28.5	37
38	18 51.6	+58.6	27.0	19 45.1	+58.6	27.1	20 38.4	+58.8	27.3	21 31.7	+58.9	27.5	22 24.9	+59.0	27.7	23 18.0	+59.1	27.9	24 11.0	+59.1	28.1	25 03.9	+59.2	28.3	38
39	19 50.2	+58.6	26.7	20 43.7	+58.7	26.9	21 37.2	+58.8	27.1	22 30.6	+58.9	27.3	23 23.9	+58.9	27.5	24 17.1	+59.0	27.7	25 10.1	+59.2	27.9	26 03.1	+59.3	28.1	39
40	20 48.8	+58.5	26.5	21 42.4	+58.7	26.7	22 36.0	+58.7	26.9	23 29.5	+58.8	27.1	24 22.8	+59.0	27.3	25 16.1	+59.1	27.5	26 09.3	+59.1	27.7	27 02.4	+59.2	27.9	40
41	21 47.3	+58.5	26.3	22 41.1	+58.6	26.5	23 34.7	+58.8	26.6	24 28.3	+58.9	26.8	25 21.8	+58.9	27.1	26 15.2	+59.0	27.3	27 08.4	+59.2	27.5	28 01.6	+59.2	27.8	41
42	22 45.8	+58.5	26.0	23 39.7	+58.6	26.2	24 33.5	+58.7	26.4	25 27.2	+58.8	26.6	26 20.7	+59.0	26.9	27 14.2	+59.0	27.1	28 07.6	+59.1	27.3	29 00.8	+59.2	27.6	42
43	23 44.3	+58.5	25.8	24 38.3	+58.6	26.0	25 32.2	+58.7	26.2	26 26.0	+58.8	26.4	27 19.7	+58.9	26.6	28 13.2	+59.0	26.9	29 06.7	+59.1	27.1	30 00.0	+59.2	27.4	43
44	24 42.8	+58.5	25.5	25 36.9	+58.6	25.8	26 30.9	+58.7	26.0	27 24.8	+58.8	26.2	28 18.6	+58.8	26.4	29 12.2	+59.0	26.7	30 05.8	+59.1	26.9	30 59.2	+59.2	27.2	44
45	25 41.3	+58.4	25.3	26 35.5	+58.5	25.5	27 29.6	+58.6	25.7	28 23.6	+58.7	26.0	29 17.4	+58.9	26.2	30 11.2	+59.0	26.5	31 04.9	+59.0	26.7	31 58.4	+59.2	27.0	45
46	26 39.7	+58.4	25.0	27 34.0	+58.5	25.3	28 28.2	+58.6	25.5	29 22.3	+58.7	25.7	30 16.3	+58.8	26.0	31 10.2	+58.9	26.2	32 03.9	+59.1	26.5	32 57.6	+59.1	26.8	46
47	27 38.1	+58.4	24.8	28 32.5	+58.5	25.0	29 26.8	+58.6	25.2	30 21.0	+58.8	25.5	31 15.1	+58.9	25.8	32 09.1	+58.9	26.0	33 03.0	+59.0	26.3	33 56.7	+59.1	26.6	47
48	28 36.5	+58.3	24.5	29 31.0	+58.5	24.8	30 25.4	+58.6	25.0	31 19.8	+58.6	25.3	32 14.0	+58.7	25.5	33 08.0	+58.9	25.8	34 02.0	+59.0	26.1	34 55.8	+59.1	26.4	48
49	29 34.8	+58.3	24.3	30 29.5	+58.4	24.5	31 24.0	+58.5	24.7	32 18.4	+58.7	25.0	33 12.7	+58.8	25.3	34 06.9	+58.9	25.6	35 01.0	+59.0	25.9	35 54.9	+59.1	26.2	49
50	30 33.1	+58.3	24.0	31 27.9	+58.4	24.2	32 22.5	+58.5	24.5	33 17.1	+58.6	24.8	34 11.5	+58.7	25.0	35 05.8	+58.8	25.3	36 00.0	+58.9	25.6	36 54.0	+59.0	26.0	50
51	31 31.4	+58.2	23.7	32 26.3	+58.3	24.0	33 21.0	+58.5	24.2	34 15.7	+58.6	24.5	35 10.2	+58.7	24.8	36 04.6	+58.8	25.1	36 58.9	+58.9	25.4	37 53.0	+59.1	25.7	51
52	32 29.6	+58.2	23.4	33 24.6	+58.3	23.7	34 19.5	+58.5	24.0	35 14.3	+58.5	24.2	36 08.9	+58.7	24.5	37 03.4	+58.8	24.8	37 57.8	+58.9	25.2	38 52.1	+58.9	25.5	52
53	33 27.8	+58.2	23.1	34 22.9	+58.3	23.4	35 18.0	+58.3	23.7	36 12.8	+58.6	24.0	37 07.6	+58.6	24.3	38 02.2	+58.8	24.6	38 56.7	+58.9	24.9	39 51.0	+59.0	25.3	53
54	34 26.0	+58.1	22.8	35 21.2	+58.3	23.1	36 16.3	+58.4	23.4	37 11.4	+58.4	23.7	38 06.2	+58.6	24.0	39 01.0	+58.7	24.3	39 55.6	+58.8	24.7	40 50.0	+58.9	25.0	54
55	35 24.1	+58.1	22.5	36 19.5	+58.1	22.8	37 14.7	+58.3	23.1	38 09.8	+58.5	23.4	39 04.8	+58.6	23.7	39 59.7	+58.6	24.1	40 54.4	+58.8	24.4	41 48.9	+58.9	24.8	55
56	36 22.2	+58.0	22.2	37 17.6	+58.2	22.5	38 13.0	+58.3	22.8	39 08.3	+58.3	23.1	40 03.4	+58.5	23.4	40 58.3	+58.7	23.8	41 53.2	+58.7	24.1	42 47.8	+58.9	24.5	56
57	37 20.2	+57.9	21.9	38 15.8	+58.1	22.2	39 11.3	+58.2	22.5	40 06.6	+58.4	22.8	41 01.9	+58.4	23.2	41 57.0	+58.6	23.5	42 51.9	+58.7	23.9	43 46.7	+58.8	24.3	57
58	38 18.1	+57.9	21.6	39 13.9	+58.0	21.9	40 09.5	+58.2	22.2	41 05.0	+58.3	22.5	42 00.3	+58.5	22.9	42 55.6	+58.5	23.2	43 50.6	+58.7	23.6	44 45.5	+58.8	24.0	58
59	39 16.0	+57.9	21.2	40 11.9	+58.0	21.5	41 07.7	+58.1	21.9	42 03.3	+58.2	22.2	42 58.8	+58.3	22.5	43 54.1	+58.5	22.9	44 49.3	+58.6	23.3	45 44.3	+58.8	23.7	59
60	40 13.9	+57.8	20.9	41 09.9	+57.9	21.2	42 05.8	+58.0	21.5	43 01.5	+58.2	21.9	43 57.1	+58.3	22.2	44 52.6	+58.4	22.6	45 47.9	+58.6	23.0	46 43.1	+58.7	23.4	60
61	41 11.7	+57.7	20.5	42 07.8	+57.9	20.9	43 03.8	+58.0	21.2	43 59.7	+58.1	21.5	44 55.4	+58.3	21.9	45 51.0	+58.4	22.3	46 46.5	+58.5	22.7	47 41.8	+58.6	23.1	61
62	42 09.4	+57.6	20.2	43 05.7	+57.7	20.5	44 01.8	+57.9	20.8	44 57.8	+58.1	21.2	45 53.7	+58.2	21.6	46 49.4	+58.3	21.9	47 45.0	+58.4	22.4	48 40.4	+58.6	22.8	62
63	43 07.0	+57.6	19.8	44 03.4	+57.7	20.1	44 59.7	+57.9	20.5	45 55.9	+57.9	20.8	46 51.9	+58.1	21.2	47 47.7	+58.3	21.6	48 43.4	+58.4	22.0	49 39.0	+58.5	22.5	63
64	44 04.6	+57.5	19.4	45 01.1	+57.7	19.7	45 57.6	+57.7	20.1	46 53.8	+58.0	20.5	47 50.0	+58.0	20.8	48 46.0	+58.2	21.2	49 41.8	+58.4	21.7	50 37.5	+58.5	22.1	64
65	45 02.1	+57.4	19.0	45 58.8	+57.5	19.3	46 55.3	+57.7	19.7	47 51.8	+57.8	20.1	48 48.0	+58.0	20.5	49 44.2	+58.1	20.9	50 40.2	+58.2	21.3	51 36.0	+58.4	21.8	65
66	45 59.5	+57.3	18.6	46 56.3	+57.5	18.9	47 53.0	+57.6	19.3	48 49.6	+57.7	19.7	49 46.0	+57.9	20.1	50 42.3	+58.0	20.5	51 38.4	+58.2	20.9	52 34.4	+58.3	21.4	66
67	46 56.8	+57.2	18.2	47 53.8	+57.3	18.5	48 50.6	+57.5	18.9	49 47.3	+57.7	19.2	50 43.9	+57.8	19.6	51 40.3	+58.0	20.1	52 36.6	+58.1	20.5	53 32.7	+58.3	21.0	67
68	47 54.0	+57.1	17.7	48 51.1	+57.3	18.1	49 48.1	+57.4	18.4	50 45.0	+57.5	18.8	51 41.7	+57.7	19.2	52 38.3	+57.8	19.6	53 34.7	+58.0	20.1	54 31.0	+58.1	20.6	68
69	48 51.1	+57.0	17.3	49 48.4	+57.1	17.6	50 45.5	+57.3	18.0	51 42.5	+57.4	18.4	52 39.4	+57.6	18.8	53 36.1	+57.8	19.2	54 32.7	+57.9	19.7	55 29.1	+58.1	20.1	69
70	49 48.1	+56.9	16.8	50 45.5	+57.0	17.1	51 42.8	+57.1	17.5	52 39.9	+57.4	17.9	53 37.0	+57.4	18.3	54 33.9	+57.6	18.7	55 30.6	+57.8	19.2	56 27.2	+57.9	19.7	70
71	50 45.0	+56.7	16.3	51 42.5	+56.9	16.6	52 39.9	+57.1	17.0	53 37.3	+57.1	17.4	54 34.4	+57.4	17.8	55 31.5	+57.5	18.3	56 28.4	+57.7	18.7	57 25.1	+57.9	19.2	71
72	51 41.7	+56.6	15.8	52 39.4	+56.7	16.1	53 37.0	+56.9	16.5	54 34.4	+57.1	16.9	55 31.8	+57.2	17.3	56 29.0	+57.4	17.7	57 26.1	+57.5	18.2	58 23.0	+57.7	18.7	72
73	52 38.3	+56.4	15.2	53 36.1	+56.6	15.6	54 33.9	+56.7	15.9	55 31.5	+56.9	16.3	56 29.0	+57.1	16.8	57 26.4	+57.2	17.2	58 23.6	+57.5	17.7	59 20.7	+57.6	18.2	73
74	53 34.7	+56.3	14.6	54 32.7	+56.4	15.0	55 30.6	+56.6	15.4	56 28.4	+56.7	15.8	57 26.1	+56.9	16.2	58 23.6	+57.1	16.6	59 21.1	+57.2	17.1	60 18.3	+57.5	17.6	74
75	54 31.0	+56.0	14.1	55 29.1	+56.3	14.4	56 27.2	+56.4	14.8	57 25.1	+56.6	15.2	58 23.0	+56.7	15.6	59 20.7	+56.9	16.0	60 18.3	+57.1	16.5	61 15.8	+57.2	17.0	75
76	55 27.0	+55.9	13.4	56 25.4	+56.0	13.8	57 23.6	+56.2	14.2	58 21.7	+56.4	14.5	59 19.7	+56.6	15.0	60 17.6	+56.8	15.4	61 15.4	+56.9	15.9	62 13.0	+57.1	16.4	76
77	56 22.9	+55.7	12.8	57 21.4	+55.8	13.1	58 19.8	+56.0	13.5	59 18.1	+56.1	13.9	60 16.3	+56.3	14.3	61 14.4	+56.5	14.8	62 12.3	+56.7	15.2	63 10.1	+56.9	15.7	77
78	57 18.6	+55.4	12.1	58 17.2	+55.6	12.4	59 15.8	+55.7	12.8	60 14.2	+56.0	13.2	61 12.6	+56.1	13.6	62 10.9	+56.2	14.0	63 09.0	+56.5	14.5	64 07.0	+56.7	15.0	78
79	58 14.0	+55.2	11.4	59 12.8	+55.3	11.7	60 11.5	+55.5	12.1	61 10.2	+55.6	12.4	62 08.7	+55.8	12.9	63 07.1	+56.1	13.3	64 05.5	+56.2	13.8	65 03.7	+56.4	14.3	79
80	59 09.2	+54.9	10.6	60 08.1	+55.1	10.9	61 07.0	+55.2	11.3	62 05.8	+55.4	11.7	63 04.5	+55.6	12.1	64 03.2	+55.7	12.5	65 01.7	+55.9	12.9	66 00.1	+56.1	13.4	80
81	60 04.1	+54.6	9.8	61 03.2	+54.7	10.1	62 02.2	+54.9	10.5	63 01.2	+55.1	10.8	64 00.1	+55.2	11.2	64 58.9	+55.4	11.6	65 57.6	+55.6	12.1	66 56.2	+55.9	12.6	81
82	60 58.7	+54.3	9.0	61 57.9	+54.4	9.3	62 57.1	+54.6	9.6	63 56.3	+54.7	9.9	64 55.3	+54.9	10.3	65 54.3	+55.1	10.7	66 53.2	+55.3	11.1	67 52.1	+55.4	11.6	82
83	61 53.0	+53.9	8.1	62 52.3	+54.1	8.4	63 51.7	+54.2	8.7	64 51.0	+54.3	9.0	65 50.2	+54.5	9.3	66 49.4	+54.6	9.7	67 48.5	+54.8	10.1	68 47.5	+55.1	10.6	83
84	62 46.9	+53.5	7.1	63 46.4	+53.6	7.4	64 45.9	+53.7	7.7	65 45.3	+53.9	8.0	66 44.7	+54.0	8.3	67 44.0	+54.3	8.6	68 43.3	+54.4	9.0	69 42.6	+54.5	9.4	84
85	63 40.4	+53.0	6.1	64 40.0	+53.1	6.4	65 39.6	+53.3	6.6	66 39.2	+53.4	6.9	67 38.7	+53.6	7.2	68 38.3	+53.7	7.5	69 37.7	+53.9	7.8	70 37.1	+54.1	8.2	85
86	64 33.4	+52.5	5.1	65 33.1	+52.7	5.3	66 32.9	+52.7	5.5	67 32.6	+52.9	5.7	68 32.3	+53.0	6.0	69 32.0	+53.1	6.2	70 31.6	+53.2	6.5	71 31.2	+53.4	6.9	86
87	65 25.9	+52.0	3.9	66 25.8	+52.1	4.1	67 25.6	+52.2	4.3	68 25.5	+52.2	4.4	69 25.3	+52.3	4.7	70 25.1	+52.4	4.9	71 24.8	+52.6	5.1	72 24.6	+52.7	5.4	87
88	66 17.9	+51.4	2.7	67 17.9	+51.4	2.8	68 17.8	+51.5	2.9	69 17.7	+51.5	3.1	70 17.6	+51.6	3.2	71 17.5	+51.7	3.4	72 17.4	+51.8	3.6	73 17.3	+51.8	3.8	88
89	67 09.3	+50.7	1.4	68 09.3	+50.7	1.5	69 09.3	+50.7	1.5	70 09.2	+50.8	1.6	71 09.2	+50.8	1.7	72 09.2	+50.8	1.8	73 09.2	+50.8	1.9	74 09.1	+50.9	2.0	89
90	68 00.0	+49.9	0.0	69 00.0	+49.9	0.0	70 00.0	+49.9	0.0	71 00.0	+49.8	0.0	72 00.0	+49.8	0.0	73 00.0	+49.8	0.0	74 00.0	+49.7	0.0	75 00.0	+49.7	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 147°, 213°

N. Lat. {L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°−Z

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	18 05.6	+58.5	144.0	17 17.0	+58.7	144.2	16 28.3	+58.8	144.3	15 39.5	+58.9	144.5	14 50.6	+59.1	144.7	14 01.6	+59.2	144.8	13 12.6	+59.2	144.9	12 23.4	+59.4	145.1	0
1	19 04.1	+58.5	143.7	18 15.7	+58.6	143.9	17 27.1	+58.8	144.1	16 38.4	+58.9	144.3	15 49.7	+59.0	144.5	15 00.8	+59.1	144.6	14 11.8	+59.2	144.8	13 22.8	+59.3	144.9	1
2	20 02.6	+58.5	143.5	19 14.3	+58.6	143.7	18 25.9	+58.7	143.9	17 37.3	+58.9	144.1	16 48.7	+59.0	144.3	15 59.9	+59.1	144.5	15 11.0	+59.3	144.6	14 22.1	+59.3	144.8	2
3	21 01.1	+58.4	143.3	20 12.9	+58.6	143.5	19 24.6	+58.8	143.7	18 36.2	+58.9	143.9	17 47.7	+59.0	144.1	16 59.0	+59.1	144.3	16 10.3	+59.2	144.4	15 21.4	+59.3	144.6	3
4	21 59.5	+58.5	143.0	21 11.5	+58.6	143.3	20 23.4	+58.7	143.5	19 35.1	+58.9	143.7	18 46.7	+59.0	143.9	17 58.1	+59.2	144.1	17 09.5	+59.2	144.3	16 20.7	+59.3	144.5	4
5	22 58.0	+58.4	142.8	22 10.1	+58.6	143.0	21 22.1	+58.7	143.3	20 34.0	+58.8	143.5	19 45.7	+58.9	143.7	18 57.3	+59.0	143.9	18 08.7	+59.2	144.1	17 20.0	+59.3	144.3	5
6	23 56.4	+58.4	142.5	23 08.7	+58.5	142.8	22 20.8	+58.7	143.0	21 32.8	+58.8	143.3	20 44.6	+59.0	143.5	19 56.3	+59.1	143.7	19 07.9	+59.2	143.9	18 19.3	+59.3	144.1	6
7	24 54.8	+58.4	142.3	24 07.2	+58.6	142.5	23 19.5	+58.7	142.8	22 31.6	+58.9	143.1	21 43.6	+59.0	143.3	20 55.4	+59.1	143.5	20 07.1	+59.2	143.8	19 18.6	+59.3	144.0	7
8	25 53.2	+58.3	142.0	25 05.8	+58.5	142.3	24 18.2	+58.7	142.6	23 30.5	+58.8	142.9	22 42.6	+58.9	143.1	21 54.5	+59.0	143.4	21 06.3	+59.1	143.6	20 17.9	+59.3	143.8	8
9	26 51.5	+58.3	141.8	26 04.3	+58.4	142.1	25 16.9	+58.6	142.4	24 29.3	+58.7	142.6	23 41.5	+58.9	142.9	22 53.5	+59.1	143.2	22 05.4	+59.2	143.4	21 17.2	+59.3	143.6	9
10	27 49.8	+58.3	141.5	27 02.7	+58.5	141.8	26 15.5	+58.6	142.1	25 28.0	+58.8	142.4	24 40.4	+58.9	142.7	23 52.6	+59.0	143.0	23 04.6	+59.1	143.2	22 16.5	+59.2	143.5	10
11	28 48.1	+58.2	141.2	28 01.2	+58.4	141.6	27 14.1	+58.6	141.9	26 26.8	+58.7	142.2	25 39.3	+58.9	142.5	24 51.6	+59.0	142.8	24 03.7	+59.2	143.0	23 15.7	+59.3	143.3	11
12	29 46.3	+58.2	140.9	28 59.6	+58.4	141.3	28 12.7	+58.5	141.6	27 25.5	+58.7	142.0	26 38.2	+58.8	142.3	25 50.6	+59.0	142.6	25 02.9	+59.1	142.9	24 15.0	+59.2	143.1	12
13	30 44.5	+58.2	140.7	29 58.0	+58.4	141.0	29 11.2	+58.6	141.4	28 24.2	+58.7	141.7	27 37.0	+58.9	142.1	26 49.6	+59.0	142.4	26 02.0	+59.1	142.7	25 14.2	+59.2	143.0	13
14	31 42.7	+58.1	140.4	30 56.4	+58.3	140.8	30 09.8	+58.5	141.1	29 22.9	+58.7	141.5	28 35.9	+58.8	141.8	27 48.6	+58.9	142.2	27 01.1	+59.1	142.5	26 13.4	+59.2	142.8	14
15	32 40.8	+58.1	140.1	31 54.7	+58.3	140.5	31 08.3	+58.4	140.9	30 21.6	+58.6	141.2	29 34.7	+58.8	141.6	28 47.5	+59.0	142.0	28 00.2	+59.1	142.3	27 12.6	+59.2	142.6	15
16	33 38.9	+58.1	139.8	32 53.0	+58.2	140.2	32 06.7	+58.5	140.6	31 20.2	+58.6	141.0	30 33.5	+58.7	141.4	29 46.5	+58.9	141.7	28 59.3	+59.0	142.1	28 11.8	+59.2	142.4	16
17	34 37.0	+58.0	139.5	33 51.2	+58.2	139.9	33 05.2	+58.4	140.3	32 18.8	+58.6	140.7	31 32.2	+58.8	141.1	30 45.4	+58.9	141.5	29 58.3	+59.0	141.9	29 11.0	+59.2	142.2	17
18	35 35.0	+57.9	139.2	34 49.4	+58.2	139.6	34 03.6	+58.3	140.1	33 17.4	+58.6	140.5	32 31.0	+58.7	140.9	31 44.3	+58.9	141.3	30 57.3	+59.1	141.7	30 10.2	+59.1	142.0	18
19	36 32.9	+57.9	138.8	35 47.6	+58.1	139.3	35 01.9	+58.3	139.8	34 16.0	+58.5	140.2	33 29.7	+58.7	140.7	32 43.2	+58.8	141.1	31 56.4	+58.9	141.5	31 09.3	+59.1	141.8	19
20	37 30.8	+57.9	138.5	36 45.7	+58.1	139.0	36 00.2	+58.3	139.5	35 14.5	+58.4	140.0	34 28.4	+58.6	140.4	33 42.0	+58.8	140.8	32 55.3	+59.0	141.2	32 08.4	+59.1	141.6	20
21	38 28.7	+57.7	138.2	37 43.8	+58.0	138.7	36 58.5	+58.2	139.2	36 12.9	+58.5	139.7	35 27.0	+58.6	140.1	34 40.8	+58.8	140.6	33 54.3	+59.0	141.0	33 07.5	+59.1	141.4	21
22	39 26.4	+57.8	137.8	38 41.8	+57.9	138.4	37 56.7	+58.2	138.9	37 11.4	+58.4	139.4	36 25.6	+58.6	139.9	35 39.6	+58.8	140.3	34 53.3	+58.9	140.8	34 06.6	+59.1	141.2	22
23	40 24.2	+57.6	137.5	39 39.7	+57.9	138.0	38 54.9	+58.2	138.6	38 09.8	+58.3	139.1	37 24.2	+58.6	139.6	36 38.4	+58.7	140.1	35 52.2	+58.9	140.6	35 05.7	+59.0	141.0	23
24	41 21.8	+57.6	137.1	40 37.6	+57.9	137.7	39 53.1	+58.0	138.3	39 08.1	+58.3	138.8	38 22.8	+58.5	139.3	37 37.1	+58.7	139.8	36 51.1	+58.8	140.3	36 04.7	+59.0	140.8	24
25	42 19.4	+57.5	136.7	41 35.5	+57.7	137.3	40 51.1	+58.1	137.9	40 06.4	+58.3	138.5	39 21.3	+58.4	139.0	38 35.8	+58.6	139.6	37 49.9	+58.9	140.1	37 03.7	+59.0	140.6	25
26	43 16.9	+57.4	136.3	42 33.2	+57.8	137.0	41 49.2	+57.9	137.6	41 04.7	+58.1	138.2	40 19.7	+58.5	138.8	39 34.4	+58.6	139.3	38 48.8	+58.8	139.8	38 02.7	+59.0	140.3	26
27	44 14.3	+57.3	135.9	43 31.0	+57.6	136.6	42 47.1	+57.9	137.2	42 02.8	+58.2	137.9	41 18.2	+58.3	138.5	40 33.0	+58.6	139.0	39 47.6	+58.7	139.6	39 01.7	+58.9	140.1	27
28	45 11.6	+57.3	135.5	44 28.6	+57.5	136.2	43 45.0	+57.8	136.9	43 01.0	+58.1	137.5	42 16.5	+58.3	138.1	41 31.6	+58.5	138.7	40 46.3	+58.7	139.3	40 00.6	+58.9	139.9	28
29	46 08.9	+57.1	135.1	45 26.1	+57.5	135.8	44 42.8	+57.8	136.5	43 59.1	+58.0	137.2	43 14.8	+58.3	137.8	42 30.1	+58.5	138.4	41 45.0	+58.7	139.0	40 59.5	+58.9	139.6	29
30	47 06.0	+57.1	134.6	46 23.6	+57.3	135.4	45 40.6	+57.7	136.1	44 57.1	+57.9	136.8	44 13.1	+58.2	137.5	43 28.6	+58.5	138.1	42 43.7	+58.7	138.8	41 58.4	+58.8	139.4	30
31	48 03.1	+56.9	134.2	47 20.9	+57.3	135.0	46 38.3	+57.5	135.7	45 55.0	+57.9	136.5	45 11.3	+58.1	137.1	44 27.1	+58.3	137.8	43 42.4	+58.6	138.5	42 57.2	+58.8	139.1	31
32	49 00.0	+56.8	133.7	48 18.2	+57.2	134.5	47 35.8	+57.5	135.3	46 52.9	+57.8	136.1	46 09.4	+58.1	136.8	45 25.4	+58.4	137.5	44 41.0	+58.5	138.2	43 56.0	+58.8	138.8	32
33	49 56.8	+56.6	133.2	49 15.4	+57.0	134.1	48 33.3	+57.4	134.9	47 50.7	+57.7	135.7	47 07.5	+58.0	136.4	46 23.8	+58.2	137.2	45 39.5	+58.5	137.9	44 54.8	+58.7	138.5	33
34	50 53.4	+56.6	132.7	50 12.4	+56.9	133.6	49 30.7	+57.3	134.4	48 48.4	+57.6	135.3	48 05.5	+57.9	136.0	47 22.0	+58.2	136.8	46 38.0	+58.5	137.5	45 53.5	+58.7	138.2	34
35	51 50.0	+56.3	132.2	51 09.3	+56.8	133.1	50 28.0	+57.2	134.0	49 46.0	+57.5	134.8	49 03.4	+57.8	135.7	48 20.2	+58.1	136.4	47 36.5	+58.3	137.2	46 52.2	+58.6	137.9	35
36	52 46.3	+56.2	131.6	52 06.1	+56.7	132.6	51 25.2	+57.0	133.5	50 43.5	+57.4	134.4	50 01.2	+57.8	135.2	49 18.3	+58.1	136.1	48 34.8	+58.4	136.9	47 50.8	+58.5	137.6	36
37	53 42.5	+56.1	131.0	53 02.8	+56.4	132.0	52 22.2	+56.9	133.0	51 40.9	+57.3	133.9	50 59.0	+57.6	134.8	50 16.4	+57.9	135.7	49 33.2	+58.2	136.5	48 49.3	+58.5	137.3	37
38	54 38.6	+55.8	130.4	53 59.2	+56.4	131.5	53 19.1	+56.8	132.5	52 38.2	+57.2	133.4	51 56.6	+57.6	134.4	51 14.3	+57.9	135.3	50 31.4	+58.2	136.1	49 47.8	+58.5	136.9	38
39	55 34.4	+55.6	129.8	54 55.6	+56.1	130.9	54 15.9	+56.6	131.9	53 35.4	+57.1	132.9	52 54.2	+57.4	133.9	52 12.2	+57.8	134.8	51 29.6	+58.1	135.7	50 46.3	+58.4	136.6	39
40	56 30.0	+55.4	129.1	55 51.7	+55.9	130.2	55 12.5	+56.4	131.3	54 32.5	+56.8	132.4	53 51.6	+57.3	133.4	53 10.0	+57.7	134.4	52 27.7	+58.0	135.3	51 44.7	+58.3	136.2	40
41	57 25.4	+55.1	128.4	56 47.6	+55.8	129.6	56 08.9	+56.3	130.7	55 29.3	+56.8	131.9	54 48.9	+57.2	132.9	54 07.7	+57.5	133.9	53 25.7	+57.9	134.9	52 43.0	+58.2	135.8	41
42	58 20.5	+54.9	127.6	57 43.4	+55.5	128.9	57 05.2	+56.1	130.1	56 26.1	+56.5	131.3	55 46.1	+57.0	132.4	55 05.2	+57.5	133.4	54 23.6	+57.8	134.5	53 41.2	+58.1	135.4	42
43	59 15.4	+54.6	126.9	58 38.9	+55.2	128.2	58 01.3	+55.8	129.4	57 22.6	+56.4	130.7	56 43.1	+56.9	131.8	56 02.7	+57.3	132.9	55 21.4	+57.7	134.0	54 39.3	+58.1	135.0	43
44	60 10.0	+54.3	126.0	59 34.1	+55.0	127.4	58 57.1	+55.6	128.7	58 19.0	+56.2	130.0	57 40.0	+56.7	131.2	57 00.0	+57.1	132.4	56 19.1	+57.5	133.5	55 37.4	+57.9	134.6	44
45	61 04.3	+53.9	125.2	60 29.1	+54.6	126.6	59 52.7	+55.3	128.0	59 15.2	+56.0	129.3	58 36.7	+56.5	130.6	57 57.1	+57.0	131.8	57 16.6	+57.5	133.0	56 35.3	+57.8	134.1	45
46	61 58.2	+53.5	124.3	61 23.7	+54.3	125.8	60 48.0	+55.1	127.2	60 11.2	+55.7	128.6	59 33.2	+56.3	130.0	58 54.1	+56.8	131.2	58 14.1	+57.3	132.4	57 33.1	+57.8	133.6	46
47	62 51.7	+53.0	123.3	62 18.0	+54.0	124.9	61 43.1	+54.7	126.4	61 06.9	+55.4	127.9	60 29.5	+56.0	129.3	59 50.9	+56.7	130.6	59 11.4	+57.1	131.9	58 30.9	+57.5	133.1	47
48	63 44.7	+52.6	122.2	63 12.0	+53.5	123.9	62 37.8	+54.4	125.5	62 02.3	+55.1	127.1	61 25.5	+55.8	128.5	60 47.6	+56.4	129.9	60 08.5	+57.0	131.3	59 28.4	+57.5	132.6	48
49	64 37.3	+52.1	121.1	64 05.5	+53.1	122.9	63 32.2	+54.0	124.6	62 57.4	+54.8	126.2	62 21.3	+55.6	127.8	61 44.0	+56.2	129.2	61 05.5	+56.8	130.6	60 25.9	+57.3	132.0	49
50	65 29.4	+51.5	120.0	64 58.6	+52.6	121.8	64 26.2	+53.5	123.6	63 52.2	+54.5	125.3	63 16.9	+55.2	126.9	62 40.2	+55.9	128.5	62 02.3	+56.5	130.0	61 23.2	+57.1	131.4	50
51	66 20.9	+50.8	118.7	65 51.2	+52.0	120.7	65 19.7	+53.1	122.5	64 46.7	+54.0	124.3	64 12.1	+54.9	126.0	63 36.1	+55.7	127.7	62 58.8	+56.3	129.2	62 20.3	+56.9	130.7	51
52	67 11.7	+50.1	117.3	66 43.2	+51.4	119.4	66 12.8	+52.6	121.4	65 40.7	+53.6	123.3	65 07.0	+54.5	125.1	64 31.8	+55.3	126.8	63 55.1	+56.1	128.5	63 17.2	+56.7	130.0	52
53	68 01.8	+49.3	115.9	67 34.6	+50.7	118.1	67 05.4	+51.9	120.2	66 34.3	+53.1	122.2	66 01.5	+54.1	124.1	65 27.1	+55.0	125.9	64 51.2	+55.7	127.6	64 13.9	+56.4	129.3	53
54	68 51.1	+48.4	114.3	68 25.3	+49.9	116.7	67 57.3	+51.3	118.9	67 27.4	+52.5	121.0	66 55.6	+53.6	123.0	66 22.1	+54.6	124.9	65 46.9	+55.5	126.7	65 10.3	+56.2	128.5	54
55	69 39.5	+47.3	112.7	69 15.2	+49.0	115.1	68 48.6	+50.5	117.5	68 19.9	+51.9	119.7	67 49.2	+53.1	121.8	67 16.7	+54.1	123.9	66 42.4	+55.0	125.8	66 06.5	+55.9	127.6	55
56	70 26.8	+46.2	110.9	70 04.2	+48.0	113.5	69 39.1	+49.7	115.9	69 11.8	+51.1	118.3	68 42.3	+52.4	120.6	68 10.8	+53.6	122.7	67 37.4	+54.7	124.8	67 02.4	+55.5	126.7	56
57	71 13.0	+44.9	108.9	70 52.2	+46.9	111.7	70 28.8	+48.7	114.3	70 02.9	+50.3	116.8	69 34.7	+51.8	119.2	69 04.4	+53.0	121.5	68 32.1	+54.2	123.7	67 57.9	+55.2	125.7	57
58	71 57.9	+43.4	106.8	71 39.1	+45.6	109.7	71 17.5	+47.6	112.5	70 53.2	+49.4	115.2	70 26.5	+51.0	117.7	69 57.4	+52.4	120.2	69 26.3	+53.6	122.5	68 53.1	+54.7	124.7	58
59	72 41.3	+41.8	104.6	72 24.7	+44.2	107.6	72 05.1	+46.3	110.6	71 42.6	+48.3	113.4	71 17.5	+50.0	116.1	70 49.8	+51.7	118.7	70 19.9	+53.0	121.2	69 47.8	+54.2	123.5	59
60	73 23.1	+39.8	•102.1	73 08.9	+42.4	105.3	72 51.4	+44.9	108.5	72 30.9	+47.1	111.5	72 07.5	+49.1	114.4	71 41.5	+50.8	117.1	71 12.9	+52.3	119.7	70 42.0	+53.6	122.2	60
61	74 02.9	+37.8	• 99.4	73 51.3	+40.7	•102.8	73 36.3	+43.3	106.2	73 18.0	+45.7	109.4	72 56.6	+47.9	112.4	72 32.3	+49.8	115.4	72 05.2	+51.5	118.2	71 35.6	+53.0	120.8	61
62	74 40.7	+35.3	• 96.5	74 32.0	+38.4	•100.1	74 19.6	+41.4	•103.6	74 03.7	+44.1	107.1	73 44.5	+46.4	110.3	73 22.1	+48.6	113.5	72 56.7	+50.6	116.5	72 28.6	+52.2	119.3	62
63	75 16.0	+32.6	• 93.4	75 10.4	+36.1	• 97.2	75 01.0	+39.2	•100.9	74 47.8	+42.2	•104.5	74 30.9	+44.9	108.0	74 10.7	+47.3	111.4	73 47.3	+49.4	114.6	73 20.8	+51.4	117.6	63
64	75 48.6	+29.6	• 90.1	75 46.5	+33.3	• 94.0	75 40.2	+36.8	• 97.9	75 30.0	+40.1	•101.8	75 15.8	+43.1	•105.5	74 58.0	+45.8	109.1	74 36.7	+48.2	112.5	74 12.2	+50.2	115.8	64
65	76 18.2	+26.2	• 86.5	76 19.8	+30.2	• 90.6	76 17.0	+34.0	• 94.7	76 10.1	+37.6	• 98.7	75 58.9	+40.9	•102.7	75 43.8	+43.9	106.5	75 24.9	+46.6	110.2	75 02.4	+49.0	113.7	65
66	76 44.4	+22.6	• 82.6	76 50.0	+26.7	• 86.8	76 51.0	+30.9	• 91.1	76 47.7	+34.7	• 95.4	76 39.8	+38.5	• 99.6	76 27.7	+41.9	•103.7	76 11.5	+44.9	107.6	75 51.4	+47.6	111.4	66
67	77 07.0	+18.5	• 78.5	77 16.7	+22.9	• 82.8	77 21.9	+27.3	• 87.3	77 22.4	+31.5	• 91.7	77 18.3	+35.5	• 96.2	77 09.6	+39.3	•100.5	76 56.4	+42.8	•104.8	76 39.0	+45.8	108.9	67
68	77 25.5	+14.1	• 74.2	77 39.6	+18.7	• 78.6	77 49.2	+23.2	• 83.1	77 53.9	+27.9	• 87.8	77 53.8	+32.3	• 92.4	77 48.9	+36.4	• 97.1	77 39.2	+40.2	•101.6	77 24.8	+43.8	•106.0	68
69	77 39.6	+9.6	• 69.7	77 58.3	+14.1	• 74.1	78 12.4	+18.9	• 78.7	78 21.8	+23.7	• 83.4	78 26.1	+28.4	• 88.3	78 25.3	+33.0	• 93.2	78 19.4	+37.4	• 98.0	78 08.6	+41.3	•102.8	69
70	77 49.2	+4.7	• 65.0	78 12.4	+9.4	• 69.4	78 31.3	+14.2	• 74.0	78 45.5	+19.1	• 78.8	78 54.5	+24.1	• 83.8	78 58.3	+29.1	• 88.9	78 56.8	+33.8	• 94.1	78 49.9	+38.3	• 99.1	70
71	77 53.9	−0.1	• 60.3	78 21.8	+4.3	• 64.5	78 45.5	+9.0	• 69.0	79 04.6	+14.0	• 73.9	79 18.6	+19.4	• 79.0	79 27.4	+24.6	• 84.3	79 30.6	+29.8	• 89.6	79 28.2	+34.7	• 95.0	71
72	77 53.8	−4.9	• 55.5	78 26.1	−0.8	• 59.5	78 54.5	+3.8	• 63.9	79 18.6	+8.8	• 68.7	79 38.0	+14.0	• 73.8	79 52.0	+19.6	• 79.2	80 00.4	+25.1	• 84.7	80 02.9	+30.6	• 90.4	72
73	77 48.9	−9.7	• 50.8	78 25.3	−5.9	• 54.5	78 58.3	−1.5	• 58.7	79 27.4	+3.2	• 63.3	79 52.0	+8.4	• 68.3	80 11.6	+13.9	• 73.7	80 25.5	+19.8	• 79.4	80 33.5	+25.7	• 85.3	73
74	77 39.2	−14.4	• 46.1	78 19.4	−10.8	• 49.6	78 56.8	−6.9	• 53.5	79 30.6	−2.4	• 57.8	80 00.4	+2.5	• 62.7	80 25.5	+8.0	• 67.9	80 45.3	+13.9	• 73.6	80 59.2	+20.0	• 79.7	74
75	77 24.8	−18.6	• 41.6	78 08.6	−15.6	• 44.8	78 49.9	−12.1	• 48.3	79 28.2	−8.0	• 52.4	80 02.9	−3.4	• 56.9	80 33.5	+1.8	• 61.9	80 59.2	+7.5	• 67.5	81 19.2	+13.8	• 73.5	75
76	77 06.2	−22.7	• 37.3	77 53.0	−20.0	• 40.1	78 37.8	−16.9	• 43.3	79 20.2	−13.4	• 47.0	79 59.5	−9.3	• 51.1	80 35.3	−4.6	• 55.8	81 06.7	+0.8	• 61.1	81 33.0	+6.9	• 67.0	76
77	76 43.5	−26.3	• 33.2	77 33.0	−24.1	• 35.7	78 20.9	−21.5	• 38.5	79 06.8	−18.5	• 41.8	79 50.2	−14.8	• 45.5	80 30.7	−10.7	• 49.7	81 07.5	−5.8	• 54.6	81 39.9	−0.2	• 60.2	77
78	76 17.2	−29.7	• 29.4	77 08.9	−27.8	• 31.5	77 59.4	−25.7	• 34.0	78 48.3	−23.1	• 36.8	79 35.4	−20.1	• 40.0	80 20.0	−16.5	• 43.8	81 01.7	−12.3	• 48.2	81 39.7	−7.2	• 53.3	78
79	75 47.5	−32.8	• 25.8	76 41.1	−31.2	• 27.6	77 33.7	−29.3	• 29.7	78 25.2	−27.3	• 32.1	79 15.3	−24.8	• 34.9	80 03.5	−21.9	• 38.2	80 49.4	−18.3	• 42.0	81 32.5	−14.1	• 46.5	79
80	75 14.7	−35.4	• 22.4	76 09.9	−34.2	• 24.0	77 04.4	−32.8	• 25.7	77 57.9	−31.0	• 27.8	78 50.5	−29.1	• 30.1	79 41.6	−26.6	• 32.9	80 31.1	−23.8	• 36.1	81 18.4	−20.3	• 40.0	80
81	74 39.3	−37.8	• 19.3	75 35.7	−36.8	• 20.6	76 31.6	−35.7	• 22.1	77 26.9	−34.3	• 23.7	78 21.4	−32.8	• 25.7	79 15.0	−30.9	• 28.0	80 07.3	−28.7	• 30.7	80 58.1	−26.0	• 33.9	81
82	74 01.5	−39.9	• 16.4	74 58.9	−39.2	• 17.5	75 55.9	−38.2	• 18.7	76 52.6	−37.3	• 20.0	77 48.6	−36.0	• 21.6	78 44.1	−34.6	• 23.5	79 38.6	−32.8	• 25.7	80 32.1	−30.8	• 28.2	82
83	73 21.6	−41.8	13.8	74 19.7	−41.2	14.6	75 17.7	−40.6	• 15.6	76 15.3	−39.7	• 16.7	77 12.6	−38.8	• 17.9	78 09.5	−37.8	• 19.4	79 05.8	−36.5	• 21.1	80 01.3	−34.9	• 23.2	83
84	72 39.8	−43.5	11.3	73 38.5	−43.0	12.0	74 37.1	−42.5	12.7	75 35.6	−42.0	• 13.6	76 33.8	−41.3	• 14.6	77 31.7	−40.5	• 15.7	78 29.3	−39.6	• 17.0	79 26.4	−38.5	• 18.6	84
85	71 56.3	−44.9	9.0	72 55.5	−44.6	9.6	73 54.6	−44.2	10.1	74 53.6	−43.8	10.8	75 52.5	−43.4	11.5	76 51.2	−42.8	• 12.4	77 49.7	−42.2	• 13.4	78 47.9	−41.4	• 14.5	85
86	71 11.4	−46.3	6.9	72 10.9	−46.0	7.3	73 10.4	−45.8	7.7	74 09.8	−45.5	8.2	75 09.1	−45.1	8.8	76 08.4	−44.8	9.4	77 07.5	−44.3	• 10.1	78 06.5	−43.8	• 10.9	86
87	70 25.1	−47.4	5.0	71 24.9	−47.3	5.3	72 24.6	−47.1	5.6	73 24.3	−46.9	5.9	74 24.0	−46.7	6.2	75 23.6	−46.5	6.7	76 23.2	−46.3	7.1	77 22.7	−46.0	7.7	87
88	69 37.7	−48.4	3.2	70 37.6	−48.3	3.4	71 37.5	−48.2	3.5	72 37.4	−48.2	3.7	73 37.3	−48.1	4.0	74 37.1	−47.9	4.2	75 36.9	−47.8	4.5	76 36.7	−47.6	4.8	88
89	68 49.3	−49.3	1.5	69 49.3	−49.3	1.6	70 49.3	−49.3	1.7	71 49.2	−49.2	1.8	72 49.2	−49.2	1.9	73 49.2	−49.2	2.0	74 49.1	−49.1	2.1	75 49.1	−49.1	2.3	89
90	68 00.0	−50.1	0.0	69 00.0	−50.2	0.0	70 00.0	−50.2	0.0	71 00.0	−50.2	0.0	72 00.0	−50.2	0.0	73 00.0	−50.3	0.0	74 00.0	−50.3	0.0	75 00.0	−50.3	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 34°, 326°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	18 05.6	−58.5	144.0	17 17.0	−58.7	144.2	16 28.3	−58.8	144.3	15 39.5	−58.9	144.5	14 50.6	−59.0	144.7	14 01.6	−59.1	144.8	13 12.6	−59.3	144.9	12 23.4	−59.3	145.1	0
1	17 07.1	−58.6	144.2	16 18.3	−58.6	144.4	15 29.5	−58.8	144.5	14 40.6	−58.9	144.7	13 51.6	−59.0	144.8	13 02.5	−59.1	145.0	12 13.3	−59.2	145.1	11 24.1	−59.4	145.2	1
2	16 08.5	−58.6	144.4	15 19.7	−58.7	144.6	14 30.7	−58.8	144.7	13 41.7	−59.0	144.9	12 52.6	−59.1	145.0	12 03.4	−59.2	145.1	11 14.1	−59.3	145.3	10 24.7	−59.3	145.4	2
3	15 09.9	−58.5	144.6	14 21.0	−58.7	144.8	13 31.9	−58.8	144.9	12 42.7	−58.9	145.1	11 53.5	−59.1	145.2	11 04.2	−59.2	145.3	10 14.8	−59.2	145.4	9 25.4	−59.4	145.5	3
4	14 11.4	−58.6	144.9	13 22.3	−58.8	145.0	12 33.1	−58.9	145.1	11 43.8	−59.0	145.3	10 54.4	−59.0	145.4	10 05.0	−59.1	145.5	9 15.6	−59.3	145.6	8 26.0	−59.3	145.7	4
5	13 12.8	−58.6	145.1	12 23.5	−58.7	145.2	11 34.2	−58.8	145.3	10 44.8	−58.9	145.5	9 55.4	−59.1	145.6	9 05.9	−59.2	145.7	8 16.3	−59.3	145.7	7 26.7	−59.4	145.8	5
6	12 14.2	−58.6	145.3	11 24.8	−58.7	145.4	10 35.4	−58.9	145.5	9 45.9	−59.0	145.6	8 56.3	−59.1	145.7	8 06.7	−59.2	145.8	7 17.0	−59.2	145.9	6 27.3	−59.3	146.0	6
7	11 15.6	−58.7	145.5	10 26.1	−58.8	145.6	9 36.5	−58.9	145.7	8 46.9	−59.0	145.8	7 57.2	−59.1	145.9	7 07.5	−59.2	146.0	6 17.8	−59.3	146.1	5 28.0	−59.4	146.1	7
8	10 16.9	−58.6	145.8	9 27.3	−58.7	145.8	8 37.6	−58.8	145.9	7 47.9	−59.0	146.0	6 58.1	−59.0	146.1	6 08.3	−59.2	146.2	5 18.5	−59.3	146.2	4 28.6	−59.4	146.3	8
9	9 18.3	−58.6	146.0	8 28.6	−58.8	146.1	7 38.8	−58.9	146.1	6 48.9	−59.0	146.2	5 59.1	−59.1	146.3	5 09.1	−59.1	146.3	4 19.2	−59.3	146.4	3 29.2	−59.3	146.4	9
10	8 19.7	−58.7	146.2	7 29.8	−58.8	146.3	6 39.9	−58.9	146.3	5 49.9	−58.9	146.4	5 00.0	−59.1	146.4	4 10.0	−59.2	146.5	3 19.9	−59.3	146.5	2 29.9	−59.4	146.5	10
11	7 21.0	−58.6	146.4	6 31.0	−58.7	146.5	5 41.0	−58.9	146.5	4 51.0	−59.0	146.6	4 00.9	−59.1	146.6	3 10.8	−59.2	146.6	2 20.6	−59.2	146.7	1 30.5	−59.4	146.7	11
12	6 22.4	−58.7	146.6	5 32.3	−58.8	146.7	4 42.1	−58.8	146.7	3 52.0	−59.0	146.8	3 01.8	−59.1	146.8	2 11.6	−59.2	146.8	1 21.4	−59.3	146.8	0 31.1	−59.3	146.8	12
13	5 23.7	−58.6	146.8	4 33.5	−58.8	146.9	3 43.3	−58.9	146.9	2 53.0	−59.0	146.9	2 02.7	−59.1	147.0	1 12.4	−59.2	147.0	0 22.1	−59.3	147.0	0 28.2	+59.4	33.0	13
14	4 25.1	−58.7	147.0	3 34.7	−58.7	147.1	2 44.4	−58.9	147.1	1 54.0	−59.0	147.1	1 03.6	−59.1	147.1	0 13.2	−59.2	147.1	0 37.2	+59.3	32.9	1 27.6	+59.4	32.9	14
15	3 26.4	−58.6	147.2	2 36.0	−58.8	147.3	1 45.5	−58.9	147.3	0 55.0	−59.0	147.3	0 04.5	−59.1	147.3	0 46.0	+59.2	32.7	1 36.5	+59.3	32.7	2 27.0	+59.3	32.7	15
16	2 27.8	−58.7	147.5	1 37.2	−58.8	147.5	0 46.6	−58.9	147.5	0 04.0	+59.0	32.5	0 54.6	+59.1	32.5	1 45.2	+59.2	32.5	2 35.8	+59.3	32.6	3 26.3	+59.4	32.6	16
17	1 29.1	−58.7	147.7	0 38.4	−58.8	147.7	0 12.3	+58.9	32.3	1 03.0	+59.0	32.3	1 53.7	+59.1	32.3	2 44.4	+59.2	32.4	3 35.1	+59.2	32.4	4 25.7	+59.4	32.4	17
18	0 30.4	−58.7	147.9	0 20.4	+58.8	32.1	1 11.2	+58.9	32.1	2 02.0	+59.0	32.2	2 52.8	+59.1	32.2	3 43.6	+59.2	32.2	4 34.3	+59.3	32.2	5 25.1	+59.3	32.3	18
19	0 28.3	+58.6	31.9	1 19.2	+58.8	31.9	2 10.1	+58.9	31.9	3 01.0	+59.0	32.0	3 51.9	+59.1	32.0	4 42.8	+59.2	32.0	5 33.6	+59.3	32.1	6 24.4	+59.4	32.1	19
20	1 26.9	+58.7	31.7	2 18.0	+58.7	31.7	3 09.0	+58.9	31.8	4 00.0	+59.0	31.8	4 51.0	+59.1	31.8	5 42.0	+59.1	31.9	6 32.9	+59.3	31.9	7 23.8	+59.3	32.0	20
21	2 25.6	+58.7	31.5	3 16.7	+58.8	31.5	4 07.9	+58.9	31.6	4 59.0	+59.0	31.6	5 50.1	+59.1	31.7	6 41.1	+59.2	31.7	7 32.2	+59.2	31.8	8 23.1	+59.4	31.8	21
22	3 24.3	+58.6	31.3	4 15.5	+58.8	31.3	5 06.8	+58.8	31.4	5 58.0	+59.0	31.4	6 49.2	+59.0	31.5	7 40.3	+59.2	31.5	8 31.4	+59.3	31.6	9 22.5	+59.3	31.7	22
23	4 22.9	+58.7	31.1	5 14.3	+58.8	31.1	6 05.6	+58.9	31.2	6 57.0	+58.9	31.2	7 48.2	+59.1	31.3	8 39.5	+59.2	31.4	9 30.7	+59.3	31.5	10 21.8	+59.4	31.6	23
24	5 21.6	+58.6	30.9	6 13.1	+58.7	30.9	7 04.5	+58.9	31.0	7 55.9	+59.0	31.0	8 47.3	+59.1	31.1	9 38.7	+59.1	31.2	10 30.0	+59.2	31.3	11 21.2	+59.3	31.4	24
25	6 20.2	+58.7	30.7	7 11.8	+58.8	30.7	8 03.4	+58.9	30.8	8 54.9	+59.0	30.9	9 46.4	+59.1	30.9	10 37.8	+59.2	31.0	11 29.2	+59.3	31.1	12 20.5	+59.4	31.3	25
26	7 18.9	+58.6	30.4	8 10.6	+58.7	30.5	9 02.3	+58.8	30.6	9 53.9	+58.9	30.7	10 45.5	+59.0	30.8	11 37.0	+59.1	30.9	12 28.5	+59.2	31.0	13 19.9	+59.3	31.1	26
27	8 17.5	+58.7	30.2	9 09.3	+58.8	30.3	10 01.1	+58.9	30.4	10 52.8	+59.0	30.5	11 44.5	+59.1	30.6	12 36.1	+59.2	30.7	13 27.7	+59.2	30.8	14 19.2	+59.3	30.9	27
28	9 16.2	+58.6	30.0	10 08.1	+58.7	30.1	11 00.0	+58.8	30.2	11 51.8	+59.0	30.3	12 43.6	+59.0	30.4	13 35.3	+59.1	30.5	14 26.9	+59.3	30.7	15 18.5	+59.3	30.8	28
29	10 14.8	+58.6	29.8	11 06.8	+58.8	29.9	11 58.8	+58.9	30.0	12 50.8	+58.9	30.1	13 42.6	+59.1	30.2	14 34.4	+59.2	30.4	15 26.2	+59.2	30.5	16 17.8	+59.4	30.6	29
30	11 13.4	+58.6	29.6	12 05.6	+58.7	29.7	12 57.7	+58.8	29.8	13 49.7	+58.9	29.9	14 41.7	+59.0	30.0	15 33.6	+59.1	30.2	16 25.4	+59.2	30.3	17 17.2	+59.3	30.5	30
31	12 12.0	+58.6	29.4	13 04.3	+58.7	29.5	13 56.5	+58.8	29.6	14 48.6	+58.9	29.7	15 40.7	+59.0	29.9	16 32.7	+59.1	30.0	17 24.6	+59.2	30.2	18 16.5	+59.2	30.3	31
32	13 10.6	+58.6	29.1	14 03.0	+58.7	29.3	14 55.3	+58.8	29.4	15 47.5	+59.0	29.5	16 39.7	+59.0	29.7	17 31.8	+59.1	29.8	18 23.8	+59.2	30.0	19 15.7	+59.3	30.2	32
33	14 09.2	+58.6	28.9	15 01.7	+58.7	29.1	15 54.1	+58.8	29.2	16 46.5	+58.9	29.3	17 38.7	+59.0	29.5	18 30.9	+59.1	29.6	19 23.0	+59.2	29.8	20 15.0	+59.3	30.0	33
34	15 07.8	+58.6	28.7	16 00.4	+58.7	28.8	16 52.9	+58.8	29.0	17 45.4	+58.8	29.1	18 37.7	+59.0	29.3	19 30.0	+59.1	29.5	20 22.2	+59.2	29.6	21 14.3	+59.3	29.8	34
35	16 06.4	+58.5	28.5	16 59.1	+58.6	28.6	17 51.7	+58.8	28.8	18 44.2	+58.9	28.9	19 36.7	+59.0	29.1	20 29.1	+59.1	29.3	21 21.4	+59.2	29.5	22 13.6	+59.2	29.7	35
36	17 04.9	+58.5	28.2	17 57.7	+58.7	28.4	18 50.5	+58.7	28.6	19 43.1	+58.9	28.7	20 35.7	+59.0	28.9	21 28.2	+59.0	29.1	22 20.6	+59.1	29.3	23 12.8	+59.3	29.5	36
37	18 03.4	+58.6	28.0	18 56.4	+58.6	28.2	19 49.2	+58.8	28.3	20 42.0	+58.8	28.5	21 34.7	+58.9	28.7	22 27.2	+59.1	28.9	23 19.7	+59.2	29.1	24 12.1	+59.2	29.3	37
38	19 02.0	+58.4	27.8	19 55.0	+58.6	27.9	20 48.0	+58.7	28.1	21 40.8	+58.9	28.3	22 33.6	+58.9	28.5	23 26.3	+59.0	28.7	24 18.9	+59.1	28.9	25 11.3	+59.2	29.1	38
39	20 00.4	+58.5	27.5	20 53.6	+58.6	27.7	21 46.7	+58.7	27.9	22 39.7	+58.8	28.1	23 32.5	+58.9	28.3	24 25.3	+59.0	28.5	25 18.0	+59.1	28.7	26 10.5	+59.2	29.0	39
40	20 58.9	+58.5	27.3	21 52.2	+58.6	27.5	22 45.4	+58.7	27.7	23 38.5	+58.8	27.9	24 31.4	+58.9	28.1	25 24.3	+59.0	28.3	26 17.1	+59.1	28.5	27 09.7	+59.2	28.8	40
41	21 57.4	+58.4	27.1	22 50.8	+58.5	27.3	23 44.1	+58.6	27.5	24 37.3	+58.7	27.7	25 30.3	+58.9	27.9	26 23.3	+59.0	28.1	27 16.2	+59.1	28.3	28 08.9	+59.2	28.6	41
42	22 55.8	+58.4	26.8	23 49.3	+58.6	27.0	24 42.7	+58.7	27.2	25 36.0	+58.8	27.4	26 29.2	+58.9	27.7	27 22.3	+59.0	27.9	28 15.3	+59.0	28.1	29 08.1	+59.2	28.4	42
43	23 54.2	+58.4	26.6	24 47.9	+58.5	26.8	25 41.4	+58.6	27.0	26 34.8	+58.7	27.2	27 28.1	+58.8	27.4	28 21.3	+58.9	27.7	29 14.3	+59.1	27.9	30 07.3	+59.1	28.2	43
44	24 52.6	+58.4	26.3	25 46.4	+58.4	26.5	26 40.0	+58.6	26.8	27 33.5	+58.7	27.0	28 26.9	+58.8	27.2	29 20.2	+58.9	27.5	30 13.4	+59.0	27.7	31 06.4	+59.2	28.0	44
45	25 51.0	+58.3	26.1	26 44.8	+58.5	26.3	27 38.6	+58.6	26.5	28 32.2	+58.7	26.7	29 25.7	+58.8	27.0	30 19.1	+59.0	27.3	31 12.4	+59.0	27.5	32 05.6	+59.1	27.8	45
46	26 49.3	+58.3	25.8	27 43.3	+58.4	26.0	28 37.2	+58.5	26.3	29 30.9	+58.7	26.5	30 24.5	+58.8	26.8	31 18.1	+58.8	27.0	32 11.4	+59.0	27.3	33 04.7	+59.0	27.6	46
47	27 47.6	+58.3	25.5	28 41.7	+58.4	25.8	29 35.7	+58.5	26.0	30 29.6	+58.6	26.3	31 23.3	+58.8	26.5	32 16.9	+58.9	26.8	33 10.4	+59.0	27.1	34 03.7	+59.1	27.4	47
48	28 45.9	+58.3	25.3	29 40.1	+58.4	25.5	30 34.2	+58.5	25.8	31 28.2	+58.6	26.0	32 22.1	+58.7	26.3	33 15.8	+58.8	26.6	34 09.4	+58.9	26.9	35 02.8	+59.1	27.2	48
49	29 44.2	+58.2	25.0	30 38.5	+58.3	25.2	31 32.7	+58.5	25.5	32 26.8	+58.6	25.8	33 20.8	+58.7	26.1	34 14.6	+58.8	26.3	35 08.3	+58.9	26.7	36 01.9	+59.0	27.0	49
50	30 42.4	+58.2	24.7	31 36.8	+58.3	25.0	32 31.2	+58.4	25.2	33 25.4	+58.5	25.5	34 19.5	+58.6	25.8	35 13.4	+58.8	26.1	36 07.2	+58.9	26.4	37 00.9	+59.0	26.8	50
51	31 40.6	+58.1	24.4	32 35.1	+58.3	24.7	33 29.6	+58.4	25.0	34 23.9	+58.5	25.2	35 18.1	+58.6	25.5	36 12.2	+58.7	25.9	37 06.1	+58.9	26.2	37 59.9	+58.9	26.5	51
52	32 38.7	+58.1	24.1	33 33.4	+58.2	24.4	34 28.0	+58.3	24.7	35 22.4	+58.5	25.0	36 16.7	+58.6	25.3	37 10.9	+58.7	25.6	38 05.0	+58.8	25.9	38 58.8	+59.0	26.3	52
53	33 36.8	+58.0	23.8	34 31.6	+58.2	24.1	35 26.3	+58.3	24.4	36 20.9	+58.4	24.7	37 15.3	+58.6	25.0	38 09.6	+58.7	25.3	39 03.8	+58.8	25.7	39 57.8	+58.9	26.0	53
54	34 34.8	+58.0	23.5	35 29.8	+58.1	23.8	36 24.6	+58.3	24.1	37 19.3	+58.4	24.4	38 13.9	+58.5	24.7	39 08.3	+58.6	25.1	40 02.6	+58.7	25.4	40 56.7	+58.8	25.8	54
55	35 32.8	+58.0	23.2	36 27.9	+58.1	23.5	37 22.9	+58.2	23.8	38 17.7	+58.3	24.1	39 12.4	+58.5	24.5	40 06.9	+58.6	24.8	41 01.3	+58.7	25.2	41 55.5	+58.9	25.5	55
56	36 30.8	+57.9	22.9	37 26.0	+58.0	23.2	38 21.1	+58.1	23.5	39 16.0	+58.3	23.8	40 10.9	+58.4	24.2	41 05.5	+58.6	24.5	42 00.0	+58.7	24.9	42 54.4	+58.8	25.3	56
57	37 28.7	+57.8	22.6	38 24.0	+58.0	22.9	39 19.2	+58.2	23.2	40 14.3	+58.3	23.5	41 09.3	+58.4	23.9	42 04.1	+58.5	24.2	42 58.7	+58.6	24.6	43 53.2	+58.7	25.0	57
58	38 26.5	+57.8	22.2	39 22.0	+57.9	22.5	40 17.4	+58.0	22.9	41 12.6	+58.2	23.2	42 07.7	+58.3	23.6	43 02.6	+58.4	23.9	43 57.3	+58.6	24.3	44 51.9	+58.8	24.7	58
59	39 24.3	+57.7	21.9	40 19.9	+57.9	22.2	41 15.4	+58.0	22.5	42 10.8	+58.1	22.9	43 06.0	+58.2	23.2	44 01.0	+58.4	23.6	44 55.9	+58.6	24.0	45 50.7	+58.6	24.4	59
60	40 22.0	+57.7	21.5	41 17.8	+57.8	21.8	42 13.4	+57.9	22.2	43 08.9	+58.1	22.5	44 04.2	+58.3	22.9	44 59.4	+58.4	23.3	45 54.5	+58.4	23.7	46 49.3	+58.6	24.1	60
61	41 19.7	+57.6	21.2	42 15.6	+57.7	21.5	43 11.3	+57.9	21.8	44 07.0	+58.0	22.2	45 02.5	+58.1	22.6	45 57.8	+58.3	23.0	46 52.9	+58.5	23.4	47 47.9	+58.6	23.8	61
62	42 17.3	+57.5	20.8	43 13.3	+57.6	21.1	44 09.2	+57.8	21.5	45 05.0	+57.9	21.8	46 00.6	+58.1	22.2	46 56.1	+58.2	22.6	47 51.4	+58.3	23.0	48 46.5	+58.5	23.5	62
63	43 14.8	+57.4	20.4	44 10.9	+57.6	20.7	45 07.0	+57.7	21.1	46 02.9	+57.9	21.5	46 58.7	+58.0	21.8	47 54.3	+58.1	22.3	48 49.7	+58.3	22.7	49 45.0	+58.4	23.1	63
64	44 12.2	+57.3	20.0	45 08.5	+57.5	20.3	46 04.7	+57.6	20.7	47 00.8	+57.8	21.1	47 56.7	+57.9	21.5	48 52.4	+58.1	21.9	49 48.0	+58.3	22.3	50 43.4	+58.4	22.8	64
65	45 09.5	+57.3	19.6	46 06.0	+57.4	19.9	47 02.3	+57.6	20.3	47 58.6	+57.6	20.7	48 54.6	+57.9	21.1	49 50.5	+58.0	21.5	50 46.3	+58.1	21.9	51 41.8	+58.3	22.4	65
66	46 06.8	+57.1	19.2	47 03.4	+57.3	19.5	47 59.9	+57.4	19.9	48 56.2	+57.6	20.3	49 52.5	+57.7	20.7	50 48.5	+57.9	21.1	51 44.4	+58.1	21.5	52 40.1	+58.3	22.0	66
67	47 03.9	+57.1	18.7	48 00.7	+57.2	19.1	48 57.3	+57.4	19.4	49 53.8	+57.6	19.8	50 50.2	+57.7	20.2	51 46.4	+57.9	20.7	52 42.5	+58.0	21.1	53 38.4	+58.1	21.6	67
68	48 01.0	+56.9	18.2	48 57.9	+57.1	18.6	49 54.7	+57.2	19.0	50 51.4	+57.3	19.4	51 47.9	+57.5	19.8	52 44.3	+57.7	20.2	53 40.5	+57.8	20.7	54 36.5	+58.0	21.2	68
69	48 57.9	+56.8	17.8	49 55.0	+56.9	18.1	50 51.9	+57.1	18.5	51 48.7	+57.3	18.9	52 45.4	+57.5	19.3	53 42.0	+57.6	19.8	54 38.3	+57.8	20.3	55 34.5	+58.0	20.8	69
70	49 54.7	+56.7	17.3	50 51.9	+56.8	17.6	51 49.0	+57.0	18.0	52 46.0	+57.2	18.4	53 42.9	+57.3	18.9	54 39.6	+57.5	19.3	55 36.1	+57.7	19.8	56 32.5	+57.8	20.3	70
71	50 51.4	+56.5	16.8	51 48.7	+56.7	17.1	52 46.0	+56.9	17.5	53 43.2	+57.0	17.9	54 40.2	+57.2	18.3	55 37.1	+57.3	18.8	56 33.8	+57.5	19.3	57 30.3	+57.8	19.8	71
72	51 47.9	+56.4	16.2	52 45.4	+56.6	16.6	53 42.9	+56.7	17.0	54 40.2	+56.9	17.4	55 37.4	+57.0	17.8	56 34.4	+57.3	18.3	57 31.3	+57.4	18.8	58 28.1	+57.5	19.3	72
73	52 44.3	+56.2	15.7	53 42.0	+56.3	16.0	54 39.6	+56.5	16.4	55 37.1	+56.7	16.8	56 34.4	+56.9	17.3	57 31.7	+57.0	17.7	58 28.7	+57.3	18.2	59 25.6	+57.5	18.7	73
74	53 40.5	+56.0	15.1	54 38.3	+56.2	15.4	55 36.1	+56.4	15.8	56 33.8	+56.5	16.2	57 31.3	+56.8	16.7	58 28.7	+56.9	17.1	59 26.0	+57.1	17.6	60 23.1	+57.3	18.2	74
75	54 36.5	+55.8	14.5	55 34.5	+56.0	14.8	56 32.5	+56.2	15.2	57 30.3	+56.4	15.6	58 28.1	+56.5	16.1	59 25.6	+56.8	16.5	60 23.1	+56.9	17.0	61 20.4	+57.1	17.6	75
76	55 32.3	+55.7	13.8	56 30.5	+55.8	14.2	57 28.7	+55.9	14.6	58 26.7	+56.1	15.0	59 24.6	+56.3	15.4	60 22.4	+56.5	15.9	61 20.0	+56.7	16.4	62 17.5	+56.9	16.9	76
77	56 28.0	+55.4	13.2	57 26.3	+55.6	13.5	58 24.6	+55.8	13.9	59 22.8	+56.0	14.3	60 20.9	+56.1	14.7	61 18.9	+56.3	15.2	62 16.7	+56.5	15.7	63 14.4	+56.7	16.2	77
78	57 23.4	+55.1	12.5	58 21.9	+55.3	12.8	59 20.4	+55.5	13.2	60 18.8	+55.6	13.6	61 17.0	+55.9	14.0	62 15.2	+56.0	14.5	63 13.2	+56.3	15.0	64 11.1	+56.5	15.5	78
79	58 18.5	+54.9	11.7	59 17.2	+55.1	12.1	60 15.9	+55.2	12.4	61 14.4	+55.4	12.8	62 12.9	+55.6	13.2	63 11.2	+55.8	13.7	64 09.5	+56.0	14.2	65 07.6	+56.2	14.7	79
80	59 13.4	+54.6	10.9	60 12.3	+54.7	11.3	61 11.1	+54.9	11.6	62 09.8	+55.1	12.0	63 08.5	+55.2	12.4	64 07.0	+55.5	12.9	65 05.5	+55.6	13.3	66 03.8	+55.9	13.8	80
81	60 08.0	+54.3	10.1	61 07.0	+54.5	10.4	62 06.0	+54.6	10.8	63 04.9	+54.8	11.1	64 03.7	+55.0	11.5	65 02.5	+55.1	12.0	66 01.1	+55.4	12.4	66 59.7	+55.5	12.9	81
82	61 02.3	+53.9	9.2	62 01.5	+54.0	9.5	63 00.6	+54.2	9.9	63 59.7	+54.4	10.2	64 58.7	+54.6	10.6	65 57.6	+54.8	11.0	66 56.5	+54.9	11.5	67 55.2	+55.2	11.9	82
83	61 56.2	+53.5	8.3	62 55.5	+53.7	8.6	63 54.8	+53.8	8.9	64 54.1	+53.9	9.2	65 53.3	+54.1	9.6	66 52.4	+54.3	10.0	67 51.4	+54.6	10.4	68 50.4	+54.7	10.9	83
84	62 49.7	+53.1	7.4	63 49.2	+53.2	7.6	64 48.6	+53.4	7.9	65 48.0	+53.6	8.2	66 47.4	+53.7	8.5	67 46.7	+53.9	8.9	68 46.0	+54.0	9.3	69 45.1	+54.3	9.7	84
85	63 42.8	+52.6	6.3	64 42.4	+52.8	6.6	65 42.0	+52.9	6.8	66 41.6	+53.0	7.1	67 41.1	+53.1	7.4	68 40.6	+53.3	7.7	69 40.0	+53.5	8.1	70 39.4	+53.7	8.5	85
86	64 35.4	+52.1	5.2	65 35.2	+52.1	5.4	66 34.9	+52.3	5.6	67 34.6	+52.4	5.9	68 34.2	+52.6	6.1	69 33.9	+52.7	6.4	70 33.5	+52.8	6.7	71 33.1	+53.0	7.1	86
87	65 27.5	+51.5	4.0	66 27.3	+51.6	4.2	67 27.2	+51.7	4.4	68 27.0	+51.8	4.6	69 26.8	+51.9	4.8	70 26.6	+52.0	5.0	71 26.3	+52.1	5.3	72 26.1	+52.2	5.6	87
88	66 19.0	+50.9	2.8	67 18.9	+50.9	2.9	68 18.9	+50.9	3.0	69 18.8	+51.0	3.2	70 18.7	+51.1	3.3	71 18.6	+51.1	3.5	72 18.4	+51.3	3.7	73 18.3	+51.4	3.9	88
89	67 09.9	+50.1	1.4	68 09.8	+50.2	1.5	69 09.8	+50.2	1.6	70 09.8	+50.2	1.6	71 09.8	+50.2	1.7	72 09.7	+50.3	1.8	73 09.7	+50.3	1.9	74 09.7	+50.3	2.0	89
90	68 00.0	+49.3	0.0	69 00.0	+49.3	0.0	70 00.0	+49.3	0.0	71 00.0	+49.2	0.0	72 00.0	+49.2	0.0	73 00.0	+49.2	0.0	74 00.0	+49.1	0.0	75 00.0	+49.1	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 146°, 214°

35°, 325° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.....Zn=360°–Z

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	17 52.2	+58.4	142.9	17 04.3	+58.6	143.1	16 16.2	+58.7	143.3	15 28.0	+58.9	143.5	14 39.8	+59.0	143.6	13 51.4	+59.1	143.8	13 03.0	+59.2	143.9	12 14.4	+59.3	144.1	0
1	18 50.6	+58.5	142.7	18 02.9	+58.5	142.9	17 14.9	+58.7	143.1	16 26.9	+58.8	143.3	15 38.8	+58.9	143.4	14 50.5	+59.1	143.6	14 02.2	+59.2	143.8	13 13.7	+59.3	143.9	1
2	19 49.1	+58.4	142.5	19 01.4	+58.6	142.7	18 13.6	+58.7	142.9	17 25.7	+58.9	143.1	16 37.7	+59.0	143.3	15 49.6	+59.1	143.4	15 01.4	+59.1	143.6	14 13.0	+59.3	143.7	2
3	20 47.5	+58.4	142.2	20 00.0	+58.5	142.4	19 12.3	+58.7	142.7	18 24.6	+58.8	142.9	17 36.7	+58.9	143.1	16 48.7	+59.0	143.2	16 00.5	+59.2	143.4	15 12.3	+59.3	143.6	3
4	21 45.9	+58.3	142.0	20 58.5	+58.5	142.2	20 11.0	+58.7	142.4	19 23.4	+58.8	142.7	18 35.6	+59.0	142.9	17 47.7	+59.1	143.1	16 59.7	+59.2	143.3	16 11.6	+59.3	143.4	4
5	22 44.2	+58.4	141.7	21 57.0	+58.5	142.0	21 09.7	+58.6	142.2	20 22.2	+58.8	142.4	19 34.6	+58.9	142.7	18 46.8	+59.0	142.9	17 58.9	+59.1	143.1	17 10.9	+59.2	143.3	5
6	23 42.6	+58.3	141.5	22 55.5	+58.5	141.7	22 08.3	+58.7	142.0	21 21.0	+58.8	142.2	20 33.5	+58.9	142.5	19 45.8	+59.1	142.7	18 58.0	+59.2	142.9	18 10.1	+59.3	143.1	6
7	24 40.9	+58.3	141.2	23 54.0	+58.5	141.5	23 07.0	+58.6	141.8	22 19.8	+58.7	142.0	21 32.4	+58.9	142.3	20 44.9	+59.0	142.5	19 57.2	+59.1	142.7	19 09.4	+59.2	142.9	7
8	25 39.2	+58.2	140.9	24 52.5	+58.4	141.2	24 05.6	+58.6	141.5	23 18.5	+58.8	141.8	22 31.3	+58.9	142.1	21 43.9	+59.0	142.3	20 56.3	+59.2	142.5	20 08.6	+59.3	142.8	8
9	26 37.4	+58.2	140.7	25 50.9	+58.4	141.0	25 04.2	+58.5	141.3	24 17.3	+58.7	141.6	23 30.2	+58.8	141.8	22 42.9	+59.0	142.1	21 55.5	+59.1	142.4	21 07.9	+59.2	142.6	9
10	27 35.6	+58.2	140.4	26 49.3	+58.4	140.7	26 02.7	+58.6	141.0	25 16.0	+58.7	141.3	24 29.0	+58.9	141.6	23 41.9	+59.0	141.9	22 54.6	+59.1	142.2	22 07.1	+59.2	142.4	10
11	28 33.8	+58.2	140.1	27 47.7	+58.3	140.5	27 01.3	+58.5	140.8	26 14.7	+58.6	141.1	25 27.9	+58.8	141.4	24 40.9	+58.9	141.7	23 53.7	+59.1	142.0	23 06.3	+59.2	142.3	11
12	29 32.0	+58.1	139.8	28 46.0	+58.3	140.2	27 59.8	+58.5	140.6	27 13.3	+58.7	140.9	26 26.7	+58.8	141.2	25 39.8	+59.0	141.5	24 52.8	+59.0	141.8	24 05.5	+59.2	142.1	12
13	30 30.1	+58.1	139.6	29 44.3	+58.3	139.9	28 58.3	+58.4	140.3	28 12.0	+58.6	140.6	27 25.5	+58.8	141.0	26 38.8	+58.9	141.3	25 51.8	+59.1	141.6	25 04.7	+59.2	141.9	13
14	31 28.2	+58.0	139.3	30 42.6	+58.2	139.7	29 56.7	+58.5	140.0	29 10.6	+58.6	140.4	28 24.3	+58.7	140.7	27 37.7	+58.9	141.1	26 50.9	+59.0	141.4	26 03.9	+59.2	141.7	14
15	32 26.2	+58.0	139.0	31 40.8	+58.2	139.4	30 55.2	+58.4	139.8	30 09.2	+58.6	140.2	29 23.0	+58.8	140.5	28 36.6	+58.9	140.9	27 49.9	+59.1	141.2	27 03.1	+59.1	141.5	15
16	33 24.2	+58.0	138.7	32 39.0	+58.2	139.1	31 53.6	+58.3	139.5	31 07.8	+58.5	139.9	30 21.8	+58.7	140.3	29 35.5	+58.9	140.6	28 49.0	+59.0	141.0	28 02.2	+59.2	141.3	16
17	34 22.2	+57.9	138.4	33 37.2	+58.1	138.8	32 51.9	+58.3	139.2	32 06.3	+58.5	139.6	31 20.5	+58.7	140.0	30 34.4	+58.8	140.4	29 48.0	+59.0	140.8	29 01.4	+59.1	141.1	17
18	35 20.1	+57.9	138.0	34 35.3	+58.1	138.5	33 50.2	+58.3	138.9	33 04.8	+58.5	139.4	32 19.2	+58.6	139.8	31 33.2	+58.8	140.2	30 47.0	+58.9	140.6	30 00.5	+59.1	141.0	18
19	36 18.0	+57.8	137.7	35 33.4	+58.0	138.2	34 48.5	+58.3	138.7	34 03.3	+58.4	139.1	33 17.8	+58.6	139.5	32 32.0	+58.8	140.0	31 45.9	+59.0	140.4	30 59.6	+59.1	140.8	19
20	37 15.8	+57.7	137.4	36 31.4	+58.0	137.9	35 46.8	+58.2	138.4	35 01.7	+58.4	138.8	34 16.4	+58.6	139.3	33 30.8	+58.8	139.7	32 44.9	+58.9	140.1	31 58.7	+59.0	140.5	20
21	38 13.5	+57.7	137.0	37 29.4	+57.9	137.6	36 45.0	+58.1	138.1	36 00.1	+58.4	138.6	35 15.0	+58.6	139.0	34 29.6	+58.7	139.5	33 43.8	+58.9	139.9	32 57.7	+59.1	140.3	21
22	39 11.2	+57.6	136.7	38 27.3	+57.9	137.2	37 43.1	+58.1	137.8	36 58.5	+58.3	138.3	36 13.6	+58.5	138.8	35 28.3	+58.7	139.2	34 42.7	+58.8	139.7	33 56.8	+59.0	140.1	22
23	40 08.8	+57.5	136.3	39 25.2	+57.8	136.9	38 41.2	+58.1	137.4	37 56.8	+58.3	138.0	37 12.1	+58.5	138.5	36 27.0	+58.6	139.0	35 41.5	+58.9	139.5	34 55.8	+59.0	139.9	23
24	41 06.3	+57.5	135.9	40 23.0	+57.7	136.5	39 39.3	+57.9	137.1	38 55.1	+58.2	137.7	38 10.6	+58.4	138.2	37 25.6	+58.7	138.7	36 40.4	+58.8	139.2	35 54.8	+59.0	139.7	24
25	42 03.8	+57.4	135.6	41 20.7	+57.7	136.2	40 37.2	+58.0	136.8	39 53.3	+58.2	137.4	39 09.0	+58.4	137.9	38 24.3	+58.6	138.4	37 39.2	+58.8	139.0	36 53.8	+58.9	139.5	25
26	43 01.2	+57.3	135.2	42 18.4	+57.6	135.8	41 35.2	+57.8	136.4	40 51.5	+58.1	137.0	40 07.4	+58.3	137.6	39 22.9	+58.5	138.2	38 38.0	+58.7	138.7	37 52.7	+58.9	139.2	26
27	43 58.5	+57.2	134.8	43 16.0	+57.5	135.4	42 33.0	+57.8	136.1	41 49.6	+58.1	136.7	41 05.7	+58.3	137.3	40 21.4	+58.5	137.9	39 36.7	+58.7	138.4	38 51.6	+58.9	139.0	27
28	44 55.7	+57.1	134.3	44 13.5	+57.5	135.0	43 30.8	+57.8	135.7	42 47.7	+57.9	136.4	42 04.0	+58.2	137.0	41 19.9	+58.5	137.6	40 35.4	+58.7	138.2	39 50.5	+58.9	138.7	28
29	45 52.8	+57.1	133.9	45 11.0	+57.3	134.6	44 28.6	+57.6	135.3	43 45.6	+58.0	136.0	43 02.2	+58.2	136.7	42 18.4	+58.4	137.3	41 34.1	+58.6	137.9	40 49.4	+58.8	138.5	29
30	46 49.9	+56.9	133.4	46 08.3	+57.3	134.2	45 26.2	+57.6	134.9	44 43.6	+57.8	135.6	44 00.4	+58.1	136.3	43 16.8	+58.4	137.0	42 32.7	+58.6	137.6	41 48.2	+58.8	138.2	30
31	47 46.8	+56.8	133.0	47 05.6	+57.1	133.8	46 23.8	+57.5	134.5	45 41.4	+57.8	135.3	44 58.5	+58.1	136.0	44 15.2	+58.3	136.7	43 31.3	+58.5	137.3	42 47.0	+58.7	137.9	31
32	48 43.6	+56.6	132.5	48 02.7	+57.1	133.3	47 21.3	+57.3	134.1	46 39.2	+57.7	134.9	45 56.6	+58.0	135.6	45 13.5	+58.2	136.3	44 29.8	+58.5	137.0	43 45.7	+58.7	137.7	32
33	49 40.2	+56.6	132.0	48 59.8	+56.9	132.8	48 18.6	+57.3	133.7	47 36.9	+57.6	134.5	46 54.6	+57.9	135.2	46 11.7	+58.2	136.0	45 28.3	+58.4	136.7	44 44.4	+58.6	137.4	33
34	50 36.8	+56.3	131.5	49 56.7	+56.8	132.4	49 15.9	+57.2	133.2	48 34.5	+57.5	134.1	47 52.5	+57.8	134.9	47 09.9	+58.1	135.6	46 26.7	+58.4	136.4	45 43.0	+58.6	137.1	34
35	51 33.1	+56.3	130.9	50 53.5	+56.6	131.9	50 13.1	+57.0	132.8	49 32.0	+57.4	133.6	48 50.3	+57.7	134.5	48 08.0	+58.0	135.3	47 25.1	+58.3	136.0	46 41.6	+58.6	136.8	35
36	52 29.4	+56.0	130.4	51 50.1	+56.5	131.3	51 10.1	+57.0	132.3	50 29.4	+57.3	133.2	49 48.0	+57.7	134.0	49 06.0	+58.0	134.9	48 23.4	+58.2	135.7	47 40.2	+58.5	136.4	36
37	53 25.4	+55.9	129.8	52 46.6	+56.4	130.8	52 07.1	+56.7	131.8	51 26.7	+57.2	132.7	50 45.7	+57.5	133.6	50 04.0	+57.9	134.5	49 21.6	+58.2	135.3	48 38.7	+58.4	136.1	37
38	54 21.3	+55.7	129.1	53 43.0	+56.2	130.2	53 03.8	+56.7	131.2	52 23.9	+57.1	132.2	51 43.2	+57.5	133.1	51 01.9	+57.7	134.1	50 19.8	+58.1	134.9	49 37.1	+58.4	135.8	38
39	55 17.0	+55.4	128.5	54 39.2	+55.9	129.6	54 00.5	+56.4	130.7	53 21.0	+56.9	131.7	52 40.7	+57.3	132.7	51 59.6	+57.7	133.6	51 17.9	+58.0	134.5	50 35.5	+58.3	135.4	39
40	56 12.4	+55.2	127.8	55 35.1	+55.8	129.0	54 56.9	+56.4	130.1	54 17.9	+56.8	131.2	53 38.0	+57.2	132.2	52 57.3	+57.6	133.2	52 15.9	+57.9	134.1	51 33.8	+58.2	135.0	40
41	57 07.6	+55.0	127.1	56 30.9	+55.6	128.3	55 53.3	+56.1	129.5	55 14.7	+56.6	130.6	54 35.2	+57.0	131.7	53 54.9	+57.5	132.7	53 13.8	+57.8	133.7	52 32.0	+58.2	134.6	41
42	58 02.6	+54.7	126.4	57 26.5	+55.3	127.6	56 49.4	+55.9	128.8	56 11.3	+56.4	130.0	55 32.2	+56.9	131.1	54 52.4	+57.3	132.2	54 11.6	+57.8	133.2	53 30.2	+58.0	134.2	42
43	58 57.3	+54.4	125.6	58 21.8	+55.1	126.9	57 45.3	+55.7	128.2	57 07.7	+56.2	129.4	56 29.1	+56.8	130.6	55 49.7	+57.2	131.7	55 09.4	+57.6	132.8	54 28.2	+58.0	133.8	43
44	59 51.7	+54.0	124.7	59 16.9	+54.8	126.1	58 41.0	+55.4	127.5	58 03.9	+56.1	128.7	57 25.9	+56.5	130.0	56 46.9	+57.0	131.1	56 07.0	+57.4	132.3	55 26.2	+57.8	133.3	44
45	60 45.7	+53.7	123.9	60 11.7	+54.4	125.3	59 36.4	+55.2	126.7	59 00.0	+55.8	128.1	58 22.4	+56.4	129.3	57 43.9	+56.9	130.6	57 04.4	+57.4	131.7	56 24.0	+57.8	132.9	45
46	61 39.4	+53.3	122.9	61 06.1	+54.2	124.5	60 31.6	+54.8	125.9	59 55.8	+55.5	127.3	59 18.8	+56.2	128.7	58 40.8	+56.7	130.0	58 01.8	+57.2	131.2	57 21.8	+57.6	132.4	46
47	62 32.7	+52.9	122.0	62 00.3	+53.7	123.6	61 26.4	+54.6	125.1	60 51.3	+55.3	126.6	60 15.0	+55.9	128.0	59 37.5	+56.5	129.3	58 59.0	+57.0	130.6	58 19.4	+57.5	131.8	47
48	63 25.6	+52.4	120.9	62 54.0	+53.3	122.6	62 21.0	+54.2	124.2	61 46.6	+54.9	125.8	61 10.9	+55.7	127.2	60 34.0	+56.3	128.6	59 56.0	+56.8	130.0	59 16.9	+57.3	131.3	48
49	64 18.0	+51.8	119.8	63 47.3	+52.9	121.6	63 15.2	+53.8	123.3	62 41.5	+54.7	124.9	62 06.6	+55.3	126.4	61 30.3	+56.0	127.9	60 52.8	+56.7	129.4	60 14.2	+57.2	130.7	49
50	65 09.8	+51.3	118.6	64 40.2	+52.4	120.5	64 09.0	+53.3	122.3	63 36.2	+54.2	124.0	63 01.9	+55.1	125.6	62 26.3	+55.8	127.2	61 49.5	+56.4	128.7	61 11.4	+57.0	130.1	50
51	66 01.1	+50.5	117.4	65 32.6	+51.8	119.3	65 02.3	+52.9	121.2	64 30.4	+53.9	123.0	63 57.0	+54.7	124.7	63 22.1	+55.5	126.4	62 45.9	+56.2	127.9	62 08.4	+56.8	129.4	51
52	66 51.6	+49.9	116.0	66 24.4	+51.1	118.1	65 55.2	+52.3	120.1	65 24.3	+53.4	122.0	64 51.7	+54.3	123.8	64 17.6	+55.2	125.5	63 42.1	+55.9	127.2	63 05.2	+56.5	128.7	52
53	67 41.5	+49.0	114.6	67 15.5	+50.5	116.8	66 47.5	+51.7	118.8	66 17.7	+52.8	120.8	65 46.0	+53.9	122.8	65 12.8	+54.8	124.6	64 38.0	+55.6	126.3	64 01.7	+56.4	128.0	53
54	68 30.5	+48.2	113.0	68 06.0	+49.6	115.3	67 39.2	+51.1	117.5	67 10.5	+52.3	119.6	66 39.9	+53.4	121.7	66 07.6	+54.4	123.6	65 33.6	+55.3	125.4	64 58.1	+56.0	127.2	54
55	69 18.7	+47.1	111.4	68 55.6	+48.8	113.8	68 30.3	+50.3	116.1	68 02.8	+51.7	118.4	67 33.3	+52.9	120.5	67 02.0	+53.9	122.5	66 28.9	+54.8	124.5	65 54.1	+55.7	126.3	55
56	70 05.8	+45.9	109.6	69 44.4	+47.7	112.1	69 20.6	+49.4	114.6	68 54.5	+50.9	117.0	68 26.2	+52.2	119.2	67 55.9	+53.4	121.4	67 23.7	+54.5	123.4	66 49.8	+55.4	125.4	56
57	70 51.7	+44.6	107.7	70 32.1	+46.7	110.4	70 10.0	+48.4	113.0	69 45.4	+50.0	115.5	69 18.4	+51.6	117.9	68 49.3	+52.9	120.1	68 18.2	+54.0	122.3	67 45.2	+55.0	124.4	57
58	71 36.3	+43.2	105.6	71 18.8	+45.3	108.4	70 58.4	+47.4	111.2	70 35.4	+49.2	113.8	70 10.0	+50.7	116.4	69 42.2	+52.2	118.8	69 12.2	+53.4	121.1	68 40.2	+54.5	123.3	58
59	72 19.5	+41.6	103.3	72 04.1	+44.0	106.4	71 45.8	+46.1	109.3	71 24.6	+48.1	112.1	71 00.7	+49.9	114.8	70 34.4	+51.4	117.4	70 05.6	+52.8	119.8	69 34.7	+54.1	122.1	59
60	73 01.1	+39.6	100.9	72 48.1	+42.2	104.1	72 31.9	+44.6	107.2	72 12.7	+46.8	110.2	71 50.6	+48.8	113.0	71 25.8	+50.5	115.8	70 58.4	+52.1	118.4	70 28.8	+53.4	120.9	60
61	73 40.7	+37.6	98.3	73 30.3	+40.5	101.6	73 16.5	+43.1	104.9	72 59.5	+45.5	108.1	72 39.4	+47.6	111.1	72 16.3	+49.6	114.0	71 50.5	+51.3	116.8	71 22.2	+52.8	119.5	61
62	74 18.3	+35.2	95.5	74 10.8	+38.3	99.0	73 59.6	+41.2	102.4	73 45.0	+43.8	105.8	73 27.0	+46.3	109.0	73 05.9	+48.4	112.1	72 41.8	+50.3	115.1	72 15.0	+52.0	118.0	62
63	74 53.5	+32.6	92.4	74 49.1	+35.9	96.1	74 40.8	+39.1	99.7	74 28.8	+42.0	103.3	74 13.3	+44.6	106.7	73 54.3	+47.1	110.1	73 32.1	+49.3	113.3	73 07.0	+51.1	116.3	63
64	75 26.1	+29.7	89.1	75 25.0	+33.3	93.0	75 19.9	+36.7	96.8	75 10.8	+39.9	100.6	74 57.9	+42.9	104.2	74 41.4	+45.5	107.8	74 21.4	+47.9	111.2	73 58.1	+50.0	114.4	64
65	75 55.8	+26.4	85.6	75 58.3	+30.2	89.6	75 56.6	+33.9	93.6	75 50.7	+37.5	97.6	75 40.8	+40.7	101.5	75 26.9	+43.7	105.2	75 09.3	+46.4	108.9	74 48.1	+48.8	112.4	65
66	76 22.2	+22.8	81.9	76 28.5	+26.9	86.0	76 30.5	+30.9	90.2	76 28.2	+34.7	94.3	76 21.5	+38.3	98.4	76 10.6	+41.7	102.5	75 55.7	+44.7	106.4	75 36.9	+47.4	110.1	66
67	76 45.0	+18.9	77.9	76 55.4	+23.1	82.1	77 01.4	+27.4	86.4	77 02.9	+31.5	90.8	76 59.8	+35.5	95.1	76 52.3	+39.2	99.4	76 40.4	+42.5	103.5	76 24.3	+45.6	107.6	67
68	77 03.9	+14.6	73.7	77 18.5	+19.1	78.0	77 28.8	+23.5	82.4	77 34.4	+28.0	86.9	77 35.3	+32.3	91.4	77 31.5	+36.3	95.9	77 22.9	+40.1	100.4	77 09.9	+43.5	104.7	68
69	77 18.5	+10.3	69.3	77 37.6	+14.7	73.6	77 52.3	+19.3	78.1	78 02.4	+23.9	82.7	78 07.6	+28.5	87.4	78 07.8	+33.0	92.2	78 03.0	+37.3	96.9	77 53.4	+41.1	101.5	69
70	77 28.8	+5.6	64.8	77 52.3	+10.1	69.0	78 11.6	+14.7	73.5	78 26.3	+19.5	78.2	78 36.1	+24.4	83.0	78 40.8	+29.2	88.0	78 40.3	+33.8	93.0	78 34.5	+38.2	98.0	70
71	77 34.4	+0.9	60.2	78 02.4	+5.2	64.3	78 26.3	+9.8	68.7	78 45.8	+14.7	73.4	79 00.5	+19.7	78.3	79 10.0	+24.8	83.5	79 14.1	+29.9	88.7	79 12.7	+34.7	93.9	71
72	77 35.3	−3.8	55.6	78 07.6	+0.2	59.5	78 36.1	+4.7	63.7	79 00.5	+9.5	68.4	79 20.2	+14.6	73.3	79 34.8	+19.9	78.5	79 44.0	+25.3	83.9	79 47.4	+30.6	89.5	72
73	77 31.5	−8.6	50.9	78 07.8	−4.8	54.6	78 40.8	−0.5	58.7	79 10.0	+4.1	63.2	79 34.8	+9.2	68.0	79 54.7	+14.6	73.2	80 09.3	+20.2	78.7	80 18.0	+25.9	84.5	73
74	77 22.9	−13.0	46.4	78 03.0	−9.6	49.8	78 40.3	−5.8	53.6	79 14.1	−1.4	57.8	79 44.0	+3.4	62.5	80 09.3	+8.7	67.6	80 29.5	+14.4	73.1	80 43.9	+20.4	79.0	74
75	77 09.9	−17.4	41.9	77 53.4	−14.3	45.0	78 34.5	−10.8	48.5	79 12.7	−6.8	52.5	79 47.4	−2.3	56.9	80 18.0	+2.8	61.8	80 43.9	+8.3	67.2	81 04.3	+14.4	73.1	75
76	76 52.5	−21.3	37.7	77 39.1	−18.7	40.5	78 23.7	−15.6	43.6	79 05.9	−12.2	47.2	79 45.1	−8.1	51.3	80 20.8	−3.5	55.8	80 52.2	+1.8	61.0	81 18.7	+7.7	66.7	76
77	76 31.2	−25.1	33.6	77 20.4	−22.8	36.1	78 08.1	−20.2	38.9	78 53.7	−17.1	42.1	79 37.0	−13.6	45.7	80 17.3	−9.5	49.9	80 54.0	−4.6	54.7	81 26.4	+0.9	60.1	77
78	76 06.1	−28.5	29.8	76 57.6	−26.5	31.9	77 47.9	−24.4	34.3	78 36.6	−21.8	37.1	79 23.4	−18.8	40.4	80 07.8	−15.2	44.1	80 49.4	−11.1	48.4	81 27.3	−6.1	53.4	78
79	75 37.6	−31.5	26.2	76 31.1	−30.0	28.0	77 23.5	−28.1	30.1	78 14.8	−26.0	32.5	79 04.6	−23.5	35.3	79 52.6	−20.5	38.5	80 38.3	−17.0	42.3	81 21.2	−12.8	46.7	79
80	75 06.1	−34.3	22.8	76 01.1	−33.0	24.3	76 55.4	−31.5	26.1	77 48.8	−29.8	28.2	78 41.1	−27.8	30.5	79 32.1	−25.4	33.3	80 21.3	−22.5	36.5	81 08.4	−19.0	40.3	80
81	74 31.8	−36.7	19.7	75 28.1	−35.7	21.0	76 23.9	−34.6	22.4	77 19.0	−33.2	24.1	78 13.3	−31.6	26.1	79 06.7	−29.7	28.4	79 58.8	−27.4	31.0	80 49.4	−24.7	34.2	81
82	73 55.1	−38.9	16.7	74 52.4	−38.1	17.8	75 49.3	−37.2	19.0	76 45.8	−36.1	20.4	77 41.7	−34.8	22.0	78 37.0	−33.4	23.9	79 31.4	−31.6	26.0	80 24.7	−29.5	28.6	82
83	73 16.2	−40.9	14.1	74 14.3	−40.3	14.9	75 12.1	−39.5	15.9	76 09.7	−38.8	17.0	77 06.9	−37.8	18.3	78 03.6	−36.7	19.7	78 59.8	−35.4	21.5	79 55.2	−33.8	23.5	83
84	72 35.3	−42.6	11.6	73 34.0	−42.1	12.2	74 32.6	−41.6	13.0	75 30.9	−41.0	13.9	76 29.1	−40.3	14.9	77 26.9	−39.5	16.0	78 24.4	−38.6	17.4	79 21.4	−37.4	18.9	84
85	71 52.7	−44.1	9.2	72 51.9	−43.8	9.8	73 51.0	−43.4	10.4	74 49.9	−42.9	11.0	75 48.8	−42.5	11.8	76 47.4	−41.9	12.6	77 45.8	−41.2	13.6	78 44.0	−40.4	14.8	85
86	71 08.6	−45.5	7.1	72 08.1	−45.2	7.5	73 07.6	−45.0	7.9	74 07.0	−44.7	8.4	75 06.3	−44.4	9.0	76 05.5	−44.0	9.6	77 04.6	−43.5	10.3	78 03.6	−43.0	11.2	86
87	70 23.1	−46.6	5.1	71 22.9	−46.5	5.4	72 22.6	−46.4	5.7	73 22.3	−46.2	6.0	74 21.9	−45.9	6.4	75 21.5	−45.7	6.8	76 21.1	−45.5	7.3	77 20.6	−45.2	7.9	87
88	69 36.5	−47.8	3.3	70 36.4	−47.7	3.5	71 36.2	−47.5	3.6	72 36.1	−47.5	3.8	73 36.0	−47.4	4.1	74 35.8	−47.2	4.3	75 35.6	−47.1	4.6	76 35.4	−46.9	5.0	88
89	68 48.7	−48.7	1.6	69 48.7	−48.7	1.7	70 48.7	−48.7	1.7	71 48.6	−48.6	1.8	72 48.6	−48.6	1.9	73 48.6	−48.6	2.1	74 48.5	−48.5	2.2	75 48.5	−48.5	2.3	89
90	68 00.0	−49.6	0.0	69 00.0	−49.6	0.0	70 00.0	−49.6	0.0	71 00.0	−49.6	0.0	72 00.0	−49.7	0.0	73 00.0	−49.7	0.0	74 00.0	−49.7	0.0	75 00.0	−49.8	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

35°, 325° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 35°, 325°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	17 52.2	−58.5	142.9	17 04.3	−58.6	143.1	16 16.2	−58.7	143.3	15 28.0	−58.8	143.5	14 39.8	−59.0	143.6	13 51.4	−59.1	143.8	13 03.0	−59.3	143.9	12 14.4	−59.3	144.1	0
1	16 53.7	−58.4	143.2	16 05.7	−58.7	143.4	15 17.5	−58.8	143.5	14 29.2	−58.9	143.7	13 40.8	−59.0	143.8	12 52.3	−59.1	144.0	12 03.7	−59.2	144.1	11 15.1	−59.3	144.2	1
2	15 55.3	−58.5	143.4	15 07.0	−58.6	143.6	14 18.7	−58.7	143.7	13 30.3	−58.9	143.9	12 41.8	−59.0	144.0	11 53.2	−59.1	144.1	11 04.5	−59.2	144.3	10 15.8	−59.3	144.4	2
3	14 56.8	−58.5	143.6	14 08.4	−58.6	143.8	13 20.0	−58.8	143.9	12 31.4	−58.9	144.1	11 42.8	−59.0	144.2	10 54.1	−59.1	144.3	10 05.3	−59.2	144.4	9 16.5	−59.3	144.5	3
4	13 58.3	−58.5	143.9	13 09.8	−58.7	144.0	12 21.2	−58.8	144.1	11 32.5	−58.9	144.3	10 43.8	−59.0	144.4	9 55.0	−59.2	144.5	9 06.1	−59.2	144.6	8 17.2	−59.4	144.7	4
5	12 59.8	−58.6	144.1	12 11.1	−58.6	144.2	11 22.4	−58.8	144.3	10 33.6	−58.9	144.5	9 44.8	−59.1	144.6	8 55.8	−59.1	144.7	8 06.9	−59.3	144.7	7 17.8	−59.3	144.8	5
6	12 01.2	−58.5	144.3	11 12.5	−58.7	144.4	10 23.6	−58.8	144.6	9 34.7	−58.9	144.7	8 45.7	−59.0	144.7	7 56.7	−59.1	144.8	7 07.6	−59.2	144.9	6 18.5	−59.3	145.0	6
7	11 02.7	−58.6	144.5	10 13.8	−58.7	144.7	9 24.8	−58.8	144.8	8 35.8	−58.9	144.8	7 46.7	−59.0	144.9	6 57.6	−59.2	145.0	6 08.4	−59.2	145.1	5 19.2	−59.3	145.1	7
8	10 04.1	−58.5	144.8	9 15.1	−58.7	144.9	8 26.0	−58.8	145.0	7 36.9	−59.0	145.0	6 47.7	−59.1	145.1	5 58.4	−59.1	145.2	5 09.2	−59.3	145.2	4 19.9	−59.4	145.3	8
9	9 05.6	−58.6	145.0	8 16.4	−58.7	145.1	7 27.2	−58.8	145.2	6 37.9	−58.9	145.2	5 48.6	−59.0	145.3	4 59.3	−59.2	145.3	4 09.9	−59.2	145.4	3 20.5	−59.3	145.4	9
10	8 07.0	−58.6	145.2	7 17.7	−58.7	145.3	6 28.4	−58.8	145.4	5 39.0	−58.9	145.4	4 49.6	−59.1	145.5	4 00.1	−59.1	145.5	3 10.7	−59.3	145.5	2 21.2	−59.3	145.6	10
11	7 08.4	−58.5	145.4	6 19.0	−58.7	145.5	5 29.6	−58.9	145.6	4 40.1	−59.0	145.6	3 50.5	−59.0	145.6	3 01.0	−59.2	145.7	2 11.4	−59.2	145.7	1 21.9	−59.4	145.7	11
12	6 09.9	−58.6	145.6	5 20.3	−58.7	145.7	4 30.7	−58.8	145.8	3 41.1	−58.9	145.8	2 51.5	−59.1	145.8	2 01.8	−59.1	145.8	1 12.2	−59.3	145.9	0 22.5	−59.3	145.9	12
13	5 11.3	−58.6	145.9	4 21.6	−58.7	145.9	3 31.9	−58.8	145.9	2 42.2	−59.0	146.0	1 52.4	−59.0	146.0	1 02.7	−59.2	146.0	0 12.9	−59.2	146.0	0 36.8	+59.3	34.0	13
14	4 12.7	−58.6	146.1	3 22.9	−58.7	146.1	2 33.1	−58.9	146.1	1 43.2	−58.9	146.2	0 53.4	−59.1	146.2	0 03.5	−59.1	146.2	0 46.3	+59.2	33.8	1 36.1	+59.4	33.8	14
15	3 14.1	−58.6	146.3	2 24.2	−58.7	146.3	1 34.2	−58.8	146.3	0 44.3	−59.0	146.4	0 05.7	+59.0	33.6	0 55.6	+59.2	33.6	1 45.5	+59.3	33.7	2 35.5	+59.3	33.7	15
16	2 15.5	−58.6	146.5	1 25.5	−58.8	146.5	0 35.4	−58.8	146.5	0 14.7	+58.9	33.5	1 04.7	+59.1	33.5	1 54.8	+59.1	33.5	2 44.8	+59.2	33.5	3 34.8	+59.3	33.5	16
17	1 16.9	−58.6	146.7	0 26.7	−58.7	146.7	0 23.4	+58.9	33.3	1 13.6	+58.9	33.3	2 03.8	+59.0	33.3	2 53.9	+59.1	33.3	3 44.0	+59.3	33.3	4 34.1	+59.4	33.4	17
18	0 18.3	−58.6	146.9	0 32.0	+58.7	33.1	1 22.3	+58.8	33.1	2 12.5	+59.0	33.1	3 02.8	+59.0	33.1	3 53.0	+59.2	33.1	4 43.3	+59.2	33.2	5 33.5	+59.3	33.2	18
19	0 40.3	+58.6	32.8	1 30.7	+58.7	32.9	2 21.1	+58.8	32.9	3 11.5	+58.9	32.9	4 01.8	+59.1	32.9	4 52.2	+59.1	33.0	5 42.5	+59.3	33.0	6 32.8	+59.3	33.1	19
20	1 38.9	+58.6	32.6	2 29.4	+58.7	32.6	3 19.9	+58.9	32.7	4 10.4	+59.0	32.7	5 00.9	+59.0	32.8	5 51.3	+59.2	32.8	6 41.8	+59.2	32.9	7 32.1	+59.3	32.9	20
21	2 37.5	+58.6	32.4	3 28.1	+58.7	32.4	4 18.8	+58.8	32.5	5 09.4	+58.9	32.5	5 59.9	+59.1	32.6	6 50.5	+59.1	32.6	7 41.0	+59.2	32.7	8 31.4	+59.4	32.8	21
22	3 36.1	+58.6	32.2	4 26.8	+58.8	32.2	5 17.6	+58.8	32.3	6 08.3	+58.9	32.3	6 59.0	+59.0	32.4	7 49.6	+59.1	32.5	8 40.2	+59.2	32.5	9 30.8	+59.3	32.6	22
23	4 34.7	+58.6	32.0	5 25.6	+58.7	32.0	6 16.4	+58.8	32.1	7 07.2	+58.9	32.1	7 58.0	+59.0	32.2	8 48.7	+59.2	32.3	9 39.4	+59.3	32.4	10 30.1	+59.3	32.5	23
24	5 33.3	+58.5	31.8	6 24.3	+58.7	31.8	7 15.2	+58.8	31.9	8 06.1	+59.0	32.0	8 57.0	+59.1	32.0	9 47.9	+59.1	32.1	10 38.7	+59.2	32.2	11 29.4	+59.3	32.3	24
25	6 31.8	+58.6	31.5	7 23.0	+58.6	31.6	8 14.0	+58.8	31.7	9 05.1	+58.9	31.8	9 56.1	+59.0	31.9	10 47.0	+59.1	32.0	11 37.9	+59.2	32.1	12 28.7	+59.3	32.2	25
26	7 30.4	+58.6	31.3	8 21.6	+58.7	31.4	9 12.8	+58.8	31.5	10 04.0	+58.9	31.6	10 55.1	+59.0	31.7	11 46.1	+59.1	31.8	12 37.1	+59.2	31.9	13 28.0	+59.3	32.0	26
27	8 29.0	+58.6	31.1	9 20.3	+58.7	31.2	10 11.6	+58.8	31.3	11 02.9	+58.9	31.4	11 54.1	+59.0	31.5	12 45.2	+59.1	31.6	13 36.3	+59.2	31.7	14 27.3	+59.3	31.9	27
28	9 27.6	+58.5	30.9	10 19.0	+58.7	31.0	11 10.4	+58.8	31.1	12 01.8	+58.9	31.2	12 53.1	+59.0	31.3	13 44.3	+59.1	31.4	14 35.5	+59.2	31.6	15 26.6	+59.3	31.7	28
29	10 26.1	+58.6	30.7	11 17.7	+58.7	30.8	12 09.2	+58.8	30.9	13 00.7	+58.9	31.0	13 52.1	+59.0	31.1	14 43.4	+59.1	31.2	15 34.7	+59.2	31.4	16 25.9	+59.2	31.5	29
30	11 24.7	+58.5	30.4	12 16.4	+58.6	30.6	13 08.0	+58.8	30.7	13 59.6	+58.8	30.8	14 51.1	+58.9	30.9	15 42.5	+59.1	31.1	16 33.9	+59.1	31.2	17 25.1	+59.3	31.4	30
31	12 23.2	+58.5	30.2	13 15.0	+58.6	30.3	14 06.8	+58.7	30.5	14 58.4	+58.9	30.6	15 50.0	+59.0	30.7	16 41.6	+59.1	30.9	17 33.0	+59.2	31.0	18 24.4	+59.3	31.2	31
32	13 21.7	+58.5	30.0	14 13.6	+58.7	30.1	15 05.5	+58.8	30.3	15 57.3	+58.9	30.4	16 49.0	+59.0	30.5	17 40.7	+59.0	30.7	18 32.2	+59.2	30.9	19 23.7	+59.2	31.0	32
33	14 20.2	+58.5	29.8	15 12.3	+58.6	29.9	16 04.3	+58.7	30.0	16 56.2	+58.8	30.2	17 48.0	+58.9	30.3	18 39.7	+59.1	30.5	19 31.4	+59.1	30.7	20 22.9	+59.2	30.9	33
34	15 18.7	+58.5	29.5	16 10.9	+58.6	29.7	17 03.0	+58.7	29.8	17 55.0	+58.8	30.0	18 46.9	+59.0	30.1	19 38.8	+59.0	30.3	20 30.5	+59.1	30.5	21 22.1	+59.3	30.7	34
35	16 17.2	+58.5	29.3	17 09.5	+58.6	29.5	18 01.7	+58.7	29.6	18 53.8	+58.8	29.8	19 45.9	+58.9	30.0	20 37.8	+59.0	30.1	21 29.6	+59.2	30.3	22 21.4	+59.2	30.5	35
36	17 15.7	+58.4	29.1	18 08.1	+58.6	29.2	19 00.4	+58.7	29.4	19 52.6	+58.8	29.6	20 44.8	+58.9	29.7	21 36.8	+59.0	29.9	22 28.8	+59.1	30.1	23 20.6	+59.2	30.4	36
37	18 14.1	+58.5	28.8	19 06.7	+58.5	29.0	19 59.1	+58.7	29.2	20 51.4	+58.8	29.4	21 43.7	+58.9	29.5	22 35.8	+59.0	29.7	23 27.9	+59.1	30.0	24 19.8	+59.2	30.2	37
38	19 12.6	+58.4	28.6	20 05.2	+58.5	28.8	20 57.8	+58.6	28.9	21 50.2	+58.8	29.1	22 42.6	+58.8	29.3	23 34.8	+59.0	29.5	24 27.0	+59.0	29.8	25 19.0	+59.2	30.0	38
39	20 11.0	+58.4	28.4	21 03.7	+58.6	28.5	21 56.4	+58.6	28.7	22 49.0	+58.7	28.9	23 41.4	+58.9	29.1	24 33.8	+59.0	29.3	25 26.0	+59.1	29.6	26 18.2	+59.1	29.8	39
40	21 09.4	+58.4	28.1	22 02.3	+58.5	28.3	22 55.0	+58.7	28.5	23 47.7	+58.7	28.7	24 40.3	+58.8	28.9	25 32.8	+58.9	29.1	26 25.1	+59.1	29.4	27 17.3	+59.2	29.6	40
41	22 07.8	+58.3	27.9	23 00.8	+58.4	28.1	23 53.7	+58.5	28.3	24 46.4	+58.8	28.5	25 39.1	+58.9	28.7	26 31.7	+58.9	28.9	27 24.2	+59.0	29.2	28 16.5	+59.1	29.4	41
42	23 06.1	+58.3	27.6	23 59.2	+58.5	27.8	24 52.2	+58.6	28.0	25 45.2	+58.6	28.2	26 38.0	+58.8	28.5	27 30.6	+58.9	28.7	28 23.2	+59.0	29.0	29 15.6	+59.1	29.2	42
43	24 04.4	+58.3	27.4	24 57.7	+58.4	27.6	25 50.8	+58.6	27.8	26 43.8	+58.7	28.0	27 36.8	+58.7	28.3	28 29.5	+58.9	28.5	29 22.2	+59.0	28.8	30 14.7	+59.1	29.1	43
44	25 02.7	+58.3	27.1	25 56.1	+58.4	27.3	26 49.4	+58.5	27.5	27 42.5	+58.6	27.8	28 35.5	+58.8	28.0	29 28.4	+58.9	28.3	30 21.2	+59.0	28.6	31 13.8	+59.1	28.8	44
45	26 01.0	+58.3	26.8	26 54.5	+58.4	27.1	27 47.9	+58.5	27.3	28 41.1	+58.7	27.5	29 34.3	+58.7	27.8	30 27.3	+58.8	28.1	31 20.2	+58.9	28.3	32 12.9	+59.1	28.6	45
46	26 59.3	+58.2	26.6	27 52.9	+58.3	26.8	28 46.4	+58.4	27.0	29 39.8	+58.5	27.3	30 33.0	+58.7	27.6	31 26.1	+58.9	27.8	32 19.1	+58.9	28.1	33 12.0	+59.0	28.4	46
47	27 57.5	+58.2	26.3	28 51.2	+58.3	26.5	29 44.8	+58.5	26.8	30 38.3	+58.6	27.0	31 31.7	+58.7	27.3	32 25.0	+58.7	27.6	33 18.0	+59.0	27.9	34 11.0	+59.0	28.2	47
48	28 55.7	+58.1	26.0	29 49.5	+58.3	26.3	30 43.3	+58.4	26.5	31 36.9	+58.5	26.8	32 30.4	+58.6	27.1	33 23.7	+58.8	27.4	34 17.0	+58.8	27.7	35 10.0	+59.0	28.0	48
49	29 53.8	+58.1	25.7	30 47.8	+58.2	26.0	31 41.7	+58.3	26.2	32 35.4	+58.5	26.5	33 29.0	+58.6	26.8	34 22.5	+58.7	27.1	35 15.8	+58.9	27.4	36 09.0	+59.0	27.8	49
50	30 51.9	+58.1	25.4	31 46.0	+58.2	25.7	32 40.0	+58.4	26.0	33 33.9	+58.5	26.3	34 27.6	+58.6	26.6	35 21.2	+58.7	26.9	36 14.7	+58.8	27.2	37 08.0	+58.9	27.5	50
51	31 50.0	+58.0	25.1	32 44.2	+58.2	25.4	33 38.4	+58.3	25.7	34 32.4	+58.4	26.0	35 26.2	+58.6	26.3	36 19.9	+58.7	26.6	37 13.5	+58.8	27.0	38 06.9	+58.9	27.3	51
52	32 48.0	+58.0	24.8	33 42.4	+58.1	25.1	34 36.7	+58.2	25.4	35 30.8	+58.4	25.7	36 24.8	+58.5	26.0	37 18.6	+58.6	26.4	38 12.3	+58.7	26.7	39 05.8	+58.9	27.1	52
53	33 46.0	+57.9	24.5	34 40.5	+58.1	24.8	35 34.9	+58.2	25.1	36 29.2	+58.3	25.4	37 23.3	+58.4	25.8	38 17.2	+58.6	26.1	39 11.0	+58.8	26.4	40 04.7	+58.8	26.8	53
54	34 43.9	+57.9	24.2	35 38.6	+58.0	24.5	36 33.1	+58.2	24.8	37 27.5	+58.3	25.1	38 21.7	+58.5	25.5	39 15.8	+58.6	25.8	40 09.8	+58.7	26.2	41 03.5	+58.8	26.6	54
55	35 41.8	+57.8	23.9	36 36.6	+58.0	24.2	37 31.3	+58.1	24.5	38 25.8	+58.2	24.8	39 20.2	+58.4	25.2	40 14.4	+58.5	25.5	41 08.5	+58.6	25.9	42 02.3	+58.8	26.3	55
56	36 39.6	+57.8	23.6	37 34.6	+57.9	23.9	38 29.4	+58.0	24.2	39 24.0	+58.2	24.5	40 18.6	+58.3	24.9	41 12.9	+58.5	25.2	42 07.1	+58.6	25.6	43 01.1	+58.7	26.0	56
57	37 37.4	+57.7	23.2	38 32.5	+57.9	23.5	39 27.4	+58.0	23.9	40 22.2	+58.2	24.2	41 16.9	+58.3	24.6	42 11.4	+58.4	24.9	43 05.7	+58.5	25.3	43 59.8	+58.7	25.7	57
58	38 35.1	+57.7	22.9	39 30.4	+57.8	23.2	40 25.4	+58.0	23.5	41 20.4	+58.1	23.9	42 15.2	+58.2	24.2	43 09.8	+58.4	24.6	44 04.2	+58.6	25.0	44 58.5	+58.7	25.4	58
59	39 32.8	+57.6	22.5	40 28.2	+57.7	22.8	41 23.4	+57.9	23.2	42 18.5	+58.0	23.5	43 13.4	+58.2	23.9	44 08.2	+58.3	24.3	45 02.8	+58.4	24.7	45 57.2	+58.6	25.1	59
60	40 30.4	+57.5	22.2	41 25.9	+57.7	22.5	42 21.3	+57.8	22.8	43 16.5	+57.9	23.2	44 11.6	+58.1	23.6	45 06.5	+58.2	24.0	46 01.2	+58.4	24.4	46 55.8	+58.5	24.8	60
61	41 27.9	+57.5	21.8	42 23.6	+57.6	22.1	43 19.1	+57.7	22.5	44 14.4	+57.9	22.8	45 09.7	+58.0	23.2	46 04.7	+58.2	23.6	46 59.6	+58.3	24.1	47 54.3	+58.5	24.5	61
62	42 25.4	+57.3	21.4	43 21.2	+57.5	21.7	44 16.8	+57.7	22.1	45 12.3	+57.9	22.5	46 07.7	+58.0	22.9	47 02.9	+58.1	23.3	47 57.9	+58.3	23.7	48 52.8	+58.4	24.2	62
63	43 22.7	+57.3	21.0	44 18.7	+57.4	21.3	45 14.5	+57.6	21.7	46 10.2	+57.7	22.1	47 05.7	+57.9	22.5	48 01.0	+58.1	22.9	48 56.2	+58.2	23.4	49 51.2	+58.3	23.8	63
64	44 20.0	+57.2	20.6	45 16.1	+57.3	20.9	46 12.1	+57.5	21.3	47 07.9	+57.6	21.7	48 03.6	+57.8	22.1	48 59.1	+57.9	22.5	49 54.4	+58.1	23.0	50 49.5	+58.3	23.5	64
65	45 17.2	+57.1	20.2	46 13.4	+57.3	20.5	47 09.6	+57.4	20.9	48 05.5	+57.6	21.3	49 01.4	+57.7	21.7	49 57.0	+57.9	22.1	50 52.5	+58.1	22.6	51 47.8	+58.2	23.1	65
66	46 14.3	+56.9	19.7	47 10.7	+57.1	20.1	48 07.0	+57.3	20.5	49 03.1	+57.5	20.9	49 59.1	+57.6	21.3	50 54.9	+57.8	21.7	51 50.6	+57.9	22.2	52 46.0	+58.2	22.7	66
67	47 11.2	+56.9	19.3	48 07.8	+57.0	19.6	49 04.3	+57.2	20.0	50 00.6	+57.3	20.4	50 56.7	+57.5	20.8	51 52.7	+57.7	21.3	52 48.5	+57.9	21.8	53 44.2	+58.0	22.3	67
68	48 08.1	+56.7	18.8	49 04.8	+56.9	19.1	50 01.5	+57.0	19.5	50 57.9	+57.3	19.9	51 54.2	+57.5	20.4	52 50.4	+57.6	20.8	53 46.4	+57.8	21.3	54 42.2	+57.9	21.8	68
69	49 04.8	+56.7	18.3	50 01.7	+56.8	18.7	50 58.5	+57.0	19.1	51 55.2	+57.1	19.5	52 51.7	+57.3	19.9	53 48.0	+57.5	20.4	54 44.2	+57.6	20.9	55 40.1	+57.9	21.4	69
70	50 01.5	+56.4	17.8	50 58.5	+56.7	18.2	51 55.5	+56.8	18.5	52 52.3	+57.0	19.0	53 49.0	+57.1	19.4	54 45.5	+57.3	19.9	55 41.8	+57.5	20.4	56 38.0	+57.7	20.9	70
71	50 57.9	+56.3	17.2	51 55.2	+56.5	17.6	52 52.3	+56.7	18.0	53 49.3	+56.8	18.4	54 46.1	+57.0	18.9	55 42.8	+57.2	19.4	56 39.3	+57.4	19.9	57 35.7	+57.6	20.4	71
72	51 54.2	+56.2	16.7	52 51.7	+56.3	17.1	53 49.0	+56.5	17.5	54 46.1	+56.7	17.9	55 43.1	+56.9	18.3	56 40.0	+57.1	18.8	57 36.7	+57.3	19.3	58 33.3	+57.4	19.9	72
73	52 50.4	+56.0	16.1	53 48.0	+56.2	16.5	54 45.5	+56.3	16.9	55 42.8	+56.5	17.3	56 40.0	+56.7	17.8	57 37.1	+56.9	18.2	58 34.0	+57.1	18.8	59 30.7	+57.3	19.3	73
74	53 46.4	+55.8	15.5	54 44.2	+55.9	15.9	55 41.8	+56.2	16.3	56 39.3	+56.4	16.7	57 36.7	+56.6	17.2	58 34.0	+56.7	17.6	59 31.1	+56.9	18.2	60 28.0	+57.1	18.7	74
75	54 42.2	+55.6	14.9	55 40.1	+55.8	15.3	56 38.0	+55.9	15.7	57 35.7	+56.1	16.1	58 33.3	+56.3	16.5	59 30.7	+56.5	17.0	60 28.0	+56.7	17.5	61 25.1	+57.0	18.1	75
76	55 37.8	+55.4	14.2	56 35.9	+55.5	14.6	57 33.9	+55.7	15.0	58 31.8	+55.9	15.4	59 29.6	+56.1	15.9	60 27.2	+56.3	16.3	61 24.7	+56.6	16.9	62 22.1	+56.7	17.4	76
77	56 33.2	+55.1	13.5	57 31.4	+55.3	13.9	58 29.6	+55.5	14.3	59 27.7	+55.7	14.7	60 25.7	+55.9	15.2	61 23.5	+56.1	15.6	62 21.3	+56.2	16.1	63 18.8	+56.5	16.7	77
78	57 28.3	+54.8	12.8	58 26.7	+55.1	13.2	59 25.1	+55.2	13.6	60 23.4	+55.4	14.0	61 21.6	+55.6	14.4	62 19.6	+55.8	14.9	63 17.5	+56.1	15.4	64 15.3	+56.3	15.9	78
79	58 23.1	+54.6	12.1	59 21.8	+54.7	12.4	60 20.3	+55.0	12.8	61 18.8	+55.1	13.2	62 17.2	+55.3	13.6	63 15.4	+55.6	14.1	64 13.6	+55.7	14.6	65 11.6	+55.9	15.1	79
80	59 17.7	+54.3	11.2	60 16.5	+54.5	11.6	61 15.3	+54.6	12.0	62 13.9	+54.8	12.3	63 12.5	+55.0	12.8	64 11.0	+55.2	13.2	65 09.3	+55.4	13.7	66 07.5	+55.7	14.2	80
81	60 12.0	+53.9	10.4	61 11.0	+54.1	10.7	62 09.9	+54.3	11.1	63 08.7	+54.5	11.5	64 07.5	+54.6	11.9	65 06.2	+54.8	12.3	66 04.7	+55.1	12.8	67 03.2	+55.3	13.3	81
82	61 05.9	+53.6	9.5	62 05.1	+53.7	9.8	63 04.2	+53.8	10.2	64 03.2	+54.1	10.5	65 02.1	+54.3	10.9	66 01.0	+54.5	11.3	66 59.8	+54.7	11.8	67 58.5	+54.9	12.3	82
83	61 59.5	+53.1	8.6	62 58.8	+53.3	8.9	63 58.0	+53.5	9.2	64 57.3	+53.6	9.5	65 56.4	+53.8	9.9	66 55.5	+54.0	10.3	67 54.5	+54.2	10.7	68 53.4	+54.4	11.2	83
84	62 52.6	+52.7	7.6	63 52.1	+52.8	7.8	64 51.5	+53.0	8.1	65 50.9	+53.1	8.4	66 50.2	+53.3	8.8	67 49.5	+53.5	9.1	68 48.7	+53.7	9.5	69 47.8	+53.9	10.0	84
85	63 45.3	+52.2	6.5	64 44.9	+52.3	6.7	65 44.5	+52.4	7.0	66 44.0	+52.6	7.3	67 43.5	+52.7	7.6	68 43.0	+52.9	7.9	69 42.4	+53.1	8.3	70 41.7	+53.3	8.7	85
86	64 37.5	+51.6	5.4	65 37.2	+51.7	5.6	66 36.9	+51.9	5.8	67 36.6	+52.0	6.0	68 36.2	+52.2	6.3	69 35.9	+52.2	6.6	70 35.5	+52.4	6.9	71 35.0	+52.6	7.3	86
87	65 29.1	+51.0	4.1	66 28.9	+51.1	4.3	67 28.8	+51.2	4.5	68 28.6	+51.3	4.7	69 28.4	+51.4	4.9	70 28.1	+51.5	5.2	71 27.9	+51.6	5.4	72 27.6	+51.8	5.7	87
88	66 20.1	+50.3	2.9	67 20.0	+50.4	3.0	68 20.0	+50.4	3.1	69 19.9	+50.5	3.3	70 19.8	+50.5	3.4	71 19.6	+50.7	3.6	72 19.5	+50.8	3.8	73 19.4	+50.8	4.0	88
89	67 10.4	+49.6	1.5	68 10.4	+49.6	1.5	69 10.4	+49.6	1.6	70 10.4	+49.6	1.7	71 10.3	+49.7	1.8	72 10.3	+49.7	1.9	73 10.3	+49.7	2.0	74 10.2	+49.8	2.1	89
90	68 00.0	+48.7	0.0	69 00.0	+48.7	0.0	70 00.0	+48.7	0.0	71 00.0	+48.6	0.0	72 00.0	+48.6	0.0	73 00.0	+48.6	0.0	74 00.0	+48.5	0.0	75 00.0	+48.5	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 145°, 215°

36°, 324° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.....Zn=360°–Z

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	17 38.5	+58.4	141.9	16 51.2	+58.5	142.1	16 03.8	+58.7	142.3	15 16.3	+58.8	142.5	14 28.7	+58.9	142.6	13 40.9	+59.1	142.8	12 53.1	+59.2	142.9	12 05.2	+59.3	143.1	0
1	18 36.9	+58.3	141.7	17 49.7	+58.5	141.9	17 02.5	+58.6	142.1	16 15.1	+58.8	142.3	15 27.6	+58.9	142.4	14 40.0	+59.0	142.6	13 52.3	+59.1	142.7	13 04.5	+59.2	142.9	1
2	19 35.2	+58.3	141.4	18 48.2	+58.5	141.6	18 01.1	+58.7	141.8	17 13.9	+58.7	142.0	16 26.5	+58.9	142.2	15 39.0	+59.0	142.4	14 51.4	+59.2	142.6	14 03.7	+59.3	142.7	2
3	20 33.5	+58.4	141.2	19 46.7	+58.5	141.4	18 59.8	+58.6	141.6	18 12.6	+58.8	141.8	17 25.4	+58.9	142.0	16 38.0	+59.1	142.2	15 50.6	+59.1	142.4	15 03.0	+59.2	142.6	3
4	21 31.9	+58.2	140.9	20 45.2	+58.4	141.2	19 58.4	+58.6	141.4	19 11.4	+58.8	141.6	18 24.3	+58.9	141.8	17 37.1	+59.0	142.0	16 49.7	+59.1	142.2	16 02.2	+59.3	142.4	4
5	22 30.1	+58.3	140.7	21 43.6	+58.5	140.9	20 57.0	+58.6	141.2	20 10.2	+58.7	141.4	19 23.2	+58.9	141.6	18 36.1	+59.0	141.8	17 48.8	+59.2	142.0	17 01.5	+59.2	142.2	5
6	23 28.4	+58.2	140.4	22 42.1	+58.4	140.7	21 55.6	+58.5	140.9	21 08.9	+58.7	141.2	20 22.1	+58.8	141.4	19 35.1	+59.0	141.7	18 48.0	+59.1	141.9	18 00.7	+59.2	142.1	6
7	24 26.6	+58.2	140.1	23 40.5	+58.3	140.4	22 54.1	+58.6	140.7	22 07.6	+58.7	141.0	21 20.9	+58.9	141.2	20 34.1	+58.9	141.5	19 47.1	+59.1	141.7	18 59.9	+59.2	141.9	7
8	25 24.8	+58.2	139.9	24 38.8	+58.4	140.2	23 52.7	+58.5	140.5	23 06.3	+58.7	140.7	22 19.8	+58.8	141.0	21 33.0	+59.0	141.3	20 46.2	+59.0	141.5	19 59.1	+59.2	141.7	8
9	26 23.0	+58.1	139.6	25 37.2	+58.3	139.9	24 51.2	+58.5	140.2	24 05.0	+58.6	140.5	23 18.6	+58.8	140.8	22 32.0	+58.9	141.1	21 45.2	+59.1	141.3	20 58.3	+59.2	141.6	9
10	27 21.1	+58.2	139.3	26 35.5	+58.3	139.7	25 49.7	+58.5	140.0	25 03.6	+58.7	140.3	24 17.4	+58.8	140.6	23 30.9	+59.0	140.9	22 44.3	+59.1	141.1	21 57.5	+59.2	141.4	10
11	28 19.3	+58.0	139.0	27 33.8	+58.3	139.4	26 48.2	+58.4	139.7	26 02.3	+58.6	140.0	25 16.2	+58.7	140.4	24 29.9	+58.9	140.6	23 43.4	+59.0	140.9	22 56.7	+59.2	141.2	11
12	29 17.3	+58.1	138.8	28 32.1	+58.2	139.1	27 46.6	+58.4	139.5	27 00.9	+58.6	139.8	26 14.9	+58.8	140.1	25 28.8	+58.9	140.4	24 42.4	+59.1	140.7	23 55.9	+59.1	141.0	12
13	30 15.4	+58.0	138.5	29 30.3	+58.2	138.8	28 45.0	+58.4	139.2	27 59.5	+58.5	139.6	27 13.7	+58.7	139.9	26 27.7	+58.9	140.2	25 41.5	+59.0	140.5	24 55.0	+59.2	140.8	13
14	31 13.4	+57.9	138.2	30 28.5	+58.2	138.6	29 43.4	+58.4	138.9	28 58.0	+58.6	139.3	28 12.4	+58.7	139.7	27 26.6	+58.8	140.0	26 40.5	+59.0	140.3	25 54.2	+59.1	140.7	14
15	32 11.3	+57.9	137.9	31 26.7	+58.1	138.3	30 41.8	+58.3	138.7	29 56.6	+58.5	139.1	29 11.1	+58.7	139.4	28 25.4	+58.8	139.8	27 39.5	+58.9	140.1	26 53.3	+59.1	140.5	15
16	33 09.2	+57.9	137.6	32 24.8	+58.1	138.0	31 40.1	+58.3	138.4	30 55.1	+58.4	138.8	30 09.8	+58.6	139.2	29 24.2	+58.8	139.6	28 38.4	+59.0	139.9	27 52.4	+59.1	140.3	16
17	34 07.1	+57.8	137.2	33 22.9	+58.0	137.7	32 38.4	+58.2	138.1	31 53.5	+58.5	138.5	31 08.4	+58.6	138.9	30 23.0	+58.8	139.3	29 37.4	+58.9	139.7	28 51.5	+59.1	140.1	17
18	35 04.9	+57.8	136.9	34 20.9	+58.0	137.4	33 36.6	+58.2	137.8	32 52.0	+58.4	138.3	32 07.0	+58.6	138.7	31 21.8	+58.8	139.1	30 36.3	+59.0	139.5	29 50.6	+59.1	139.9	18
19	36 02.7	+57.7	136.6	35 18.9	+58.0	137.1	34 34.8	+58.2	137.5	33 50.4	+58.3	138.0	33 05.6	+58.6	138.4	32 20.6	+58.7	138.9	31 35.3	+58.9	139.3	30 49.7	+59.0	139.7	19
20	37 00.4	+57.6	136.2	36 16.9	+57.8	136.8	35 33.0	+58.1	137.2	34 48.7	+58.4	137.7	34 04.2	+58.5	138.2	33 19.3	+58.7	138.6	32 34.2	+58.8	139.0	31 48.7	+59.0	139.5	20
21	37 58.0	+57.6	135.9	37 14.7	+57.9	136.4	36 31.1	+58.1	136.9	35 47.1	+58.3	137.4	35 02.7	+58.5	137.9	34 18.0	+58.7	138.4	33 33.0	+58.9	138.8	32 47.7	+59.0	139.2	21
22	38 55.6	+57.5	135.5	38 12.6	+57.7	136.1	37 29.2	+58.0	136.6	36 45.4	+58.2	137.1	36 01.2	+58.4	137.6	35 16.7	+58.6	138.1	34 31.9	+58.8	138.6	33 46.7	+59.0	139.0	22
23	39 53.1	+57.4	135.2	39 10.3	+57.8	135.7	38 27.2	+57.9	136.3	37 43.6	+58.2	136.8	36 59.6	+58.5	137.4	36 15.3	+58.6	137.9	35 30.7	+58.8	138.3	34 45.7	+58.9	138.8	23
24	40 50.5	+57.4	134.8	40 08.1	+57.6	135.4	39 25.1	+57.9	136.0	38 41.8	+58.1	136.5	37 58.1	+58.3	137.1	37 13.9	+58.6	137.6	36 29.5	+58.7	138.1	35 44.6	+59.0	138.6	24
25	41 47.9	+57.3	134.4	41 05.7	+57.6	135.0	40 23.0	+57.9	135.6	39 39.9	+58.1	136.2	38 56.4	+58.3	136.8	38 12.5	+58.5	137.3	37 28.2	+58.7	137.8	36 43.6	+58.9	138.3	25
26	42 45.2	+57.2	134.0	42 03.3	+57.5	134.6	41 20.9	+57.8	135.3	40 38.0	+58.1	135.9	39 54.7	+58.3	136.5	39 11.0	+58.5	137.0	38 26.9	+58.7	137.6	37 42.5	+58.8	138.1	26
27	43 42.4	+57.1	133.6	43 00.8	+57.4	134.3	42 18.7	+57.7	134.9	41 36.1	+57.9	135.5	40 53.0	+58.2	136.2	40 09.5	+58.5	136.7	39 25.6	+58.7	137.3	38 41.3	+58.9	137.9	27
28	44 39.5	+57.0	133.1	43 58.2	+57.3	133.9	43 16.4	+57.6	134.5	42 34.0	+57.9	135.2	41 51.2	+58.2	135.8	41 08.0	+58.4	136.4	40 24.3	+58.6	137.0	39 40.2	+58.8	137.6	28
29	45 36.5	+56.9	132.7	44 55.5	+57.3	133.4	44 14.0	+57.5	134.2	43 31.9	+57.9	134.8	42 49.4	+58.1	135.5	42 06.4	+58.3	136.1	41 22.9	+58.5	136.8	40 39.0	+58.7	137.3	29
30	46 33.4	+56.8	132.2	45 52.8	+57.1	133.0	45 11.5	+57.5	133.8	44 29.8	+57.7	134.5	43 47.5	+58.0	135.2	43 04.7	+58.3	135.8	42 21.4	+58.5	136.5	41 37.7	+58.7	137.1	30
31	47 30.2	+56.6	131.8	46 49.9	+57.0	132.6	46 09.0	+57.4	133.3	45 27.5	+57.7	134.1	44 45.5	+58.0	134.8	44 03.0	+58.2	135.5	43 19.9	+58.5	136.2	42 36.4	+58.7	136.8	31
32	48 26.8	+56.6	131.3	47 46.9	+56.9	132.1	47 06.4	+57.2	132.9	46 25.2	+57.6	133.7	45 43.5	+57.9	134.4	45 01.2	+58.2	135.2	44 18.4	+58.4	135.8	43 35.1	+58.7	136.5	32
33	49 23.4	+56.4	130.8	48 43.8	+56.8	131.6	48 03.6	+57.2	132.5	47 22.8	+57.5	133.3	46 41.4	+57.8	134.1	45 59.4	+58.1	134.8	45 16.8	+58.4	135.5	44 33.8	+58.6	136.2	33
34	50 19.8	+56.2	130.2	49 40.6	+56.7	131.1	49 00.8	+57.1	132.0	48 20.3	+57.4	132.9	47 39.2	+57.7	133.7	46 57.5	+58.0	134.4	46 15.2	+58.3	135.2	45 32.4	+58.5	135.9	34
35	51 16.0	+56.1	129.7	50 37.3	+56.5	130.6	49 57.9	+56.9	131.5	49 17.7	+57.3	132.4	48 36.9	+57.7	133.3	47 55.5	+58.0	134.1	47 13.5	+58.2	134.8	46 30.9	+58.5	135.6	35
36	52 12.1	+55.9	129.1	51 33.8	+56.4	130.1	50 54.8	+56.8	131.0	50 15.0	+57.2	132.0	49 34.6	+57.5	132.8	48 53.5	+57.8	133.7	48 11.7	+58.2	134.5	47 29.4	+58.4	135.3	36
37	53 08.0	+55.7	128.5	52 30.2	+56.2	129.5	51 51.6	+56.7	130.5	51 12.2	+57.1	131.5	50 32.1	+57.5	132.4	49 51.3	+57.8	133.3	49 09.9	+58.1	134.1	48 27.8	+58.4	134.9	37
38	54 03.7	+55.5	127.9	53 26.4	+56.0	129.0	52 48.3	+56.5	130.0	52 09.3	+56.9	131.0	51 29.6	+57.3	131.9	50 49.1	+57.7	132.8	50 08.0	+58.0	133.7	49 26.2	+58.3	134.6	38
39	54 59.2	+55.3	127.2	54 22.4	+55.9	128.4	53 44.8	+56.3	129.4	53 06.2	+56.8	130.5	52 26.9	+57.2	131.5	51 46.8	+57.6	132.4	51 06.0	+57.9	133.3	50 24.5	+58.2	134.2	39
40	55 54.5	+55.1	126.6	55 18.3	+55.6	127.7	54 41.1	+56.2	128.8	54 03.0	+56.7	129.9	53 24.1	+57.1	131.0	52 44.4	+57.5	132.0	52 03.9	+57.8	132.9	51 22.7	+58.2	133.8	40
41	56 49.6	+54.7	125.8	56 13.9	+55.4	127.1	55 37.3	+55.9	128.2	54 59.7	+56.5	129.3	54 21.2	+56.9	130.4	53 41.9	+57.3	131.5	53 01.7	+57.8	132.5	52 20.9	+58.0	133.4	41
42	57 44.3	+54.6	125.1	57 09.3	+55.2	126.4	56 33.2	+55.8	127.6	55 56.2	+56.3	128.8	55 18.1	+56.8	129.9	54 39.2	+57.3	131.0	53 59.5	+57.6	132.0	53 18.9	+58.0	133.0	42
43	58 38.9	+54.2	124.3	58 04.5	+54.9	125.6	57 29.0	+55.5	126.9	56 52.5	+56.1	128.1	56 14.9	+56.6	129.3	55 36.5	+57.0	130.4	54 57.1	+57.5	131.5	54 16.9	+57.9	132.6	43
44	59 33.1	+53.8	123.5	58 59.4	+54.6	124.8	58 24.5	+55.3	126.2	57 48.6	+55.8	127.5	57 11.5	+56.5	128.7	56 33.5	+57.0	129.9	55 54.6	+57.4	131.0	55 14.8	+57.7	132.1	44
45	60 26.9	+53.5	122.6	59 54.0	+54.3	124.0	59 19.8	+55.0	125.4	58 44.4	+55.7	126.8	58 08.0	+56.2	128.1	57 30.5	+56.7	129.3	56 52.0	+57.2	130.5	56 12.5	+57.7	131.6	45
46	61 20.4	+53.1	121.6	60 48.3	+53.9	123.2	60 14.8	+54.7	124.6	59 40.1	+55.4	126.0	59 04.2	+56.0	127.4	58 27.2	+56.6	128.7	57 49.2	+57.1	129.9	57 10.2	+57.5	131.1	46
47	62 13.5	+52.7	120.7	61 42.2	+53.6	122.3	61 09.5	+54.4	123.8	60 35.5	+55.1	125.3	60 00.2	+55.8	126.7	59 23.8	+56.4	128.1	58 46.3	+56.9	129.4	58 07.7	+57.4	130.6	47
48	63 06.2	+52.1	119.6	62 35.8	+53.1	121.3	62 03.9	+54.0	122.9	61 30.6	+54.8	124.5	60 56.0	+55.5	125.9	60 20.2	+56.1	127.4	59 43.2	+56.7	128.7	59 05.1	+57.2	130.0	48
49	63 58.3	+51.7	118.5	63 28.9	+52.7	120.3	62 57.9	+53.6	122.0	62 25.4	+54.5	123.6	61 51.5	+55.2	125.2	61 16.3	+55.9	126.7	60 39.9	+56.5	128.1	60 02.3	+57.1	129.5	49
50	64 50.0	+51.0	117.3	64 21.6	+52.1	119.2	63 51.5	+53.1	121.0	63 19.9	+54.0	122.7	62 46.7	+54.9	124.3	62 12.2	+55.7	125.9	61 36.4	+56.3	127.4	60 59.4	+56.9	128.8	50
51	65 41.0	+50.3	116.1	65 13.7	+51.6	118.0	64 44.6	+52.7	119.9	64 13.9	+53.7	121.7	63 41.6	+54.6	123.4	63 07.9	+55.3	125.1	62 32.7	+56.1	126.6	61 56.3	+56.6	128.2	51
52	66 31.3	+49.7	114.7	66 05.3	+50.9	116.8	65 37.3	+52.1	118.7	65 07.6	+53.2	120.6	64 36.2	+54.1	122.5	64 03.2	+55.0	124.2	63 28.8	+55.7	125.9	62 52.9	+56.5	127.4	52
53	67 21.0	+48.8	113.3	66 56.2	+50.2	115.4	66 29.4	+51.5	117.5	66 00.8	+52.6	119.5	65 30.3	+53.7	121.4	64 58.2	+54.7	123.3	64 24.5	+55.5	125.0	63 49.4	+56.2	126.7	53
54	68 09.8	+47.8	111.8	67 46.4	+49.4	114.0	67 20.9	+50.9	116.2	66 53.4	+52.1	118.3	66 24.0	+53.3	120.3	65 52.9	+54.2	122.3	65 20.0	+55.1	124.1	64 45.6	+55.9	125.9	54
55	68 57.6	+46.9	110.1	68 35.8	+48.6	112.5	68 11.8	+50.0	114.8	67 45.5	+51.4	117.0	67 17.3	+52.6	119.2	66 47.1	+53.7	121.2	66 15.1	+54.7	123.2	65 41.5	+55.6	125.0	55
56	69 44.5	+45.7	108.3	69 24.4	+47.5	110.9	69 01.8	+49.2	113.3	68 36.9	+50.7	115.7	68 09.9	+52.0	117.9	67 40.8	+53.3	120.1	67 09.8	+54.3	122.1	66 37.1	+55.2	124.1	56
57	70 30.2	+44.4	106.4	70 11.9	+46.4	109.1	69 51.0	+48.2	111.7	69 27.6	+49.9	114.2	69 01.9	+51.4	116.5	68 34.1	+52.6	118.8	68 04.1	+53.8	121.0	67 32.3	+54.8	123.1	57
58	71 14.6	+43.0	104.4	70 58.3	+45.1	107.2	70 39.2	+47.1	109.9	70 17.5	+48.9	112.5	69 53.3	+50.5	115.1	69 26.7	+52.0	117.5	68 57.9	+53.3	119.8	68 27.1	+54.4	122.0	58
59	71 57.6	+41.3	102.2	71 43.4	+43.7	105.1	71 26.3	+45.9	108.0	71 06.4	+47.8	110.8	70 43.8	+49.6	113.5	70 18.7	+51.2	116.0	69 51.2	+52.6	118.5	69 21.5	+53.9	120.8	59
60	72 38.9	+39.6	99.8	72 27.1	+42.1	102.9	72 12.2	+44.5	105.9	71 54.2	+46.7	108.9	71 33.4	+48.6	111.7	71 09.9	+50.3	114.5	70 43.8	+51.9	117.1	70 15.4	+53.2	119.5	60
61	73 18.5	+37.4	97.2	73 09.2	+40.3	100.5	72 56.7	+42.8	103.7	72 40.9	+45.2	106.8	72 22.0	+47.4	109.8	72 00.2	+49.4	112.7	71 35.7	+51.1	115.5	71 08.6	+52.6	118.2	61
62	73 55.9	+35.2	94.4	73 49.5	+38.2	97.9	73 39.5	+41.0	101.3	73 26.1	+43.7	104.6	73 09.4	+46.0	107.8	72 49.6	+48.2	110.8	72 26.8	+50.1	113.8	72 01.2	+51.8	116.6	62
63	74 31.1	+32.6	91.5	74 27.7	+35.8	95.1	74 20.5	+39.0	98.6	74 09.8	+41.8	102.1	73 55.4	+44.5	105.5	73 37.8	+46.8	108.8	73 16.9	+49.0	111.9	72 53.0	+50.9	115.0	63
64	75 03.7	+29.7	88.3	75 03.5	+33.3	92.0	74 59.5	+36.6	95.7	74 51.6	+39.7	99.4	74 39.9	+42.7	103.0	74 24.6	+45.3	106.5	74 05.9	+47.7	109.9	73 43.9	+49.8	113.1	64
65	75 33.4	+26.5	84.8	75 36.8	+30.3	88.7	75 36.1	+33.9	92.6	75 31.3	+37.4	96.5	75 22.6	+40.6	100.3	75 09.9	+43.6	104.0	74 53.6	+46.2	107.6	74 33.7	+48.6	111.1	65
66	75 59.9	+23.1	81.2	76 07.1	+27.0	85.2	76 10.0	+30.9	89.2	76 08.7	+34.7	93.3	76 03.2	+38.1	97.3	75 53.5	+41.4	101.3	75 39.8	+44.4	105.1	75 22.3	+47.1	108.8	66
67	76 23.0	+19.3	77.3	76 34.1	+23.4	81.4	76 40.9	+27.6	85.6	76 43.4	+31.5	89.8	76 41.3	+35.5	94.0	76 34.9	+39.1	98.2	76 24.2	+42.4	102.3	76 09.4	+45.4	106.3	67
68	76 42.3	+15.2	73.2	76 57.5	+19.5	77.4	77 08.5	+23.8	81.6	77 14.9	+28.1	86.0	77 16.8	+32.2	90.4	77 14.0	+36.2	94.9	77 06.6	+40.0	99.2	76 54.8	+43.4	103.5	68
69	76 57.5	+11.0	69.0	77 17.0	+15.3	73.1	77 32.3	+19.7	77.5	77 43.0	+24.2	81.9	77 49.0	+28.7	86.5	77 50.2	+33.1	91.2	77 46.6	+37.1	95.8	77 38.2	+40.9	100.3	69
70	77 08.5	+6.4	64.6	77 32.3	+10.7	68.7	77 52.0	+15.2	73.0	78 07.2	+19.9	77.6	78 17.7	+24.6	82.3	78 23.3	+29.3	87.1	78 23.7	+33.9	92.0	78 19.1	+38.1	96.8	70
71	77 14.9	+1.9	60.1	77 43.0	+6.0	64.1	78 07.2	+10.5	68.4	78 27.1	+15.2	72.9	78 42.3	+20.1	77.7	78 52.6	+25.0	82.7	78 57.6	+29.9	87.8	78 57.2	+34.7	92.9	71
72	77 16.8	−2.8	55.6	77 49.0	+1.2	59.4	78 17.7	+5.6	63.6	78 42.3	+10.3	68.0	79 02.4	+15.2	72.8	79 17.6	+20.4	77.9	79 27.5	+25.6	83.1	79 31.9	+30.7	88.5	72
73	77 14.0	−7.4	51.0	77 50.2	−3.6	54.7	78 23.3	+0.4	58.6	78 52.6	+5.0	63.0	79 17.6	+9.9	67.7	79 38.0	+15.1	72.7	79 53.1	+20.6	78.1	80 02.6	+26.1	83.7	73
74	77 06.6	−11.8	46.6	77 46.6	−8.4	49.9	78 23.7	−4.6	53.7	78 57.6	−0.4	57.8	79 27.5	+4.4	62.3	79 53.1	+9.5	67.3	80 13.7	+15.0	72.7	80 28.7	+20.8	78.4	74
75	76 54.8	−16.1	42.2	77 38.2	−13.1	45.3	78 19.1	−9.6	48.7	78 57.2	−5.7	52.6	79 31.9	−1.3	56.9	80 02.6	+3.6	61.6	80 28.7	+9.1	66.9	80 49.5	+14.9	72.6	75
76	76 38.7	−20.0	38.0	77 25.1	−17.4	40.8	78 09.5	−14.4	43.9	78 51.5	−10.9	47.4	79 30.6	−6.9	51.4	80 06.2	−2.3	55.8	80 37.8	+2.8	60.8	81 04.4	+8.6	66.4	76
77	76 18.7	−23.8	34.0	77 07.7	−21.5	36.4	77 55.1	−18.9	39.2	78 40.6	−15.9	42.3	79 23.7	−12.4	45.9	80 03.9	−8.3	50.0	80 40.6	−3.6	54.7	81 13.0	+1.8	60.0	77
78	75 54.9	−27.3	30.1	76 46.2	−25.3	32.3	77 36.2	−23.0	34.7	78 24.7	−20.4	37.5	79 11.3	−17.4	40.7	79 55.6	−13.9	44.3	80 37.0	−9.8	48.6	81 14.8	−5.0	53.4	78
79	75 27.6	−30.3	26.5	76 20.9	−28.7	28.4	77 13.2	−26.9	30.5	78 04.3	−24.8	32.9	78 53.9	−22.3	35.6	79 41.7	−19.3	38.8	80 27.2	−15.7	42.5	81 09.8	−11.5	46.9	79
80	74 57.3	−33.1	23.2	75 52.2	−31.9	24.7	76 46.3	−30.3	26.5	77 39.5	−28.6	28.5	78 31.6	−26.5	30.9	79 22.4	−24.1	33.6	80 11.5	−21.3	36.8	80 58.3	−17.7	40.6	80
81	74 24.2	−35.6	20.0	75 20.3	−34.5	21.3	76 16.0	−33.4	22.8	77 10.9	−32.0	24.5	78 05.1	−30.3	26.4	78 58.3	−28.4	28.7	79 50.2	−26.1	31.4	80 40.6	−23.3	34.6	81
82	73 48.6	−37.9	17.1	74 45.8	−37.1	18.1	75 42.6	−36.2	19.4	76 38.9	−35.0	20.7	77 34.8	−33.8	22.4	78 29.9	−32.3	24.2	79 24.1	−30.5	26.4	80 17.3	−28.4	29.0	82
83	73 10.7	−39.9	14.3	74 08.7	−39.3	15.2	75 06.4	−38.5	16.2	76 03.9	−37.7	17.3	77 01.0	−36.7	18.6	77 57.6	−35.6	20.1	78 53.6	−34.2	21.8	79 48.9	−32.6	23.9	83
84	72 30.8	−41.7	11.8	73 29.4	−41.2	12.5	74 27.9	−40.6	13.3	75 26.2	−40.0	14.1	76 24.3	−39.4	15.2	77 22.0	−38.5	16.3	78 19.4	−37.5	17.7	79 16.3	−36.3	19.3	84
85	71 49.1	−43.3	9.4	72 48.2	−42.9	10.0	73 47.3	−42.6	10.6	74 46.2	−42.1	11.2	75 44.9	−41.5	12.0	76 43.5	−40.9	12.9	77 41.9	−40.3	13.9	78 40.0	−39.5	15.1	85
86	71 05.8	−44.7	7.3	72 05.3	−44.5	7.7	73 04.7	−44.2	8.1	74 04.1	−43.9	8.6	75 03.4	−43.6	9.1	76 02.6	−43.2	9.8	77 01.6	−42.6	10.5	78 00.5	−42.1	11.4	86
87	70 21.1	−45.9	5.2	71 20.8	−45.8	5.5	72 20.5	−45.6	5.8	73 20.2	−45.4	6.2	74 19.8	−45.2	6.5	75 19.4	−44.9	7.0	76 19.0	−44.7	7.5	77 18.4	−44.3	8.0	87
88	69 35.2	−47.1	3.4	70 35.0	−46.9	3.5	71 34.9	−46.9	3.7	72 34.8	−46.8	3.9	73 34.6	−46.6	4.2	74 34.5	−46.6	4.4	75 34.3	−46.4	4.7	76 34.1	−46.3	5.1	88
89	68 48.1	−48.1	1.6	69 48.1	−48.1	1.7	70 48.0	−48.0	1.8	71 48.0	−48.0	1.9	72 48.0	−48.0	2.0	73 47.9	−47.9	2.1	74 47.9	−47.9	2.2	75 47.8	−47.8	2.4	89
90	68 00.0	−49.0	0.0	69 00.0	−49.0	0.0	70 00.0	−49.0	0.0	71 00.0	−49.0	0.0	72 00.0	−49.1	0.0	73 00.0	−49.1	0.0	74 00.0	−49.1	0.0	75 00.0	−49.2	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

36°, 324° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 36°, 324°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	17 38.5	−58.4	141.9	16 51.2	−58.5	142.1	16 03.8	−58.7	142.3	15 16.3	−58.8	142.5	14 28.7	−59.0	142.6	13 40.9	−59.0	142.8	12 53.1	−59.2	142.9	12 05.2	−59.3	143.1	0
1	16 40.1	−58.4	142.2	15 52.7	−58.6	142.3	15 05.1	−58.7	142.5	14 17.5	−58.9	142.7	13 29.7	−58.9	142.8	12 41.9	−59.1	143.0	11 53.9	−59.1	143.1	11 05.9	−59.3	143.2	1
2	15 41.7	−58.4	142.4	14 54.1	−58.5	142.6	14 06.4	−58.7	142.7	13 18.6	−58.8	142.9	12 30.8	−59.0	143.0	11 42.8	−59.1	143.1	10 54.8	−59.2	143.3	10 06.6	−59.2	143.4	2
3	14 43.3	−58.4	142.6	13 55.6	−58.6	142.8	13 07.7	−58.7	142.9	12 19.8	−58.8	143.1	11 31.8	−59.0	143.2	10 43.7	−59.1	143.3	9 55.6	−59.2	143.4	9 07.4	−59.3	143.5	3
4	13 44.9	−58.5	142.9	12 57.0	−58.6	143.0	12 09.0	−58.7	143.1	11 21.0	−58.9	143.3	10 32.8	−58.9	143.4	9 44.6	−59.0	143.5	8 56.4	−59.2	143.6	8 08.1	−59.3	143.7	4
5	12 46.4	−58.4	143.1	11 58.4	−58.6	143.2	11 10.3	−58.7	143.4	10 22.1	−58.8	143.5	9 33.9	−59.0	143.6	8 45.6	−59.1	143.7	7 57.2	−59.2	143.8	7 08.8	−59.3	143.8	5
6	11 48.0	−58.5	143.3	10 59.8	−58.6	143.5	10 11.6	−58.8	143.6	9 23.3	−58.9	143.7	8 34.9	−59.0	143.8	7 46.5	−59.1	143.8	6 58.0	−59.2	143.9	6 09.5	−59.3	144.0	6
7	10 49.5	−58.5	143.6	10 01.2	−58.6	143.7	9 12.8	−58.7	143.8	8 24.4	−58.9	143.9	7 35.9	−59.0	143.9	6 47.4	−59.1	144.0	5 58.8	−59.2	144.1	5 10.2	−59.3	144.1	7
8	9 51.0	−58.5	143.8	9 02.6	−58.6	143.9	8 14.1	−58.8	144.0	7 25.5	−58.8	144.1	6 36.9	−59.0	144.1	5 48.3	−59.1	144.2	4 59.6	−59.2	144.2	4 10.9	−59.3	144.3	8
9	8 52.5	−58.5	144.0	8 04.0	−58.7	144.1	7 15.3	−58.7	144.2	6 26.7	−58.9	144.3	5 37.9	−59.0	144.3	4 49.2	−59.1	144.4	4 00.4	−59.2	144.4	3 11.6	−59.3	144.4	9
10	7 54.0	−58.5	144.2	7 05.3	−58.6	144.3	6 16.6	−58.8	144.4	5 27.8	−58.9	144.4	4 38.9	−59.0	144.5	3 50.1	−59.1	144.5	3 01.2	−59.2	144.6	2 12.3	−59.3	144.6	10
11	6 55.5	−58.5	144.5	6 06.7	−58.7	144.5	5 17.8	−58.8	144.6	4 28.9	−58.9	144.6	3 39.9	−59.0	144.7	2 51.0	−59.1	144.7	2 02.0	−59.2	144.7	1 13.0	−59.3	144.8	11
12	5 57.0	−58.5	144.7	5 08.0	−58.6	144.7	4 19.0	−58.7	144.8	3 30.0	−58.9	144.8	2 40.9	−59.0	144.9	1 51.9	−59.1	144.9	1 02.8	−59.2	144.9	0 13.7	−59.3	144.9	12
13	4 58.5	−58.5	144.9	4 09.4	−58.6	145.0	3 20.3	−58.8	145.0	2 31.1	−58.9	145.0	1 41.9	−59.0	145.0	0 52.8	−59.1	145.1	0 03.6	−59.2	145.1	0 45.6	+59.3	34.9	13
14	4 00.0	−58.5	145.1	3 10.8	−58.7	145.2	2 21.5	−58.8	145.2	1 32.2	−58.9	145.2	0 42.9	−59.0	145.2	0 06.3	+59.1	34.8	0 55.6	+59.2	34.8	1 44.9	+59.3	34.8	14
15	3 01.5	−58.6	145.4	2 12.1	−58.6	145.4	1 22.7	−58.7	145.4	0 33.3	−58.9	145.4	0 16.1	+59.0	34.6	1 05.4	+59.2	34.6	1 54.8	+59.2	34.6	2 44.2	+59.3	34.6	15
16	2 02.9	−58.5	145.6	1 13.5	−58.7	145.6	0 24.0	−58.8	145.6	0 25.6	+58.8	34.4	1 15.1	+59.0	34.4	2 04.6	+59.1	34.4	2 54.0	+59.2	34.5	3 43.5	+59.3	34.5	16
17	1 04.4	−58.5	145.8	0 14.8	−58.7	145.8	0 34.8	+58.8	34.2	1 24.4	+58.9	34.2	2 14.1	+59.0	34.2	3 03.7	+59.1	34.3	3 53.2	+59.2	34.3	4 42.8	+59.3	34.3	17
18	0 05.9	−58.5	146.0	0 43.9	+58.6	34.0	1 33.6	+58.8	34.0	2 23.3	+58.9	34.0	3 13.1	+59.0	34.0	4 02.8	+59.1	34.1	4 52.4	+59.2	34.1	5 42.1	+59.3	34.2	18
19	0 52.6	+58.6	33.8	1 42.5	+58.7	33.8	2 32.4	+58.7	33.8	3 22.2	+58.9	33.8	4 12.1	+58.9	33.9	5 01.9	+59.1	33.9	5 51.6	+59.2	34.0	6 41.4	+59.3	34.0	19
20	1 51.2	+58.5	33.5	2 41.2	+58.6	33.6	3 31.1	+58.8	33.6	4 21.1	+58.9	33.6	5 11.0	+59.0	33.7	6 01.0	+59.1	33.7	6 50.8	+59.2	33.8	7 40.7	+59.3	33.9	20
21	2 49.7	+58.5	33.3	3 39.8	+58.7	33.4	4 29.9	+58.8	33.4	5 20.0	+58.9	33.4	6 10.0	+59.0	33.5	7 00.1	+59.0	33.6	7 50.0	+59.2	33.6	8 40.0	+59.2	33.7	21
22	3 48.2	+58.5	33.1	4 38.5	+58.6	33.1	5 28.7	+58.7	33.2	6 18.9	+58.8	33.3	7 09.0	+59.0	33.3	7 59.1	+59.1	33.4	8 49.2	+59.2	33.5	9 39.2	+59.3	33.6	22
23	4 46.7	+58.5	32.9	5 37.1	+58.6	32.9	6 27.4	+58.8	33.0	7 17.7	+58.9	33.1	8 08.0	+59.0	33.1	8 58.2	+59.1	33.2	9 48.4	+59.2	33.3	10 38.5	+59.3	33.4	23
24	5 45.2	+58.6	32.7	6 35.7	+58.7	32.7	7 26.2	+58.7	32.8	8 16.6	+58.9	32.9	9 07.0	+59.0	32.9	9 57.3	+59.1	33.0	10 47.6	+59.2	33.1	11 37.8	+59.3	33.2	24
25	6 43.8	+58.5	32.4	7 34.4	+58.6	32.5	8 24.9	+58.8	32.6	9 15.5	+58.8	32.7	10 06.0	+58.9	32.8	10 56.4	+59.1	32.9	11 46.8	+59.1	33.0	12 37.1	+59.2	33.1	25
26	7 42.3	+58.5	32.2	8 33.0	+58.6	32.3	9 23.7	+58.7	32.4	10 14.3	+58.9	32.5	11 04.9	+59.0	32.6	11 55.5	+59.0	32.7	12 45.9	+59.2	32.8	13 36.3	+59.3	32.9	26
27	8 40.8	+58.4	32.0	9 31.6	+58.6	32.1	10 22.4	+58.8	32.2	11 13.2	+58.8	32.3	12 03.9	+58.9	32.4	12 54.5	+59.1	32.5	13 45.1	+59.2	32.6	14 35.6	+59.2	32.8	27
28	9 39.2	+58.5	31.8	10 30.2	+58.6	31.9	11 21.2	+58.7	32.0	12 12.0	+58.9	32.1	13 02.8	+59.0	32.2	13 53.6	+59.0	32.3	14 44.3	+59.1	32.5	15 34.8	+59.3	32.6	28
29	10 37.7	+58.5	31.5	11 28.8	+58.6	31.6	12 19.9	+58.7	31.8	13 10.9	+58.8	31.9	14 01.8	+58.9	32.0	14 52.6	+59.1	32.1	15 43.4	+59.1	32.3	16 34.1	+59.2	32.4	29
30	11 36.2	+58.4	31.3	12 27.4	+58.6	31.4	13 18.6	+58.7	31.5	14 09.7	+58.8	31.7	15 00.7	+58.9	31.8	15 51.7	+59.0	32.0	16 42.5	+59.2	32.1	17 33.3	+59.2	32.3	30
31	12 34.6	+58.5	31.1	13 26.0	+58.6	31.2	14 17.3	+58.7	31.3	15 08.5	+58.8	31.5	15 59.6	+59.0	31.6	16 50.7	+59.0	31.8	17 41.7	+59.1	31.9	18 32.5	+59.3	32.1	31
32	13 33.1	+58.4	30.8	14 24.6	+58.5	31.0	15 16.0	+58.7	31.1	16 07.3	+58.8	31.3	16 58.6	+58.9	31.4	17 49.7	+59.0	31.6	18 40.8	+59.1	31.7	19 31.8	+59.2	31.9	32
33	14 31.5	+58.4	30.6	15 23.1	+58.6	30.7	16 14.7	+58.6	30.9	17 06.1	+58.8	31.0	17 57.5	+58.9	31.2	18 48.7	+59.0	31.4	19 39.9	+59.1	31.6	20 31.0	+59.2	31.8	33
34	15 29.9	+58.5	30.4	16 21.7	+58.5	30.5	17 13.3	+58.7	30.7	18 04.9	+58.7	30.8	18 56.4	+58.8	31.0	19 47.7	+59.0	31.2	20 39.0	+59.1	31.4	21 30.2	+59.2	31.6	34
35	16 28.4	+58.3	30.1	17 20.2	+58.5	30.3	18 12.0	+58.6	30.5	19 03.6	+58.8	30.6	19 55.2	+58.9	30.8	20 46.7	+59.0	31.0	21 38.1	+59.1	31.2	22 29.4	+59.1	31.4	35
36	17 26.7	+58.4	29.9	18 18.7	+58.5	30.1	19 10.6	+58.6	30.2	20 02.4	+58.7	30.4	20 54.1	+58.8	30.6	21 45.7	+58.9	30.8	22 37.2	+59.0	31.0	23 28.5	+59.2	31.2	36
37	18 25.1	+58.4	29.7	19 17.2	+58.5	29.8	20 09.2	+58.6	30.0	21 01.1	+58.7	30.2	21 52.9	+58.9	30.4	22 44.6	+59.0	30.6	23 36.2	+59.1	30.8	24 27.7	+59.1	31.0	37
38	19 23.5	+58.3	29.4	20 15.7	+58.4	29.6	21 07.8	+58.6	29.8	21 59.8	+58.7	30.0	22 51.8	+58.8	30.2	23 43.6	+58.9	30.4	24 35.3	+59.0	30.6	25 26.8	+59.2	30.9	38
39	20 21.8	+58.3	29.2	21 14.1	+58.5	29.3	22 06.4	+58.6	29.5	22 58.5	+58.7	29.7	23 50.6	+58.8	30.0	24 42.5	+58.9	30.2	25 34.3	+59.0	30.4	26 26.0	+59.1	30.7	39
40	21 20.1	+58.3	28.9	22 12.6	+58.4	29.1	23 05.0	+58.5	29.3	23 57.2	+58.7	29.5	24 49.4	+58.8	29.7	25 41.4	+58.9	30.0	26 33.3	+59.0	30.2	27 25.1	+59.1	30.5	40
41	22 18.4	+58.3	28.7	23 11.0	+58.4	28.9	24 03.5	+58.5	29.1	24 55.9	+58.6	29.3	25 48.2	+58.7	29.5	26 40.3	+58.9	29.8	27 32.3	+59.0	30.0	28 24.2	+59.1	30.3	41
42	23 16.7	+58.2	28.4	24 09.4	+58.4	28.6	25 02.0	+58.5	28.8	25 54.5	+58.6	29.1	26 46.9	+58.7	29.3	27 39.2	+58.8	29.5	28 31.3	+59.0	29.8	29 23.3	+59.1	30.1	42
43	24 14.9	+58.2	28.1	25 07.8	+58.3	28.3	26 00.5	+58.5	28.6	26 53.1	+58.6	28.8	27 45.6	+58.8	29.1	28 38.0	+58.9	29.3	29 30.3	+58.9	29.6	30 22.4	+59.0	29.9	43
44	25 13.1	+58.2	27.9	26 06.1	+58.3	28.1	26 59.0	+58.4	28.3	27 51.7	+58.6	28.6	28 44.4	+58.6	28.8	29 36.9	+58.8	29.1	30 29.2	+58.9	29.4	31 21.4	+59.0	29.7	44
45	26 11.3	+58.1	27.6	27 04.4	+58.3	27.8	27 57.4	+58.4	28.1	28 50.3	+58.5	28.3	29 43.0	+58.7	28.6	30 35.7	+58.7	28.9	31 28.1	+58.9	29.2	32 20.4	+59.0	29.5	45
46	27 09.4	+58.2	27.3	28 02.7	+58.2	27.6	28 55.8	+58.4	27.8	29 48.8	+58.5	28.1	30 41.7	+58.6	28.3	31 34.4	+58.8	28.6	32 27.0	+58.9	28.9	33 19.4	+59.0	29.3	46
47	28 07.6	+58.0	27.0	29 00.9	+58.3	27.3	29 54.2	+58.3	27.5	30 47.3	+58.5	27.8	31 40.3	+58.6	28.1	32 33.2	+58.7	28.4	33 25.9	+58.8	28.7	34 18.4	+59.0	29.0	47
48	29 05.6	+58.1	26.7	29 59.2	+58.1	27.0	30 52.5	+58.4	27.3	31 45.8	+58.5	27.6	32 38.9	+58.6	27.8	33 31.9	+58.7	28.2	34 24.7	+58.9	28.5	35 17.4	+58.9	28.8	48
49	30 03.7	+58.0	26.5	30 57.3	+58.2	26.7	31 50.9	+58.2	27.0	32 44.3	+58.4	27.3	33 37.5	+58.5	27.6	34 30.6	+58.7	27.9	35 23.6	+58.7	28.2	36 16.3	+58.9	28.6	49
50	31 01.7	+58.0	26.2	31 55.5	+58.1	26.4	32 49.1	+58.3	26.7	33 42.7	+58.3	27.0	34 36.0	+58.5	27.3	35 29.3	+58.6	27.6	36 22.3	+58.8	28.0	37 15.2	+58.9	28.3	50
51	31 59.7	+57.9	25.9	32 53.6	+58.0	26.1	33 47.4	+58.2	26.4	34 41.0	+58.4	26.7	35 34.5	+58.5	27.1	36 27.9	+58.6	27.4	37 21.1	+58.7	27.7	38 14.1	+58.9	28.1	51
52	32 57.6	+57.8	25.5	33 51.6	+58.1	25.8	34 45.6	+58.1	26.1	35 39.4	+58.3	26.4	36 33.0	+58.4	26.8	37 26.5	+58.6	27.1	38 19.8	+58.7	27.5	39 13.0	+58.8	27.8	52
53	33 55.4	+57.9	25.2	34 49.7	+57.9	25.5	35 43.7	+58.1	25.8	36 37.7	+58.2	26.2	37 31.4	+58.4	26.5	38 25.1	+58.5	26.8	39 18.5	+58.7	27.2	40 11.8	+58.8	27.6	53
54	34 53.3	+57.7	24.9	35 47.6	+57.9	25.2	36 41.8	+58.1	25.5	37 35.9	+58.2	25.9	38 29.8	+58.4	26.2	39 23.6	+58.5	26.6	40 17.2	+58.6	26.9	41 10.6	+58.7	27.3	54
55	35 51.0	+57.8	24.6	36 45.5	+57.9	24.9	37 39.9	+58.0	25.2	38 34.1	+58.2	25.5	39 28.2	+58.3	25.9	40 22.1	+58.4	26.3	41 15.8	+58.5	26.6	42 09.3	+58.7	27.1	55
56	36 48.8	+57.6	24.2	37 43.4	+57.8	24.6	38 37.9	+58.0	24.9	39 32.3	+58.1	25.2	40 26.5	+58.2	25.6	41 20.5	+58.4	26.0	42 14.3	+58.6	26.4	43 08.0	+58.7	26.8	56
57	37 46.4	+57.6	23.9	38 41.2	+57.7	24.2	39 35.9	+57.8	24.5	40 30.4	+58.0	24.9	41 24.7	+58.2	25.3	42 18.9	+58.3	25.7	43 12.9	+58.4	26.1	44 06.7	+58.6	26.5	57
58	38 44.0	+57.5	23.5	39 38.9	+57.7	23.9	40 33.7	+57.9	24.2	41 28.4	+58.0	24.6	42 22.9	+58.1	24.9	43 17.2	+58.3	25.3	44 11.3	+58.5	25.7	45 05.3	+58.5	26.2	58
59	39 41.5	+57.5	23.2	40 36.6	+57.6	23.5	41 31.6	+57.7	23.9	42 26.4	+57.9	24.2	43 21.0	+58.1	24.6	44 15.5	+58.2	25.0	45 09.8	+58.3	25.4	46 03.8	+58.6	25.9	59
60	40 39.0	+57.4	22.8	41 34.2	+57.6	23.1	42 29.3	+57.7	23.5	43 24.3	+57.8	23.9	44 19.1	+58.0	24.3	45 13.7	+58.1	24.7	46 08.1	+58.3	25.1	47 02.4	+58.4	25.5	60
61	41 36.4	+57.3	22.4	42 31.8	+57.4	22.7	43 27.0	+57.6	23.1	44 22.1	+57.8	23.5	45 17.1	+57.9	23.9	46 11.8	+58.1	24.3	47 06.4	+58.3	24.8	48 00.8	+58.4	25.2	61
62	42 33.7	+57.2	22.0	43 29.2	+57.4	22.4	44 24.6	+57.6	22.7	45 19.9	+57.7	23.1	46 15.0	+57.9	23.5	47 09.9	+58.0	23.9	48 04.7	+58.1	24.4	48 59.2	+58.3	24.9	62
63	43 30.9	+57.1	21.6	44 26.6	+57.3	21.9	45 22.2	+57.4	22.3	46 17.6	+57.6	22.7	47 12.9	+57.7	23.1	48 07.9	+58.0	23.6	49 02.8	+58.1	24.0	49 57.5	+58.3	24.5	63
64	44 28.0	+57.0	21.2	45 23.9	+57.2	21.5	46 19.6	+57.4	21.9	47 15.2	+57.5	22.3	48 10.6	+57.7	22.7	49 05.9	+57.8	23.2	50 00.9	+58.1	23.6	50 55.8	+58.2	24.1	64
65	45 25.0	+56.9	20.7	46 21.1	+57.1	21.1	47 17.0	+57.2	21.5	48 12.7	+57.5	21.9	49 08.3	+57.6	22.3	50 03.7	+57.8	22.8	50 59.0	+57.9	23.2	51 54.0	+58.1	23.7	65
66	46 21.9	+56.8	20.3	47 18.2	+56.9	20.6	48 14.2	+57.2	21.0	49 10.2	+57.3	21.4	50 05.9	+57.5	21.9	51 01.5	+57.7	22.3	51 56.9	+57.8	22.8	52 52.1	+58.0	23.3	66
67	47 18.7	+56.7	19.8	48 15.1	+56.9	20.2	49 11.4	+57.0	20.6	50 07.5	+57.2	21.0	51 03.4	+57.4	21.4	51 59.2	+57.5	21.9	52 54.7	+57.8	22.4	53 50.1	+57.9	22.9	67
68	48 15.4	+56.6	19.3	49 12.0	+56.7	19.7	50 08.4	+56.9	20.1	51 04.7	+57.1	20.5	52 00.8	+57.3	21.0	52 56.7	+57.5	21.4	53 52.5	+57.6	21.9	54 48.0	+57.9	22.5	68
69	49 12.0	+56.4	18.8	50 08.7	+56.6	19.2	51 05.3	+56.8	19.6	52 01.8	+56.9	20.0	52 58.1	+57.1	20.5	53 54.2	+57.3	20.9	54 50.1	+57.5	21.5	55 45.9	+57.7	22.0	69
70	50 08.4	+56.3	18.3	51 05.3	+56.5	18.7	52 02.1	+56.6	19.1	52 58.7	+56.8	19.5	53 55.2	+57.0	20.0	54 51.5	+57.2	20.4	55 47.6	+57.4	21.0	56 43.6	+57.6	21.5	70
71	51 04.7	+56.1	17.7	52 01.8	+56.3	18.1	52 58.7	+56.5	18.5	53 55.5	+56.7	19.0	54 52.2	+56.9	19.4	55 48.7	+57.1	19.9	56 45.0	+57.3	20.4	57 41.2	+57.4	21.0	71
72	52 00.8	+55.9	17.2	52 58.1	+56.1	17.6	53 55.2	+56.3	18.0	54 52.2	+56.5	18.4	55 49.1	+56.7	18.9	56 45.8	+56.9	19.4	57 42.3	+57.1	19.9	58 38.6	+57.3	20.4	72
73	52 56.7	+55.8	16.6	53 54.2	+55.9	17.0	54 51.5	+56.1	17.4	55 48.7	+56.3	17.8	56 45.8	+56.5	18.3	57 42.7	+56.7	18.8	58 39.4	+56.9	19.3	59 35.9	+57.1	19.9	73
74	53 52.5	+55.5	16.0	54 50.1	+55.8	16.3	55 47.6	+56.0	16.8	56 45.0	+56.2	17.2	57 42.3	+56.3	17.7	58 39.4	+56.5	18.1	59 36.3	+56.7	18.7	60 33.0	+57.0	19.2	74
75	54 48.0	+55.4	15.3	55 45.9	+55.5	15.7	56 43.6	+55.7	16.1	57 41.2	+55.9	16.5	58 38.6	+56.1	17.0	59 35.9	+56.3	17.5	60 33.0	+56.6	18.0	61 30.0	+56.8	18.6	75
76	55 43.4	+55.1	14.6	56 41.4	+55.3	15.0	57 39.3	+55.5	15.4	58 37.1	+55.7	15.8	59 34.7	+55.9	16.3	60 32.2	+56.1	16.8	61 29.6	+56.3	17.3	62 26.8	+56.5	17.9	76
77	56 38.5	+54.8	13.9	57 36.7	+55.0	14.3	58 34.8	+55.2	14.7	59 32.8	+55.4	15.1	60 30.6	+55.6	15.6	61 28.3	+55.9	16.1	62 25.9	+56.1	16.6	63 23.3	+56.3	17.2	77
78	57 33.3	+54.6	13.2	58 31.7	+54.8	13.5	59 30.0	+54.9	13.9	60 28.2	+55.1	14.4	61 26.2	+55.4	14.8	62 24.2	+55.6	15.3	63 22.0	+55.8	15.8	64 19.6	+56.1	16.4	78
79	58 27.9	+54.3	12.4	59 26.5	+54.4	12.7	60 24.9	+54.7	13.1	61 23.3	+54.9	13.5	62 21.6	+55.1	14.0	63 19.8	+55.2	14.5	64 17.8	+55.5	15.0	65 15.7	+55.7	15.5	79
80	59 22.2	+53.9	11.6	60 20.9	+54.1	11.9	61 19.6	+54.3	12.3	62 18.2	+54.5	12.7	63 16.7	+54.7	13.1	64 15.0	+55.0	13.6	65 13.3	+55.2	14.1	66 11.4	+55.4	14.6	80
81	60 16.1	+53.6	10.7	61 15.0	+53.8	11.0	62 13.9	+53.9	11.4	63 12.7	+54.1	11.8	64 11.4	+54.3	12.2	65 10.0	+54.5	12.6	66 08.5	+54.7	13.1	67 06.8	+55.0	13.7	81
82	61 09.7	+53.2	9.8	62 08.8	+53.3	10.1	63 07.8	+53.6	10.4	64 06.8	+53.7	10.8	65 05.7	+53.9	11.2	66 04.5	+54.1	11.6	67 03.2	+54.4	12.1	68 01.8	+54.6	12.6	82
83	62 02.9	+52.7	8.8	63 02.1	+52.9	9.1	64 01.4	+53.0	9.4	65 00.5	+53.3	9.8	65 59.6	+53.5	10.1	66 58.6	+53.7	10.6	67 57.6	+53.9	11.0	68 56.4	+54.1	11.5	83
84	62 55.6	+52.3	7.8	63 55.0	+52.5	8.0	64 54.4	+52.6	8.3	65 53.8	+52.7	8.7	66 53.1	+52.9	9.0	67 52.3	+53.1	9.4	68 51.5	+53.3	9.8	69 50.5	+53.6	10.3	84
85	63 47.9	+51.7	6.7	64 47.5	+51.8	6.9	65 47.0	+52.0	7.2	66 46.5	+52.2	7.5	67 46.0	+52.3	7.8	68 45.4	+52.5	8.1	69 44.8	+52.7	8.5	70 44.1	+52.9	8.9	85
86	64 39.6	+51.2	5.5	65 39.3	+51.3	5.7	66 39.0	+51.4	5.9	67 38.7	+51.5	6.2	68 38.3	+51.7	6.5	69 37.9	+51.8	6.8	70 37.5	+52.0	7.1	71 37.0	+52.2	7.5	86
87	65 30.8	+50.5	4.3	66 30.6	+50.6	4.4	67 30.4	+50.7	4.6	68 30.2	+50.8	4.8	69 30.0	+50.9	5.0	70 29.7	+51.1	5.3	71 29.5	+51.1	5.6	72 29.2	+51.3	5.9	87
88	66 21.3	+49.7	2.9	67 21.2	+49.8	3.1	68 21.1	+49.9	3.2	69 21.0	+50.0	3.3	70 20.9	+50.0	3.5	71 20.8	+50.1	3.7	72 20.6	+50.3	3.9	73 20.5	+50.3	4.1	88
89	67 11.0	+49.0	1.5	68 11.0	+49.0	1.6	69 11.0	+49.0	1.7	70 11.0	+49.0	1.7	71 10.9	+49.1	1.8	72 10.9	+49.1	1.9	73 10.9	+49.1	2.0	74 10.8	+49.2	2.2	89
90	68 00.0	+48.1	0.0	69 00.0	+48.1	0.0	70 00.0	+48.0	0.0	71 00.0	+48.0	0.0	72 00.0	+48.0	0.0	73 00.0	+47.9	0.0	74 00.0	+47.9	0.0	75 00.0	+47.8	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 144°, 216°

Dec.	68° Hc	68° d	68° Z	69° Hc	69° d	69° Z	70° Hc	70° d	70° Z	71° Hc	71° d	71° Z
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°
0	17 24.5	+58.3	140.9	16 37.9	+58.4	141.1	15 51.1	+58.6	141.3	15 04.2	+58.8	141.4
1	18 22.8	+58.2	140.6	17 36.3	+58.4	140.9	16 49.7	+58.6	141.0	16 03.0	+58.7	141.2
2	19 21.0	+58.3	140.4	18 34.7	+58.5	140.6	17 48.3	+58.6	140.8	17 01.7	+58.7	141.0
3	20 19.3	+58.2	140.1	19 33.2	+58.4	140.4	18 46.9	+58.5	140.6	18 00.4	+58.7	140.8
4	21 17.5	+58.2	139.9	20 31.6	+58.3	140.1	19 45.4	+58.6	140.4	18 59.1	+58.7	140.6
5	22 15.7	+58.2	139.6	21 29.9	+58.4	139.9	20 44.0	+58.5	140.1	19 57.8	+58.7	140.4
6	23 13.9	+58.2	139.4	22 28.3	+58.3	139.6	21 42.5	+58.5	139.9	20 56.5	+58.7	140.1
7	24 12.1	+58.1	139.1	23 26.6	+58.3	139.4	22 41.0	+58.5	139.7	21 55.2	+58.6	139.9
8	25 10.2	+58.1	138.8	24 24.9	+58.3	139.1	23 39.5	+58.4	139.4	22 53.8	+58.6	139.7
9	26 08.3	+58.0	138.5	25 23.2	+58.3	138.9	24 37.9	+58.4	139.2	23 52.4	+58.6	139.5
10	27 06.3	+58.1	138.3	26 21.5	+58.2	138.6	25 36.3	+58.4	138.9	24 51.0	+58.6	139.2
11	28 04.4	+58.0	138.0	27 19.7	+58.2	138.3	26 34.7	+58.4	138.7	25 49.6	+58.5	139.0
12	29 02.4	+57.9	137.7	28 17.9	+58.1	138.0	27 33.1	+58.4	138.4	26 48.1	+58.6	138.7
13	30 00.3	+57.9	137.4	29 16.0	+58.1	137.8	28 31.5	+58.3	138.1	27 46.7	+58.5	138.5
14	30 58.2	+57.9	137.1	30 14.1	+58.1	137.5	29 29.8	+58.3	137.9	28 45.2	+58.4	138.2
15	31 56.1	+57.8	136.8	31 12.2	+58.1	137.2	30 28.1	+58.2	137.6	29 43.6	+58.5	138.0
16	32 53.9	+57.8	136.4	32 10.3	+58.0	136.9	31 26.3	+58.2	137.3	30 42.1	+58.4	137.7
17	33 51.7	+57.7	136.1	33 08.3	+57.9	136.6	32 24.5	+58.2	137.0	31 40.5	+58.3	137.4
18	34 49.4	+57.7	135.8	34 06.2	+57.9	136.3	33 22.7	+58.1	136.7	32 38.8	+58.4	137.2
19	35 47.1	+57.6	135.5	35 04.1	+57.9	136.0	34 20.8	+58.1	136.4	33 37.2	+58.3	136.9
20	36 44.7	+57.5	135.1	36 02.0	+57.8	135.6	35 18.9	+58.0	136.1	34 35.5	+58.2	136.6
21	37 42.2	+57.5	134.8	36 59.8	+57.7	135.3	36 16.9	+58.0	135.8	35 33.7	+58.2	136.3
22	38 39.7	+57.4	134.4	37 57.5	+57.7	135.0	37 14.9	+57.9	135.5	36 31.9	+58.2	136.0
23	39 37.1	+57.3	134.0	38 55.2	+57.6	134.6	38 12.8	+57.9	135.2	37 30.1	+58.1	135.7
24	40 34.4	+57.3	133.6	39 52.8	+57.6	134.2	39 10.7	+57.8	134.8	38 28.2	+58.1	135.4
25	41 31.7	+57.2	133.2	40 50.4	+57.4	133.9	40 08.5	+57.8	134.5	39 26.3	+58.0	135.1
26	42 28.9	+57.0	132.8	41 47.8	+57.4	133.5	41 06.3	+57.7	134.1	40 24.3	+57.9	134.7
27	43 25.9	+57.0	132.4	42 45.2	+57.3	133.1	42 04.0	+57.6	133.8	41 22.2	+57.9	134.4
28	44 22.9	+56.9	132.0	43 42.5	+57.3	132.7	43 01.6	+57.5	133.4	42 20.1	+57.8	134.0
29	45 19.8	+56.8	131.5	44 39.8	+57.1	132.3	43 59.1	+57.5	133.0	43 17.9	+57.8	133.7
30	46 16.6	+56.7	131.1	45 36.9	+57.0	131.8	44 56.6	+57.3	132.6	44 15.7	+57.7	133.3
31	47 13.3	+56.5	130.6	46 33.9	+56.9	131.4	45 53.9	+57.3	132.2	45 13.4	+57.6	132.9
32	48 09.8	+56.4	130.1	47 30.8	+56.8	130.9	46 51.2	+57.2	131.7	46 11.0	+57.5	132.5
33	49 06.2	+56.2	129.6	48 27.6	+56.7	130.4	47 48.4	+57.0	131.3	47 08.5	+57.4	132.1
34	50 02.4	+56.1	129.0	49 24.3	+56.5	129.9	48 45.4	+57.0	130.8	48 05.9	+57.3	131.7
35	50 58.5	+56.0	128.5	50 20.8	+56.4	129.4	49 42.4	+56.8	130.3	49 03.2	+57.2	131.2
36	51 54.5	+55.7	127.9	51 17.2	+56.3	128.9	50 39.2	+56.7	129.8	50 00.4	+57.1	130.8
37	52 50.2	+55.6	127.3	52 13.5	+56.0	128.3	51 35.9	+56.5	129.3	50 57.5	+56.9	130.3
38	53 45.8	+55.4	126.7	53 09.5	+55.9	127.7	52 32.4	+56.4	128.8	51 54.4	+56.8	129.8
39	54 41.2	+55.1	126.0	54 05.4	+55.7	127.1	53 28.8	+56.2	128.2	52 51.2	+56.7	129.2
40	55 36.3	+54.9	125.3	55 01.1	+55.5	126.5	54 25.0	+56.0	127.6	53 47.9	+56.5	128.7
41	56 31.2	+54.6	124.6	55 56.6	+55.3	125.8	55 21.0	+55.8	127.0	54 44.4	+56.4	128.1
42	57 25.8	+54.4	123.8	56 51.9	+55.0	125.1	56 16.8	+55.7	126.3	55 40.8	+56.2	127.5
43	58 20.2	+54.0	123.0	57 46.9	+54.7	124.4	57 12.5	+55.3	125.6	56 37.0	+55.9	126.9
44	59 14.2	+53.7	122.2	58 41.6	+54.4	123.6	58 07.8	+55.1	124.9	57 32.9	+55.8	126.2
45	60 07.9	+53.3	121.3	59 36.0	+54.1	122.8	59 02.9	+54.9	124.2	58 28.7	+55.5	125.5
46	61 01.2	+52.9	120.4	60 30.1	+53.8	121.9	59 57.8	+54.5	123.4	59 24.2	+55.2	124.8
47	61 54.1	+52.4	119.4	61 23.9	+53.4	121.0	60 52.3	+54.2	122.5	60 19.4	+55.0	124.0
48	62 46.5	+52.0	118.3	62 17.3	+52.9	120.0	61 46.5	+53.9	121.6	61 14.4	+54.6	123.2
49	63 38.5	+51.4	117.2	63 10.2	+52.5	119.0	62 40.4	+53.4	120.7	62 09.0	+54.3	122.3
50	64 29.9	+50.8	116.0	64 02.7	+51.9	117.9	63 33.8	+52.9	119.7	63 03.3	+53.9	121.4
51	65 20.7	+50.1	114.8	64 54.6	+51.4	116.7	64 26.7	+52.5	118.6	63 57.2	+53.5	120.4
52	66 10.8	+49.4	113.4	65 46.0	+50.7	115.5	65 19.2	+51.9	117.5	64 50.7	+53.0	119.4
53	67 00.2	+48.6	112.0	66 36.7	+50.0	114.2	66 11.1	+51.3	116.2	65 43.7	+52.4	118.2
54	67 48.8	+47.7	110.5	67 26.7	+49.2	112.7	67 02.4	+50.6	114.9	66 36.1	+51.9	117.0
55	68 36.5	+46.6	108.9	68 15.9	+48.3	111.2	67 53.0	+49.9	113.5	67 28.0	+51.2	115.7
56	69 23.1	+45.5	107.1	69 04.2	+47.3	109.6	68 42.9	+48.9	112.0	68 19.2	+50.5	114.4
57	70 08.6	+44.2	105.2	69 51.5	+46.2	107.8	69 31.8	+48.0	110.4	69 09.7	+49.7	112.9
58	70 52.8	+42.8	103.2	70 37.7	+44.9	106.0	70 19.8	+47.0	108.7	69 59.4	+48.7	111.3
59	71 35.6	+41.2	101.0	71 22.6	+43.5	103.9	71 06.8	+45.6	106.8	70 48.1	+47.6	109.5
60	72 16.8	+39.3	98.7	72 06.1	+42.0	101.7	71 52.4	+44.3	104.7	71 35.7	+46.4	107.6
61	72 56.1	+37.4 •	96.1	72 48.1	+40.1 •	99.3	72 36.7	+42.6	102.5	72 22.1	+45.1	105.6
62	73 33.5	+35.1 •	93.4	73 28.2	+38.0 •	96.8	73 19.3	+40.9	100.1	73 07.2	+43.4	103.4
63	74 08.6	+32.6 •	90.5	74 06.2	+35.8 •	94.0	74 00.2	+38.9 •	97.5	73 50.6	+41.7	100.9
64	74 41.2	+29.8 •	87.4	74 42.0	+33.3 •	91.0	74 39.1	+36.5 •	94.7	74 32.3	+39.6 •	98.3
65	75 11.0	+26.8 •	84.0	75 15.3	+30.4 •	87.8	75 15.6	+33.9 •	91.6	75 11.9	+37.3 •	95.4
66	75 37.8	+23.3 •	80.5	75 45.7	+27.2 •	84.4	75 49.5	+31.0 •	88.3	75 49.2	+34.6 •	92.3
67	76 01.1	+19.7 •	76.7	76 12.9	+23.7 •	80.7	76 20.5	+27.7 •	84.8	76 23.8	+31.6 •	88.9
68	76 20.8	+15.8 •	72.8	76 36.6	+19.9 •	76.8	76 48.2	+24.1 •	80.9	76 55.4	+28.3 •	85.2
69	76 36.6	+11.6 •	68.6	76 56.5	+15.8 •	72.7	77 12.3	+20.1 •	76.9	77 23.7	+24.5 •	81.2
70	76 48.2	+7.2 •	64.4	77 12.3	+11.4 •	68.3	77 32.4	+15.8 •	72.5	77 48.2	+20.3 •	77.0
71	76 55.4	+2.8 •	60.0	77 23.7	+6.8 •	63.9	77 48.2	+11.2 •	68.0	78 08.5	+15.7 •	72.4
72	76 58.2	−1.7 •	55.6	77 30.5	+2.2 •	59.3	77 59.4	+6.3 •	63.3	78 24.2	+11.0 •	67.7
73	76 56.5	−6.2 •	51.1	77 32.7	−2.6 •	54.7	78 05.7	+1.5 •	58.5	78 35.2	+5.8 •	62.8
74	76 50.3	−10.6 •	46.8	77 30.1	−7.2 •	50.0	78 07.2	−3.5 •	53.7	78 41.0	+0.7 •	57.7
75	76 39.7	−14.8 •	42.5	77 22.9	−11.8 •	45.5	78 03.7	−8.4 •	48.8	78 41.7	−4.6 •	52.6
76	76 24.9	−18.9 •	38.3	77 11.1	−16.2 •	41.0	77 55.3	−13.2 •	44.1	78 37.1	−9.7 •	47.5
77	76 06.0	−22.5 •	34.3	76 54.9	−20.2 •	36.7	77 42.1	−17.6 •	39.5	78 27.4	−14.6 •	42.6
78	75 43.5	−26.0 •	30.5	76 34.7	−24.1 •	32.6	77 24.5	−21.8 •	35.0	78 12.8	−19.2 •	37.8
79	75 17.5	−29.1 •	26.9	76 10.6	−27.5 •	28.7	77 02.7	−25.6 •	30.8	77 53.6	−23.5 •	33.2
80	74 48.4	−31.9 •	23.5	75 43.1	−30.6 •	25.1	76 37.1	−29.1 •	26.8	77 30.1	−27.3 •	28.9
81	74 16.5	−34.6 •	20.3	75 12.5	−33.5 •	21.6	76 08.0	−32.3 •	23.1	77 02.8	−30.8 •	24.8
82	73 41.9	−36.9 •	17.4	74 39.0	−36.0 •	18.4	75 35.7	−35.0 •	19.7	76 32.0	−34.0 •	21.1
83	73 05.0	−38.9	14.6	74 03.0	−38.3 •	15.5	75 00.7	−37.5 •	16.5	75 58.0	−36.6 •	17.6
84	72 26.1	−40.8	12.0	73 24.7	−40.3	12.7	74 23.2	−39.8 •	13.5	75 21.4	−39.1 •	14.4
85	71 45.3	−42.4	9.6	72 44.4	−42.0	10.2	73 43.4	−41.6	10.8	74 42.3	−41.2	11.5
86	71 02.9	−43.9	7.4	72 02.4	−43.7	7.8	73 01.8	−43.4	8.3	74 01.1	−43.0	8.8
87	70 19.0	−45.2	5.4	71 18.7	−45.0	5.6	72 18.4	−44.8	5.9	73 18.1	−44.7	6.3
88	69 33.8	−46.4	3.4	70 33.7	−46.3	3.6	71 33.6	−46.2	3.8	72 33.4	−46.1	4.0
89	68 47.4	−47.4	1.7	69 47.4	−47.4	1.7	70 47.4	−47.4	1.8	71 47.3	−47.3	1.9
90	68 00.0	−48.4	0.0	69 00.0	−48.4	0.0	70 00.0	−48.4	0.0	71 00.0	−48.4	0.0
	68°			69°			70°			71°		

72° Hc	72° d	72° Z	73° Hc	73° d	73° Z	74° Hc	74° d	74° Z	75° Hc	75° d	75° Z	Dec.
° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
14 17.3	+58.8	141.6	13 30.2	+59.0	141.8	12 43.0	+59.1	141.9	11 55.7	+59.3	142.0	0
15 16.1	+58.9	141.4	14 29.2	+59.0	141.6	13 42.1	+59.2	141.7	12 55.0	+59.2	141.9	1
16 15.0	+58.9	141.2	15 28.2	+59.0	141.4	14 41.3	+59.1	141.6	13 54.2	+59.2	141.7	2
17 13.9	+58.8	141.0	16 27.2	+59.0	141.2	15 40.4	+59.1	141.4	14 53.4	+59.2	141.5	3
18 12.7	+58.8	140.8	17 26.2	+58.9	141.0	16 39.5	+59.0	141.2	15 52.6	+59.2	141.4	4
19 11.5	+58.9	140.6	18 25.1	+59.0	140.8	17 38.5	+59.1	141.0	16 51.8	+59.2	141.2	5
20 10.4	+58.8	140.4	19 24.1	+58.9	140.6	18 37.6	+59.1	140.8	17 51.0	+59.2	141.0	6
21 09.2	+58.8	140.2	20 23.0	+58.9	140.4	19 36.7	+59.0	140.6	18 50.2	+59.2	140.9	7
22 08.0	+58.7	140.0	21 21.9	+58.9	140.2	20 35.7	+59.1	140.5	19 49.4	+59.2	140.7	8
23 06.7	+58.8	139.7	22 20.8	+58.9	140.0	21 34.8	+59.0	140.3	20 48.6	+59.1	140.5	9
24 05.5	+58.7	139.5	23 19.7	+58.9	139.8	22 33.8	+59.0	140.1	21 47.7	+59.2	140.3	10
25 04.2	+58.7	139.3	24 18.6	+58.9	139.6	23 32.8	+59.0	139.9	22 46.9	+59.1	140.2	11
26 02.9	+58.7	139.1	25 17.5	+58.8	139.4	24 31.8	+59.0	139.7	23 46.0	+59.1	140.0	12
27 01.6	+58.7	138.8	26 16.3	+58.9	139.2	25 30.8	+59.0	139.5	24 45.1	+59.1	139.8	13
28 00.3	+58.6	138.6	27 15.2	+58.8	138.9	26 29.8	+58.9	139.3	25 44.2	+59.1	139.6	14
28 58.9	+58.6	138.4	28 14.0	+58.7	138.7	27 28.7	+59.0	139.1	26 43.3	+59.1	139.4	15
29 57.5	+58.6	138.1	29 12.7	+58.8	138.5	28 27.7	+58.9	138.9	27 42.4	+59.0	139.2	16
30 56.1	+58.6	137.9	30 11.5	+58.7	138.3	29 26.6	+58.9	138.6	28 41.4	+59.1	139.0	17
31 54.7	+58.5	137.6	31 10.2	+58.7	138.0	30 25.5	+58.9	138.4	29 40.5	+59.0	138.8	18
32 53.2	+58.5	137.3	32 08.9	+58.7	137.8	31 24.4	+58.8	138.2	30 39.5	+59.0	138.6	19
33 51.7	+58.5	137.1	33 07.6	+58.6	137.5	32 23.2	+58.8	138.0	31 38.5	+59.0	138.4	20
34 50.2	+58.4	136.8	34 06.2	+58.7	137.3	33 22.0	+58.8	137.7	32 37.5	+58.9	138.2	21
35 48.6	+58.4	136.5	35 04.9	+58.5	137.0	34 20.8	+58.8	137.5	33 36.4	+58.9	137.9	22
36 47.0	+58.3	136.2	36 03.4	+58.6	136.7	35 19.6	+58.7	137.2	34 35.3	+59.0	137.7	23
37 45.3	+58.3	135.9	37 02.0	+58.5	136.5	36 18.3	+58.7	137.0	35 34.3	+58.8	137.5	24
38 43.6	+58.2	135.6	38 00.5	+58.5	136.2	37 17.0	+58.7	136.7	36 33.1	+58.9	137.2	25
39 41.8	+58.2	135.3	38 59.0	+58.4	135.9	38 15.7	+58.6	136.5	37 32.0	+58.8	137.0	26
40 40.0	+58.2	135.0	39 57.4	+58.3	135.6	39 14.3	+58.6	136.2	38 30.8	+58.8	136.7	27
41 38.2	+58.1	134.7	40 55.7	+58.4	135.3	40 12.9	+58.5	135.9	39 29.6	+58.7	136.5	28
42 36.3	+58.0	134.3	41 54.1	+58.2	135.0	41 11.4	+58.5	135.6	40 28.3	+58.7	136.2	29
43 34.3	+57.9	134.0	42 52.3	+58.3	134.7	42 09.9	+58.5	135.3	41 27.0	+58.7	135.9	30
44 32.2	+57.9	133.6	43 50.6	+58.1	134.3	43 08.4	+58.4	135.0	42 25.7	+58.6	135.7	31
45 30.1	+57.8	133.3	44 48.7	+58.1	134.0	44 06.8	+58.3	134.7	43 24.3	+58.6	135.4	32
46 27.9	+57.8	132.9	45 46.8	+58.0	133.6	45 05.1	+58.3	134.4	44 22.9	+58.5	135.1	33
47 25.7	+57.6	132.5	46 44.8	+58.0	133.3	46 03.4	+58.2	134.0	45 21.4	+58.5	134.8	34
48 23.3	+57.6	132.1	47 42.8	+57.9	132.9	47 01.6	+58.2	133.7	46 19.9	+58.4	134.4	35
49 20.9	+57.4	131.6	48 40.7	+57.7	132.5	47 59.8	+58.1	133.3	47 18.3	+58.4	134.1	36
50 18.3	+57.4	131.2	49 38.4	+57.7	132.1	48 57.9	+58.0	132.9	48 16.7	+58.3	133.8	37
51 15.7	+57.2	130.7	50 36.1	+57.6	131.7	49 55.9	+57.9	132.5	49 15.0	+58.2	133.4	38
52 12.9	+57.1	130.2	51 33.7	+57.5	131.2	50 53.8	+57.9	132.1	50 13.2	+58.2	133.0	39
53 10.0	+57.0	129.7	52 31.2	+57.4	130.7	51 51.7	+57.7	131.7	51 11.4	+58.1	132.6	40
54 07.0	+56.8	129.2	53 28.6	+57.3	130.3	52 49.4	+57.7	131.3	52 09.5	+58.0	132.2	41
55 03.8	+56.7	128.7	54 25.9	+57.1	129.7	53 47.1	+57.5	130.8	53 07.5	+57.9	131.8	42
56 00.5	+56.4	128.1	55 23.0	+57.0	129.2	54 44.6	+57.4	130.3	54 05.4	+57.8	131.4	43
56 56.9	+56.4	127.5	56 20.0	+56.8	128.7	55 42.0	+57.3	129.8	55 03.2	+57.6	130.9	44
57 53.3	+56.1	126.8	57 16.8	+56.6	128.1	56 39.3	+57.1	129.3	56 00.8	+57.6	130.4	45
58 49.4	+55.8	126.1	58 13.4	+56.5	127.5	57 36.4	+57.0	128.7	56 58.4	+57.4	129.9	46
59 45.2	+55.7	125.4	59 09.9	+56.2	126.8	58 33.4	+56.8	128.1	57 55.8	+57.3	129.4	47
60 40.9	+55.3	124.7	60 06.1	+56.0	126.1	59 30.2	+56.6	127.5	58 53.1	+57.1	128.8	48
61 36.2	+55.1	123.9	61 02.1	+55.8	125.4	60 26.8	+56.4	126.8	59 50.2	+57.0	128.2	49
62 31.3	+54.7	123.0	61 57.9	+55.5	124.6	61 23.2	+56.1	126.1	60 47.2	+56.8	127.6	50
63 26.0	+54.4	122.1	62 53.4	+55.2	123.8	62 19.3	+56.0	125.4	61 44.0	+56.5	126.9	51
64 20.4	+54.0	121.2	63 48.6	+54.8	122.9	63 15.3	+55.6	124.6	62 40.5	+56.3	126.2	52
65 14.4	+53.5	120.1	64 43.4	+54.5	122.0	64 10.9	+55.3	123.7	63 36.8	+56.1	125.4	53
66 07.9	+53.1	119.0	65 37.9	+54.1	121.0	65 06.2	+55.0	122.8	64 32.9	+55.8	124.6	54
67 01.0	+52.4	117.9	66 32.0	+53.5	119.9	66 01.2	+54.5	121.9	65 28.7	+55.4	123.7	55
67 53.4	+51.9	116.6	67 25.5	+53.1	118.8	66 55.7	+54.2	120.8	66 24.1	+55.1	122.8	56
68 45.3	+51.1	115.2	68 18.6	+52.5	117.5	67 49.9	+53.6	119.7	67 19.2	+54.7	121.8	57
69 36.4	+50.3	113.8	69 11.1	+51.7	116.2	68 43.5	+53.1	118.5	68 13.9	+54.2	120.7	58
70 26.7	+49.4	112.2	70 02.8	+51.0	114.7	69 36.6	+52.4	117.2	69 08.1	+53.7	119.5	59
71 16.1	+48.4	110.4	70 53.8	+50.2	113.2	70 29.0	+51.7	115.7	70 01.8	+53.0	118.2	60
72 04.5	+47.2	108.6	71 44.0	+49.1	111.4	71 20.7	+50.9	114.2	70 54.8	+52.4	116.8	61
72 51.7	+45.8	106.5	72 33.1	+48.0	109.6	72 11.6	+49.9	112.5	71 47.2	+51.6	115.3	62
73 37.5	+44.3	104.3	73 21.1	+46.6	107.5	73 01.5	+48.8	110.6	72 38.8	+50.7	113.6	63
74 21.8	+42.5	101.8	74 07.7	+45.2	105.3	73 50.3	+47.5	108.6	73 29.5	+49.6	111.8	64
75 04.3	+40.4 •	99.1	74 52.9	+43.3	102.8	74 37.8	+46.0	106.4	74 19.1	+48.4	109.8	65
75 44.7	+38.1 •	96.2	75 36.2	+41.4 •	100.1	75 23.8	+44.2	103.9	75 07.5	+47.0	107.5	66
76 22.8	+35.4 •	93.0	76 17.6	+38.9 •	97.1	76 08.0	+42.3 •	101.1	75 54.5	+45.2	105.0	67
76 58.2	+32.3 •	89.5	76 56.5	+36.2 •	93.8	76 50.3	+39.8 •	98.1	76 39.7	+43.2 •	102.3	68
77 30.5	+28.9 •	85.7	77 32.7	+33.0 •	90.2	77 30.1	+37.1 •	94.7	77 22.9	+40.8 •	99.2	69
77 59.4	+24.8 •	81.5	78 05.7	+29.5 •	86.2	78 07.2	+33.8 •	91.0	78 03.7	+38.0 •	95.7	70
78 24.2	+20.6 •	77.1	78 35.2	+25.3 •	81.9	78 41.0	+30.1 •	86.9	78 41.7	+34.7 •	91.9	71
78 44.8	+15.7 •	72.3	79 00.5	+20.7 •	77.3	79 11.1	+25.8 •	82.4	79 16.4	+30.8 •	87.6	72
79 00.5	+10.6 •	67.3	79 21.2	+15.7 •	72.3	79 36.9	+21.0 •	77.5	79 47.2	+26.3 •	82.9	73
79 11.1	+5.3 •	62.1	79 36.9	+10.3 •	67.0	79 57.9	+15.6 •	72.2	80 13.5	+21.2 •	77.7	74
79 16.4	−0.3 •	56.8	79 47.2	+4.5 •	61.5	80 13.5	+9.8 •	66.6	80 34.7	+15.5 •	72.1	75
79 16.1	−5.8 •	51.4	79 51.7	−1.3 •	55.8	80 23.3	+3.8 •	60.7	80 50.2	+9.3 •	66.1	76
79 10.3	−11.1 •	46.1	79 50.4	−7.1 •	50.1	80 27.1	−2.5 •	54.7	80 59.5	+2.8 •	59.8	77
78 59.2	−16.2 •	40.9	79 43.3	−12.7 •	44.5	80 24.6	−8.6 •	48.7	81 02.3	−3.8 •	53.4	78
78 43.0	−20.9 •	35.9	79 30.6	−17.9 •	39.1	80 16.0	−14.5 •	42.8	80 58.5	−10.3 •	47.1	79
78 22.1	−25.3 •	31.2	79 12.7	−22.9 •	33.9	80 01.5	−19.9 •	37.1	80 48.2	−16.5 •	40.8	80
77 56.8	−29.2 •	26.8	78 49.8	−27.2 •	29.1	79 41.6	−24.9 •	31.7	80 31.7	−22.0 •	34.9	81
77 27.6	−32.6 •	22.7	78 22.6	−31.1 •	24.6	79 16.7	−29.2 •	26.8	80 09.7	−27.1 •	29.4	82
76 55.0	−35.6 •	18.9	77 51.5	−34.5 •	20.4	78 47.5	−33.2 •	22.2	79 42.6	−31.5 •	24.2	83
76 19.4	−38.4 •	15.4	77 17.0	−37.4 •	16.6	78 14.3	−36.4 •	18.0	79 11.1	−35.2 •	19.6	84
75 41.0	−40.6 •	12.2	76 39.6	−40.1 •	13.1	77 37.9	−39.3 •	14.2	78 35.9	−38.5 •	15.4	85
75 00.4	−42.7	9.3	75 59.5	−42.2 •	10.0	76 58.6	−41.8 •	10.7	77 57.4	−41.2 •	11.6	86
74 17.7	−44.4	6.7	75 17.3	−44.2	7.1	76 16.8	−43.9	7.6	77 16.2	−43.5 •	8.2	87
73 33.3	−46.0	4.3	74 33.1	−45.8	4.5	75 32.9	−45.7	4.8	76 32.7	−45.5	5.2	88
72 47.3	−47.3	2.0	73 47.3	−47.3	2.2	74 47.2	−47.2	2.3	75 47.2	−47.2	2.5	89
72 00.0	−48.5	0.0	73 00.0	−48.5	0.0	74 00.0	−48.5	0.0	75 00.0	−48.6	0.0	90
72°			73°			74°			75°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 37°, 323°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	17 24.5	−58.3	140.9	16 37.9	−58.5	141.1	15 51.1	−58.6	141.3	15 04.2	−58.7	141.4	14 17.3	−58.9	141.6	13 30.2	−59.0	141.8	12 43.0	−59.1	141.9	11 55.7	−59.2	142.0	0
1	16 26.2	−58.4	141.1	15 39.4	−58.5	141.3	14 52.5	−58.6	141.5	14 05.5	−58.8	141.7	13 18.4	−58.9	141.8	12 31.2	−59.0	141.9	11 43.9	−59.2	142.1	10 56.5	−59.2	142.2	1
2	15 27.8	−58.3	141.4	14 40.9	−58.5	141.6	13 53.9	−58.7	141.7	13 06.7	−58.8	141.9	12 19.5	−58.9	142.0	11 32.2	−59.1	142.1	10 44.7	−59.1	142.3	9 57.3	−59.3	142.4	2
3	14 29.5	−58.4	141.6	13 42.4	−58.5	141.8	12 55.2	−58.6	141.9	12 07.9	−58.8	142.1	11 20.6	−58.9	142.2	10 33.1	−59.0	142.3	9 45.6	−59.1	142.4	8 58.0	−59.2	142.5	3
4	13 31.1	−58.3	141.9	12 43.9	−58.5	142.0	11 56.6	−58.7	142.1	11 09.1	−58.7	142.3	10 21.7	−59.0	142.4	9 34.1	−59.0	142.5	8 46.5	−59.2	142.6	7 58.8	−59.3	142.7	4
5	12 32.8	−58.4	142.1	11 45.4	−58.6	142.2	10 57.9	−58.7	142.4	10 10.4	−58.8	142.5	9 22.7	−58.9	142.6	8 35.1	−59.1	142.7	7 47.3	−59.1	142.8	6 59.5	−59.2	142.8	5
6	11 34.4	−58.4	142.3	10 46.8	−58.5	142.5	9 59.2	−58.6	142.6	9 11.6	−58.9	142.7	8 23.8	−58.9	142.8	7 36.0	−59.0	142.9	6 48.2	−59.2	142.9	6 00.3	−59.3	143.0	6
7	10 36.0	−58.4	142.6	9 48.3	−58.5	142.7	9 00.6	−58.7	142.8	8 12.7	−58.8	142.9	7 24.9	−59.0	143.0	6 37.0	−59.1	143.0	5 49.0	−59.2	143.1	5 01.0	−59.3	143.2	7
8	9 37.6	−58.4	142.8	8 49.8	−58.6	142.9	8 01.9	−58.7	143.0	7 13.9	−58.8	143.1	6 25.9	−58.9	143.1	5 37.9	−59.1	143.2	4 49.8	−59.1	143.3	4 01.7	−59.2	143.3	8
9	8 39.2	−58.5	143.0	7 51.2	−58.6	143.1	7 03.2	−58.7	143.2	6 15.1	−58.8	143.3	5 27.0	−59.0	143.3	4 38.8	−59.0	143.4	3 50.7	−59.2	143.4	3 02.5	−59.3	143.5	9
10	7 40.7	−58.4	143.3	6 52.6	−58.5	143.3	6 04.5	−58.7	143.4	5 16.3	−58.8	143.5	4 28.0	−58.9	143.5	3 39.8	−59.1	143.6	2 51.5	−59.2	143.6	2 03.2	−59.3	143.6	10
11	6 42.3	−58.4	143.5	5 54.1	−58.6	143.6	5 05.8	−58.7	143.6	4 17.5	−58.9	143.7	3 29.1	−58.9	143.7	2 40.7	−59.0	143.7	1 52.3	−59.1	143.8	1 03.9	−59.2	143.8	11
12	5 43.9	−58.5	143.7	4 55.5	−58.6	143.8	4 07.1	−58.7	143.8	3 18.6	−58.8	143.9	2 30.2	−59.0	143.9	1 41.7	−59.1	143.9	0 53.2	−59.2	143.9	0 04.7	−59.3	143.9	12
13	4 45.4	−58.4	144.0	3 56.9	−58.6	144.0	3 08.4	−58.8	144.0	2 19.8	−58.8	144.1	1 31.2	−59.0	144.1	0 42.6	−59.1	144.1	0 06.0	+59.2	35.9	0 54.6	+59.3	35.9	13
14	3 47.0	−58.5	144.2	2 58.3	−58.6	144.2	2 09.6	−58.7	144.2	1 21.0	−58.9	144.3	0 32.2	−58.9	144.3	0 16.5	+59.0	35.7	1 05.2	+59.1	35.7	1 53.9	+59.2	35.8	14
15	2 48.5	−58.4	144.4	1 59.7	−58.5	144.4	1 10.9	−58.7	144.4	0 22.1	−58.8	144.5	0 26.7	+59.0	35.5	1 15.5	+59.1	35.6	2 04.3	+59.2	35.6	2 53.1	+59.3	35.6	15
16	1 50.1	−58.5	144.6	1 01.2	−58.6	144.6	0 12.2	−58.7	144.7	0 36.7	+58.9	35.3	1 25.7	+58.9	35.4	2 14.6	+59.1	35.4	3 03.5	+59.2	35.4	3 52.4	+59.3	35.4	16
17	0 51.6	−58.4	144.9	0 02.6	−58.6	144.9	0 46.5	+58.7	35.1	1 35.6	+58.8	35.2	2 24.6	+59.0	35.2	3 13.7	+59.0	35.2	4 02.7	+59.1	35.2	4 51.7	+59.2	35.3	17
18	0 06.8	+58.5	34.9	0 56.0	+58.6	34.9	1 45.2	+58.7	34.9	2 34.4	+58.8	35.0	3 23.6	+58.9	35.0	4 12.7	+59.1	35.0	5 01.8	+59.2	35.1	5 50.9	+59.3	35.1	18
19	1 05.3	+58.4	34.7	1 54.6	+58.6	34.7	2 43.9	+58.7	34.7	3 33.2	+58.9	34.8	4 22.5	+59.0	34.8	5 11.8	+59.0	34.8	6 01.0	+59.2	34.9	6 50.2	+59.2	35.0	19
20	2 03.7	+58.5	34.5	2 53.2	+58.6	34.5	3 42.6	+58.7	34.5	4 32.1	+58.8	34.6	5 21.5	+58.9	34.6	6 10.8	+59.1	34.7	7 00.2	+59.1	34.7	7 49.4	+59.3	34.8	20
21	3 02.2	+58.4	34.2	3 51.8	+58.6	34.3	4 41.3	+58.8	34.3	5 30.9	+58.8	34.4	6 20.4	+58.9	34.4	7 09.9	+59.0	34.5	7 59.3	+59.2	34.6	8 48.7	+59.2	34.6	21
22	4 00.6	+58.5	34.0	4 50.4	+58.5	34.1	5 40.1	+58.7	34.1	6 29.7	+58.8	34.2	7 19.3	+59.0	34.2	8 08.9	+59.1	34.3	8 58.5	+59.1	34.4	9 47.9	+59.3	34.5	22
23	4 59.1	+58.4	33.8	5 48.9	+58.6	33.8	6 38.8	+58.6	33.9	7 28.5	+58.8	34.0	8 18.3	+58.9	34.0	9 08.0	+59.0	34.1	9 57.6	+59.1	34.2	10 47.2	+59.2	34.3	23
24	5 57.5	+58.5	33.6	6 47.5	+58.6	33.6	7 37.4	+58.7	33.7	8 27.3	+58.9	33.8	9 17.2	+58.9	33.9	10 07.0	+59.0	33.9	10 56.7	+59.2	34.1	11 46.4	+59.3	34.2	24
25	6 56.0	+58.4	33.3	7 46.1	+58.5	33.4	8 36.1	+58.7	33.5	9 26.2	+58.8	33.6	10 16.1	+58.9	33.7	11 06.0	+59.1	33.8	11 55.9	+59.1	33.9	12 45.7	+59.2	34.0	25
26	7 54.4	+58.4	33.1	8 44.6	+58.6	33.2	9 34.8	+58.7	33.3	10 25.0	+58.7	33.4	11 15.0	+58.9	33.5	12 05.1	+59.0	33.6	12 55.0	+59.1	33.7	13 44.9	+59.2	33.8	26
27	8 52.8	+58.4	32.9	9 43.2	+58.5	33.0	10 33.5	+58.7	33.1	11 23.7	+58.8	33.2	12 13.9	+58.9	33.3	13 04.1	+59.0	33.4	13 54.1	+59.1	33.5	14 44.1	+59.2	33.7	27
28	9 51.2	+58.4	32.6	10 41.7	+58.5	32.7	11 32.2	+58.6	32.8	12 22.5	+58.8	33.0	13 12.8	+58.9	33.1	14 03.1	+59.0	33.2	14 53.2	+59.1	33.4	15 43.3	+59.2	33.5	28
29	10 49.6	+58.4	32.4	11 40.2	+58.6	32.5	12 30.8	+58.7	32.6	13 21.3	+58.8	32.8	14 11.7	+58.9	32.9	15 02.1	+59.0	33.0	15 52.3	+59.1	33.2	16 42.5	+59.2	33.3	29
30	11 48.0	+58.4	32.2	12 38.8	+58.5	32.3	13 29.5	+58.6	32.4	14 20.1	+58.7	32.5	15 10.6	+58.9	32.7	16 01.1	+59.0	32.8	16 51.4	+59.1	33.0	17 41.7	+59.2	33.2	30
31	12 46.4	+58.4	31.9	13 37.3	+58.5	32.1	14 28.1	+58.6	32.2	15 18.8	+58.8	32.3	16 09.5	+58.8	32.5	17 00.1	+58.9	32.6	17 50.5	+59.1	32.8	18 40.9	+59.2	33.0	31
32	13 44.8	+58.3	31.7	14 35.8	+58.5	31.8	15 26.7	+58.6	32.0	16 17.6	+58.7	32.1	17 08.3	+58.9	32.3	17 59.0	+59.0	32.5	18 49.6	+59.1	32.6	19 40.1	+59.1	32.8	32
33	14 43.1	+58.4	31.5	15 34.3	+58.4	31.6	16 25.3	+58.6	31.7	17 16.3	+58.7	31.9	18 07.2	+58.8	32.1	18 58.0	+58.9	32.3	19 48.7	+59.0	32.4	20 39.2	+59.2	32.6	33
34	15 41.5	+58.3	31.2	16 32.7	+58.5	31.4	17 23.9	+58.6	31.5	18 15.0	+58.7	31.7	19 06.0	+58.8	31.9	19 56.9	+59.0	32.1	20 47.7	+59.1	32.3	21 38.4	+59.2	32.5	34
35	16 39.8	+58.3	31.0	17 31.2	+58.4	31.1	18 22.5	+58.6	31.3	19 13.7	+58.7	31.5	20 04.8	+58.8	31.7	20 55.9	+58.9	31.9	21 46.8	+59.0	32.1	22 37.6	+59.1	32.3	35
36	17 38.1	+58.3	30.7	18 29.6	+58.4	30.9	19 21.1	+58.5	31.1	20 12.4	+58.7	31.3	21 03.6	+58.8	31.4	21 54.8	+58.9	31.7	22 45.8	+59.0	31.9	23 36.7	+59.1	32.1	36
37	18 36.4	+58.2	30.5	19 28.0	+58.4	30.6	20 19.6	+58.5	30.8	21 11.1	+58.6	31.0	22 02.4	+58.8	31.2	22 53.7	+58.9	31.4	23 44.8	+59.0	31.7	24 35.8	+59.1	31.9	37
38	19 34.6	+58.3	30.2	20 26.4	+58.4	30.4	21 18.1	+58.5	30.6	22 09.7	+58.7	30.8	23 01.2	+58.8	31.0	23 52.6	+58.8	31.2	24 43.8	+59.0	31.5	25 34.9	+59.1	31.7	38
39	20 32.9	+58.2	30.0	21 24.8	+58.4	30.2	22 16.6	+58.5	30.4	23 08.4	+58.6	30.6	24 00.0	+58.7	30.8	24 51.4	+58.9	31.0	25 42.8	+59.0	31.3	26 34.0	+59.1	31.5	39
40	21 31.1	+58.2	29.7	22 23.2	+58.3	29.9	23 15.1	+58.5	30.1	24 07.0	+58.6	30.3	24 58.7	+58.7	30.6	25 50.3	+58.8	30.8	26 41.8	+58.9	31.1	27 33.1	+59.0	31.3	40
41	22 29.3	+58.2	29.4	23 21.5	+58.3	29.7	24 13.6	+58.4	29.9	25 05.6	+58.5	30.1	25 57.4	+58.7	30.3	26 49.1	+58.8	30.6	27 40.7	+58.9	30.9	28 32.1	+59.1	31.1	41
42	23 27.5	+58.1	29.2	24 19.8	+58.3	29.4	25 12.0	+58.4	29.6	26 04.1	+58.6	29.9	26 56.1	+58.7	30.1	27 47.9	+58.8	30.4	28 39.6	+58.9	30.6	29 31.2	+59.0	30.9	42
43	24 25.6	+58.1	28.9	25 18.1	+58.2	29.1	26 10.4	+58.4	29.4	27 02.7	+58.5	29.6	27 54.8	+58.6	29.9	28 46.7	+58.8	30.1	29 38.5	+58.9	30.4	30 30.2	+59.0	30.7	43
44	25 23.7	+58.1	28.6	26 16.3	+58.3	28.9	27 08.8	+58.4	29.1	28 01.2	+58.5	29.4	28 53.4	+58.6	29.6	29 45.5	+58.7	29.9	30 37.4	+58.9	30.2	31 29.2	+59.0	30.5	44
45	26 21.8	+58.1	28.4	27 14.6	+58.2	28.6	28 07.2	+58.3	28.8	28 59.7	+58.4	29.1	29 52.0	+58.6	29.4	30 44.2	+58.7	29.7	31 36.3	+58.8	30.0	32 28.2	+58.9	30.3	45
46	27 19.9	+58.0	28.1	28 12.8	+58.1	28.3	29 05.5	+58.3	28.6	29 58.1	+58.5	28.9	30 50.6	+58.6	29.1	31 42.9	+58.7	29.4	32 35.1	+58.8	29.7	33 27.1	+59.0	30.1	46
47	28 17.9	+58.0	27.8	29 10.9	+58.1	28.0	30 03.8	+58.3	28.3	30 56.6	+58.4	28.6	31 49.2	+58.5	28.9	32 41.6	+58.7	29.2	33 33.9	+58.8	29.5	34 26.1	+58.9	29.8	47
48	29 15.9	+57.9	27.5	30 09.0	+58.1	27.8	31 02.1	+58.2	28.0	31 55.0	+58.3	28.3	32 47.7	+58.5	28.6	33 40.3	+58.6	28.9	34 32.7	+58.8	29.3	35 25.0	+58.9	29.6	48
49	30 13.8	+57.9	27.2	31 07.1	+58.1	27.5	32 00.3	+58.2	27.7	32 53.3	+58.4	28.0	33 46.2	+58.5	28.4	34 38.9	+58.6	28.7	35 31.5	+58.7	29.0	36 23.9	+58.8	29.4	49
50	31 11.7	+57.9	26.9	32 05.2	+58.0	27.2	32 58.5	+58.1	27.5	33 51.7	+58.2	27.8	34 44.7	+58.4	28.1	35 37.5	+58.6	28.4	36 30.2	+58.7	28.8	37 22.7	+58.8	29.1	50
51	32 09.6	+57.8	26.6	33 03.2	+57.9	26.9	33 56.6	+58.1	27.2	34 49.9	+58.3	27.5	35 43.1	+58.4	27.8	36 36.1	+58.5	28.1	37 28.9	+58.6	28.5	38 21.5	+58.8	28.9	51
52	33 07.4	+57.8	26.3	34 01.1	+57.9	26.6	34 54.7	+58.1	26.9	35 48.2	+58.2	27.2	36 41.5	+58.3	27.5	37 34.6	+58.5	27.9	38 27.5	+58.7	28.2	39 20.3	+58.8	28.6	52
53	34 05.2	+57.7	25.9	34 59.0	+57.9	26.2	35 52.8	+58.0	26.6	36 46.4	+58.1	26.9	37 39.8	+58.3	27.2	38 33.1	+58.4	27.6	39 26.2	+58.5	28.0	40 19.1	+58.7	28.4	53
54	35 02.9	+57.6	25.6	35 56.9	+57.8	25.9	36 50.8	+57.9	26.2	37 44.5	+58.1	26.6	38 38.1	+58.3	26.9	39 31.5	+58.4	27.3	40 24.7	+58.6	27.7	41 17.8	+58.7	28.1	54
55	36 00.5	+57.6	25.3	36 54.7	+57.7	25.6	37 48.7	+57.9	25.9	38 42.6	+58.1	26.3	39 36.4	+58.2	26.6	40 29.9	+58.4	27.0	41 23.3	+58.5	27.4	42 16.5	+58.6	27.8	55
56	36 58.1	+57.5	24.9	37 52.4	+57.7	25.2	38 46.6	+57.9	25.6	39 40.7	+58.0	25.9	40 34.6	+58.1	26.3	41 28.3	+58.3	26.7	42 21.8	+58.4	27.1	43 15.1	+58.6	27.5	56
57	37 55.6	+57.5	24.6	38 50.1	+57.7	24.9	39 44.5	+57.8	25.2	40 38.7	+57.9	25.6	41 32.7	+58.1	26.0	42 26.6	+58.2	26.4	43 20.2	+58.4	26.8	44 13.7	+58.5	27.2	57
58	38 53.1	+57.4	24.2	39 47.8	+57.5	24.5	40 42.3	+57.7	24.9	41 36.6	+57.9	25.2	42 30.8	+58.0	25.6	43 24.8	+58.2	26.0	44 18.6	+58.4	26.5	45 12.2	+58.5	26.9	58
59	39 50.5	+57.3	23.8	40 45.3	+57.5	24.2	41 40.0	+57.6	24.5	42 34.5	+57.8	24.9	43 28.8	+58.0	25.3	44 23.0	+58.1	25.7	45 17.0	+58.2	26.1	46 10.7	+58.4	26.6	59
60	40 47.8	+57.2	23.4	41 42.8	+57.4	23.8	42 37.6	+57.6	24.1	43 32.3	+57.7	24.5	44 26.8	+57.9	24.9	45 21.1	+58.1	25.4	46 15.2	+58.2	25.8	47 09.1	+58.4	26.3	60
61	41 45.0	+57.2	23.0	42 40.2	+57.3	23.4	43 35.2	+57.5	23.8	44 30.0	+57.7	24.1	45 24.7	+57.8	24.6	46 19.2	+57.9	25.0	47 13.4	+58.2	25.4	48 07.5	+58.3	25.9	61
62	42 42.2	+57.1	22.6	43 37.5	+57.2	23.0	44 32.7	+57.4	23.4	45 27.7	+57.5	23.8	46 22.5	+57.7	24.2	47 17.1	+58.0	24.6	48 11.6	+58.1	25.1	49 05.8	+58.3	25.6	62
63	43 39.3	+56.9	22.2	44 34.7	+57.2	22.6	45 30.1	+57.3	22.9	46 25.2	+57.5	23.3	47 20.2	+57.7	23.8	48 15.1	+57.8	24.2	49 09.7	+58.0	24.7	50 04.1	+58.1	25.2	63
64	44 36.2	+56.9	21.7	45 31.9	+57.0	22.1	46 27.4	+57.2	22.5	47 22.7	+57.4	22.9	48 17.9	+57.6	23.4	49 12.9	+57.7	23.8	50 07.7	+57.9	24.3	51 02.2	+58.1	24.8	64
65	45 33.1	+56.7	21.3	46 28.9	+56.9	21.7	47 24.6	+57.1	22.1	48 20.1	+57.3	22.5	49 15.5	+57.4	22.9	50 10.6	+57.7	23.4	51 05.6	+57.8	23.9	52 00.3	+58.0	24.4	65
66	46 29.8	+56.7	20.8	47 25.8	+56.8	21.2	48 21.7	+57.0	21.6	49 17.4	+57.2	22.0	50 12.9	+57.4	22.5	51 08.3	+57.5	23.0	52 03.4	+57.7	23.5	52 58.3	+57.9	24.0	66
67	47 26.5	+56.5	20.3	48 22.6	+56.7	20.7	49 18.7	+56.9	21.1	50 14.6	+57.0	21.6	51 10.3	+57.2	22.0	52 05.8	+57.4	22.5	53 01.1	+57.6	23.0	53 56.2	+57.9	23.5	67
68	48 23.0	+56.3	19.8	49 19.3	+56.6	20.2	50 15.6	+56.7	20.6	51 11.6	+56.9	21.1	52 07.5	+57.1	21.5	53 03.2	+57.3	22.0	53 58.7	+57.6	22.5	54 54.1	+57.7	23.1	68
69	49 19.3	+56.3	19.3	50 15.9	+56.4	19.7	51 12.3	+56.6	20.1	52 08.5	+56.8	20.6	53 04.6	+57.0	21.0	54 00.5	+57.2	21.5	54 56.3	+57.3	22.1	55 51.8	+57.5	22.6	69
70	50 15.6	+56.0	18.8	51 12.3	+56.2	19.2	52 08.9	+56.4	19.6	53 05.3	+56.7	20.0	54 01.6	+56.9	20.5	54 57.7	+57.1	21.0	55 53.6	+57.3	21.5	56 49.3	+57.5	22.1	70
71	51 11.6	+55.9	18.2	52 08.5	+56.1	18.6	53 05.3	+56.3	19.0	54 02.0	+56.5	19.5	54 58.5	+56.6	20.0	55 54.8	+56.8	20.5	56 50.9	+57.1	21.0	57 46.8	+57.3	21.6	71
72	52 07.5	+55.7	17.6	53 04.6	+55.9	18.0	54 01.6	+56.1	18.5	54 58.5	+56.3	18.9	55 55.1	+56.5	19.4	56 51.6	+56.8	19.9	57 48.0	+56.9	20.4	58 44.1	+57.2	21.0	72
73	53 03.2	+55.5	17.0	54 00.5	+55.8	17.4	54 57.7	+55.9	17.8	55 54.8	+56.1	18.3	56 51.6	+56.4	18.8	57 48.4	+56.5	19.3	58 44.9	+56.8	19.8	59 41.3	+56.9	20.4	73
74	53 58.7	+55.4	16.4	54 56.3	+55.5	16.8	55 53.6	+55.7	17.2	56 50.9	+55.9	17.7	57 48.0	+56.1	18.1	58 44.9	+56.4	18.6	59 41.7	+56.5	19.2	60 38.2	+56.8	19.8	74
75	54 54.1	+55.0	15.7	55 51.8	+55.2	16.1	56 49.3	+55.5	16.5	57 46.8	+55.7	17.0	58 44.1	+55.9	17.5	59 41.3	+56.1	18.0	60 38.2	+56.4	18.5	61 35.0	+56.6	19.1	75
76	55 49.1	+54.9	15.0	56 47.0	+55.1	15.4	57 44.8	+55.2	15.8	58 42.5	+55.4	16.3	59 40.0	+55.7	16.8	60 37.4	+55.9	17.3	61 34.6	+56.1	17.8	62 31.6	+56.4	18.4	76
77	56 44.0	+54.5	14.3	57 42.1	+54.7	14.7	58 40.0	+55.0	15.1	59 37.9	+55.2	15.5	60 35.7	+55.3	16.0	61 33.3	+55.6	16.5	62 30.7	+55.9	17.1	63 28.0	+56.1	17.6	77
78	57 38.5	+54.3	13.5	58 36.8	+54.5	13.9	59 35.0	+54.7	14.3	60 33.1	+54.9	14.7	61 31.0	+55.1	15.2	62 28.9	+55.3	15.7	63 26.6	+55.5	16.3	64 24.1	+55.8	16.8	78
79	58 32.8	+53.9	12.7	59 31.3	+54.1	13.1	60 29.7	+54.3	13.5	61 28.0	+54.5	13.9	62 26.1	+54.8	14.4	63 24.2	+55.0	14.9	64 22.1	+55.3	15.4	65 19.9	+55.5	16.0	79
80	59 26.7	+53.6	11.9	60 25.4	+53.8	12.2	61 24.0	+54.0	12.6	62 22.5	+54.2	13.0	63 20.9	+54.4	13.5	64 19.2	+54.7	14.0	65 17.4	+54.9	14.5	66 15.4	+55.1	15.0	80
81	60 20.3	+53.2	11.0	61 19.2	+53.4	11.3	62 18.0	+53.6	11.7	63 16.7	+53.8	12.1	64 15.3	+54.1	12.5	65 13.9	+54.2	13.0	66 12.3	+54.4	13.5	67 10.5	+54.8	14.0	81
82	61 13.5	+52.8	10.0	62 12.6	+53.0	10.3	63 11.6	+53.2	10.7	64 10.5	+53.4	11.1	65 09.4	+53.5	11.5	66 08.1	+53.8	11.9	67 06.7	+54.1	12.4	68 05.3	+54.3	13.0	82
83	62 06.3	+52.4	9.0	63 05.6	+52.5	9.3	64 04.8	+52.6	9.7	65 03.9	+52.8	10.0	66 02.9	+53.1	10.4	67 01.9	+53.3	10.8	68 00.8	+53.5	11.3	68 59.6	+53.7	11.8	83
84	62 58.7	+51.8	8.0	63 58.1	+52.0	8.2	64 57.4	+52.2	8.5	65 56.7	+52.4	8.9	66 56.0	+52.5	9.2	67 55.2	+52.7	9.6	68 54.3	+53.0	10.1	69 53.3	+53.2	10.5	84
85	63 50.5	+51.3	6.8	64 50.1	+51.4	7.1	65 49.6	+51.6	7.4	66 49.1	+51.7	7.7	67 48.5	+51.9	8.0	68 47.9	+52.1	8.3	69 47.3	+52.2	8.7	70 46.5	+52.5	9.2	85
86	64 41.8	+50.6	5.6	65 41.5	+50.8	5.9	66 41.2	+50.9	6.1	67 40.8	+51.1	6.3	68 40.4	+51.2	6.6	69 40.0	+51.4	6.9	70 39.5	+51.6	7.3	71 39.0	+51.8	7.7	86
87	65 32.4	+50.0	4.4	66 32.3	+50.0	4.5	67 32.1	+50.1	4.7	68 31.9	+50.2	4.9	69 31.6	+50.4	5.2	70 31.4	+50.5	5.4	71 31.1	+50.7	5.7	72 30.8	+50.8	6.0	87
88	66 22.4	+49.2	3.0	67 22.3	+49.3	3.1	68 22.2	+49.4	3.3	69 22.1	+49.5	3.4	70 22.0	+49.5	3.6	71 21.9	+49.6	3.8	72 21.8	+49.7	4.0	73 21.6	+49.8	4.2	88
89	67 11.6	+48.4	1.6	68 11.6	+48.4	1.6	69 11.6	+48.4	1.7	70 11.6	+48.4	1.8	71 11.5	+48.5	1.9	72 11.5	+48.5	2.0	73 11.5	+48.5	2.1	74 11.4	+48.6	2.2	89
90	68 00.0	+47.4	0.0	69 00.0	+47.4	0.0	70 00.0	+47.4	0.0	71 00.0	+47.3	0.0	72 00.0	+47.3	0.0	73 00.0	+47.3	0.0	74 00.0	+47.2	0.0	75 00.0	+47.2	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 143°, 217°

N. Lat. {L.H.A. greater than 180° .....Zn=Z; L.H.A. less than 180°............Zn=360°–Z}

Dec.	68°			69°			70°			71°		
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°
0	17 10.2	+58.2	139.9	16 24.2	+58.4	140.1	15 38.1	+58.6	140.3	14 51.9	+58.7	140.4
1	18 08.4	+58.2	139.6	17 22.6	+58.4	139.8	16 36.7	+58.5	140.0	15 50.6	+58.7	140.2
2	19 06.6	+58.1	139.4	18 21.0	+58.3	139.6	17 35.2	+58.5	139.8	16 49.3	+58.7	140.0
3	20 04.7	+58.2	139.1	19 19.3	+58.3	139.3	18 33.7	+58.5	139.6	17 48.0	+58.6	139.8
4	21 02.9	+58.1	138.8	20 17.6	+58.3	139.1	19 32.2	+58.5	139.3	18 46.6	+58.6	139.6
5	22 01.0	+58.1	138.6	21 15.9	+58.3	138.8	20 30.7	+58.4	139.1	19 45.2	+58.7	139.3
6	22 59.1	+58.1	138.3	22 14.2	+58.3	138.6	21 29.1	+58.5	138.9	20 43.9	+58.6	139.1
7	23 57.2	+58.0	138.0	23 12.5	+58.2	138.3	22 27.6	+58.4	138.6	21 42.5	+58.5	138.9
8	24 55.2	+58.0	137.8	24 10.7	+58.2	138.1	23 26.0	+58.4	138.4	22 41.0	+58.6	138.6
9	25 53.2	+58.0	137.5	25 08.9	+58.2	137.8	24 24.4	+58.3	138.1	23 39.6	+58.5	138.4
10	26 51.2	+58.0	137.2	26 07.1	+58.1	137.5	25 22.7	+58.3	137.9	24 38.1	+58.5	138.2
11	27 49.2	+57.9	136.9	27 05.2	+58.1	137.2	26 21.0	+58.4	137.6	25 36.6	+58.5	137.9
12	28 47.1	+57.8	136.6	28 03.3	+58.1	137.0	27 19.4	+58.2	137.3	26 35.1	+58.5	137.7
13	29 44.9	+57.9	136.3	29 01.4	+58.1	136.7	28 17.6	+58.3	137.1	27 33.6	+58.4	137.4
14	30 42.8	+57.7	136.0	29 59.5	+58.0	136.4	29 15.9	+58.2	136.8	28 32.0	+58.4	137.2
15	31 40.5	+57.8	135.7	30 57.5	+57.9	136.1	30 14.1	+58.2	136.5	29 30.4	+58.4	136.9
16	32 38.3	+57.6	135.3	31 55.4	+57.9	135.8	31 12.3	+58.1	136.2	30 28.8	+58.3	136.6
17	33 35.9	+57.7	135.0	32 53.3	+57.9	135.5	32 10.4	+58.1	135.9	31 27.1	+58.3	136.4
18	34 33.6	+57.5	134.7	33 51.2	+57.8	135.2	33 08.5	+58.0	135.6	32 25.4	+58.3	136.1
19	35 31.1	+57.6	134.3	34 49.0	+57.8	134.8	34 06.5	+58.0	135.3	33 23.7	+58.2	135.8
20	36 28.7	+57.4	134.0	35 46.8	+57.7	134.5	35 04.5	+58.0	135.0	34 21.9	+58.2	135.5
21	37 26.1	+57.4	133.6	36 44.5	+57.6	134.2	36 02.5	+57.9	134.7	35 20.1	+58.1	135.2
22	38 23.5	+57.3	133.3	37 42.1	+57.6	133.8	37 00.4	+57.8	134.4	36 18.2	+58.1	134.9
23	39 20.8	+57.2	132.9	38 39.7	+57.6	133.5	37 58.2	+57.8	134.0	37 16.3	+58.1	134.6
24	40 18.0	+57.2	132.5	39 37.3	+57.4	133.1	38 56.0	+57.8	133.7	38 14.4	+57.9	134.3
25	41 15.2	+57.0	132.1	40 34.7	+57.4	132.7	39 53.8	+57.6	133.3	39 12.3	+58.0	133.9
26	42 12.2	+57.0	131.7	41 32.1	+57.3	132.3	40 51.4	+57.6	133.0	40 10.3	+57.8	133.6
27	43 09.2	+56.9	131.2	42 29.4	+57.2	131.9	41 49.0	+57.5	132.6	41 08.1	+57.8	133.3
28	44 06.1	+56.7	130.8	43 26.6	+57.1	131.5	42 46.5	+57.5	132.2	42 05.9	+57.8	132.9
29	45 02.8	+56.7	130.3	44 23.7	+57.0	131.1	43 44.0	+57.3	131.8	43 03.7	+57.6	132.5
30	45 59.5	+56.5	129.9	45 20.7	+56.9	130.7	44 41.3	+57.3	131.4	44 01.3	+57.6	132.1
31	46 56.0	+56.4	129.4	46 17.6	+56.8	130.2	45 38.6	+57.1	131.0	44 58.9	+57.5	131.7
32	47 52.4	+56.3	128.9	47 14.4	+56.7	129.7	46 35.7	+57.1	130.6	45 56.4	+57.4	131.3
33	48 48.7	+56.1	128.4	48 11.1	+56.6	129.2	47 32.8	+57.0	130.1	46 53.8	+57.3	130.9
34	49 44.8	+56.0	127.8	49 07.7	+56.4	128.7	48 29.8	+56.8	129.6	47 51.1	+57.2	130.5
35	50 40.8	+55.8	127.3	50 04.1	+56.2	128.2	49 26.6	+56.7	129.1	48 48.3	+57.1	130.0
36	51 36.6	+55.6	126.7	51 00.3	+56.2	127.7	50 23.3	+56.5	128.6	49 45.4	+57.0	129.6
37	52 32.2	+55.4	126.1	51 56.5	+55.9	127.1	51 19.8	+56.5	128.1	50 42.4	+56.9	129.1
38	53 27.6	+55.2	125.4	52 52.4	+55.7	126.5	52 16.3	+56.2	127.6	51 39.3	+56.7	128.6
39	54 22.8	+55.0	124.8	53 48.1	+55.6	125.9	53 12.5	+56.1	127.0	52 36.0	+56.5	128.0
40	55 17.8	+54.7	124.1	54 43.7	+55.3	125.2	54 08.6	+55.9	126.4	53 32.5	+56.4	127.5
41	56 12.5	+54.5	123.3	55 39.0	+55.1	124.6	55 04.5	+55.7	125.7	54 28.9	+56.3	126.9
42	57 07.0	+54.2	122.6	56 34.1	+54.9	123.9	56 00.2	+55.4	125.1	55 25.2	+56.0	126.3
43	58 01.2	+53.8	121.8	57 29.0	+54.6	123.1	56 55.6	+55.3	124.4	56 21.2	+55.8	125.6
44	58 55.0	+53.5	120.9	58 23.6	+54.2	122.3	57 50.9	+54.9	123.7	57 17.0	+55.6	125.0
45	59 48.5	+53.1	120.0	59 17.8	+54.0	121.5	58 45.8	+54.7	122.9	58 12.6	+55.4	124.3
46	60 41.6	+52.8	119.1	60 11.8	+53.5	120.6	59 40.5	+54.4	122.1	59 08.0	+55.1	123.5
47	61 34.4	+52.2	118.1	61 05.3	+53.2	119.7	60 34.9	+54.0	121.3	60 03.1	+54.8	122.7
48	62 26.6	+51.8	117.1	61 58.5	+52.8	118.7	61 28.9	+53.7	120.4	60 57.9	+54.5	121.9
49	63 18.4	+51.2	116.0	62 51.3	+52.2	117.7	62 22.6	+53.2	119.4	61 52.4	+54.1	121.0
50	64 09.6	+50.6	114.8	63 43.5	+51.8	116.6	63 15.8	+52.8	118.4	62 46.5	+53.7	120.1
51	65 00.2	+49.9	113.5	64 35.3	+51.2	115.5	64 08.6	+52.3	117.3	63 40.2	+53.3	119.1
52	65 50.1	+49.2	112.2	65 26.5	+50.5	114.2	65 00.9	+51.7	116.2	64 33.5	+52.9	118.1
53	66 39.3	+48.4	110.8	66 17.0	+49.8	112.9	65 52.6	+51.1	115.0	65 26.4	+52.2	117.0
54	67 27.7	+47.4	109.3	67 06.8	+49.0	111.5	66 43.7	+50.4	113.7	66 18.6	+51.7	115.8
55	68 15.1	+46.4	107.6	67 55.8	+48.1	110.0	67 34.1	+49.7	112.3	67 10.3	+51.1	114.5
56	69 01.5	+45.3	105.9	68 43.9	+47.1	108.4	68 23.8	+48.7	110.8	68 01.4	+50.2	113.1
57	69 46.8	+44.1	104.0	69 31.0	+46.0	106.6	69 12.5	+47.8	109.2	68 51.6	+49.5	111.6
58	70 30.9	+42.6	102.0	70 17.0	+44.7	104.8	70 00.3	+46.7	107.4	69 41.1	+48.5	110.0
59	71 13.5	+41.0	99.9	71 01.7	+43.3	102.7	70 47.0	+45.5	105.5	70 29.6	+47.4	108.3
60	71 54.5	+39.3	97.6	71 45.0	+41.8	100.6	71 32.5	+44.1	103.5	71 17.0	+46.2	106.4
61	72 33.8	+37.3 •	95.1	72 26.8	+40.0	98.2	72 16.6	+42.5	101.3	72 03.2	+44.9	104.4
62	73 11.1	+35.0 •	92.4	73 06.8	+38.0 •	95.7	72 59.1	+40.8	99.0	72 48.1	+43.3	102.2
63	73 46.1	+32.7 •	89.6	73 44.8	+35.7 •	93.0	73 39.9	+38.7 •	96.4	73 31.4	+41.5	99.8
64	74 18.8	+29.9 •	86.5	74 20.5	+33.3 •	90.1	74 18.6	+36.5 •	93.6	74 12.9	+39.5 •	97.2
65	74 48.7	+26.9 •	83.3	74 53.8	+30.5 •	86.9	74 55.1	+33.9 •	90.7	74 52.4	+37.3 •	94.4
66	75 15.6	+23.7 •	79.8	75 24.3	+27.4 •	83.6	75 29.0	+31.1 •	87.4	75 29.7	+34.6 •	91.3
67	75 39.3	+20.1 •	76.1	75 51.7	+24.0 •	80.0	76 00.1	+27.8 •	83.9	76 04.3	+31.7 •	88.0
68	75 59.4	+16.3 •	72.3	76 15.7	+20.3 •	76.2	76 27.9	+24.4 •	80.2	76 36.0	+28.4 •	84.4
69	76 15.7	+12.2 •	68.3	76 36.0	+16.3 •	72.2	76 52.3	+20.5 •	76.3	77 04.4	+24.8 •	80.5
70	76 27.9	+8.1 •	64.1	76 52.3	+12.1 •	68.0	77 12.8	+16.4 •	72.1	77 29.2	+20.7 •	76.4
71	76 36.0	+3.7 •	59.9	77 04.4	+7.7 •	63.6	77 29.2	+11.8 •	67.7	77 49.9	+16.3 •	72.0
72	76 39.7	–0.7 •	55.6	77 12.1	+3.1 •	59.2	77 41.0	+7.2 •	63.1	78 06.2	+11.6 •	67.3
73	76 39.0	–5.1 •	51.2	77 15.2	–1.6 •	54.7	77 48.2	+2.5 •	58.4	78 17.8	+6.7 •	62.6
74	76 33.9	–9.4 •	46.9	77 13.6	–6.1 •	50.1	77 50.7	–2.5 •	53.7	78 24.5	+1.7 •	57.6
75	76 24.5	–13.6 •	42.7	77 07.5	–10.6 •	45.7	77 48.2	–7.2 •	49.0	78 26.2	–3.5 •	52.6
76	76 10.9	–17.6 •	38.6	76 56.9	–14.9 •	41.3	77 41.0	–12.0 •	44.3	78 22.7	–8.5 •	47.7
77	75 53.3	–21.2 •	34.6	76 42.0	–19.0 •	37.0	77 29.0	–16.3 •	39.7	78 14.2	–13.4 •	42.8
78	75 32.1	–24.8 •	30.8	76 23.0	–22.8 •	32.9	77 12.7	–20.6 •	35.3	78 00.8	–17.9 •	38.0
79	75 07.3	–27.9 •	27.2	76 00.2	–26.2 •	29.1	76 52.1	–24.3 •	31.1	77 42.9	–22.3 •	33.5
80	74 39.4	–30.8 •	23.8	75 34.0	–29.5 •	25.4	76 27.8	–28.0 •	27.2	77 20.6	–26.1 •	29.2
81	74 08.6	–33.5 •	20.6	75 04.5	–32.4 •	22.0	75 59.8	–31.0 •	23.5	76 54.5	–29.6 •	25.2
82	73 35.1	–35.8 •	17.7	74 32.1	–34.9 •	18.7	75 28.8	–34.0 •	20.0	76 24.9	–32.8 •	21.4
83	72 59.3	–37.9 •	14.9	73 57.2	–37.3 •	15.7	74 54.8	–36.5 •	16.8	75 52.1	–35.6 •	17.9
84	72 21.4	–39.9	12.3	73 19.9	–39.3	13.0	74 18.3	–38.7 •	13.8	75 16.5	–38.1 •	14.7
85	71 41.5	–41.5	9.8	72 40.6	–41.2	10.4	73 39.6	–40.8	11.0	74 38.4	–40.3 •	11.7
86	71 00.0	–43.1	7.6	71 59.4	–42.8	8.0	72 58.8	–42.5	8.4	73 58.1	–42.2	8.9
87	70 16.9	–44.5	5.5	71 16.6	–44.3	5.8	72 16.3	–44.1	6.1	73 15.9	–43.9	6.4
88	69 32.4	–45.6	3.5	70 32.3	–45.6	3.7	71 32.2	–45.5	3.9	72 32.0	–45.3	4.1
89	68 46.8	–46.8	1.7	69 46.7	–46.7	1.8	70 46.7	–46.7	1.9	71 46.7	–46.7	2.0
90	68 00.0	–47.8	0.0	69 00.0	–47.8	0.0	70 00.0	–47.8	0.0	71 00.0	–47.8	0.0
	68°			69°			70°			71°		

72°			73°			74°			75°			Dec.
Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
14 05.6	+58.9	140.6	13 19.2	+59.0	140.8	12 32.7	+59.1	140.9	11 46.1	+59.2	141.0	0
15 04.5	+58.8	140.4	14 18.2	+58.9	140.6	13 31.8	+59.1	140.7	12 45.3	+59.2	140.9	1
16 03.3	+58.8	140.2	15 17.1	+59.0	140.4	14 30.9	+59.0	140.5	13 44.5	+59.2	140.7	2
17 02.1	+58.8	140.0	16 16.1	+58.9	140.2	15 29.9	+59.1	140.4	14 43.7	+59.1	140.5	3
18 00.9	+58.8	139.8	17 15.0	+58.9	140.0	16 29.0	+59.0	140.2	15 42.8	+59.2	140.4	4
18 59.7	+58.7	139.6	18 13.9	+58.9	139.8	17 28.0	+59.1	140.0	16 42.0	+59.2	140.2	5
19 58.4	+58.8	139.3	19 12.8	+58.9	139.6	18 27.1	+59.0	139.8	17 41.2	+59.1	140.0	6
20 57.2	+58.7	139.1	20 11.7	+58.9	139.4	19 26.1	+59.0	139.6	18 40.3	+59.2	139.8	7
21 55.9	+58.7	138.9	21 10.6	+58.9	139.2	20 25.1	+59.0	139.4	19 39.5	+59.1	139.7	8
22 54.6	+58.7	138.7	22 09.5	+58.8	139.0	21 24.1	+59.0	139.2	20 38.6	+59.1	139.5	9
23 53.3	+58.7	138.5	23 08.3	+58.8	138.7	22 23.1	+59.0	139.0	21 37.7	+59.1	139.3	10
24 52.0	+58.6	138.2	24 07.1	+58.8	138.5	23 22.1	+58.9	138.8	22 36.8	+59.1	139.1	11
25 50.6	+58.7	138.0	25 05.9	+58.8	138.3	24 21.0	+59.0	138.6	23 35.9	+59.1	138.9	12
26 49.3	+58.6	137.8	26 04.7	+58.8	138.1	25 20.0	+58.9	138.4	24 35.0	+59.0	138.7	13
27 47.9	+58.6	137.5	27 03.5	+58.8	137.9	26 18.9	+58.9	138.2	25 34.0	+59.1	138.5	14
28 46.5	+58.5	137.3	28 02.3	+58.7	137.6	27 17.8	+58.9	138.0	26 33.1	+59.0	138.3	15
29 45.0	+58.6	137.0	29 01.0	+58.7	137.4	28 16.7	+58.8	137.8	27 32.1	+59.0	138.1	16
30 43.6	+58.4	136.8	29 59.7	+58.7	137.2	29 15.5	+58.9	137.6	28 31.1	+59.0	137.9	17
31 42.0	+58.5	136.5	30 58.4	+58.6	136.9	30 14.4	+58.8	137.3	29 30.1	+59.0	137.7	18
32 40.5	+58.4	136.2	31 57.0	+58.6	136.7	31 13.2	+58.8	137.1	30 29.1	+59.0	137.5	19
33 38.9	+58.4	136.0	32 55.6	+58.6	136.4	32 12.0	+58.8	136.9	31 28.1	+58.9	137.3	20
34 37.3	+58.4	135.7	33 54.2	+58.6	136.2	33 10.8	+58.7	136.6	32 27.0	+58.9	137.1	21
35 35.7	+58.3	135.4	34 52.8	+58.5	135.9	34 09.5	+58.7	136.4	33 25.9	+58.9	136.8	22
36 34.0	+58.3	135.1	35 51.3	+58.5	135.6	35 08.2	+58.7	136.1	34 24.8	+58.8	136.6	23
37 32.3	+58.2	134.8	36 49.8	+58.4	135.4	36 06.9	+58.6	135.9	35 23.6	+58.9	136.4	24
38 30.5	+58.2	134.5	37 48.2	+58.4	135.1	37 05.5	+58.6	135.6	36 22.5	+58.8	136.1	25
39 28.7	+58.1	134.2	38 46.6	+58.4	134.8	38 04.1	+58.6	135.3	37 21.3	+58.7	135.9	26
40 26.8	+58.1	133.9	39 45.0	+58.3	134.5	39 02.7	+58.5	135.1	38 20.0	+58.8	135.6	27
41 24.9	+58.0	133.5	40 43.3	+58.2	134.2	40 01.2	+58.5	134.8	39 18.8	+58.7	135.4	28
42 22.9	+57.9	133.2	41 41.5	+58.2	133.9	40 59.7	+58.5	134.5	40 17.5	+58.6	135.1	29
43 20.8	+57.9	132.8	42 39.7	+58.2	133.5	41 58.2	+58.4	134.2	41 16.1	+58.6	134.8	30
44 18.7	+57.8	132.5	43 37.9	+58.1	133.2	42 56.6	+58.3	133.9	42 14.7	+58.6	134.5	31
45 16.5	+57.7	132.1	44 36.0	+58.0	132.8	43 54.9	+58.3	133.5	43 13.3	+58.5	134.2	32
46 14.2	+57.7	131.7	45 34.0	+57.9	132.5	44 53.2	+58.2	133.2	44 11.8	+58.5	133.9	33
47 11.9	+57.5	131.3	46 31.9	+57.9	132.1	45 51.4	+58.2	132.9	45 10.3	+58.4	133.6	34
48 09.4	+57.5	130.9	47 29.8	+57.8	131.7	46 49.6	+58.1	132.5	46 08.7	+58.4	133.3	35
49 06.9	+57.3	130.5	48 27.6	+57.7	131.3	47 47.7	+58.0	132.1	47 07.1	+58.3	133.0	36
50 04.2	+57.3	130.0	49 25.3	+57.6	130.9	48 45.7	+57.9	131.8	48 05.4	+58.2	132.6	37
51 01.5	+57.1	129.5	50 22.9	+57.5	130.5	49 43.6	+57.9	131.4	49 03.6	+58.2	132.2	38
51 58.6	+57.0	129.0	51 20.4	+57.4	130.0	50 41.5	+57.7	131.0	50 01.8	+58.1	131.9	39
52 55.6	+56.9	128.5	52 17.8	+57.3	129.5	51 39.2	+57.7	130.5	50 59.9	+58.0	131.5	40
53 52.5	+56.7	128.0	53 15.1	+57.2	129.0	52 36.9	+57.5	130.1	51 57.9	+57.9	131.1	41
54 49.2	+56.5	127.4	54 12.3	+57.0	128.5	53 34.4	+57.5	129.6	52 55.8	+57.8	130.6	42
55 45.7	+56.4	126.8	55 09.3	+56.8	128.0	54 31.9	+57.3	129.1	53 53.6	+57.7	130.2	43
56 42.1	+56.2	126.2	56 06.1	+56.7	127.4	55 29.2	+57.2	128.6	54 51.3	+57.6	129.7	44
57 38.3	+56.0	125.6	57 02.8	+56.6	126.8	56 26.4	+57.0	128.0	55 48.9	+57.5	129.2	45
58 34.3	+55.7	124.9	57 59.4	+56.3	126.2	57 23.4	+56.9	127.5	56 46.4	+57.3	128.7	46
59 30.0	+55.5	124.2	58 55.7	+56.1	125.6	58 20.3	+56.6	126.9	57 43.7	+57.2	128.2	47
60 25.5	+55.2	123.4	59 51.8	+55.9	124.9	59 16.9	+56.5	126.2	58 40.9	+57.0	127.6	48
61 20.7	+55.0	122.6	60 47.7	+55.7	124.1	60 13.4	+56.3	125.6	59 37.9	+56.9	127.0	49
62 15.7	+54.5	121.8	61 43.4	+55.3	123.3	61 09.7	+56.1	124.9	60 34.8	+56.6	126.3	50
63 10.2	+54.3	120.9	62 38.7	+55.1	122.5	62 05.8	+55.7	124.1	61 31.4	+56.5	125.6	51
64 04.5	+53.8	119.9	63 33.8	+54.7	121.6	63 01.5	+55.5	123.3	62 27.9	+56.2	124.9	52
64 58.3	+53.3	118.9	64 28.5	+54.3	120.7	63 57.0	+55.2	122.5	63 24.1	+55.9	124.2	53
65 51.6	+52.9	117.8	65 22.8	+53.9	119.7	64 52.2	+54.8	121.6	64 20.0	+55.6	123.3	54
66 44.5	+52.3	116.6	66 16.7	+53.4	118.6	65 47.0	+54.4	120.6	65 15.6	+55.4	122.5	55
67 36.8	+51.6	115.3	67 10.1	+52.9	117.5	66 41.4	+54.0	119.5	66 11.0	+54.9	121.5	56
68 28.4	+50.9	114.0	68 03.0	+52.2	116.2	67 35.4	+53.5	118.4	67 05.9	+54.5	120.5	57
69 19.3	+50.2	112.5	68 55.2	+51.6	114.9	68 28.9	+52.9	117.2	68 00.4	+54.1	119.4	58
70 09.5	+49.2	110.9	69 46.8	+50.8	113.4	69 21.8	+52.2	115.9	68 54.5	+53.5	118.2	59
70 58.7	+48.2	109.2	70 37.6	+50.0	111.9	70 14.0	+51.5	114.5	69 48.0	+52.9	116.9	60
71 46.9	+47.0	107.3	71 27.6	+48.9	110.2	71 05.5	+50.7	112.9	70 40.9	+52.2	115.5	61
72 33.9	+45.6	105.3	72 16.5	+47.8	108.3	71 56.2	+49.7	111.2	71 33.1	+51.4	114.0	62
73 19.5	+44.1	103.1	73 04.3	+46.5	106.3	72 45.9	+48.6	109.4	72 24.5	+50.5	112.4	63
74 03.6	+42.4	100.7	73 50.8	+44.9	104.1	73 34.5	+47.3	107.3	73 15.0	+49.5	110.5	64
74 46.0	+40.3 •	98.0	74 35.7	+43.2	101.6	74 21.8	+45.9	105.1	74 04.5	+48.2	108.5	65
75 26.3	+38.0 •	95.1	75 18.9	+41.2 •	98.9	75 07.7	+44.1	102.7	74 52.7	+46.7	106.3	66
76 04.3	+35.4 •	92.0	76 00.1	+38.9 •	96.0	75 51.8	+42.1 •	100.0	75 39.4	+45.1	103.8	67
76 39.7	+32.4 •	88.6	76 39.0	+36.2 •	92.8	76 33.9	+39.7 •	97.0	76 24.5	+43.0 •	101.1	68
77 12.1	+28.9 •	84.8	77 15.2	+33.0 •	89.2	77 13.6	+37.1 •	93.7	77 07.5	+40.7 •	98.0	69
77 41.0	+25.2 •	80.8	77 48.2	+29.6 •	85.4	77 50.7	+33.8 •	90.0	77 48.2	+38.0 •	94.6	70
78 06.2	+20.9 •	76.5	78 17.8	+25.6 •	81.2	78 24.5	+30.2 •	86.0	78 26.2	+34.7 •	90.9	71
78 27.1	+16.3 •	71.9	78 43.4	+21.2 •	76.6	78 54.7	+26.1 •	81.6	79 00.9	+30.9 •	86.7	72
78 43.4	+11.3 •	67.0	79 04.6	+16.2 •	71.8	79 20.8	+21.4 •	76.8	79 31.8	+26.6 •	82.1	73
78 54.7	+6.2 •	61.9	79 20.8	+11.0 •	66.6	79 42.2	+16.2 •	71.7	79 58.4	+21.6 •	77.1	74
79 00.9	+0.7 •	56.7	79 31.8	+5.4 •	61.3	79 58.4	+10.5 •	66.2	80 20.0	+16.0 •	71.6	75
79 01.6	–4.6 •	51.5	79 37.2	–0.2 •	55.8	80 08.9	+4.7 •	60.5	80 36.0	+10.1 •	65.8	76
78 57.0	–9.9 •	46.3	79 37.0	–6.0 •	50.2	80 13.6	–1.5 •	54.7	80 46.1	+3.7 •	59.7	77
78 47.1	–15.0 •	41.2	79 31.0	–11.5 •	44.7	80 12.1	–7.4 •	48.8	80 49.8	–2.7 •	53.4	78
78 32.1	–19.7 •	36.2	79 19.5	–16.7 •	39.4	80 04.7	–13.2 •	43.0	80 47.1	–9.1 •	47.2	79
78 12.4	–24.0 •	31.5	79 02.8	–21.5 •	34.2	79 51.5	–18.7 •	37.4	80 38.0	–15.2 •	41.1	80
77 48.4	–28.0 •	27.1	78 41.3	–26.0 •	29.4	79 32.8	–23.6 •	32.1	80 22.8	–20.8 •	35.2	81
77 20.4	–31.4 •	23.0	78 15.3	–29.9 •	24.9	79 09.2	–28.0 •	27.1	80 02.0	–25.8 •	29.7	82
76 49.0	–34.6 •	19.2	77 45.4	–33.4 •	20.7	78 41.2	–32.0 •	22.5	79 36.2	–30.3 •	24.6	83
76 14.4	–37.3 •	15.7	77 12.0	–36.4 •	16.9	78 09.2	–35.4 •	18.3	79 05.9	–34.2 •	19.9	84
75 37.1	–39.7 •	12.5	76 35.6	–39.1 •	13.4	77 33.8	–38.3 •	14.4	78 31.7	–37.4 •	15.7	85
74 57.4	–41.9	9.5	75 56.5	–41.4 •	10.2	76 55.5	–40.9 •	10.9	77 54.3	–40.3 •	11.8	86
74 15.5	–43.6	6.8	75 15.1	–43.4	7.3	76 14.6	–43.1 •	7.8	77 14.0	–42.7 •	8.4	87
73 31.9	–45.3	4.3	74 31.7	–45.1	4.6	75 31.5	–44.9	4.9	76 31.3	–44.8	5.3	88
72 46.6	–46.6	2.1	73 46.6	–46.6	2.2	74 46.6	–46.6	2.3	75 46.5	–46.5	2.5	89
72 00.0	–47.9	0.0	73 00.0	–47.9	0.0	74 00.0	–47.9	0.0	75 00.0	–48.0	0.0	90
72°			73°			74°			75°			

38°, 322° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 38°, 322°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	17 10.2	−58.3	139.9	16 24.2	−58.4	140.1	15 38.1	−58.5	140.3	14 51.9	−58.7	140.4	14 05.6	−58.8	140.6	13 19.2	−59.0	140.8	12 32.7	−59.1	140.9	11 46.1	−59.2	141.0	0
1	16 11.9	−58.2	140.1	15 25.8	−58.4	140.3	14 39.6	−58.6	140.5	13 53.2	−58.7	140.6	13 06.8	−58.9	140.8	12 20.2	−58.9	140.9	11 33.6	−59.1	141.1	10 46.9	−59.2	141.2	1
2	15 13.7	−58.3	140.4	14 27.4	−58.4	140.5	13 41.0	−58.6	140.7	12 54.5	−58.7	140.9	12 07.9	−58.8	141.0	11 21.3	−59.0	141.1	10 34.5	−59.1	141.3	9 47.7	−59.2	141.4	2
3	14 15.4	−58.3	140.6	13 29.0	−58.5	140.8	12 42.4	−58.6	140.9	11 55.8	−58.7	141.1	11 09.1	−58.9	141.2	10 22.3	−59.0	141.3	9 35.4	−59.1	141.4	8 48.5	−59.3	141.5	3
4	13 17.1	−58.3	140.9	12 30.5	−58.4	141.0	11 43.8	−58.6	141.2	10 57.1	−58.8	141.3	10 10.2	−58.9	141.4	9 23.3	−59.0	141.5	8 36.3	−59.1	141.6	7 49.2	−59.2	141.7	4
5	12 18.8	−58.3	141.1	11 32.1	−58.5	141.2	10 45.2	−58.6	141.4	9 58.3	−58.7	141.5	9 11.3	−58.8	141.6	8 24.3	−59.0	141.7	7 37.2	−59.1	141.8	6 50.0	−59.2	141.9	5
6	11 20.5	−58.3	141.4	10 33.6	−58.5	141.5	9 46.6	−58.6	141.6	8 59.6	−58.8	141.7	8 12.5	−58.9	141.8	7 25.3	−59.0	141.9	6 38.1	−59.1	141.9	5 50.8	−59.2	142.0	6
7	10 22.2	−58.4	141.6	9 35.1	−58.5	141.7	8 48.0	−58.6	141.8	8 00.8	−58.7	141.9	7 13.6	−58.9	142.0	6 26.3	−59.0	142.1	5 39.0	−59.2	142.1	4 51.6	−59.2	142.2	7
8	9 23.8	−58.3	141.8	8 36.6	−58.4	141.9	7 49.4	−58.7	142.0	7 02.1	−58.8	142.1	6 14.7	−58.9	142.2	5 27.3	−59.0	142.2	4 39.8	−59.1	142.3	3 52.4	−59.3	142.3	8
9	8 25.5	−58.3	142.1	7 38.2	−58.5	142.2	6 50.7	−58.6	142.2	6 03.3	−58.8	142.3	5 15.8	−58.9	142.4	4 28.3	−59.0	142.4	3 40.7	−59.1	142.5	2 53.1	−59.2	142.5	9
10	7 27.2	−58.4	142.3	6 39.7	−58.5	142.4	5 52.1	−58.6	142.4	5 04.5	−58.8	142.5	4 16.9	−58.9	142.6	3 29.3	−59.1	142.6	2 41.6	−59.1	142.6	1 53.9	−59.2	142.7	10
11	6 28.8	−58.4	142.5	5 41.2	−58.6	142.6	4 53.5	−58.7	142.7	4 05.7	−58.7	142.7	3 18.0	−58.9	142.7	2 30.2	−59.0	142.8	1 42.5	−59.2	142.8	0 54.7	−59.3	142.8	11
12	5 30.4	−58.3	142.8	4 42.6	−58.5	142.8	3 54.8	−58.6	142.9	3 07.0	−58.8	142.9	2 19.1	−58.9	142.9	1 31.2	−59.0	143.0	0 43.3	−59.1	143.0	0 04.6	+59.2	37.0	12
13	4 32.1	−58.4	143.0	3 44.1	−58.5	143.0	2 56.2	−58.7	143.1	2 08.2	−58.8	143.1	1 20.2	−58.9	143.1	0 32.2	−59.0	143.1	0 15.8	+59.1	36.9	1 03.8	+59.2	36.9	13
14	3 33.7	−58.4	143.2	2 45.6	−58.5	143.3	1 57.5	−58.6	143.3	1 09.4	−58.8	143.3	0 21.3	−58.9	143.3	0 26.8	+59.0	36.7	1 14.9	+59.2	36.7	2 03.0	+59.3	36.7	14
15	2 35.3	−58.4	143.5	1 47.1	−58.5	143.5	0 58.9	−58.7	143.5	0 10.6	−58.8	143.5	0 37.6	+58.9	36.5	1 25.8	+59.1	36.5	2 14.1	+59.1	36.5	3 02.3	+59.2	36.5	15
16	1 36.9	−58.4	143.7	0 48.6	−58.5	143.7	0 00.2	−58.6	143.7	0 48.2	+58.7	36.3	1 36.5	+58.9	36.3	2 24.9	+59.0	36.3	3 13.2	+59.1	36.4	4 01.5	+59.2	36.4	16
17	0 38.5	−58.3	143.9	0 09.9	+58.6	36.1	0 58.4	+58.7	36.1	1 46.9	+58.8	36.1	2 35.4	+58.9	36.1	3 23.9	+59.0	36.1	4 12.3	+59.1	36.2	5 00.7	+59.3	36.2	17
18	0 19.8	+58.4	35.8	1 08.5	+58.5	35.8	1 57.1	+58.7	35.9	2 45.7	+58.8	35.9	3 34.3	+58.9	35.9	4 22.9	+59.0	36.0	5 11.4	+59.2	36.0	6 00.0	+59.2	36.1	18
19	1 18.2	+58.4	35.6	2 07.0	+58.5	35.6	2 55.8	+58.6	35.7	3 44.5	+58.8	35.7	4 33.2	+58.9	35.7	5 21.9	+59.0	35.8	6 10.6	+59.1	35.8	6 59.2	+59.2	35.9	19
20	2 16.6	+58.4	35.4	3 05.5	+58.5	35.4	3 54.4	+58.6	35.4	4 43.3	+58.7	35.5	5 32.1	+58.9	35.5	6 20.9	+59.0	35.6	7 09.7	+59.1	35.7	7 58.4	+59.2	35.7	20
21	3 15.0	+58.4	35.1	4 04.0	+58.5	35.2	4 53.0	+58.7	35.2	5 42.0	+58.8	35.3	6 31.0	+58.9	35.3	7 19.9	+59.0	35.4	8 08.8	+59.1	35.5	8 57.6	+59.2	35.6	21
22	4 13.4	+58.3	34.9	5 02.5	+58.5	35.0	5 51.7	+58.6	35.0	6 40.8	+58.8	35.1	7 29.9	+58.9	35.2	8 18.9	+59.0	35.2	9 07.9	+59.1	35.3	9 56.8	+59.2	35.4	22
23	5 11.7	+58.4	34.7	6 01.0	+58.5	34.7	6 50.3	+58.7	34.8	7 39.6	+58.7	34.9	8 28.8	+58.8	35.0	9 17.9	+59.0	35.0	10 07.0	+59.1	35.1	10 56.0	+59.2	35.3	23
24	6 10.1	+58.3	34.5	6 59.5	+58.5	34.5	7 49.0	+58.6	34.6	8 38.3	+58.8	34.7	9 27.6	+58.9	34.8	10 16.9	+59.0	34.9	11 06.1	+59.1	35.0	11 55.2	+59.2	35.1	24
25	7 08.4	+58.4	34.2	7 58.0	+58.5	34.3	8 47.6	+58.6	34.4	9 37.1	+58.7	34.5	10 26.5	+58.9	34.6	11 15.9	+59.0	34.7	12 05.2	+59.1	34.8	12 54.4	+59.2	34.9	25
26	8 06.8	+58.3	34.0	8 56.5	+58.5	34.1	9 46.2	+58.6	34.2	10 35.8	+58.8	34.3	11 25.4	+58.8	34.4	12 14.9	+58.9	34.5	13 04.3	+59.1	34.6	13 53.6	+59.2	34.8	26
27	9 05.1	+58.4	33.7	9 55.0	+58.5	33.8	10 44.8	+58.6	33.9	11 34.6	+58.7	34.1	12 24.2	+58.9	34.2	13 13.8	+59.0	34.3	14 03.4	+59.0	34.4	14 52.8	+59.2	34.6	27
28	10 03.5	+58.3	33.5	10 53.5	+58.4	33.6	11 43.4	+58.6	33.7	12 33.3	+58.7	33.8	13 23.1	+58.8	34.0	14 12.8	+59.0	34.1	15 02.4	+59.1	34.3	15 52.0	+59.2	34.4	28
29	11 01.8	+58.3	33.3	11 51.9	+58.5	33.4	12 42.0	+58.6	33.5	13 32.0	+58.7	33.6	14 21.9	+58.8	33.8	15 11.8	+58.9	33.9	16 01.5	+59.1	34.1	16 51.2	+59.1	34.2	29
30	12 00.1	+58.3	33.0	12 50.4	+58.4	33.2	13 40.6	+58.6	33.3	14 30.7	+58.7	33.4	15 20.7	+58.9	33.6	16 10.7	+58.9	33.7	17 00.6	+59.0	33.9	17 50.3	+59.2	34.1	30
31	12 58.4	+58.3	32.8	13 48.8	+58.5	32.9	14 39.2	+58.5	33.1	15 29.4	+58.7	33.2	16 19.6	+58.8	33.4	17 09.6	+58.9	33.5	17 59.6	+59.0	33.7	18 49.5	+59.1	33.9	31
32	13 56.7	+58.3	32.5	14 47.3	+58.4	32.7	15 37.7	+58.6	32.8	16 28.1	+58.7	33.0	17 18.4	+58.8	33.2	18 08.5	+59.0	33.3	18 58.6	+59.0	33.5	19 48.6	+59.1	33.7	32
33	14 55.0	+58.2	32.3	15 45.7	+58.4	32.4	16 36.3	+58.5	32.6	17 26.8	+58.6	32.8	18 17.2	+58.7	32.9	19 07.5	+58.8	33.1	19 57.6	+59.1	33.3	20 47.7	+59.1	33.5	33
34	15 53.2	+58.3	32.1	16 44.1	+58.3	32.2	17 34.8	+58.5	32.4	18 25.4	+58.6	32.5	19 15.9	+58.8	32.7	20 06.3	+58.9	32.9	20 56.7	+58.9	33.1	21 46.8	+59.1	33.3	34
35	16 51.5	+58.2	31.8	17 42.4	+58.4	32.0	18 33.3	+58.5	32.1	19 24.0	+58.7	32.3	20 14.7	+58.7	32.5	21 05.2	+58.9	32.7	21 55.6	+59.0	32.9	22 45.9	+59.1	33.2	35
36	17 49.7	+58.2	31.5	18 40.8	+58.3	31.7	19 31.8	+58.5	31.9	20 22.7	+58.6	32.1	21 13.4	+58.8	32.3	22 04.1	+58.8	32.5	22 54.6	+59.0	32.7	23 45.0	+59.1	33.0	36
37	18 47.9	+58.2	31.3	19 39.1	+58.4	31.5	20 30.3	+58.4	31.7	21 21.3	+58.6	31.9	22 12.2	+58.7	32.1	23 02.9	+58.9	32.3	23 53.6	+58.9	32.5	24 44.1	+59.1	32.8	37
38	19 46.1	+58.1	31.0	20 37.5	+58.2	31.2	21 28.7	+58.4	31.4	22 19.9	+58.5	31.6	23 10.9	+58.7	31.9	24 01.8	+58.8	32.1	24 52.5	+59.0	32.3	25 43.2	+59.0	32.6	38
39	20 44.2	+58.2	30.8	21 35.7	+58.3	31.0	22 27.1	+58.5	31.2	23 18.4	+58.6	31.4	24 09.6	+58.6	31.6	25 00.6	+58.8	31.9	25 51.5	+58.9	32.1	26 42.2	+59.0	32.4	39
40	21 42.4	+58.1	30.5	22 34.0	+58.3	30.7	23 25.6	+58.3	30.9	24 17.0	+58.5	31.2	25 08.2	+58.7	31.4	25 59.4	+58.8	31.6	26 50.4	+58.9	31.9	27 41.2	+59.1	32.2	40
41	22 40.5	+58.1	30.2	23 32.3	+58.2	30.5	24 23.9	+58.4	30.7	25 15.5	+58.5	30.9	26 06.9	+58.6	31.2	26 58.2	+58.7	31.4	27 49.3	+58.9	31.7	28 40.3	+59.0	32.0	41
42	23 38.6	+58.0	30.0	24 30.5	+58.2	30.2	25 22.3	+58.3	30.4	26 14.0	+58.4	30.7	27 05.5	+58.6	30.9	27 56.9	+58.7	31.2	28 48.2	+58.8	31.5	29 39.3	+58.9	31.8	42
43	24 36.6	+58.0	29.7	25 28.7	+58.2	29.9	26 20.6	+58.3	30.2	27 12.4	+58.5	30.4	28 04.1	+58.6	30.7	28 55.6	+58.7	31.0	29 47.0	+58.8	31.3	30 38.2	+59.0	31.6	43
44	25 34.6	+58.0	29.4	26 26.9	+58.1	29.6	27 18.9	+58.3	29.9	28 10.9	+58.4	30.2	29 02.7	+58.5	30.4	29 54.3	+58.7	30.7	30 45.8	+58.9	31.0	31 37.2	+58.9	31.3	44
45	26 32.6	+58.0	29.1	27 25.0	+58.1	29.4	28 17.2	+58.3	29.6	29 09.3	+58.4	29.9	30 01.2	+58.6	30.2	30 53.0	+58.7	30.5	31 44.7	+58.7	30.8	32 36.1	+58.9	31.1	45
46	27 30.6	+57.9	28.8	28 23.1	+58.1	29.1	29 15.5	+58.2	29.4	30 07.7	+58.3	29.6	30 59.8	+58.4	29.9	31 51.7	+58.6	30.2	32 43.4	+58.8	30.6	33 35.0	+58.9	30.9	46
47	28 28.5	+57.9	28.5	29 21.2	+58.0	28.8	30 13.7	+58.1	29.1	31 06.0	+58.3	29.4	31 58.2	+58.5	29.7	32 50.3	+58.6	30.0	33 42.2	+58.7	30.3	34 33.9	+58.8	30.7	47
48	29 26.4	+57.8	28.2	30 19.2	+58.0	28.5	31 11.8	+58.2	28.8	32 04.3	+58.3	29.1	32 56.7	+58.4	29.4	33 48.9	+58.5	29.7	34 40.9	+58.7	30.1	35 32.7	+58.9	30.4	48
49	30 24.2	+57.8	27.9	31 17.2	+57.9	28.2	32 10.0	+58.1	28.5	33 02.6	+58.3	28.8	33 55.1	+58.4	29.1	34 47.4	+58.6	29.5	35 39.6	+58.7	29.8	36 31.6	+58.8	30.2	49
50	31 22.0	+57.8	27.6	32 15.1	+57.9	27.9	33 08.1	+58.0	28.2	34 00.9	+58.2	28.5	34 53.5	+58.3	28.8	35 46.0	+58.5	29.2	36 38.3	+58.6	29.5	37 30.4	+58.7	29.9	50
51	32 19.8	+57.7	27.3	33 13.0	+57.9	27.6	34 06.1	+58.0	27.9	34 59.1	+58.1	28.2	35 51.8	+58.3	28.6	36 44.5	+58.4	28.9	37 36.9	+58.6	29.3	38 29.1	+58.7	29.7	51
52	33 17.5	+57.6	27.0	34 10.9	+57.8	27.3	35 04.1	+58.0	27.6	35 57.2	+58.1	27.9	36 50.1	+58.3	28.3	37 42.9	+58.4	28.6	38 35.5	+58.5	29.0	39 27.8	+58.7	29.4	52
53	34 15.1	+57.6	26.6	35 08.7	+57.7	26.9	36 02.1	+57.9	27.3	36 55.3	+58.1	27.6	37 48.4	+58.2	28.0	38 41.3	+58.4	28.3	39 34.0	+58.5	28.7	40 26.5	+58.7	29.1	53
54	35 12.7	+57.5	26.3	36 06.4	+57.7	26.6	37 00.0	+57.8	26.9	37 53.4	+58.0	27.3	38 46.6	+58.2	27.7	39 39.7	+58.3	28.0	40 32.5	+58.5	28.4	41 25.2	+58.6	28.9	54
55	36 10.2	+57.5	25.9	37 04.1	+57.6	26.3	37 57.8	+57.8	26.6	38 51.4	+57.9	27.0	39 44.8	+58.1	27.3	40 38.0	+58.2	27.7	41 31.0	+58.4	28.1	42 23.8	+58.6	28.6	55
56	37 07.7	+57.4	25.6	38 01.7	+57.6	25.9	38 55.6	+57.7	26.3	39 49.3	+57.9	26.6	40 42.9	+58.0	27.0	41 36.2	+58.3	27.4	42 29.4	+58.4	27.8	43 22.4	+58.5	28.3	56
57	38 05.1	+57.3	25.2	38 59.3	+57.5	25.6	39 53.3	+57.7	25.9	40 47.2	+57.9	26.3	41 40.9	+58.0	26.7	42 34.5	+58.1	27.1	43 27.8	+58.3	27.5	44 20.9	+58.4	28.0	57
58	39 02.4	+57.3	24.8	39 56.8	+57.4	25.2	40 51.0	+57.6	25.6	41 45.1	+57.7	25.9	42 38.9	+57.9	26.3	43 32.6	+58.1	26.7	44 26.1	+58.2	27.2	45 19.3	+58.4	27.6	58
59	39 59.7	+57.2	24.4	40 54.2	+57.4	24.8	41 48.6	+57.5	25.2	42 42.8	+57.7	25.6	43 36.8	+57.9	26.0	44 30.7	+58.0	26.4	45 24.3	+58.2	26.8	46 17.7	+58.4	27.3	59
60	40 56.9	+57.0	24.1	41 51.6	+57.2	24.4	42 46.1	+57.5	24.8	43 40.5	+57.6	25.2	44 34.7	+57.8	25.6	45 28.7	+58.0	26.0	46 22.5	+58.1	26.5	47 16.1	+58.3	27.0	60
61	41 53.9	+57.0	23.6	42 48.8	+57.2	24.0	43 43.6	+57.3	24.4	44 38.1	+57.5	24.8	45 32.5	+57.7	25.2	46 26.7	+57.8	25.7	47 20.6	+58.1	26.1	48 14.4	+58.2	26.6	61
62	42 50.9	+56.9	23.2	43 46.0	+57.1	23.6	44 40.9	+57.3	24.0	45 35.6	+57.5	24.4	46 30.2	+57.6	24.8	47 24.5	+57.8	25.3	48 18.7	+58.0	25.8	49 12.6	+58.2	26.3	62
63	43 47.8	+56.9	22.8	44 43.1	+57.0	23.2	45 38.2	+57.1	23.6	46 33.1	+57.3	24.0	47 27.8	+57.5	24.4	48 22.3	+57.8	24.9	49 16.7	+57.9	25.4	50 10.8	+58.0	25.9	63
64	44 44.7	+56.6	22.3	45 40.1	+56.9	22.7	46 35.3	+57.1	23.1	47 30.4	+57.3	23.5	48 25.3	+57.5	24.0	49 20.1	+57.6	24.5	50 14.6	+57.8	25.0	51 08.8	+58.0	25.5	64
65	45 41.3	+56.6	21.9	46 37.0	+56.7	22.3	47 32.4	+56.9	22.7	48 27.7	+57.1	23.1	49 22.8	+57.3	23.6	50 17.7	+57.5	24.0	51 12.4	+57.7	24.5	52 06.8	+57.9	25.1	65
66	46 37.9	+56.5	21.4	47 33.7	+56.7	21.8	48 29.3	+56.9	22.2	49 24.8	+57.0	22.6	50 20.1	+57.2	23.1	51 15.2	+57.4	23.6	52 10.1	+57.6	24.1	53 04.7	+57.8	24.6	66
67	47 34.4	+56.3	20.9	48 30.4	+56.5	21.3	49 26.2	+56.7	21.7	50 21.8	+56.9	22.2	51 17.3	+57.1	22.6	52 12.6	+57.3	23.1	53 07.7	+57.5	23.6	54 02.5	+57.7	24.2	67
68	48 30.7	+56.2	20.4	49 26.9	+56.3	20.8	50 22.9	+56.5	21.2	51 18.7	+56.8	21.7	52 14.4	+57.0	22.1	53 09.9	+57.2	22.6	54 05.2	+57.3	23.2	55 00.2	+57.6	23.7	68
69	49 26.9	+56.0	19.8	50 23.2	+56.2	20.2	51 19.4	+56.5	20.7	52 15.5	+56.6	21.1	53 11.4	+56.8	21.6	54 07.1	+57.0	22.1	55 02.5	+57.3	22.6	55 57.8	+57.5	23.2	69
70	50 22.9	+55.8	19.3	51 19.4	+56.1	19.7	52 15.9	+56.2	20.1	53 12.1	+56.5	20.6	54 08.2	+56.7	21.1	55 04.1	+56.9	21.6	55 59.8	+57.1	22.1	56 55.3	+57.3	22.7	70
71	51 18.7	+55.7	18.7	52 15.5	+55.9	19.1	53 12.1	+56.1	19.5	54 08.6	+56.3	20.0	55 04.9	+56.5	20.5	56 01.0	+56.7	21.0	56 56.9	+56.9	21.6	57 52.6	+57.1	22.1	71
72	52 14.4	+55.5	18.1	53 11.4	+55.7	18.5	54 08.2	+55.9	18.9	55 04.9	+56.1	19.4	56 01.4	+56.3	19.9	56 57.7	+56.5	20.4	57 53.8	+56.8	21.0	58 49.7	+57.0	21.6	72
73	53 09.9	+55.3	17.5	54 07.1	+55.4	17.9	55 04.1	+55.7	18.3	56 01.0	+55.9	18.8	56 57.7	+56.1	19.3	57 54.2	+56.4	19.8	58 50.6	+56.6	20.4	59 46.7	+56.9	21.0	73
74	54 05.2	+55.0	16.8	55 02.5	+55.3	17.2	55 59.8	+55.5	17.7	56 56.9	+55.7	18.1	57 53.8	+55.9	18.6	58 50.6	+56.1	19.1	59 47.2	+56.4	19.7	60 43.6	+56.6	20.3	74
75	55 00.2	+54.8	16.1	55 57.8	+55.0	16.5	56 55.3	+55.2	17.0	57 52.6	+55.4	17.4	58 49.7	+55.7	17.9	59 46.7	+55.9	18.5	60 43.6	+56.1	19.0	61 40.2	+56.4	19.6	75
76	55 55.0	+54.6	15.4	56 52.8	+54.8	15.8	57 50.5	+55.0	16.2	58 48.0	+55.2	16.7	59 45.4	+55.4	17.2	60 42.6	+55.7	17.7	61 39.7	+55.9	18.3	62 36.6	+56.1	18.9	76
77	56 49.6	+54.2	14.7	57 47.6	+54.4	15.1	58 45.5	+54.6	15.5	59 43.2	+54.9	15.9	60 40.8	+55.2	16.4	61 38.3	+55.4	17.0	62 35.6	+55.6	17.5	63 32.7	+55.9	18.1	77
78	57 43.8	+54.0	13.9	58 42.0	+54.2	14.3	59 40.1	+54.4	14.7	60 38.1	+54.6	15.1	61 36.0	+54.8	15.6	62 33.7	+55.1	16.1	63 31.2	+55.4	16.7	64 28.6	+55.6	17.3	78
79	58 37.8	+53.6	13.0	59 36.2	+53.8	13.4	60 34.5	+54.0	13.8	61 32.7	+54.3	14.3	62 30.8	+54.5	14.7	63 28.8	+54.7	15.3	64 26.6	+55.0	15.8	65 24.2	+55.3	16.4	79
80	59 31.4	+53.3	12.2	60 30.0	+53.5	12.5	61 28.5	+53.7	12.9	62 27.0	+53.9	13.4	63 25.3	+54.1	13.8	64 23.5	+54.3	14.3	65 21.6	+54.6	14.9	66 19.5	+54.9	15.4	80
81	60 24.7	+52.8	11.2	61 23.5	+53.0	11.6	62 22.2	+53.3	12.0	63 20.9	+53.4	12.4	64 19.4	+53.7	12.8	65 17.8	+54.0	13.3	66 16.2	+54.2	13.8	67 14.4	+54.4	14.4	81
82	61 17.5	+52.4	10.3	62 16.5	+52.6	10.6	63 15.5	+52.7	11.0	64 14.3	+53.0	11.4	65 13.1	+53.2	11.8	66 11.8	+53.4	12.3	67 10.4	+53.7	12.8	68 08.8	+54.0	13.3	82
83	62 09.9	+51.9	9.2	63 09.1	+52.1	9.6	64 08.2	+52.3	9.9	65 07.3	+52.5	10.3	66 06.3	+52.7	10.7	67 05.2	+53.0	11.1	68 04.1	+53.1	11.6	69 02.8	+53.4	12.1	83
84	63 01.8	+51.4	8.2	64 01.2	+51.6	8.4	65 00.5	+51.8	8.8	65 59.8	+51.9	9.1	66 59.0	+52.1	9.5	67 58.2	+52.3	9.9	68 57.2	+52.6	10.3	69 56.2	+52.8	10.8	84
85	63 53.2	+50.8	7.0	64 52.8	+50.9	7.3	65 52.3	+51.1	7.5	66 51.7	+51.3	7.8	67 51.1	+51.5	8.2	68 50.5	+51.6	8.5	69 49.8	+51.9	9.0	70 49.0	+52.1	9.4	85
86	64 44.0	+50.2	5.8	65 43.7	+50.3	6.0	66 43.4	+50.4	6.2	67 43.0	+50.6	6.5	68 42.6	+50.7	6.8	69 42.1	+50.9	7.1	70 41.7	+51.0	7.5	71 41.1	+51.3	7.9	86
87	65 34.2	+49.4	4.5	66 34.0	+49.5	4.6	67 33.8	+49.6	4.8	68 33.6	+49.7	5.1	69 33.3	+49.9	5.3	70 33.0	+50.1	5.6	71 32.7	+50.2	5.8	72 32.4	+50.4	6.2	87
88	66 23.6	+48.6	3.1	67 23.5	+48.7	3.2	68 23.4	+48.8	3.3	69 23.3	+48.9	3.5	70 23.2	+48.9	3.7	71 23.1	+49.0	3.9	72 22.9	+49.2	4.1	73 22.8	+49.2	4.3	88
89	67 12.2	+47.8	1.6	68 12.2	+47.8	1.7	69 12.2	+47.8	1.7	70 12.2	+47.8	1.8	71 12.1	+47.9	1.9	72 12.1	+47.9	2.0	73 12.1	+47.9	2.1	74 12.0	+48.0	2.3	89
90	68 00.0	+46.8	0.0	69 00.0	+46.7	0.0	70 00.0	+46.7	0.0	71 00.0	+46.7	0.0	72 00.0	+46.6	0.0	73 00.0	+46.6	0.0	74 00.0	+46.6	0.0	75 00.0	+46.5	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 142°, 218°

39°, 321° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.....Zn=360°–Z

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	16 55.5	+58.2	138.9	16 10.3	+58.3	139.1	15 24.9	+58.4	139.2	14 39.4	+58.6	139.4	13 53.7	+58.8	139.6	13 08.0	+58.9	139.7	12 22.2	+59.0	139.9	11 36.2	+59.2	140.0	0
1	17 53.7	+58.1	138.6	17 08.6	+58.3	138.8	16 23.3	+58.5	139.0	15 38.0	+58.6	139.2	14 52.5	+58.8	139.4	14 06.9	+58.9	139.5	13 21.2	+59.0	139.7	12 35.4	+59.1	139.9	1
2	18 51.8	+58.1	138.3	18 06.9	+58.2	138.6	17 21.8	+58.5	138.8	16 36.6	+58.6	139.0	15 51.3	+58.7	139.2	15 05.8	+58.9	139.4	14 20.2	+59.1	139.5	13 34.5	+59.2	139.7	2
3	19 49.9	+58.0	138.1	19 05.1	+58.3	138.3	18 20.3	+58.4	138.5	17 35.2	+58.6	138.8	16 50.0	+58.8	139.0	16 04.7	+58.9	139.2	15 19.3	+59.0	139.3	14 33.7	+59.1	139.5	3
4	20 47.9	+58.1	137.8	20 03.4	+58.2	138.1	19 18.7	+58.4	138.3	18 33.8	+58.6	138.5	17 48.8	+58.7	138.7	17 03.6	+58.9	139.0	16 18.3	+59.0	139.1	15 32.8	+59.2	139.3	4
5	21 46.0	+58.0	137.5	21 01.6	+58.2	137.8	20 17.1	+58.4	138.1	19 32.4	+58.5	138.3	18 47.5	+58.7	138.5	18 02.5	+58.8	138.8	17 17.3	+59.0	139.0	16 32.0	+59.1	139.2	5
6	22 44.0	+58.0	137.3	21 59.8	+58.2	137.5	21 15.5	+58.3	137.8	20 30.9	+58.6	138.1	19 46.2	+58.7	138.3	19 01.3	+58.9	138.5	18 16.3	+59.0	138.8	17 31.1	+59.1	139.0	6
7	23 42.0	+58.0	137.0	22 58.0	+58.2	137.3	22 13.8	+58.4	137.6	21 29.5	+58.5	137.8	20 44.9	+58.7	138.1	20 00.2	+58.8	138.3	19 15.3	+58.9	138.6	18 30.2	+59.1	138.8	7
8	24 40.0	+57.9	136.7	23 56.2	+58.1	137.0	23 12.2	+58.3	137.3	22 28.0	+58.5	137.6	21 43.6	+58.6	137.9	20 59.0	+58.8	138.1	20 14.2	+59.0	138.4	19 29.3	+59.1	138.6	8
9	25 37.9	+57.9	136.4	24 54.3	+58.1	136.7	24 10.5	+58.3	137.1	23 26.5	+58.5	137.4	22 42.2	+58.7	137.6	21 57.8	+58.8	137.9	21 13.2	+58.9	138.2	20 28.4	+59.1	138.4	9
10	26 35.8	+57.9	136.1	25 52.4	+58.1	136.5	25 08.8	+58.3	136.8	24 25.0	+58.4	137.1	23 40.9	+58.6	137.4	22 56.6	+58.8	137.7	22 12.1	+59.0	138.0	21 27.5	+59.0	138.2	10
11	27 33.7	+57.8	135.8	26 50.5	+58.0	136.2	26 07.1	+58.2	136.5	25 23.4	+58.4	136.9	24 39.5	+58.6	137.2	23 55.4	+58.8	137.5	23 11.1	+58.9	137.8	22 26.5	+59.1	138.1	11
12	28 31.5	+57.7	135.5	27 48.5	+58.0	135.9	27 05.3	+58.2	136.3	26 21.8	+58.4	136.6	25 38.1	+58.6	136.9	24 54.2	+58.7	137.3	24 10.0	+58.9	137.6	23 25.6	+59.0	137.9	12
13	29 29.2	+57.8	135.2	28 46.5	+58.0	135.6	28 03.5	+58.2	136.0	27 20.2	+58.4	136.3	26 36.7	+58.5	136.7	25 52.9	+58.7	137.0	25 08.9	+58.9	137.4	24 24.6	+59.1	137.7	13
14	30 27.0	+57.7	134.9	29 44.5	+57.9	135.3	29 01.7	+58.1	135.7	28 18.6	+58.3	136.1	27 35.2	+58.6	136.5	26 51.6	+58.7	136.8	26 07.8	+58.8	137.1	25 23.7	+59.0	137.5	14
15	31 24.7	+57.6	134.6	30 42.4	+57.9	135.0	29 59.8	+58.1	135.4	29 16.9	+58.3	135.8	28 33.8	+58.5	136.2	27 50.3	+58.7	136.6	27 06.6	+58.9	136.9	26 22.7	+59.0	137.3	15
16	32 22.3	+57.6	134.3	31 40.3	+57.8	134.7	30 57.9	+58.1	135.1	30 15.2	+58.3	135.5	29 32.3	+58.4	135.9	28 49.0	+58.6	136.3	28 05.5	+58.8	136.7	27 21.7	+58.9	137.1	16
17	33 19.9	+57.5	133.9	32 38.1	+57.8	134.4	31 56.0	+58.0	134.8	31 13.5	+58.2	135.3	30 30.7	+58.5	135.7	29 47.6	+58.7	136.1	29 04.3	+58.8	136.5	28 20.6	+59.0	136.9	17
18	34 17.4	+57.5	133.6	33 35.9	+57.7	134.1	32 54.0	+58.0	134.5	32 11.7	+58.2	135.0	31 29.2	+58.4	135.4	30 46.3	+58.6	135.8	30 03.1	+58.7	136.3	29 19.6	+58.9	136.6	18
19	35 14.9	+57.4	133.2	34 33.6	+57.7	133.7	33 52.0	+57.9	134.2	33 09.9	+58.2	134.7	32 27.6	+58.3	135.2	31 44.9	+58.5	135.6	31 01.8	+58.8	136.0	30 18.5	+58.9	136.4	19
20	36 12.3	+57.4	132.9	35 31.3	+57.6	133.4	34 49.9	+57.9	133.9	34 08.1	+58.1	134.4	33 25.9	+58.4	134.9	32 43.4	+58.6	135.3	32 00.6	+58.7	135.8	31 17.4	+58.9	136.2	20
21	37 09.7	+57.3	132.5	36 28.9	+57.6	133.1	35 47.8	+57.8	133.6	35 06.2	+58.1	134.1	34 24.3	+58.2	134.6	33 42.0	+58.4	135.1	32 59.3	+58.7	135.5	32 16.3	+58.9	136.0	21
22	38 07.0	+57.2	132.1	37 26.5	+57.5	132.7	36 45.6	+57.7	133.3	36 04.3	+58.0	133.8	35 22.5	+58.3	134.3	34 40.4	+58.5	134.8	33 58.0	+58.6	135.3	33 15.2	+58.8	135.8	22
23	39 04.2	+57.1	131.7	38 24.0	+57.4	132.3	37 43.3	+57.8	132.9	37 02.3	+57.9	133.5	36 20.8	+58.2	134.0	35 38.9	+58.4	134.5	34 56.6	+58.7	135.0	34 14.0	+58.8	135.5	23
24	40 01.3	+57.0	131.3	39 21.4	+57.4	132.0	38 41.1	+57.6	132.6	38 00.2	+57.9	133.1	37 19.0	+58.1	133.7	36 37.3	+58.4	134.2	35 55.3	+58.6	134.8	35 12.8	+58.8	135.3	24
25	40 58.3	+57.0	130.9	40 18.8	+57.2	131.6	39 38.7	+57.6	132.2	38 58.1	+57.9	132.8	38 17.1	+58.2	133.4	37 35.7	+58.4	134.0	36 53.9	+58.5	134.5	36 11.6	+58.8	135.0	25
26	41 55.3	+56.8	130.5	41 16.0	+57.2	131.2	40 36.3	+57.5	131.8	39 56.0	+57.8	132.5	39 15.3	+58.0	133.1	38 34.1	+58.2	133.7	37 52.4	+58.5	134.2	37 10.4	+58.7	134.8	26
27	42 52.1	+56.8	130.1	42 13.2	+57.1	130.8	41 33.8	+57.4	131.5	40 53.8	+57.7	132.1	40 13.3	+58.0	132.7	39 32.3	+58.3	133.4	38 50.9	+58.5	133.9	38 09.1	+58.7	134.5	27
28	43 48.9	+56.7	129.6	43 10.3	+57.0	130.4	42 31.2	+57.3	131.1	41 51.5	+57.7	131.8	41 11.3	+57.9	132.4	40 30.6	+58.2	133.0	39 49.4	+58.4	133.7	39 07.8	+58.6	134.2	28
29	44 45.6	+56.5	129.2	44 07.3	+57.0	129.9	43 28.5	+57.3	130.7	42 49.2	+57.5	131.4	42 09.2	+57.9	132.1	41 28.8	+58.1	132.7	40 47.8	+58.4	133.4	40 06.4	+58.6	134.0	29
30	45 42.1	+56.4	128.7	45 04.3	+56.8	129.5	44 25.8	+57.2	130.3	43 46.7	+57.5	131.0	43 07.1	+57.8	131.7	42 26.9	+58.1	132.4	41 46.2	+58.3	133.1	41 05.0	+58.6	133.7	30
31	46 38.5	+56.3	128.2	46 01.1	+56.7	129.0	45 23.0	+57.0	129.8	44 44.2	+57.4	130.6	44 04.9	+57.7	131.3	43 25.0	+58.0	132.0	42 44.5	+58.3	132.7	42 03.6	+58.5	133.4	31
32	47 34.8	+56.1	127.7	46 57.8	+56.5	128.6	46 20.0	+57.0	129.4	45 41.6	+57.3	130.2	45 02.6	+57.7	130.9	44 23.0	+57.9	131.7	43 42.8	+58.2	132.4	43 02.1	+58.4	133.1	32
33	48 30.9	+56.0	127.2	47 54.3	+56.5	128.1	47 17.0	+56.8	128.9	46 38.9	+57.3	129.7	46 00.3	+57.5	130.5	45 20.9	+57.9	131.3	44 41.0	+58.2	132.1	44 00.5	+58.5	132.8	33
34	49 26.9	+55.9	126.6	48 50.8	+56.2	127.6	48 13.8	+56.7	128.4	47 36.2	+57.1	129.3	46 57.8	+57.5	130.1	46 18.8	+57.8	130.9	45 39.2	+58.1	131.7	44 59.0	+58.3	132.5	34
35	50 22.8	+55.6	126.1	49 47.0	+56.2	127.0	49 10.5	+56.6	127.9	48 33.3	+57.0	128.8	47 55.3	+57.3	129.7	47 16.6	+57.7	130.6	46 37.3	+58.0	131.4	45 57.3	+58.3	132.1	35
36	51 18.4	+55.5	125.5	50 43.2	+56.0	126.5	50 07.1	+56.5	127.4	49 30.3	+56.8	128.4	48 52.6	+57.3	129.3	48 14.3	+57.6	130.1	47 35.3	+57.9	131.0	46 55.6	+58.2	131.8	36
37	52 13.9	+55.3	124.9	51 39.2	+55.8	125.9	51 03.6	+56.3	126.9	50 27.1	+56.8	127.9	49 49.9	+57.2	128.8	49 11.9	+57.5	129.7	48 33.2	+57.9	130.6	47 53.8	+58.2	131.4	37
38	53 09.2	+55.0	124.2	52 35.0	+55.6	125.3	51 59.9	+56.1	126.3	51 23.9	+56.6	127.4	50 47.1	+57.0	128.3	50 09.4	+57.5	129.3	49 31.1	+57.8	130.2	48 52.0	+58.1	131.1	38
39	54 04.2	+54.9	123.5	53 30.6	+55.4	124.7	52 56.0	+55.9	125.8	52 20.5	+56.4	126.8	51 44.1	+56.9	127.8	51 06.9	+57.3	128.8	50 28.9	+57.6	129.8	49 50.1	+58.0	130.7	39
40	54 59.1	+54.5	122.8	54 26.0	+55.2	124.0	53 51.9	+55.8	125.2	53 16.9	+56.3	126.3	52 41.0	+56.7	127.3	52 04.2	+57.2	128.3	51 26.5	+57.6	129.3	50 48.1	+58.0	130.3	40
41	55 53.6	+54.3	122.1	55 21.2	+55.0	123.3	54 47.7	+55.6	124.5	54 13.2	+56.1	125.7	53 37.7	+56.6	126.8	53 01.4	+57.0	127.9	52 24.1	+57.5	128.9	51 46.1	+57.8	129.9	41
42	56 47.9	+54.0	121.3	56 16.2	+54.7	122.6	55 43.3	+55.3	123.9	55 09.3	+55.9	125.1	54 34.3	+56.5	126.2	53 58.4	+56.9	127.3	53 21.6	+57.3	128.4	52 43.9	+57.7	129.4	42
43	57 41.9	+53.7	120.5	57 10.9	+54.4	121.9	56 38.6	+55.1	123.2	56 05.2	+55.7	124.4	55 30.8	+56.2	125.6	54 55.3	+56.8	126.8	54 18.9	+57.3	127.9	53 41.6	+57.7	129.0	43
44	58 35.6	+53.3	119.7	58 05.3	+54.1	121.1	57 33.7	+54.8	122.4	57 00.9	+55.5	123.7	56 27.0	+56.1	125.0	55 52.1	+56.6	126.2	55 16.2	+57.0	127.4	54 39.3	+57.5	128.5	44
45	59 28.9	+53.0	118.8	58 59.4	+53.7	120.3	58 28.5	+54.5	121.7	57 56.4	+55.2	123.0	57 23.1	+55.8	124.3	56 48.7	+56.4	125.6	56 13.2	+57.0	126.8	55 36.8	+57.4	128.0	45
46	60 21.9	+52.5	117.9	59 53.1	+53.5	119.4	59 23.0	+54.2	120.9	58 51.6	+55.0	122.3	58 18.9	+55.7	123.7	57 45.1	+56.2	125.0	57 10.2	+56.7	126.3	56 34.2	+57.2	127.5	46
47	61 14.4	+52.1	116.9	60 46.6	+53.0	118.5	60 17.2	+53.9	120.0	59 46.6	+54.6	121.5	59 14.6	+55.3	122.9	58 41.3	+56.0	124.3	58 06.9	+56.6	125.7	57 31.4	+57.1	126.9	47
48	62 06.5	+51.6	115.8	61 39.6	+52.5	117.5	61 11.1	+53.5	119.1	60 41.2	+54.3	120.7	60 09.9	+55.1	122.2	59 37.3	+55.8	123.6	59 03.5	+56.4	125.0	58 28.5	+56.9	126.4	48
49	62 58.1	+51.0	114.7	62 32.1	+52.1	116.5	62 04.6	+53.1	118.2	61 35.5	+54.0	119.8	61 05.0	+54.8	121.4	60 33.1	+55.5	122.9	59 59.9	+56.1	124.3	59 25.4	+56.8	125.7	49
50	63 49.1	+50.4	113.5	63 24.2	+51.6	115.4	62 57.7	+52.6	117.1	62 29.5	+53.6	118.9	61 59.8	+54.4	120.5	61 28.6	+55.2	122.1	60 56.0	+56.0	123.6	60 22.2	+56.5	125.1	50
51	64 39.5	+49.7	112.3	64 15.8	+50.9	114.2	63 50.3	+52.1	116.1	63 23.1	+53.1	117.9	62 54.2	+54.1	119.6	62 23.8	+54.9	121.3	61 52.0	+55.6	122.9	61 18.7	+56.3	124.4	51
52	65 29.2	+49.0	111.0	65 06.7	+50.4	113.0	64 42.4	+51.5	114.9	64 16.2	+52.6	116.8	63 48.3	+53.6	118.6	63 18.7	+54.6	120.4	62 47.6	+55.4	122.1	62 15.0	+56.1	123.7	52
53	66 18.2	+48.2	109.5	65 57.1	+49.6	111.7	65 33.9	+50.9	113.7	65 08.8	+52.2	115.7	64 41.9	+53.2	117.6	64 13.3	+54.1	119.4	63 43.0	+55.0	121.2	63 11.1	+55.8	122.9	53
54	67 06.4	+47.2	108.0	66 46.7	+48.8	110.3	66 24.8	+50.3	112.4	66 01.0	+51.5	114.5	65 35.1	+52.7	116.5	65 07.4	+53.8	118.4	64 38.0	+54.7	120.3	64 06.9	+55.6	122.1	54
55	67 53.6	+46.3	106.4	67 35.5	+47.9	108.8	67 15.1	+49.4	111.0	66 52.5	+50.8	113.2	66 27.8	+52.1	115.3	66 01.2	+53.2	117.4	65 32.7	+54.3	119.3	65 02.5	+55.1	121.2	55
56	68 39.9	+45.1	104.7	68 23.4	+46.9	107.2	68 04.5	+48.6	109.5	67 43.3	+50.1	111.8	67 19.9	+51.5	114.1	66 54.4	+52.7	116.2	66 27.0	+53.8	118.3	65 57.6	+54.8	120.2	56
57	69 25.0	+43.8	102.9	69 10.3	+45.8	105.4	68 53.1	+47.6	107.9	68 33.4	+49.3	110.4	68 11.4	+50.7	112.7	67 47.1	+52.1	115.0	67 20.8	+53.3	117.1	66 52.4	+54.4	119.2	57
58	70 08.8	+42.5	100.9	69 56.1	+44.6	103.6	69 40.7	+46.5	106.2	69 22.7	+48.3	108.8	69 02.1	+50.0	111.2	68 39.2	+51.4	113.6	68 14.1	+52.7	115.9	67 46.8	+53.9	118.1	58
59	70 51.3	+40.9	98.8	70 40.7	+43.2	101.6	70 27.2	+45.3	104.4	70 11.0	+47.2	107.0	69 52.1	+49.0	109.7	69 30.6	+50.7	112.2	69 06.8	+52.1	114.6	68 40.7	+53.4	116.9	59
60	71 32.2	+39.2	96.5	71 23.9	+41.6	99.5	71 12.5	+43.9	102.4	70 58.2	+46.1	105.2	70 41.1	+48.0	108.0	70 21.3	+49.7	110.6	69 58.9	+51.3	113.2	69 34.1	+52.7	115.7	60
61	72 11.4	+37.2	94.1	72 05.5	+39.9	97.2	71 56.4	+42.4	100.2	71 44.3	+44.7	103.2	71 29.1	+46.8	106.1	71 11.0	+48.8	108.9	70 50.2	+50.5	111.6	70 26.8	+52.1	114.3	61
62	72 48.6	+35.1	91.5	72 45.4	+37.9	94.7	72 38.8	+40.6	97.9	72 29.0	+43.1	101.0	72 15.9	+45.5	104.1	71 59.8	+47.6	107.1	71 40.7	+49.6	110.0	71 18.9	+51.2	112.8	62
63	73 23.7	+32.6	88.7	73 23.3	+35.7	92.0	73 19.4	+38.7	95.4	73 12.1	+41.4	98.7	73 01.4	+44.0	101.9	72 47.4	+46.3	105.1	72 30.3	+48.4	108.1	72 10.1	+50.3	111.1	63
64	73 56.3	+30.1	85.7	73 59.0	+33.3	89.2	73 58.1	+36.4	92.6	73 53.5	+39.4	96.1	73 45.4	+42.2	99.5	73 33.7	+44.8	102.9	73 18.7	+47.1	106.1	73 00.4	+49.3	109.3	64
65	74 26.4	+27.1	82.5	74 32.3	+30.6	86.1	74 34.5	+34.0	89.7	74 32.9	+37.2	93.3	74 27.6	+40.2	96.9	74 18.5	+43.1	100.5	74 05.8	+45.7	103.9	73 49.7	+48.0	107.3	65
66	74 53.5	+24.0	79.1	75 02.9	+27.6	82.8	75 08.5	+31.2	86.6	75 10.1	+34.7	90.3	75 07.8	+38.0	94.1	75 01.6	+41.1	97.8	74 51.5	+44.0	101.5	74 37.7	+46.6	105.1	66
67	75 17.5	+20.5	75.6	75 30.5	+24.3	79.3	75 39.7	+28.0	83.2	75 44.8	+31.8	87.1	75 45.8	+35.4	91.0	75 42.7	+38.8	94.9	75 35.5	+41.9	98.8	75 24.3	+44.9	102.6	67
68	75 38.0	+16.8	71.8	75 54.8	+20.7	75.6	76 07.7	+24.7	79.5	76 16.6	+28.6	83.6	76 21.2	+32.4	87.7	76 21.5	+36.1	91.8	76 17.4	+39.7	95.9	76 09.2	+42.9	99.9	68
69	75 54.8	+12.9	67.9	76 15.5	+16.9	71.7	76 32.4	+20.9	75.7	76 45.2	+25.0	79.8	76 53.6	+29.1	84.0	76 57.6	+33.2	88.3	76 57.1	+37.0	92.6	76 52.1	+40.6	96.9	69
70	76 07.7	+8.9	63.9	76 32.4	+12.8	67.6	76 53.3	+16.9	71.6	77 10.2	+21.1	75.8	77 22.7	+25.5	80.1	77 30.8	+29.7	84.5	77 34.1	+33.9	89.1	77 32.7	+37.9	93.6	70
71	76 16.6	+4.6	59.7	76 45.2	+8.4	63.4	77 10.2	+12.5	67.3	77 31.3	+16.9	71.5	77 48.2	+21.3	75.9	78 00.5	+25.9	80.4	78 08.0	+30.4	85.1	78 10.6	+34.8	89.9	71
72	76 21.2	+0.3	55.5	76 53.6	+4.0	59.0	77 22.7	+8.1	62.9	77 48.2	+12.3	67.0	78 09.5	+16.9	71.4	78 26.4	+21.5	76.0	78 38.4	+26.3	80.9	78 45.4	+31.0	85.8	72
73	76 21.5	−4.1	51.3	76 57.6	−0.5	54.6	77 30.8	+3.3	58.3	78 00.5	+7.5	62.3	78 26.4	+12.0	66.7	78 47.9	+16.8	71.3	79 04.7	+21.8	76.2	79 16.4	+26.8	81.3	73
74	76 17.4	−8.2	47.0	76 57.1	−5.0	50.2	77 34.1	−1.4	53.7	78 08.0	+2.6	57.5	78 38.4	+7.0	61.7	79 04.7	+11.7	66.3	79 26.5	+16.7	71.2	79 43.2	+22.0	76.4	74
75	76 09.2	−12.4	42.9	76 52.1	−9.4	45.8	77 32.7	−6.1	49.0	78 10.6	−2.4	52.7	78 45.4	+1.7	56.7	79 16.4	+6.3	61.1	79 43.2	+11.3	65.9	80 05.2	+16.7	71.1	75
76	75 56.8	−16.3	38.8	76 42.7	−13.7	41.5	77 26.6	−10.7	44.5	78 08.2	−7.3	47.8	78 47.1	−3.5	51.5	79 22.7	+0.8	55.7	79 54.5	+5.6	60.3	80 21.9	+10.8	65.5	76
77	75 40.5	−20.0	34.9	76 29.0	−17.7	37.3	77 15.9	−15.1	40.0	78 00.9	−12.2	43.0	78 43.6	−8.8	46.4	79 23.5	−4.8	50.3	80 00.1	−0.4	54.6	80 32.7	+4.7	59.5	77
78	75 20.5	−23.5	31.1	76 11.3	−21.6	33.2	77 00.8	−19.3	35.6	77 48.7	−16.7	38.3	78 34.8	−13.7	41.4	79 18.7	−10.3	44.9	79 59.7	−6.3	48.9	80 37.4	−1.7	53.4	78
79	74 57.0	−26.7	27.5	75 49.7	−25.0	29.4	76 41.5	−23.2	31.4	77 32.0	−20.9	33.8	78 21.1	−18.4	36.5	79 08.4	−15.5	39.6	79 53.4	−12.0	43.2	80 35.7	−7.9	47.3	79
80	74 30.3	−29.7	24.1	75 24.7	−28.3	25.7	76 18.3	−26.7	27.5	77 11.1	−24.9	29.5	78 02.7	−22.8	31.8	78 52.9	−20.3	34.5	79 41.4	−17.4	37.6	80 27.8	−14.0	41.3	80
81	74 00.6	−32.3	20.9	74 56.4	−31.2	22.3	75 51.6	−29.9	23.8	76 46.2	−28.5	25.5	77 39.9	−26.7	27.4	78 32.6	−24.7	29.7	79 24.0	−22.3	32.4	80 13.8	−19.5	35.5	81
82	73 28.3	−34.8	17.9	74 25.2	−33.9	19.0	75 21.7	−32.9	20.3	76 17.7	−31.7	21.7	77 13.2	−30.4	23.3	78 07.9	−28.8	25.2	79 01.7	−26.9	27.4	79 54.3	−24.6	30.0	82
83	72 53.5	−36.9	15.1	73 51.3	−36.2	16.0	74 48.8	−35.4	17.0	75 46.0	−34.5	18.2	76 42.8	−33.5	19.5	77 39.1	−32.2	21.0	78 34.8	−30.8	22.8	79 29.7	−29.1	24.9	83
84	72 16.6	−38.9	12.5	73 15.1	−38.4	13.2	74 13.4	−37.8	14.0	75 11.5	−37.1	14.9	76 09.3	−36.3	16.0	77 06.9	−35.4	17.2	78 04.0	−34.4	18.5	79 00.6	−33.1	20.2	84
85	71 37.7	−40.7	10.0	72 36.7	−40.3	10.6	73 35.6	−39.8	11.2	74 34.4	−39.3	11.9	75 33.0	−38.7	12.7	76 31.5	−38.2	13.6	77 29.6	−37.3	14.7	78 27.5	−36.4	15.9	85
86	70 57.0	−42.3	7.7	71 56.4	−42.0	8.1	72 55.8	−41.7	8.6	73 55.1	−41.4	9.1	74 54.3	−41.0	9.7	75 53.3	−40.5	10.4	76 52.3	−40.0	11.1	77 51.1	−39.4	12.0	86
87	70 14.7	−43.6	5.6	71 14.4	−43.5	5.9	72 14.1	−43.3	6.2	73 13.7	−43.1	6.6	74 13.3	−42.8	7.0	75 12.8	−42.5	7.4	76 12.3	−42.2	7.9	77 11.7	−41.9	8.5	87
88	69 31.1	−45.0	3.6	70 30.9	−44.8	3.8	71 30.8	−44.8	4.0	72 30.6	−44.6	4.2	73 30.5	−44.5	4.4	74 30.3	−44.4	4.7	75 30.1	−44.2	5.0	76 29.8	−44.0	5.4	88
89	68 46.1	−46.1	1.7	69 46.1	−46.1	1.8	70 46.0	−46.0	1.9	71 46.0	−46.0	2.0	72 46.0	−46.0	2.1	73 45.9	−45.9	2.3	74 45.9	−45.9	2.4	75 45.8	−45.8	2.6	89
90	68 00.0	−47.1	0.0	69 00.0	−47.1	0.0	70 00.0	−47.2	0.0	71 00.0	−47.2	0.0	72 00.0	−47.2	0.0	73 00.0	−47.3	0.0	74 00.0	−47.3	0.0	75 00.0	−47.4	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

39°, 321° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 39°, 321°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	16 55.5	−58.1	138.9	16 10.3	−58.4	139.1	15 24.9	−58.5	139.2	14 39.4	−58.7	139.4	13 53.7	−58.8	139.6	13 08.0	−58.9	139.7	12 22.2	−59.1	139.9	11 36.2	−59.1	140.0	0
1	15 57.4	−58.2	139.1	15 11.9	−58.3	139.3	14 26.4	−58.5	139.5	13 40.7	−58.6	139.6	12 54.9	−58.8	139.8	12 09.1	−59.0	139.9	11 23.1	−59.1	140.1	10 37.1	−59.2	140.2	1
2	14 59.2	−58.2	139.4	14 13.6	−58.4	139.5	13 27.9	−58.5	139.7	12 42.1	−58.7	139.9	11 56.1	−58.8	140.0	11 10.1	−58.9	140.1	10 24.0	−59.0	140.2	9 37.9	−59.2	140.4	2
3	14 01.0	−58.2	139.6	13 15.2	−58.4	139.8	12 29.4	−58.6	139.9	11 43.4	−58.7	140.1	10 57.3	−58.8	140.2	10 11.2	−58.9	140.3	9 25.0	−59.1	140.4	8 38.7	−59.2	140.5	3
4	13 02.8	−58.2	139.9	12 16.8	−58.3	140.0	11 30.8	−58.5	140.2	10 44.7	−58.7	140.3	9 58.5	−58.8	140.4	9 12.3	−59.0	140.5	8 25.9	−59.1	140.6	7 39.5	−59.2	140.7	4
5	12 04.6	−58.3	140.1	11 18.5	−58.4	140.3	10 32.3	−58.6	140.4	9 46.0	−58.7	140.5	8 59.7	−58.8	140.6	8 13.3	−59.0	140.7	7 26.8	−59.0	140.8	6 40.3	−59.2	140.9	5
6	11 06.3	−58.2	140.4	10 20.1	−58.4	140.5	9 33.7	−58.5	140.6	8 47.3	−58.7	140.7	8 00.9	−58.9	140.8	7 14.3	−58.9	140.9	6 27.8	−59.1	141.0	5 41.1	−59.1	141.0	6
7	10 08.1	−58.3	140.6	9 21.7	−58.5	140.7	8 35.2	−58.6	140.8	7 48.6	−58.7	140.9	7 02.0	−58.8	141.0	6 15.4	−59.0	141.1	5 28.7	−59.1	141.1	4 42.0	−59.2	141.2	7
8	9 09.8	−58.3	140.9	8 23.2	−58.4	141.0	7 36.6	−58.6	141.0	6 49.9	−58.7	141.1	6 03.2	−58.8	141.2	5 16.4	−59.0	141.3	4 29.6	−59.1	141.3	3 42.8	−59.2	141.4	8
9	8 11.5	−58.2	141.1	7 24.8	−58.4	141.2	6 38.0	−58.5	141.3	5 51.2	−58.7	141.3	5 04.4	−58.9	141.4	4 17.4	−58.9	141.4	3 30.5	−59.1	141.5	2 43.6	−59.2	141.5	9
10	7 13.3	−58.3	141.3	6 26.4	−58.5	141.4	5 39.5	−58.6	141.5	4 52.5	−58.7	141.5	4 05.5	−58.8	141.6	3 18.5	−59.0	141.6	2 31.4	−59.1	141.7	1 44.4	−59.2	141.7	10
11	6 15.0	−58.3	141.6	5 27.9	−58.4	141.6	4 40.9	−58.6	141.7	3 53.8	−58.7	141.7	3 06.7	−58.9	141.8	2 19.5	−59.0	141.8	1 32.3	−59.0	141.8	0 45.2	−59.2	141.8	11
12	5 16.7	−58.3	141.8	4 29.5	−58.4	141.9	3 42.3	−58.6	141.9	2 55.1	−58.8	141.9	2 07.8	−58.9	142.0	1 20.5	−58.9	142.0	0 33.3	−59.1	142.0	0 14.0	+59.2	38.0	12
13	4 18.4	−58.3	142.1	3 31.1	−58.5	142.1	2 43.7	−58.6	142.1	1 56.3	−58.7	142.2	1 08.9	−58.8	142.2	0 21.6	−59.0	142.2	0 25.8	+59.1	37.8	1 13.2	+59.2	37.8	13
14	3 20.1	−58.3	142.3	2 32.6	−58.4	142.3	1 45.1	−58.6	142.3	0 57.6	−58.7	142.4	0 10.1	−58.9	142.4	0 37.4	+59.0	37.6	1 24.9	+59.1	37.6	2 12.4	+59.2	37.7	14
15	2 21.8	−58.3	142.5	1 34.2	−58.5	142.5	0 46.5	−58.6	142.6	0 01.1	+58.7	37.4	0 48.8	+58.8	37.4	1 36.4	+59.0	37.5	2 24.0	+59.1	37.5	3 11.6	+59.2	37.5	15
16	1 23.5	−58.3	142.8	0 35.7	−58.4	142.8	0 12.1	+58.6	37.2	0 59.8	+58.8	37.2	1 47.6	+58.9	37.2	2 35.4	+58.9	37.3	3 23.1	+59.1	37.3	4 10.8	+59.2	37.3	16
17	0 25.2	−58.3	143.0	0 22.7	+58.5	37.0	1 10.7	+58.6	37.0	1 58.6	+58.7	37.0	2 46.5	+58.8	37.1	3 34.3	+59.0	37.1	4 22.2	+59.1	37.1	5 10.0	+59.2	37.2	17
18	0 33.1	+58.3	36.8	1 21.2	+58.5	36.8	2 09.3	+58.5	36.8	2 57.3	+58.7	36.8	3 45.3	+58.9	36.9	4 33.3	+59.0	36.9	5 21.3	+59.1	37.0	6 09.2	+59.2	37.0	18
19	1 31.4	+58.4	36.5	2 19.7	+58.4	36.6	3 07.8	+58.6	36.6	3 56.0	+58.7	36.6	4 44.2	+58.8	36.7	5 32.3	+58.9	36.7	6 20.4	+59.0	36.8	7 08.4	+59.2	36.8	19
20	2 29.8	+58.3	36.3	3 18.1	+58.5	36.3	4 06.4	+58.6	36.4	4 54.7	+58.8	36.4	5 43.0	+58.9	36.5	6 31.2	+59.0	36.5	7 19.4	+59.1	36.6	8 07.6	+59.2	36.7	20
21	3 28.1	+58.3	36.1	4 16.6	+58.4	36.1	5 05.0	+58.6	36.1	5 53.5	+58.7	36.2	6 41.9	+58.8	36.3	7 30.2	+59.0	36.3	8 18.5	+59.1	36.4	9 06.8	+59.1	36.5	21
22	4 26.4	+58.3	35.8	5 15.0	+58.4	35.9	6 03.6	+58.6	35.9	6 52.2	+58.7	36.0	7 40.7	+58.8	36.1	8 29.2	+58.9	36.2	9 17.6	+59.0	36.2	10 05.9	+59.2	36.3	22
23	5 24.7	+58.2	35.6	6 13.4	+58.5	35.6	7 02.2	+58.5	35.7	7 50.9	+58.7	35.8	8 39.5	+58.8	35.9	9 28.1	+59.0	36.0	10 16.6	+59.1	36.1	11 05.1	+59.2	36.2	23
24	6 22.9	+58.3	35.3	7 11.9	+58.4	35.4	8 00.7	+58.6	35.5	8 49.6	+58.7	35.6	9 38.3	+58.9	35.7	10 27.1	+58.9	35.8	11 15.7	+59.0	35.9	12 04.3	+59.1	36.0	24
25	7 21.2	+58.3	35.1	8 10.3	+58.4	35.2	8 59.3	+58.6	35.3	9 48.3	+58.6	35.4	10 37.2	+58.8	35.5	11 26.0	+58.9	35.6	12 14.7	+59.1	35.7	13 03.4	+59.2	35.8	25
26	8 19.5	+58.3	34.9	9 08.7	+58.4	35.0	9 57.9	+58.5	35.1	10 46.9	+58.7	35.2	11 36.0	+58.8	35.3	12 24.9	+58.9	35.4	13 13.8	+59.0	35.5	14 02.6	+59.1	35.7	26
27	9 17.8	+58.2	34.6	10 07.1	+58.4	34.7	10 56.4	+58.5	34.8	11 45.6	+58.7	34.9	12 34.8	+58.8	35.1	13 23.8	+59.0	35.2	14 12.8	+59.1	35.3	15 01.7	+59.2	35.5	27
28	10 16.0	+58.3	34.4	11 05.5	+58.4	34.5	11 54.9	+58.6	34.6	12 44.3	+58.6	34.7	13 33.6	+58.7	34.9	14 22.8	+58.9	35.0	15 11.9	+59.0	35.2	16 00.9	+59.1	35.3	28
29	11 14.3	+58.2	34.1	12 03.9	+58.4	34.3	12 53.5	+58.5	34.4	13 42.9	+58.7	34.5	14 32.3	+58.8	34.7	15 21.7	+58.8	34.8	16 10.9	+59.0	35.0	17 00.0	+59.1	35.1	29
30	12 12.5	+58.2	33.9	13 02.3	+58.3	34.0	13 52.0	+58.5	34.2	14 41.6	+58.6	34.3	15 31.1	+58.8	34.4	16 20.5	+58.9	34.6	17 09.9	+59.0	34.8	17 59.1	+59.1	35.0	30
31	13 10.7	+58.2	33.6	14 00.6	+58.4	33.8	14 50.5	+58.5	33.9	15 40.2	+58.6	34.1	16 29.9	+58.7	34.2	17 19.4	+58.9	34.4	18 08.9	+59.0	34.6	18 58.2	+59.1	34.8	31
32	14 08.9	+58.2	33.4	14 59.0	+58.3	33.5	15 49.0	+58.4	33.7	16 38.8	+58.6	33.9	17 28.6	+58.8	34.0	18 18.3	+58.9	34.2	19 07.9	+58.9	34.4	19 57.3	+59.1	34.6	32
33	15 07.1	+58.2	33.1	15 57.3	+58.3	33.3	16 47.4	+58.5	33.5	17 37.4	+58.6	33.6	18 27.4	+58.7	33.8	19 17.2	+58.8	34.0	20 06.8	+59.0	34.2	20 56.4	+59.1	34.4	33
34	16 05.3	+58.2	32.9	16 55.6	+58.3	33.0	17 45.9	+58.4	33.2	18 36.0	+58.6	33.4	19 26.1	+58.7	33.6	20 16.0	+58.8	33.8	21 05.8	+58.9	34.0	21 55.5	+59.0	34.2	34
35	17 03.5	+58.1	32.6	17 53.9	+58.3	32.8	18 44.3	+58.5	33.0	19 34.6	+58.6	33.2	20 24.8	+58.7	33.4	21 14.8	+58.8	33.6	22 04.7	+59.0	33.8	22 54.5	+59.1	34.0	35
36	18 01.6	+58.1	32.4	18 52.2	+58.3	32.6	19 42.8	+58.4	32.7	20 33.2	+58.5	32.9	21 23.5	+58.6	33.1	22 13.6	+58.8	33.4	23 03.7	+58.9	33.6	23 53.6	+59.0	33.8	36
37	18 59.7	+58.1	32.1	19 50.5	+58.2	32.3	20 41.2	+58.3	32.5	21 31.7	+58.5	32.7	22 22.1	+58.7	32.9	23 12.4	+58.8	33.2	24 02.6	+58.9	33.4	24 52.6	+59.0	33.6	37
38	19 57.8	+58.1	31.8	20 48.7	+58.2	32.0	21 39.5	+58.4	32.2	22 30.2	+58.5	32.5	23 20.8	+58.6	32.7	24 11.2	+58.8	32.9	25 01.5	+58.9	33.2	25 51.6	+59.0	33.4	38
39	20 55.9	+58.0	31.6	21 46.9	+58.2	31.8	22 37.9	+58.3	32.0	23 28.7	+58.5	32.2	24 19.4	+58.6	32.5	25 10.0	+58.7	32.7	26 00.4	+58.8	33.0	26 50.6	+59.0	33.2	39
40	21 53.9	+58.0	31.3	22 45.1	+58.2	31.5	23 36.2	+58.3	31.7	24 27.2	+58.4	32.0	25 18.0	+58.6	32.2	26 08.7	+58.7	32.5	26 59.2	+58.9	32.8	27 49.6	+59.0	33.0	40
41	22 51.9	+58.0	31.0	23 43.3	+58.1	31.3	24 34.5	+58.3	31.5	25 25.6	+58.5	31.7	26 16.6	+58.6	32.0	27 07.4	+58.7	32.3	27 58.1	+58.8	32.5	28 48.6	+58.9	32.8	41
42	23 49.9	+58.0	30.7	24 41.4	+58.1	31.0	25 32.8	+58.3	31.2	26 24.1	+58.3	31.5	27 15.2	+58.5	31.7	28 06.1	+58.7	32.0	28 56.9	+58.8	32.3	29 47.5	+58.9	32.6	42
43	24 47.9	+57.9	30.5	25 39.5	+58.1	30.7	26 31.1	+58.2	31.0	27 22.4	+58.4	31.2	28 13.7	+58.5	31.5	29 04.8	+58.6	31.8	29 55.7	+58.8	32.1	30 46.4	+58.9	32.4	43
44	25 45.8	+57.9	30.2	26 37.6	+58.1	30.4	27 29.3	+58.2	30.7	28 20.8	+58.4	31.0	29 12.2	+58.5	31.2	30 03.4	+58.6	31.5	30 54.5	+58.7	31.8	31 45.3	+58.9	32.2	44
45	26 43.7	+57.9	29.9	27 35.7	+58.0	30.1	28 27.5	+58.1	30.4	29 19.2	+58.3	30.7	30 10.7	+58.4	31.0	31 02.0	+58.6	31.3	31 53.2	+58.7	31.6	32 44.2	+58.9	31.9	45
46	27 41.6	+57.8	29.6	28 33.7	+57.9	29.9	29 25.6	+58.2	30.1	30 17.5	+58.2	30.4	31 09.1	+58.4	30.7	32 00.6	+58.6	31.0	32 51.9	+58.7	31.4	33 43.1	+58.8	31.7	46
47	28 39.4	+57.7	29.3	29 31.6	+58.0	29.6	30 23.8	+58.0	29.8	31 15.7	+58.3	30.1	32 07.5	+58.4	30.5	32 59.2	+58.5	30.8	33 50.6	+58.7	31.1	34 41.9	+58.8	31.5	47
48	29 37.1	+57.8	29.0	30 29.6	+57.9	29.3	31 21.8	+58.1	29.5	32 14.0	+58.2	29.9	33 05.9	+58.4	30.2	33 57.7	+58.5	30.5	34 49.3	+58.6	30.9	35 40.7	+58.8	31.2	48
49	30 34.9	+57.7	28.7	31 27.5	+57.8	28.9	32 19.9	+58.0	29.3	33 12.2	+58.1	29.6	34 04.3	+58.3	29.9	34 56.2	+58.4	30.2	35 47.9	+58.6	30.6	36 39.5	+58.7	31.0	49
50	31 32.6	+57.6	28.3	32 25.3	+57.8	28.6	33 17.9	+57.9	28.9	34 10.3	+58.1	29.3	35 02.6	+58.2	29.6	35 54.6	+58.4	30.0	36 46.5	+58.6	30.3	37 38.2	+58.7	30.7	50
51	32 30.2	+57.6	28.0	33 23.1	+57.7	28.3	34 15.8	+57.9	28.6	35 08.4	+58.1	29.0	36 00.8	+58.2	29.3	36 53.0	+58.4	29.7	37 45.1	+58.5	30.1	38 36.9	+58.7	30.5	51
52	33 27.8	+57.5	27.7	34 20.8	+57.7	28.0	35 13.7	+57.9	28.3	36 06.5	+58.0	28.7	36 59.0	+58.2	29.0	37 51.4	+58.3	29.4	38 43.6	+58.5	29.8	39 35.6	+58.6	30.2	52
53	34 25.3	+57.5	27.3	35 18.5	+57.7	27.7	36 11.6	+57.8	28.0	37 04.5	+57.9	28.3	37 57.2	+58.1	28.7	38 49.7	+58.3	29.1	39 42.1	+58.4	29.5	40 34.2	+58.6	29.9	53
54	35 22.8	+57.4	27.0	36 16.2	+57.5	27.3	37 09.4	+57.7	27.7	38 02.4	+58.0	28.0	38 55.3	+58.1	28.4	39 48.0	+58.2	28.8	40 40.5	+58.4	29.2	41 32.8	+58.5	29.6	54
55	36 20.2	+57.3	26.6	37 13.7	+57.5	27.0	38 07.1	+57.7	27.3	39 00.4	+57.8	27.7	39 53.4	+58.0	28.1	40 46.2	+58.2	28.5	41 38.9	+58.3	28.9	42 31.3	+58.5	29.3	55
56	37 17.5	+57.3	26.3	38 11.2	+57.5	26.6	39 04.8	+57.6	27.0	39 58.2	+57.8	27.3	40 51.4	+58.0	27.7	41 44.4	+58.1	28.1	42 37.2	+58.3	28.6	43 29.8	+58.4	29.0	56
57	38 14.8	+57.2	25.9	39 08.7	+57.4	26.2	40 02.4	+57.6	26.6	40 56.0	+57.7	27.0	41 49.4	+57.8	27.4	42 42.5	+58.1	27.8	43 35.5	+58.2	28.2	44 28.2	+58.4	28.7	57
58	39 12.0	+57.1	25.5	40 06.1	+57.3	25.8	41 00.0	+57.4	26.2	41 53.7	+57.6	26.6	42 47.2	+57.9	27.0	43 40.6	+58.0	27.5	44 33.7	+58.2	27.9	45 26.6	+58.4	28.4	58
59	40 09.1	+57.0	25.1	41 03.4	+57.2	25.5	41 57.4	+57.4	25.8	42 51.3	+57.6	26.2	43 45.1	+57.7	26.7	44 38.6	+57.9	27.1	45 31.9	+58.1	27.6	46 25.0	+58.2	28.0	59
60	41 06.1	+57.0	24.7	42 00.6	+57.1	25.1	42 54.8	+57.3	25.4	43 48.9	+57.5	25.9	44 42.8	+57.7	26.3	45 36.5	+57.9	26.7	46 30.0	+58.0	27.2	47 23.2	+58.2	27.7	60
61	42 03.1	+56.8	24.3	42 57.7	+57.0	24.6	43 52.1	+57.3	25.0	44 46.4	+57.4	25.5	45 40.5	+57.6	25.9	46 34.4	+57.7	26.3	47 28.0	+58.0	26.8	48 21.4	+58.2	27.3	61
62	42 59.9	+56.8	23.8	43 54.7	+57.0	24.2	44 49.4	+57.1	24.6	45 43.8	+57.3	25.0	46 38.1	+57.5	25.5	47 32.1	+57.7	26.0	48 26.0	+57.8	26.4	49 19.6	+58.0	27.0	62
63	43 56.7	+56.6	23.4	44 51.7	+56.8	23.8	45 46.5	+57.0	24.2	46 41.1	+57.2	24.6	47 35.6	+57.4	25.1	48 29.8	+57.6	25.5	49 23.8	+57.8	26.0	50 17.6	+58.0	26.6	63
64	44 53.3	+56.5	22.9	45 48.5	+56.7	23.3	46 43.5	+56.9	23.7	47 38.3	+57.1	24.2	48 33.0	+57.3	24.6	49 27.4	+57.5	25.1	50 21.6	+57.7	25.6	51 15.6	+57.9	26.2	64
65	45 49.8	+56.4	22.4	46 45.2	+56.6	22.8	47 40.4	+56.8	23.3	48 35.4	+57.0	23.7	49 30.3	+57.2	24.2	50 24.9	+57.4	24.7	51 19.3	+57.6	25.2	52 13.5	+57.8	25.7	65
66	46 46.2	+56.3	21.9	47 41.8	+56.5	22.4	48 37.2	+56.7	22.8	49 32.4	+56.9	23.2	50 27.5	+57.0	23.7	51 22.3	+57.3	24.2	52 16.9	+57.5	24.7	53 11.3	+57.7	25.3	66
67	47 42.5	+56.1	21.4	48 38.3	+56.3	21.8	49 33.9	+56.5	22.3	50 29.3	+56.7	22.7	51 24.5	+57.0	23.2	52 19.6	+57.1	23.7	53 14.4	+57.4	24.3	54 09.0	+57.5	24.8	67
68	48 38.6	+56.0	20.9	49 34.6	+56.2	21.3	50 30.4	+56.4	21.8	51 26.0	+56.6	22.2	52 21.5	+56.8	22.7	53 16.7	+57.0	23.2	54 11.8	+57.2	23.8	55 06.5	+57.5	24.3	68
69	49 34.6	+55.8	20.4	50 30.8	+56.0	20.8	51 26.8	+56.2	21.2	52 22.6	+56.5	21.7	53 18.3	+56.6	22.2	54 13.7	+56.9	22.7	55 09.0	+57.1	23.2	56 04.0	+57.3	23.8	69
70	50 30.4	+55.6	19.8	51 26.8	+55.8	20.2	52 23.0	+56.1	20.6	53 19.1	+56.2	21.1	54 14.9	+56.5	21.6	55 10.6	+56.7	22.1	56 06.1	+56.9	22.7	57 01.3	+57.2	23.3	70
71	51 26.0	+55.5	19.2	52 22.6	+55.7	19.6	53 19.1	+55.8	20.1	54 15.3	+56.1	20.5	55 11.4	+56.4	21.0	56 07.3	+56.6	21.6	57 03.0	+56.8	22.1	57 58.5	+57.0	22.7	71
72	52 21.5	+55.2	18.6	53 18.3	+55.4	19.0	54 14.9	+55.7	19.4	55 11.4	+55.9	19.9	56 07.8	+56.1	20.4	57 03.9	+56.4	21.0	57 59.8	+56.6	21.5	58 55.5	+56.9	22.1	72
73	53 16.7	+55.1	17.9	54 13.7	+55.3	18.3	55 10.6	+55.5	18.8	56 07.3	+55.7	19.3	57 03.9	+55.9	19.8	58 00.3	+56.1	20.3	58 56.4	+56.4	20.9	59 52.4	+56.6	21.5	73
74	54 11.8	+54.7	17.2	55 09.0	+55.0	17.7	56 06.1	+55.2	18.1	57 03.0	+55.5	18.6	57 59.8	+55.7	19.1	58 56.4	+56.0	19.6	59 52.8	+56.2	20.2	60 49.0	+56.5	20.8	74
75	55 06.5	+54.6	16.5	56 04.0	+54.8	17.0	57 01.3	+55.0	17.4	57 58.5	+55.2	17.9	58 55.5	+55.5	18.4	59 52.4	+55.7	18.9	60 49.0	+56.0	19.5	61 45.5	+56.2	20.1	75
76	56 01.1	+54.2	15.8	56 58.8	+54.4	16.2	57 56.3	+54.7	16.7	58 53.7	+54.9	17.1	59 51.0	+55.1	17.6	60 48.1	+55.4	18.2	61 45.0	+55.7	18.8	62 41.7	+55.9	19.4	76
77	56 55.3	+54.0	15.0	57 53.2	+54.2	15.4	58 51.0	+54.4	15.9	59 48.6	+54.7	16.4	60 46.1	+54.9	16.9	61 43.5	+55.1	17.4	62 40.7	+55.4	18.0	63 37.6	+55.7	18.6	77
78	57 49.3	+53.6	14.2	58 47.4	+53.9	14.6	59 45.4	+54.1	15.1	60 43.3	+54.3	15.5	61 41.0	+54.6	16.0	62 38.6	+54.8	16.5	63 36.1	+55.0	17.1	64 33.3	+55.4	17.7	78
79	58 42.9	+53.3	13.4	59 41.3	+53.5	13.8	60 39.5	+53.7	14.2	61 37.6	+53.9	14.6	62 35.6	+54.2	15.1	63 33.4	+54.5	15.6	64 31.1	+54.8	16.2	65 28.7	+55.0	16.8	79
80	59 36.2	+52.9	12.5	60 34.8	+53.1	12.9	61 33.2	+53.3	13.3	62 31.5	+53.6	13.7	63 29.8	+53.8	14.2	64 27.9	+54.0	14.7	65 25.9	+54.3	15.2	66 23.7	+54.6	15.8	80
81	60 29.1	+52.5	11.5	61 27.9	+52.6	11.9	62 26.5	+52.9	12.3	63 25.1	+53.1	12.7	64 23.6	+53.3	13.2	65 21.9	+53.6	13.7	66 20.2	+53.9	14.2	67 18.3	+54.1	14.8	81
82	61 21.6	+52.0	10.5	62 20.5	+52.2	10.9	63 19.4	+52.4	11.2	64 18.2	+52.6	11.7	65 16.9	+52.9	12.1	66 15.5	+53.2	12.6	67 14.1	+53.3	13.1	68 12.4	+53.7	13.6	82
83	62 13.6	+51.5	9.5	63 12.7	+51.7	9.8	64 11.8	+51.9	10.1	65 10.8	+52.1	10.5	66 09.8	+52.3	10.9	67 08.7	+52.5	11.4	68 07.4	+52.8	11.9	69 06.1	+53.1	12.4	83
84	63 05.1	+50.9	8.4	64 04.4	+51.1	8.7	65 03.7	+51.3	9.0	66 02.9	+51.5	9.3	67 02.1	+51.7	9.7	68 01.2	+51.9	10.1	69 00.2	+52.2	10.6	69 59.2	+52.4	11.1	84
85	63 56.0	+50.3	7.2	64 55.5	+50.5	7.4	65 55.0	+50.6	7.7	66 54.4	+50.8	8.0	67 53.8	+51.0	8.4	68 53.1	+51.2	8.8	69 52.4	+51.4	9.2	70 51.6	+51.7	9.6	85
86	64 46.3	+49.6	5.9	65 46.0	+49.7	6.1	66 45.6	+49.9	6.4	67 45.2	+50.1	6.7	68 44.8	+50.2	7.0	69 44.3	+50.5	7.3	70 43.8	+50.6	7.6	71 43.3	+50.8	8.0	86
87	65 35.9	+48.9	4.6	66 35.7	+49.0	4.8	67 35.5	+49.1	5.0	68 35.3	+49.2	5.2	69 35.0	+49.4	5.4	70 34.8	+49.5	5.7	71 34.4	+49.7	6.0	72 34.1	+49.8	6.3	87
88	66 24.8	+48.1	3.1	67 24.7	+48.2	3.3	68 24.6	+48.2	3.4	69 24.5	+48.3	3.6	70 24.4	+48.4	3.8	71 24.3	+48.4	3.9	72 24.1	+48.6	4.2	73 23.9	+48.7	4.4	88
89	67 12.9	+47.1	1.6	68 12.9	+47.1	1.7	69 12.8	+47.2	1.8	70 12.8	+47.2	1.9	71 12.8	+47.2	2.0	72 12.7	+47.3	2.1	73 12.7	+47.3	2.2	74 12.6	+47.4	2.3	89
90	68 00.0	+46.1	0.0	69 00.0	+46.1	0.0	70 00.0	+46.0	0.0	71 00.0	+46.0	0.0	72 00.0	+46.0	0.0	73 00.0	+45.9	0.0	74 00.0	+45.9	0.0	75 00.0	+45.8	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 141°, 219°

40°, 320° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.....Zn=360°–Z

Dec. °	68° Hc ° ′	d ′	Z °	69° Hc ° ′	d ′	Z °	70° Hc ° ′	d ′	Z °	71° Hc ° ′	d ′	Z °	72° Hc ° ′	d ′	Z °	73° Hc ° ′	d ′	Z °	74° Hc ° ′	d ′	Z °	75° Hc ° ′	d ′	Z °	Dec. °
0	16 40.6	+58.0	137.9	15 56.0	+58.3	138.1	15 11.3	+58.5	138.2	14 26.5	+58.6	138.4	13 41.6	+58.7	138.6	12 56.5	+58.9	138.7	12 11.4	+59.0	138.9	11 26.1	+59.2	139.0	0
1	17 38.6	+58.1	137.6	16 54.3	+58.2	137.8	16 09.8	+58.3	138.0	15 25.1	+58.6	138.2	14 40.3	+58.7	138.4	13 55.4	+58.9	138.5	13 10.4	+59.0	138.7	12 25.3	+59.1	138.8	1
2	18 36.7	+58.0	137.3	17 52.5	+58.2	137.5	17 08.1	+58.4	137.8	16 23.7	+58.5	138.0	15 39.0	+58.7	138.2	14 54.3	+58.8	138.3	14 09.4	+59.0	138.5	13 24.4	+59.1	138.7	2
3	19 34.7	+58.0	137.1	18 50.7	+58.2	137.3	18 06.5	+58.4	137.5	17 22.2	+58.5	137.7	16 37.7	+58.7	137.9	15 53.1	+58.9	138.1	15 08.4	+58.9	138.3	14 23.5	+59.1	138.5	3
4	20 32.7	+58.0	136.8	19 48.9	+58.1	137.0	19 04.9	+58.3	137.3	18 20.7	+58.6	137.5	17 36.4	+58.7	137.7	16 52.0	+58.8	137.9	16 07.3	+59.0	138.1	15 22.6	+59.1	138.3	4
5	21 30.7	+57.9	136.5	20 47.0	+58.2	136.8	20 03.2	+58.4	137.0	19 19.3	+58.4	137.3	18 35.1	+58.7	137.5	17 50.8	+58.8	137.7	17 06.3	+59.0	137.9	16 21.7	+59.1	138.1	5
6	22 28.6	+57.9	136.2	21 45.2	+58.1	136.5	21 01.6	+58.3	136.8	20 17.7	+58.5	137.0	19 33.8	+58.6	137.3	18 49.6	+58.8	137.5	18 05.3	+58.9	137.7	17 20.8	+59.1	138.0	6
7	23 26.5	+57.9	135.9	22 43.3	+58.1	136.2	21 59.9	+58.2	136.5	21 16.2	+58.5	136.8	20 32.4	+58.6	137.1	19 48.4	+58.8	137.3	19 04.2	+58.9	137.5	18 19.9	+59.0	137.8	7
8	24 24.4	+57.9	135.7	23 41.4	+58.0	136.0	22 58.1	+58.3	136.3	22 14.7	+58.4	136.6	21 31.0	+58.6	136.8	20 47.2	+58.7	137.1	20 03.1	+59.0	137.3	19 18.9	+59.1	137.6	8
9	25 22.3	+57.8	135.4	24 39.4	+58.1	135.7	23 56.4	+58.2	136.0	23 13.1	+58.4	136.3	22 29.6	+58.6	136.6	21 45.9	+58.8	136.9	21 02.1	+58.9	137.1	20 18.0	+59.0	137.4	9
10	26 20.1	+57.7	135.1	25 37.5	+58.0	135.4	24 54.6	+58.2	135.7	24 11.5	+58.4	136.1	23 28.2	+58.6	136.4	22 44.7	+58.7	136.7	22 01.0	+58.8	136.9	21 17.0	+59.1	137.2	10
11	27 17.8	+57.8	134.8	26 35.5	+57.9	135.1	25 52.8	+58.2	135.5	25 09.9	+58.4	135.8	24 26.8	+58.5	136.1	23 43.4	+58.7	136.4	22 59.8	+58.9	136.7	22 16.1	+59.0	137.0	11
12	28 15.6	+57.7	134.5	27 33.4	+57.9	134.8	26 51.0	+58.1	135.2	26 08.3	+58.3	135.5	25 25.3	+58.5	135.9	24 42.1	+58.7	136.2	23 58.7	+58.9	136.5	23 15.1	+59.0	136.8	12
13	29 13.3	+57.6	134.1	28 31.3	+57.9	134.5	27 49.1	+58.1	134.9	27 06.6	+58.3	135.3	26 23.8	+58.5	135.6	25 40.8	+58.7	136.0	24 57.6	+58.8	136.3	24 14.1	+59.0	136.6	13
14	30 10.9	+57.6	133.8	29 29.2	+57.9	134.2	28 47.2	+58.1	134.6	28 04.9	+58.3	135.0	27 22.3	+58.5	135.4	26 39.5	+58.6	135.7	25 56.4	+58.8	136.1	25 13.1	+58.9	136.4	14
15	31 08.5	+57.6	133.5	30 27.1	+57.8	133.9	29 45.3	+58.0	134.3	29 03.2	+58.2	134.7	28 20.8	+58.4	135.1	27 38.1	+58.7	135.5	26 55.2	+58.8	135.9	26 12.0	+59.0	136.2	15
16	32 06.1	+57.5	133.2	31 24.9	+57.7	133.6	30 43.3	+58.0	134.0	30 01.4	+58.2	134.5	29 19.2	+58.4	134.9	28 36.8	+58.6	135.3	27 54.0	+58.8	135.6	27 11.0	+58.9	136.0	16
17	33 03.6	+57.4	132.8	32 22.6	+57.7	133.3	31 41.3	+57.9	133.7	30 59.6	+58.2	134.2	30 17.6	+58.4	134.6	29 35.4	+58.5	135.0	28 52.8	+58.7	135.4	28 09.9	+58.9	135.8	17
18	34 01.0	+57.4	132.5	33 20.3	+57.6	133.0	32 39.2	+57.9	133.4	31 57.8	+58.1	133.9	31 16.0	+58.4	134.3	30 33.9	+58.6	134.8	29 51.5	+58.7	135.2	29 08.8	+58.9	135.6	18
19	34 58.4	+57.3	132.1	34 17.9	+57.6	132.6	33 37.1	+57.9	133.1	32 55.9	+58.1	133.6	32 14.4	+58.3	134.1	31 32.5	+58.5	134.5	30 50.2	+58.7	134.9	30 07.7	+58.9	135.4	19
20	35 55.7	+57.3	131.8	35 15.5	+57.6	132.3	34 35.0	+57.8	132.8	33 54.0	+58.0	133.3	33 12.7	+58.2	133.8	32 31.0	+58.4	134.2	31 48.9	+58.7	134.7	31 06.6	+58.8	135.1	20
21	36 53.0	+57.1	131.4	36 13.1	+57.4	131.9	35 32.8	+57.7	132.5	34 52.0	+58.0	133.0	34 10.9	+58.3	133.5	33 29.4	+58.5	134.0	32 47.6	+58.6	134.4	32 05.4	+58.8	134.9	21
22	37 50.1	+57.1	131.0	37 10.5	+57.4	131.6	36 30.5	+57.7	132.1	35 50.0	+58.0	132.7	35 09.2	+58.1	133.2	34 27.9	+58.4	133.7	33 46.2	+58.6	134.2	33 04.2	+58.8	134.7	22
23	38 47.2	+57.1	130.6	38 07.9	+57.4	131.2	37 28.2	+57.6	131.8	36 48.0	+57.9	132.4	36 07.3	+58.2	132.9	35 26.3	+58.3	133.4	34 44.8	+58.6	133.9	34 03.0	+58.8	134.4	23
24	39 44.3	+56.9	130.2	39 05.3	+57.2	130.8	38 25.8	+57.6	131.4	37 45.9	+57.8	132.0	37 05.5	+58.1	132.6	36 24.6	+58.4	133.1	35 43.4	+58.6	133.7	35 01.8	+58.7	134.2	24
25	40 41.2	+56.9	129.8	40 02.5	+57.2	130.5	39 23.4	+57.4	131.1	38 43.7	+57.8	131.7	38 03.6	+58.0	132.3	37 23.0	+58.2	132.8	36 42.0	+58.4	133.4	36 00.5	+58.7	133.9	25
26	41 38.1	+56.7	129.4	40 59.7	+57.1	130.1	40 20.8	+57.5	130.7	39 41.5	+57.7	131.3	39 01.6	+58.0	132.0	38 21.2	+58.3	132.5	37 40.4	+58.5	133.1	36 59.2	+58.7	133.7	26
27	42 34.8	+56.7	128.9	41 56.8	+57.0	129.6	41 18.3	+57.3	130.3	40 39.2	+57.6	131.0	39 59.6	+57.9	131.6	39 19.5	+58.1	132.2	38 38.9	+58.4	132.8	37 57.9	+58.6	133.4	27
28	43 31.5	+56.5	128.5	42 53.8	+56.9	129.2	42 15.6	+57.2	129.9	41 36.8	+57.6	130.6	40 57.5	+57.8	131.3	40 17.6	+58.2	131.9	39 37.3	+58.4	132.5	38 56.5	+58.6	133.1	28
29	44 28.0	+56.4	128.0	43 50.7	+56.8	128.8	43 12.8	+57.2	129.5	42 34.4	+57.5	130.2	41 55.3	+57.8	130.9	41 15.8	+58.0	131.6	40 35.7	+58.3	132.2	39 55.1	+58.6	132.9	29
30	45 24.4	+56.3	127.5	44 47.5	+56.7	128.3	44 10.0	+57.1	129.1	43 31.9	+57.4	129.8	42 53.1	+57.7	130.6	42 13.8	+58.0	131.3	41 34.0	+58.3	131.9	40 53.7	+58.5	132.6	30
31	46 20.7	+56.2	127.0	45 44.2	+56.6	127.9	45 07.1	+56.9	128.7	44 29.3	+57.3	129.4	43 50.8	+57.7	130.2	43 11.8	+58.0	130.9	42 32.3	+58.2	131.6	41 52.2	+58.4	132.3	31
32	47 16.9	+56.0	126.5	46 40.8	+56.5	127.4	46 04.0	+56.9	128.2	45 26.6	+57.2	129.0	44 48.5	+57.5	129.8	44 09.8	+57.8	130.5	43 30.5	+58.1	131.3	42 50.6	+58.4	132.0	32
33	48 12.9	+55.9	126.0	47 37.3	+56.3	126.9	47 00.9	+56.7	127.8	46 23.8	+57.1	128.6	45 46.0	+57.5	129.4	45 07.6	+57.8	130.2	44 28.6	+58.1	130.9	43 49.0	+58.4	131.7	33
34	49 08.8	+55.7	125.4	48 33.6	+56.1	126.4	47 57.6	+56.6	127.3	47 20.9	+57.0	128.1	46 43.5	+57.4	129.0	46 05.4	+57.8	129.8	45 26.7	+58.0	130.6	44 47.4	+58.3	131.3	34
35	50 04.5	+55.5	124.9	49 29.7	+56.1	125.8	48 54.2	+56.5	126.8	48 17.9	+56.9	127.7	47 40.9	+57.3	128.5	47 03.2	+57.6	129.4	46 24.7	+58.0	130.2	45 45.7	+58.2	131.0	35
36	51 00.0	+55.3	124.3	50 25.8	+55.8	125.3	49 50.7	+56.3	126.3	49 14.8	+56.8	127.2	48 38.2	+57.1	128.1	48 00.8	+57.5	129.0	47 22.7	+57.9	129.8	46 43.9	+58.2	130.6	36
37	51 55.3	+55.2	123.7	51 21.6	+55.7	124.7	50 47.0	+56.2	125.7	50 11.6	+56.6	126.7	49 35.3	+57.1	127.6	48 58.3	+57.5	128.6	48 20.6	+57.7	129.4	47 42.1	+58.1	130.3	37
38	52 50.5	+54.9	123.0	52 17.3	+55.5	124.1	51 43.2	+56.0	125.2	51 08.2	+56.5	126.2	50 32.4	+56.9	127.2	49 55.8	+57.3	128.1	49 18.3	+57.7	129.0	48 40.2	+58.0	129.9	38
39	53 45.4	+54.7	122.3	53 12.8	+55.3	123.5	52 39.2	+55.8	124.6	52 04.7	+56.3	125.6	51 29.3	+56.8	126.7	50 53.1	+57.2	127.6	50 16.0	+57.6	128.6	49 38.2	+58.0	129.5	39
40	54 40.1	+54.4	121.6	54 08.1	+55.0	122.8	53 35.0	+55.7	124.0	53 01.0	+56.2	125.1	52 26.1	+56.7	126.1	51 50.3	+57.1	127.2	51 13.6	+57.5	128.2	50 36.2	+57.8	129.1	40
41	55 34.5	+54.1	120.9	55 03.1	+54.8	122.1	54 30.7	+55.4	123.3	53 57.2	+56.0	124.5	53 22.8	+56.5	125.6	52 47.4	+57.0	126.7	52 11.1	+57.4	127.7	51 34.0	+57.8	128.7	41
42	56 28.6	+53.9	120.1	55 57.9	+54.6	121.4	55 26.1	+55.2	122.7	54 53.2	+55.8	123.9	54 19.3	+56.3	125.0	53 44.4	+56.8	126.1	53 08.5	+57.3	127.2	52 31.8	+57.7	128.3	42
43	57 22.5	+53.5	119.3	56 52.5	+54.2	120.7	56 21.3	+54.9	122.0	55 49.0	+55.6	123.2	55 15.6	+56.1	124.4	54 41.2	+56.6	125.6	54 05.8	+57.1	126.7	53 29.5	+57.5	127.8	43
44	58 16.0	+53.1	118.5	57 46.7	+54.0	119.9	57 16.2	+54.7	121.2	56 44.6	+55.3	122.5	56 11.7	+56.0	123.8	55 37.8	+56.5	125.0	55 02.9	+57.0	126.2	54 27.0	+57.4	127.3	44
45	59 09.1	+52.8	117.6	58 40.7	+53.6	119.0	58 10.9	+54.4	120.4	57 39.9	+55.1	121.8	57 07.7	+55.7	123.1	56 34.3	+56.3	124.4	55 59.9	+56.8	125.6	55 24.4	+57.3	126.8	45
46	60 01.9	+52.4	116.6	59 34.3	+53.2	118.2	59 05.3	+54.1	119.6	58 35.0	+54.8	121.1	58 03.4	+55.5	122.4	57 30.6	+56.1	123.8	56 56.7	+56.7	125.1	56 21.7	+57.2	126.3	46
47	60 54.3	+51.9	115.6	60 27.5	+52.9	117.2	59 59.4	+53.7	118.8	59 29.8	+54.5	120.3	58 58.9	+55.2	121.7	58 26.7	+55.9	123.1	57 53.4	+56.5	124.4	57 18.9	+57.0	125.7	47
48	61 46.2	+51.3	114.6	61 20.4	+52.4	116.3	60 53.1	+53.3	117.9	60 24.3	+54.2	119.4	59 54.1	+55.0	120.9	59 22.6	+55.7	122.4	58 49.9	+56.2	123.8	58 15.9	+56.8	125.1	48
49	62 37.5	+50.9	113.5	62 12.8	+51.9	115.2	61 46.4	+52.9	116.9	61 18.5	+53.8	118.6	60 49.1	+54.6	120.1	60 18.3	+55.3	121.7	59 46.1	+56.1	123.1	59 12.7	+56.7	124.5	49
50	63 28.4	+50.2	112.3	63 04.7	+51.4	114.1	62 39.3	+52.5	115.9	62 12.3	+53.4	117.6	61 43.7	+54.3	119.3	61 13.6	+55.1	120.9	60 42.2	+55.8	122.4	60 09.4	+56.4	123.9	50
51	64 18.6	+49.5	111.1	63 56.1	+50.8	113.0	63 31.8	+51.9	114.8	63 05.7	+53.0	116.6	62 38.0	+53.9	118.4	62 08.7	+54.8	120.0	61 38.0	+55.5	121.6	61 05.8	+56.2	123.2	51
52	65 08.1	+48.8	109.8	64 46.9	+50.1	111.8	64 23.7	+51.3	113.7	63 58.7	+52.5	115.6	63 31.9	+53.5	117.4	63 03.5	+54.4	119.1	62 33.5	+55.2	120.8	62 02.0	+56.0	122.4	52
53	65 56.9	+48.0	108.3	65 37.0	+49.4	110.4	65 15.0	+50.8	112.5	64 51.2	+51.9	114.5	64 25.4	+53.0	116.4	63 57.9	+54.0	118.2	63 28.7	+54.9	120.0	62 58.0	+55.7	121.7	53
54	66 44.9	+47.1	106.8	66 26.4	+48.6	109.0	66 05.8	+50.0	111.2	65 43.1	+51.3	113.3	65 18.4	+52.6	115.3	64 51.9	+53.6	117.2	64 23.6	+54.6	119.0	63 53.7	+55.4	120.8	54
55	67 32.0	+46.1	105.3	67 15.0	+47.8	107.6	66 55.8	+49.3	109.8	66 34.4	+50.7	112.0	66 11.0	+51.9	114.1	65 45.5	+53.1	116.1	65 18.2	+54.1	118.1	64 49.1	+55.0	119.9	55
56	68 18.1	+44.9	103.5	68 02.8	+46.7	106.0	67 45.1	+48.4	108.3	67 25.1	+49.9	110.6	67 02.9	+51.3	112.8	66 38.6	+52.5	115.0	66 12.3	+53.7	117.0	65 44.1	+54.7	119.0	56
57	69 03.0	+43.7	101.7	68 49.5	+45.7	104.3	68 33.5	+47.4	106.7	68 15.0	+49.1	109.1	67 54.2	+50.6	111.5	67 31.1	+52.0	113.7	67 06.0	+53.1	115.9	66 38.8	+54.2	118.0	57
58	69 46.7	+42.4	99.8	69 35.2	+44.4	102.4	69 20.9	+46.4	105.0	69 04.1	+48.1	107.6	68 44.8	+49.7	110.0	68 23.1	+51.2	112.4	67 59.1	+52.6	114.7	67 33.0	+53.8	116.9	58
59	70 29.1	+40.7	97.7	70 19.6	+43.0	100.5	70 07.3	+45.1	103.2	69 52.2	+47.1	105.8	69 34.5	+48.9	108.4	69 14.3	+50.5	110.9	68 51.7	+51.9	113.4	68 26.8	+53.2	115.7	59
60	71 09.8	+39.1	95.5	71 02.6	+41.5	98.4	70 52.4	+43.8	101.2	70 39.3	+45.9	104.0	70 23.4	+47.8	106.7	70 04.8	+49.6	109.4	69 43.6	+51.2	111.9	69 20.0	+52.6	114.4	60
61	71 48.9	+37.2•	93.1	71 44.1	+39.8	96.1	71 36.2	+42.3	99.1	71 25.2	+44.6	102.0	71 11.2	+46.7	104.9	70 54.4	+48.6	107.7	70 34.8	+50.3	110.4	70 12.6	+51.9	113.0	61
62	72 26.1	+35.1•	90.5	72 23.9	+37.9•	93.7	72 18.5	+40.5	96.8	72 09.8	+43.0	99.9	71 57.9	+45.3	102.9	71 43.0	+47.4	105.9	71 25.1	+49.4	108.7	71 04.5	+51.1	111.5	62
63	73 01.2	+32.7•	87.8	73 01.8	+35.7•	91.1	72 59.0	+38.6•	94.3	72 52.8	+41.3	97.6	72 43.2	+43.8	100.8	72 30.4	+46.2	103.9	72 14.5	+48.3	106.9	71 55.6	+50.1	109.8	63
64	73 33.9	+30.2•	84.9	73 37.5	+33.4•	88.3	73 37.6	+36.4•	91.7	73 34.1	+39.3•	95.0	73 27.0	+42.2	98.4	73 16.6	+44.6	101.7	73 02.8	+46.9	104.9	72 45.7	+49.1	108.0	64
65	74 04.1	+27.4•	81.8	74 10.9	+30.7•	85.3	74 14.0	+34.0•	88.8	74 13.4	+37.2•	92.3	74 09.2	+40.1•	95.9	74 01.2	+43.0	99.3	73 49.7	+45.6	102.7	73 34.8	+47.9	106.0	65
66	74 31.5	+24.2•	78.5	74 41.6	+27.8•	82.1	74 48.0	+31.3•	85.7	74 50.6	+34.7•	89.4	74 49.3	+37.9•	93.1	74 44.2	+41.0•	96.7	74 35.3	+43.8	100.3	74 22.7	+46.4	103.9	66
67	74 55.7	+21.0•	75.0	75 09.4	+24.6•	78.6	75 19.3	+28.3•	82.4	75 25.3	+31.9•	86.2	75 27.2	+35.4•	90.0	75 25.2	+38.7•	93.9	75 19.1	+41.9•	97.7	75 09.1	+44.8	101.5	67
68	75 16.7	+17.3•	71.4	75 34.0	+21.2•	75.0	75 47.6	+24.9•	78.9	75 57.2	+28.8•	82.8	76 02.6	+32.6•	86.8	76 03.9	+36.2•	90.8	76 01.0	+39.6•	94.8	75 53.9	+42.8•	98.8	68
69	75 34.0	+13.6•	67.5	75 55.2	+17.3•	71.2	76 12.5	+21.4•	75.1	76 26.0	+25.3•	79.1	76 35.2	+29.3•	83.2	76 40.1	+33.2•	87.4	76 40.6	+37.0•	91.6	76 36.7	+40.5•	95.8	69
70	75 47.6	+9.6•	63.6	76 12.5	+13.5•	67.3	76 33.9	+17.4•	71.1	76 51.3	+21.5•	75.2	77 04.5	+25.7•	79.4	77 13.3	+29.9•	83.7	77 17.6	+34.0•	88.1	77 17.2	+37.9•	92.6	70
71	75 57.2	+5.4•	59.6	76 26.0	+9.2•	63.1	76 51.3	+13.2•	67.0	77 12.8	+17.4•	71.0	77 30.2	+21.8•	75.3	77 43.2	+26.2•	79.7	77 51.6	+30.5•	84.3	77 55.1	+34.8•	89.0	71
72	76 02.6	+1.3•	55.4	76 35.2	+4.9•	58.9	77 04.5	+8.8•	62.6	77 30.2	+13.0•	66.6	77 52.0	+17.4•	70.9	78 09.4	+21.9•	75.4	78 22.1	+26.6•	80.1	78 29.9	+31.2•	85.0	72
73	76 03.9	−2.9•	51.3	76 40.1	+0.5•	54.6	77 13.3	+4.3•	58.2	77 43.2	+8.4•	62.1	78 09.4	+12.7•	66.3	78 31.3	+17.4•	70.8	78 48.7	+22.2•	75.6	79 01.1	+27.1•	80.6	73
74	76 01.0	−7.1•	47.2	76 40.6	−3.9•	50.2	77 17.6	−0.4•	53.7	77 51.6	+3.5•	57.4	78 22.1	+7.8•	61.5	78 48.7	+12.4•	65.9	79 10.9	+17.3•	70.7	79 28.2	+22.4•	75.8	74
75	75 53.9	−11.2•	43.1	76 36.7	−8.3•	45.9	77 17.2	−5.0•	49.1	77 55.1	−1.4•	52.6	78 29.9	+2.7•	56.5	79 01.1	+7.1•	60.8	79 28.2	+12.0•	65.5	79 50.6	+17.2•	70.6	75
76	75 42.7	−15.1•	39.1	76 28.4	−12.5•	41.7	77 12.2	−9.5•	44.6	77 53.7	−6.2•	47.9	78 32.6	−2.5•	51.5	79 08.2	+1.8•	55.6	79 40.2	+6.4•	60.1	80 07.8	+11.5•	65.1	76
77	75 27.6	−18.8•	35.2	76 15.9	−16.5•	37.5	77 02.7	−13.9•	40.2	77 47.5	−10.9•	43.1	78 30.1	−7.5•	46.5	79 10.0	−3.7•	50.3	79 46.6	+0.6•	54.6	80 19.3	+5.6•	59.3	77
78	75 08.8	−22.3•	31.4	75 59.4	−20.3•	33.5	76 48.8	−18.1•	35.9	77 36.6	−15.5•	38.5	78 22.6	−12.5•	41.6	79 06.3	−9.1•	45.0	79 47.2	−5.1•	48.9	80 24.9	−0.6•	53.4	78
79	74 46.5	−25.5•	27.8	75 39.1	−23.8•	29.7	76 30.7	−21.9•	31.7	77 21.1	−19.7•	34.1	78 10.1	−17.2•	36.7	78 57.2	−14.3•	39.8	79 42.1	−10.8•	43.3	80 24.3	−6.8•	47.4	79
80	74 21.0	−28.5•	24.4	75 15.3	−27.1•	26.0	76 08.8	−25.5•	27.8	77 01.4	−23.7•	29.8	77 52.9	−21.6•	32.1	78 42.9	−19.0•	34.8	79 31.3	−16.2•	37.9	80 17.5	−12.7•	41.4	80
81	73 52.5	−31.2•	21.2	74 48.2	−30.1•	22.6	75 43.3	−28.8•	24.1	76 37.7	−27.3•	25.8	77 31.3	−25.5•	27.7	78 23.9	−23.6•	30.0	79 15.1	−21.1•	32.6	80 04.8	−18.3•	35.7	81
82	73 21.3	−33.7•	18.2	74 18.1	−32.8•	19.3	75 14.5	−31.7•	20.6	76 10.4	−30.5•	22.0	77 05.8	−29.2•	23.6	78 00.3	−27.5•	25.5	78 54.0	−25.6•	27.7	79 46.5	−23.4•	30.3	82
83	72 47.6	−35.9•	15.4	73 45.3	−35.2•	16.3	74 42.8	−34.4•	17.3	75 39.9	−33.5•	18.4	76 36.6	−32.4•	19.8	77 32.8	−31.2•	21.3	78 28.4	−29.7•	23.1	79 23.1	−27.9•	25.2	83
84	72 11.7	−38.0	12.7	73 10.1	−37.4•	13.4	74 08.4	−36.8•	14.2	75 06.4	−36.1•	15.2	76 04.2	−35.3•	16.2	77 01.6	−34.3•	17.4	77 58.7	−33.3•	18.8	78 55.2	−32.0•	20.5	84
85	71 33.7	−39.8	10.2	72 32.7	−39.4	10.8	73 31.6	−38.9•	11.4	74 30.3	−38.4•	12.1	75 28.9	−37.8•	12.9	76 27.3	−37.1•	13.8	77 25.4	−36.3•	14.9	78 23.2	−35.4•	16.2	85
86	70 53.9	−41.4	7.9	71 53.3	−41.1	8.3	72 52.7	−40.8	8.8	73 51.9	−40.4	9.3	74 51.1	−40.1•	9.9	75 50.2	−39.6•	10.6	76 49.1	−39.1•	11.3	77 47.8	−38.4•	12.2	86
87	70 12.5	−42.9	5.7	71 12.2	−42.7	6.0	72 11.9	−42.5	6.3	73 11.5	−42.3	6.7	74 11.0	−42.0	7.1	75 10.6	−41.8•	7.6	76 10.0	−41.4•	8.1	77 09.4	−41.1•	8.7	87
88	69 29.6	−44.2	3.7	70 29.5	−44.1	3.9	71 29.4	−44.1	4.1	72 29.2	−43.9	4.3	73 29.0	−43.7	4.5	74 28.8	−43.6	4.8	75 28.6	−43.4	5.1	76 28.3	−43.2•	5.5	88
89	68 45.4	−45.4	1.8	69 45.4	−45.4	1.9	70 45.3	−45.3	2.0	71 45.3	−45.3	2.1	72 45.3	−45.3	2.2	73 45.2	−45.2	2.3	74 45.2	−45.2	2.4	75 45.1	−45.1	2.6	89
90	68 00.0	−46.5	0.0	69 00.0	−46.5	0.0	70 00.0	−46.5	0.0	71 00.0	−46.6	0.0	72 00.0	−46.6	0.0	73 00.0	−46.6	0.0	74 00.0	−46.7	0.0	75 00.0	−46.7	0.0	90
Dec. °	68°			69°			70°			71°			72°			73°			74°			75°			Dec. °

40°, 320° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 40°, 320°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	16 40.6	−58.1	137.9	15 56.0	−58.2	138.1	15 11.3	−58.4	138.2	14 26.5	−58.6	138.4	13 41.6	−58.8	138.6	12 56.5	−58.8	138.7	12 11.4	−59.0	138.9	11 26.1	−59.1	139.0	0
1	15 42.5	−58.1	138.1	14 57.8	−58.3	138.3	14 12.9	−58.4	138.5	13 27.9	−58.6	138.6	12 42.8	−58.7	138.8	11 57.7	−58.9	138.9	11 12.4	−59.0	139.1	10 27.0	−59.1	139.2	1
2	14 44.4	−58.1	138.4	13 59.5	−58.3	138.5	13 14.5	−58.5	138.7	12 29.3	−58.6	138.9	11 44.1	−58.8	139.0	10 58.8	−58.9	139.1	10 13.4	−59.1	139.3	9 27.9	−59.2	139.4	2
3	13 46.3	−58.2	138.6	13 01.2	−58.3	138.8	12 16.0	−58.5	138.9	11 30.7	−58.6	139.1	10 45.3	−58.7	139.2	9 59.9	−58.9	139.3	9 14.3	−59.0	139.4	8 28.7	−59.1	139.5	3
4	12 48.1	−58.1	138.9	12 02.9	−58.3	139.0	11 17.5	−58.4	139.2	10 32.1	−58.6	139.3	9 46.6	−58.8	139.4	9 01.0	−58.9	139.5	8 15.3	−59.0	139.6	7 29.6	−59.2	139.7	4
5	11 50.0	−58.2	139.1	11 04.6	−58.4	139.3	10 19.1	−58.5	139.4	9 33.5	−58.7	139.5	8 47.8	−58.8	139.6	8 02.1	−58.9	139.7	7 16.3	−59.1	139.8	6 30.4	−59.1	139.9	5
6	10 51.8	−58.1	139.4	10 06.2	−58.3	139.5	9 20.6	−58.5	139.6	8 34.8	−58.6	139.7	7 49.0	−58.8	139.8	7 03.2	−59.0	139.9	6 17.2	−59.0	140.0	5 31.3	−59.2	140.0	6
7	9 53.7	−58.2	139.6	9 07.9	−58.3	139.7	8 22.1	−58.5	139.8	7 36.2	−58.7	139.9	6 50.2	−58.7	140.0	6 04.2	−58.9	140.1	5 18.2	−59.0	140.2	4 32.1	−59.1	140.2	7
8	8 55.5	−58.2	139.9	8 09.6	−58.4	140.0	7 23.6	−58.5	140.1	6 37.5	−58.6	140.1	5 51.5	−58.8	140.2	5 05.3	−58.9	140.3	4 19.2	−59.1	140.3	3 33.0	−59.2	140.4	8
9	7 57.3	−58.2	140.1	7 11.2	−58.4	140.2	6 25.1	−58.6	140.3	5 38.9	−58.7	140.4	4 52.7	−58.8	140.4	4 06.4	−58.9	140.5	3 20.1	−59.0	140.5	2 33.8	−59.2	140.5	9
10	6 59.1	−58.2	140.4	6 12.8	−58.3	140.4	5 26.5	−58.5	140.5	4 40.2	−58.6	140.6	3 53.9	−58.8	140.6	3 07.5	−59.0	140.7	2 21.1	−59.1	140.7	1 34.6	−59.1	140.7	10
11	6 00.9	−58.3	140.6	5 14.5	−58.4	140.7	4 28.0	−58.5	140.7	3 41.6	−58.7	140.8	2 55.1	−58.8	140.8	2 08.5	−58.9	140.8	1 22.0	−59.0	140.9	0 35.5	−59.2	140.9	11
12	5 02.6	−58.2	140.9	4 16.1	−58.4	140.9	3 29.5	−58.5	141.0	2 42.9	−58.7	141.0	1 56.3	−58.8	141.0	1 09.6	−58.9	141.0	0 23.0	−59.1	141.0	0 23.7	+59.2	39.0	12
13	4 04.4	−58.2	141.1	3 17.7	−58.4	141.1	2 31.0	−58.6	141.2	1 44.2	−58.6	141.2	0 57.5	−58.8	141.2	0 10.7	−58.9	141.2	0 36.1	+59.0	38.8	1 22.9	+59.1	38.8	13
14	3 06.2	−58.2	141.3	2 19.3	−58.4	141.4	1 32.4	−58.5	141.4	0 45.6	−58.7	141.4	0 01.3	+58.9	38.6	0 48.2	+59.0	38.6	1 35.1	+59.1	38.6	2 22.0	+59.2	38.6	14
15	2 08.0	−58.3	141.6	1 20.9	−58.3	141.6	0 33.9	−58.5	141.6	0 13.1	+58.7	38.4	1 00.2	+58.8	38.4	1 47.2	+58.9	38.4	2 34.2	+59.0	38.4	3 21.2	+59.1	38.5	15
16	1 09.7	−58.2	141.8	0 22.6	−58.4	141.8	0 24.6	+58.6	38.2	1 11.8	+58.7	38.2	1 59.0	+58.8	38.2	2 46.1	+58.9	38.2	3 33.2	+59.1	38.2	4 20.3	+59.2	38.3	16
17	0 11.5	−58.2	142.1	0 35.8	+58.4	37.9	1 23.2	+58.5	37.9	2 10.5	+58.6	38.0	2 57.8	+58.8	38.0	3 45.0	+59.0	38.0	4 32.3	+59.0	38.1	5 19.5	+59.2	38.1	17
18	0 46.7	+58.3	37.7	1 34.2	+58.4	37.7	2 21.7	+58.5	37.7	3 09.1	+58.7	37.8	3 56.6	+58.8	37.8	4 44.0	+58.9	37.8	5 31.3	+59.1	37.9	6 18.7	+59.1	38.0	18
19	1 45.0	+58.2	37.4	2 32.6	+58.4	37.5	3 20.2	+58.5	37.5	4 07.8	+58.7	37.5	4 55.4	+58.7	37.6	5 42.9	+58.9	37.6	6 30.4	+59.0	37.7	7 17.8	+59.2	37.8	19
20	2 43.2	+58.2	37.2	3 31.0	+58.4	37.2	4 18.7	+58.6	37.3	5 06.5	+58.6	37.3	5 54.1	+58.8	37.4	6 41.8	+58.9	37.5	7 29.4	+59.0	37.5	8 17.0	+59.1	37.6	20
21	3 41.4	+58.3	37.0	4 29.4	+58.3	37.0	5 17.3	+58.5	37.1	6 05.1	+58.7	37.1	6 52.9	+58.8	37.2	7 40.7	+58.9	37.3	8 28.4	+59.1	37.4	9 16.1	+59.1	37.4	21
22	4 39.7	+58.2	36.7	5 27.7	+58.4	36.8	6 15.8	+58.5	36.8	7 03.8	+58.6	36.9	7 51.7	+58.8	37.0	8 39.6	+58.9	37.1	9 27.5	+59.0	37.2	10 15.2	+59.2	37.3	22
23	5 37.9	+58.2	36.5	6 26.1	+58.4	36.5	7 14.3	+58.5	36.6	8 02.4	+58.7	36.7	8 50.5	+58.8	36.8	9 38.5	+58.9	36.9	10 26.5	+59.0	37.0	11 14.4	+59.1	37.1	23
24	6 36.1	+58.2	36.2	7 24.5	+58.3	36.3	8 12.8	+58.5	36.4	9 01.1	+58.6	36.5	9 49.3	+58.7	36.6	10 37.4	+58.9	36.7	11 25.5	+59.0	36.8	12 13.5	+59.1	36.9	24
25	7 34.3	+58.2	36.0	8 22.8	+58.4	36.1	9 11.3	+58.5	36.2	9 59.7	+58.6	36.3	10 48.0	+58.8	36.4	11 36.3	+58.9	36.5	12 24.5	+59.0	36.6	13 12.6	+59.1	36.8	25
26	8 32.5	+58.2	35.7	9 21.2	+58.3	35.8	10 09.8	+58.5	35.9	10 58.3	+58.6	36.1	11 46.8	+58.7	36.2	12 35.2	+58.9	36.3	13 23.5	+59.0	36.4	14 11.7	+59.1	36.6	26
27	9 30.7	+58.2	35.5	10 19.5	+58.3	35.6	11 08.3	+58.4	35.7	11 56.9	+58.6	35.8	12 45.5	+58.8	36.0	13 34.1	+58.8	36.1	14 22.5	+59.0	36.2	15 10.8	+59.1	36.4	27
28	10 28.9	+58.1	35.3	11 17.8	+58.3	35.4	12 06.7	+58.5	35.5	12 55.5	+58.6	35.6	13 44.3	+58.7	35.8	14 32.9	+58.9	35.9	15 21.5	+59.0	36.1	16 09.9	+59.1	36.2	28
29	11 27.0	+58.2	35.0	12 16.1	+58.3	35.1	13 05.2	+58.4	35.3	13 54.1	+58.6	35.4	14 43.0	+58.7	35.5	15 31.8	+58.8	35.7	16 20.5	+58.9	35.9	17 09.0	+59.1	36.0	29
30	12 25.2	+58.1	34.8	13 14.4	+58.3	34.9	14 03.6	+58.5	35.0	14 52.7	+58.6	35.2	15 41.7	+58.7	35.3	16 30.6	+58.9	35.5	17 19.4	+59.0	35.7	18 08.1	+59.1	35.9	30
31	13 23.3	+58.2	34.5	14 12.7	+58.3	34.6	15 02.1	+58.4	34.8	15 51.3	+58.5	34.9	16 40.4	+58.7	35.1	17 29.5	+58.8	35.3	18 18.4	+58.9	35.5	19 07.2	+59.0	35.7	31
32	14 21.5	+58.1	34.2	15 11.0	+58.3	34.4	16 00.5	+58.4	34.5	16 49.8	+58.6	34.7	17 39.1	+58.7	34.9	18 28.3	+58.8	35.1	19 17.3	+58.9	35.3	20 06.2	+59.1	35.5	32
33	15 19.6	+58.1	34.0	16 09.3	+58.2	34.1	16 58.9	+58.4	34.3	17 48.4	+58.5	34.5	18 37.8	+58.6	34.7	19 27.1	+58.8	34.9	20 16.2	+59.0	35.1	21 05.3	+59.0	35.3	33
34	16 17.7	+58.0	33.7	17 07.5	+58.2	33.9	17 57.3	+58.3	34.1	18 46.9	+58.5	34.3	19 36.4	+58.7	34.5	20 25.9	+58.7	34.7	21 15.2	+58.8	34.9	22 04.3	+59.0	35.1	34
35	17 15.7	+58.1	33.5	18 05.7	+58.2	33.6	18 55.6	+58.4	33.8	19 45.4	+58.5	34.0	20 35.1	+58.6	34.2	21 24.6	+58.8	34.4	22 14.0	+58.9	34.7	23 03.3	+59.0	34.9	35
36	18 13.8	+58.0	33.2	19 03.9	+58.2	33.4	19 54.0	+58.3	33.6	20 43.9	+58.5	33.8	21 33.7	+58.6	34.0	22 23.4	+58.7	34.2	23 12.9	+58.9	34.5	24 02.3	+59.0	34.7	36
37	19 11.8	+58.0	32.9	20 02.1	+58.2	33.1	20 52.3	+58.3	33.3	21 42.4	+58.4	33.5	22 32.3	+58.6	33.8	23 22.1	+58.7	34.0	24 11.8	+58.8	34.2	25 01.3	+59.0	34.5	37
38	20 09.8	+58.0	32.7	21 00.3	+58.1	32.9	21 50.6	+58.3	33.1	22 40.8	+58.4	33.3	23 30.9	+58.6	33.5	24 20.8	+58.7	33.8	25 10.6	+58.9	34.0	26 00.3	+58.9	34.3	38
39	21 07.8	+57.9	32.4	21 58.4	+58.1	32.6	22 48.9	+58.2	32.8	23 39.2	+58.4	33.0	24 29.5	+58.5	33.3	25 19.5	+58.7	33.5	26 09.5	+58.8	33.8	26 59.2	+59.0	34.1	39
40	22 05.7	+58.0	32.1	22 56.5	+58.1	32.3	23 47.1	+58.3	32.6	24 37.6	+58.4	32.8	25 28.0	+58.5	33.1	26 18.2	+58.7	33.3	27 08.3	+58.8	33.6	27 58.2	+58.9	33.9	40
41	23 03.7	+57.9	31.8	23 54.6	+58.0	32.0	24 45.4	+58.2	32.3	25 36.0	+58.4	32.5	26 26.5	+58.5	32.8	27 16.9	+58.6	33.1	28 07.1	+58.7	33.4	28 57.1	+58.9	33.7	41
42	24 01.6	+57.8	31.5	24 52.6	+58.0	31.8	25 43.6	+58.1	32.0	26 34.4	+58.3	32.3	27 25.0	+58.5	32.6	28 15.5	+58.6	32.8	29 05.8	+58.8	33.1	29 56.0	+58.9	33.5	42
43	24 59.4	+57.8	31.2	25 50.6	+58.0	31.5	26 41.7	+58.2	31.7	27 32.7	+58.3	32.0	28 23.5	+58.4	32.3	29 14.1	+58.6	32.6	30 04.6	+58.7	32.9	30 54.9	+58.8	33.2	43
44	25 57.2	+57.8	30.9	26 48.6	+58.0	31.2	27 39.9	+58.1	31.5	28 31.0	+58.2	31.8	29 21.9	+58.4	32.0	30 12.7	+58.5	32.3	31 03.3	+58.7	32.7	31 53.7	+58.8	33.0	44
45	26 55.0	+57.8	30.6	27 46.6	+57.9	30.9	28 38.0	+58.1	31.2	29 29.2	+58.3	31.5	30 20.3	+58.4	31.8	31 11.2	+58.6	32.1	32 02.0	+58.6	32.4	32 52.5	+58.8	32.8	45
46	27 52.8	+57.7	30.3	28 44.5	+57.9	30.6	29 36.1	+58.0	30.9	30 27.5	+58.1	31.2	31 18.7	+58.3	31.5	32 09.8	+58.4	31.8	33 00.6	+58.7	32.2	33 51.3	+58.8	32.5	46
47	28 50.5	+57.7	30.0	29 42.4	+57.8	30.3	30 34.1	+58.0	30.6	31 25.6	+58.2	30.9	32 17.0	+58.3	31.2	33 08.2	+58.5	31.6	33 59.3	+58.6	31.9	34 50.1	+58.7	32.3	47
48	29 48.2	+57.6	29.7	30 40.2	+57.8	30.0	31 32.1	+57.9	30.3	32 23.8	+58.1	30.6	33 15.3	+58.3	31.0	34 06.7	+58.4	31.3	34 57.9	+58.5	31.7	35 48.8	+58.7	32.0	48
49	30 45.8	+57.6	29.4	31 38.0	+57.7	29.7	32 30.0	+57.9	30.0	33 21.9	+58.1	30.3	34 13.6	+58.2	30.7	35 05.1	+58.4	31.0	35 56.4	+58.6	31.4	36 47.5	+58.7	31.8	49
50	31 43.4	+57.5	29.1	32 35.7	+57.7	29.4	33 27.9	+57.9	29.7	34 20.0	+58.0	30.0	35 11.8	+58.2	30.4	36 03.5	+58.3	30.7	36 55.0	+58.5	31.1	37 46.2	+58.7	31.5	50
51	32 40.9	+57.4	28.7	33 33.4	+57.6	29.0	34 25.8	+57.8	29.4	35 18.0	+58.0	29.7	36 10.0	+58.1	30.1	37 01.8	+58.3	30.4	37 53.5	+58.4	30.8	38 44.9	+58.6	31.2	51
52	33 38.3	+57.4	28.4	34 31.0	+57.6	28.7	35 23.6	+57.7	29.0	36 16.0	+57.9	29.4	37 08.1	+58.1	29.8	38 00.1	+58.3	30.1	38 51.9	+58.4	30.5	39 43.5	+58.5	31.0	52
53	34 35.7	+57.4	28.0	35 28.6	+57.5	28.4	36 21.3	+57.7	28.7	37 13.9	+57.8	29.1	38 06.2	+58.0	29.4	38 58.4	+58.2	29.8	39 50.3	+58.4	30.3	40 42.0	+58.5	30.7	53
54	35 33.1	+57.3	27.7	36 26.1	+57.5	28.0	37 19.0	+57.7	28.4	38 11.7	+57.8	28.7	39 04.2	+58.0	29.1	39 56.6	+58.1	29.5	40 48.7	+58.3	29.9	41 40.5	+58.5	30.4	54
55	36 30.4	+57.2	27.3	37 23.6	+57.4	27.6	38 16.7	+57.5	28.0	39 09.5	+57.8	28.4	40 02.2	+57.9	28.8	40 54.7	+58.1	29.2	41 47.0	+58.2	29.6	42 39.0	+58.4	30.1	55
56	37 27.6	+57.1	26.9	38 21.0	+57.3	27.3	39 14.2	+57.5	27.7	40 07.3	+57.7	28.0	41 00.1	+57.9	28.4	41 52.8	+58.0	28.9	42 45.2	+58.2	29.3	43 37.4	+58.4	29.8	56
57	38 24.7	+57.1	26.5	39 18.3	+57.2	26.9	40 11.7	+57.4	27.3	41 05.0	+57.6	27.7	41 58.0	+57.8	28.1	42 50.8	+58.0	28.5	43 43.4	+58.2	29.0	44 35.8	+58.3	29.4	57
58	39 21.8	+56.9	26.1	40 15.5	+57.2	26.5	41 09.1	+57.4	26.9	42 02.6	+57.5	27.3	42 55.8	+57.7	27.7	43 48.8	+57.9	28.2	44 41.6	+58.0	28.6	45 34.1	+58.3	29.1	58
59	40 18.7	+56.9	25.7	41 12.7	+57.1	26.1	42 06.5	+57.3	26.5	43 00.1	+57.4	26.9	43 53.5	+57.6	27.3	44 46.7	+57.8	27.8	45 39.6	+58.0	28.3	46 32.4	+58.1	28.8	59
60	41 15.6	+56.8	25.3	42 09.8	+57.0	25.7	43 03.8	+57.1	26.1	43 57.5	+57.4	26.5	44 51.1	+57.6	27.0	45 44.5	+57.7	27.4	46 37.6	+58.0	27.9	47 30.5	+58.2	28.4	60
61	42 12.4	+56.7	24.9	43 06.8	+56.8	25.3	44 00.9	+57.1	25.7	44 54.9	+57.3	26.1	45 48.7	+57.4	26.6	46 42.2	+57.7	27.0	47 35.6	+57.8	27.5	48 28.7	+58.0	28.0	61
62	43 09.1	+56.6	24.4	44 03.6	+56.8	24.8	44 58.0	+57.0	25.2	45 52.2	+57.2	25.7	46 46.1	+57.4	26.1	47 39.9	+57.6	26.6	48 33.4	+57.8	27.1	49 26.7	+58.0	27.7	62
63	44 05.7	+56.5	24.0	45 00.4	+56.7	24.4	45 55.0	+56.9	24.8	46 49.4	+57.0	25.2	47 43.5	+57.3	25.7	48 37.5	+57.4	26.2	49 31.2	+57.7	26.7	50 24.7	+57.8	27.3	63
64	45 02.2	+56.3	23.5	45 57.1	+56.5	23.9	46 51.9	+56.7	24.3	47 46.4	+57.0	24.8	48 40.8	+57.2	25.3	49 34.9	+57.4	25.8	50 28.9	+57.5	26.3	51 22.5	+57.8	26.8	64
65	45 58.5	+56.2	23.0	46 53.6	+56.5	23.4	47 48.6	+56.6	23.9	48 43.4	+56.8	24.3	49 38.0	+57.0	24.8	50 32.3	+57.3	25.3	51 26.4	+57.5	25.8	52 20.3	+57.7	26.4	65
66	46 54.7	+56.1	22.5	47 50.1	+56.3	22.9	48 45.2	+56.5	23.4	49 40.2	+56.7	23.8	50 35.0	+56.9	24.3	51 29.6	+57.1	24.8	52 23.9	+57.4	25.4	53 18.0	+57.6	25.9	66
67	47 50.8	+55.9	22.0	48 46.4	+56.1	22.4	49 41.7	+56.4	22.8	50 36.9	+56.6	23.3	51 31.9	+56.8	23.8	52 26.7	+57.0	24.3	53 21.3	+57.2	24.9	54 15.6	+57.4	25.5	67
68	48 46.7	+55.8	21.4	49 42.5	+56.0	21.9	50 38.1	+56.2	22.3	51 33.5	+56.4	22.8	52 28.7	+56.7	23.3	53 23.7	+56.9	23.8	54 18.5	+57.1	24.4	55 13.0	+57.3	25.0	68
69	49 42.5	+55.6	20.9	50 38.5	+55.8	21.3	51 34.3	+56.0	21.8	52 29.9	+56.3	22.2	53 25.4	+56.5	22.7	54 20.6	+56.7	23.3	55 15.6	+56.9	23.8	56 10.3	+57.2	24.4	69
70	50 38.1	+55.4	20.3	51 34.3	+55.6	20.7	52 30.3	+55.9	21.2	53 26.2	+56.1	21.7	54 21.9	+56.3	22.2	55 17.3	+56.6	22.7	56 12.5	+56.8	23.3	57 07.5	+57.1	23.9	70
71	51 33.5	+55.2	19.7	52 29.9	+55.5	20.1	53 26.2	+55.7	20.6	54 22.3	+55.9	21.1	55 18.2	+56.1	21.6	56 13.9	+56.3	22.1	57 09.3	+56.7	22.7	58 04.6	+56.8	23.3	71
72	52 28.7	+55.0	19.0	53 25.4	+55.2	19.5	54 21.9	+55.4	19.9	55 18.2	+55.7	20.4	56 14.3	+55.9	20.9	57 10.2	+56.2	21.5	58 06.0	+56.4	22.1	59 01.4	+56.7	22.7	72
73	53 23.7	+54.8	18.4	54 20.6	+55.0	18.8	55 17.3	+55.2	19.3	56 13.9	+55.4	19.8	57 10.2	+55.8	20.3	58 06.4	+56.0	20.8	59 02.4	+56.2	21.4	59 58.1	+56.5	22.1	73
74	54 18.5	+54.5	17.7	55 15.6	+54.7	18.1	56 12.5	+55.0	18.6	57 09.3	+55.3	19.1	58 06.0	+55.4	19.6	59 02.4	+55.7	20.1	59 58.6	+56.0	20.7	60 54.6	+56.3	21.4	74
75	55 13.0	+54.3	17.0	56 10.3	+54.5	17.4	57 07.5	+54.8	17.8	58 04.6	+54.9	18.3	59 01.4	+55.3	18.9	59 58.1	+55.5	19.4	60 54.6	+55.7	20.0	61 50.9	+56.0	20.6	75
76	56 07.3	+53.9	16.2	57 04.8	+54.2	16.6	58 02.3	+54.4	17.1	58 59.5	+54.7	17.6	59 56.7	+54.9	18.1	60 53.6	+55.2	18.6	61 50.3	+55.5	19.2	62 46.9	+55.7	19.9	76
77	57 01.2	+53.7	15.4	57 59.0	+53.9	15.8	58 56.7	+54.1	16.3	59 54.2	+54.4	16.8	60 51.6	+54.6	17.3	61 48.8	+54.9	17.8	62 45.8	+55.2	18.4	63 42.6	+55.5	19.1	77
78	57 54.9	+53.3	14.6	58 52.9	+53.5	15.0	59 50.8	+53.8	15.4	60 48.6	+54.0	15.9	61 46.2	+54.3	16.4	62 43.7	+54.5	17.0	63 41.0	+54.8	17.5	64 38.1	+55.1	18.2	78
79	58 48.2	+52.9	13.7	59 46.4	+53.2	14.1	60 44.6	+53.4	14.5	61 42.6	+53.6	15.0	62 40.5	+53.9	15.5	63 38.2	+54.2	16.0	64 35.8	+54.5	16.6	65 33.2	+54.8	17.2	79
80	59 41.1	+52.5	12.8	60 39.6	+52.7	13.2	61 38.0	+52.9	13.6	62 36.2	+53.3	14.0	63 34.4	+53.5	14.5	64 32.4	+53.7	15.0	65 30.3	+54.0	15.6	66 28.0	+54.3	16.2	80
81	60 33.6	+52.1	11.8	61 32.3	+52.3	12.2	62 30.9	+52.6	12.6	63 29.5	+52.7	13.0	64 27.9	+53.0	13.5	65 26.1	+53.3	14.0	66 24.3	+53.5	14.5	67 22.3	+53.8	15.1	81
82	61 25.7	+51.6	10.8	62 24.6	+51.8	11.1	63 23.5	+52.0	11.5	64 22.2	+52.3	11.9	65 20.9	+52.5	12.4	66 19.4	+52.8	12.9	67 17.8	+53.1	13.4	68 16.1	+53.4	14.0	82
83	62 17.3	+51.1	9.7	63 16.4	+51.3	10.0	64 15.5	+51.4	10.4	65 14.5	+51.6	10.8	66 13.4	+51.9	11.2	67 12.2	+52.1	11.7	68 10.9	+52.4	12.2	69 09.5	+52.7	12.7	83
84	63 08.4	+50.4	8.6	64 07.7	+50.6	8.9	65 06.9	+50.9	9.2	66 06.1	+51.1	9.5	67 05.3	+51.2	9.9	68 04.3	+51.5	10.4	69 03.3	+51.8	10.8	70 02.2	+52.0	11.3	84
85	63 58.8	+49.9	7.3	64 58.3	+50.0	7.6	65 57.8	+50.1	7.9	66 57.2	+50.3	8.2	67 56.5	+50.6	8.6	68 55.8	+50.8	9.0	69 55.1	+51.0	9.4	70 54.2	+51.3	9.9	85
86	64 48.7	+49.1	6.0	65 48.3	+49.2	6.3	66 47.9	+49.4	6.5	67 47.5	+49.6	6.8	68 47.1	+49.7	7.1	69 46.6	+49.9	7.5	70 46.1	+50.1	7.8	71 45.5	+50.3	8.2	86
87	65 37.8	+48.3	4.7	66 37.5	+48.5	4.9	67 37.3	+48.6	5.1	68 37.1	+48.7	5.3	69 36.8	+48.8	5.5	70 36.5	+49.0	5.8	71 36.2	+49.1	6.1	72 35.8	+49.3	6.5	87
88	66 26.1	+47.4	3.2	67 26.0	+47.5	3.4	68 25.9	+47.6	3.5	69 25.8	+47.6	3.7	70 25.6	+47.8	3.8	71 25.5	+47.9	4.0	72 25.3	+48.0	4.3	73 25.1	+48.2	4.5	88
89	67 13.5	+46.5	1.7	68 13.5	+46.5	1.7	69 13.5	+46.5	1.8	70 13.4	+46.6	1.9	71 13.4	+46.6	2.0	72 13.4	+46.6	2.1	73 13.3	+46.7	2.2	74 13.3	+46.7	2.4	89
90	68 00.0	+45.4	0.0	69 00.0	+45.4	0.0	70 00.0	+45.3	0.0	71 00.0	+45.3	0.0	72 00.0	+45.3	0.0	73 00.0	+45.2	0.0	74 00.0	+45.2	0.0	75 00.0	+45.1	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 140°, 220°

41°, 319° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.....Zn=360°–Z

Dec. °	68° Hc ° ′	d ′	Z °	69° Hc ° ′	d ′	Z °	70° Hc ° ′	d ′	Z °	71° Hc ° ′	d ′	Z °	72° Hc ° ′	d ′	Z °	73° Hc ° ′	d ′	Z °	74° Hc ° ′	d ′	Z °	75° Hc ° ′	d ′	Z °	Dec. °
0	16 25.4	+57.9	136.8	15 41.5	+58.2	137.0	14 57.5	+58.4	137.2	14 13.4	+58.5	137.4	13 29.2	+58.7	137.6	12 44.9	+58.8	137.7	12 00.4	+59.0	137.9	11 15.9	+59.0	138.0	0
1	17 23.3	+58.0	136.6	16 39.7	+58.1	136.8	15 55.9	+58.3	137.0	15 11.9	+58.5	137.2	14 27.9	+58.6	137.4	13 43.7	+58.8	137.5	12 59.4	+58.9	137.7	12 14.9	+59.1	137.8	1
2	18 21.3	+57.9	136.3	17 37.8	+58.2	136.5	16 54.2	+58.3	136.7	16 10.4	+58.5	136.9	15 26.5	+58.7	137.1	14 42.5	+58.8	137.3	13 58.3	+59.0	137.5	13 14.0	+59.1	137.7	2
3	19 19.2	+58.0	136.0	18 36.0	+58.1	136.3	17 52.5	+58.3	136.5	17 08.9	+58.5	136.7	16 25.2	+58.6	136.9	15 41.3	+58.8	137.1	14 57.3	+58.9	137.3	14 13.1	+59.1	137.5	3
4	20 17.2	+57.9	135.8	19 34.1	+58.1	136.0	18 50.8	+58.3	136.2	18 07.4	+58.5	136.5	17 23.8	+58.6	136.7	16 40.1	+58.8	136.9	15 56.2	+58.9	137.1	15 12.2	+59.0	137.3	4
5	21 15.1	+57.8	135.5	20 32.2	+58.0	135.7	19 49.1	+58.3	136.0	19 05.9	+58.4	136.2	18 22.4	+58.7	136.5	17 38.9	+58.7	136.7	16 55.1	+58.9	136.9	16 11.2	+59.1	137.1	5
6	22 12.9	+57.8	135.2	21 30.2	+58.1	135.5	20 47.4	+58.2	135.7	20 04.3	+58.4	136.0	19 21.1	+58.5	136.2	18 37.6	+58.8	136.5	17 54.0	+58.9	136.7	17 10.3	+59.0	136.9	6
7	23 10.7	+57.8	134.9	22 28.3	+58.0	135.2	21 45.6	+58.2	135.5	21 02.7	+58.4	135.8	20 19.6	+58.6	136.0	19 36.4	+58.7	136.3	18 52.9	+58.9	136.5	18 09.3	+59.0	136.7	7
8	24 08.5	+57.8	134.6	23 26.3	+58.0	134.9	22 43.8	+58.2	135.2	22 01.1	+58.4	135.5	21 18.2	+58.6	135.8	20 35.1	+58.7	136.1	19 51.8	+58.9	136.3	19 08.3	+59.1	136.6	8
9	25 06.3	+57.7	134.3	24 24.3	+57.9	134.6	23 42.0	+58.2	135.0	22 59.5	+58.3	135.3	22 16.8	+58.5	135.6	21 33.8	+58.7	135.8	20 50.7	+58.9	136.1	20 07.4	+59.0	136.4	9
10	26 04.0	+57.7	134.0	25 22.2	+57.9	134.4	24 40.2	+58.1	134.7	23 57.8	+58.4	135.0	23 15.3	+58.5	135.3	22 32.5	+58.7	135.6	21 49.6	+58.8	135.9	21 06.4	+59.0	136.2	10
11	27 01.7	+57.7	133.7	26 20.1	+57.9	134.1	25 38.3	+58.1	134.4	24 56.2	+58.3	134.7	24 13.8	+58.5	135.1	23 31.2	+58.7	135.4	22 48.4	+58.8	135.7	22 05.4	+58.9	136.0	11
12	27 59.4	+57.6	133.4	27 18.0	+57.9	133.8	26 36.4	+58.0	134.1	25 54.5	+58.2	134.5	25 12.3	+58.5	134.8	24 29.9	+58.6	135.2	23 47.2	+58.8	135.5	23 04.3	+59.0	135.8	12
13	28 57.0	+57.6	133.1	28 15.9	+57.8	133.5	27 34.4	+58.1	133.8	26 52.7	+58.3	134.2	26 10.8	+58.4	134.6	25 28.5	+58.6	134.9	24 46.0	+58.8	135.3	24 03.3	+58.9	135.6	13
14	29 54.6	+57.5	132.7	29 13.7	+57.7	133.2	28 32.5	+58.0	133.6	27 51.0	+58.2	133.9	27 09.2	+58.4	134.3	26 27.1	+58.6	134.7	25 44.8	+58.8	135.0	25 02.2	+59.0	135.4	14
15	30 52.1	+57.4	132.4	30 11.4	+57.7	132.8	29 30.5	+57.9	133.3	28 49.2	+58.2	133.7	28 07.6	+58.4	134.1	27 25.7	+58.6	134.4	26 43.6	+58.7	134.8	26 01.2	+58.9	135.2	15
16	31 49.5	+57.4	132.1	31 09.1	+57.7	132.5	30 28.4	+57.9	133.0	29 47.4	+58.1	133.4	29 06.0	+58.3	133.8	28 24.3	+58.5	134.2	27 42.3	+58.8	134.6	27 00.1	+58.9	134.9	16
17	32 46.9	+57.4	131.7	32 06.8	+57.6	132.2	31 26.3	+57.9	132.7	30 45.5	+58.1	133.1	30 04.3	+58.3	133.5	29 22.8	+58.6	133.9	28 41.1	+58.7	134.3	27 59.0	+58.8	134.7	17
18	33 44.3	+57.3	131.4	33 04.4	+57.6	131.9	32 24.2	+57.8	132.4	31 43.6	+58.0	132.8	31 02.6	+58.3	133.3	30 21.4	+58.4	133.7	29 39.8	+58.6	134.1	28 57.8	+58.9	134.5	18
19	34 41.6	+57.2	131.0	34 02.0	+57.5	131.5	33 22.0	+57.8	132.0	32 41.6	+58.1	132.5	32 00.9	+58.3	133.0	31 19.8	+58.5	133.4	30 38.4	+58.7	133.9	29 56.7	+58.8	134.3	19
20	35 38.8	+57.2	130.7	34 59.5	+57.4	131.2	34 19.8	+57.7	131.7	33 39.7	+57.9	132.2	32 59.2	+58.2	132.7	32 18.3	+58.4	133.2	31 37.1	+58.6	133.6	30 55.5	+58.8	134.1	20
21	36 36.0	+57.0	130.3	35 56.9	+57.4	130.8	35 17.5	+57.7	131.4	34 37.6	+57.9	131.9	33 57.4	+58.1	132.4	33 16.7	+58.4	132.9	32 35.7	+58.6	133.4	31 54.3	+58.8	133.8	21
22	37 33.0	+57.0	129.9	36 54.3	+57.3	130.5	36 15.2	+57.6	131.0	35 35.5	+57.9	131.6	34 55.5	+58.1	132.1	34 15.1	+58.3	132.6	33 34.3	+58.5	133.1	32 53.1	+58.7	133.6	22
23	38 30.0	+57.0	129.5	37 51.6	+57.3	130.1	37 12.8	+57.5	130.7	36 33.4	+57.8	131.3	35 53.6	+58.1	131.8	35 13.4	+58.3	132.3	34 32.8	+58.5	132.8	33 51.8	+58.8	133.3	23
24	39 27.0	+56.8	129.1	38 48.9	+57.1	129.7	38 10.3	+57.5	130.3	37 31.2	+57.8	130.9	36 51.7	+58.0	131.5	36 11.7	+58.3	132.0	35 31.3	+58.5	132.6	34 50.6	+58.6	133.1	24
25	40 23.8	+56.7	128.7	39 46.0	+57.1	129.3	39 07.8	+57.4	130.0	38 29.0	+57.7	130.6	37 49.7	+58.0	131.2	37 10.0	+58.2	131.7	36 29.8	+58.5	132.3	35 49.2	+58.7	132.8	25
26	41 20.5	+56.7	128.2	40 43.1	+57.0	128.9	40 05.2	+57.3	129.6	39 26.7	+57.6	130.2	38 47.7	+57.9	130.8	38 08.2	+58.2	131.4	37 28.3	+58.4	132.0	36 47.9	+58.6	132.6	26
27	42 17.2	+56.5	127.8	41 40.1	+56.9	128.5	41 02.5	+57.2	129.2	40 24.3	+57.5	129.9	39 45.6	+57.8	130.5	39 06.4	+58.1	131.1	38 26.7	+58.3	131.7	37 46.5	+58.6	132.3	27
28	43 13.7	+56.5	127.3	42 37.0	+56.8	128.1	41 59.7	+57.2	128.8	41 21.8	+57.5	129.5	40 43.4	+57.8	130.2	40 04.5	+58.0	130.8	39 25.0	+58.3	131.4	38 45.1	+58.5	132.0	28
29	44 10.2	+56.3	126.9	43 33.8	+56.7	127.6	42 56.9	+57.0	128.4	42 19.3	+57.4	129.1	41 41.2	+57.7	129.8	41 02.5	+58.0	130.5	40 23.3	+58.3	131.1	39 43.6	+58.5	131.7	29
30	45 06.5	+56.1	126.4	44 30.5	+56.6	127.2	43 53.9	+57.0	128.0	43 16.7	+57.3	128.7	42 38.9	+57.7	129.4	42 00.5	+58.0	130.1	41 21.6	+58.2	130.8	40 42.1	+58.5	131.5	30
31	46 02.6	+56.1	125.9	45 27.1	+56.5	126.7	44 50.9	+56.9	127.5	44 14.0	+57.3	128.3	43 36.6	+57.5	129.0	42 58.5	+57.8	129.8	42 19.8	+58.1	130.5	41 40.6	+58.4	131.2	31
32	46 58.7	+55.9	125.4	46 23.6	+56.3	126.2	45 47.8	+56.7	127.1	45 11.3	+57.1	127.9	44 34.1	+57.5	128.7	43 56.3	+57.8	129.4	43 17.9	+58.1	130.1	42 39.0	+58.3	130.8	32
33	47 54.6	+55.7	124.8	47 19.9	+56.2	125.7	46 44.5	+56.7	126.6	46 08.4	+57.0	127.4	45 31.6	+57.4	128.2	44 54.1	+57.7	129.0	44 16.0	+58.1	129.8	43 37.3	+58.3	130.5	33
34	48 50.3	+55.6	124.3	48 16.1	+56.1	125.2	47 41.2	+56.5	126.1	47 05.4	+56.9	127.0	46 29.0	+57.3	127.8	45 51.8	+57.7	128.6	45 14.1	+57.9	129.4	44 35.6	+58.3	130.2	34
35	49 45.9	+55.4	123.7	49 12.2	+55.9	124.7	48 37.7	+56.3	125.6	48 02.3	+56.8	126.5	47 26.3	+57.2	127.4	46 49.5	+57.5	128.2	46 12.0	+57.9	129.1	45 33.9	+58.2	129.9	35
36	50 41.3	+55.2	123.1	50 08.1	+55.7	124.1	49 34.0	+56.2	125.1	48 59.1	+56.7	126.0	48 23.5	+57.0	126.9	47 47.0	+57.5	127.8	47 09.9	+57.8	128.7	46 32.1	+58.1	129.5	36
37	51 36.5	+55.0	122.5	51 03.8	+55.6	123.5	50 30.2	+56.1	124.5	49 55.8	+56.5	125.5	49 20.5	+57.0	126.5	48 44.5	+57.3	127.4	48 07.7	+57.7	128.3	47 30.2	+58.0	129.1	37
38	52 31.5	+54.8	121.8	51 59.4	+55.3	122.9	51 26.3	+55.9	124.0	50 52.3	+56.4	125.0	50 17.5	+56.8	126.0	49 41.8	+57.3	126.9	49 05.4	+57.6	127.9	48 28.2	+58.0	128.8	38
39	53 26.3	+54.5	121.1	52 54.7	+55.2	122.3	52 22.2	+55.7	123.4	51 48.7	+56.2	124.4	51 14.3	+56.7	125.5	50 39.1	+57.1	126.5	50 03.0	+57.5	127.4	49 26.2	+57.8	128.4	39
40	54 20.8	+54.3	120.4	53 49.9	+54.9	121.6	53 17.9	+55.5	122.8	52 44.9	+56.1	123.9	52 11.0	+56.6	124.9	51 36.2	+57.0	126.0	51 00.5	+57.5	127.0	50 24.0	+57.8	128.0	40
41	55 15.1	+54.0	119.7	54 44.8	+54.7	120.9	54 13.4	+55.3	122.1	53 41.0	+55.9	123.3	53 07.6	+56.4	124.4	52 33.2	+56.9	125.5	51 58.0	+57.2	126.5	51 21.8	+57.7	127.5	41
42	56 09.1	+53.6	118.9	55 39.5	+54.4	120.2	55 08.7	+55.1	121.4	54 36.9	+55.6	122.7	54 04.0	+56.2	123.8	53 30.1	+56.7	124.9	52 55.2	+57.2	126.0	52 19.5	+57.6	127.1	42
43	57 02.7	+53.4	118.1	56 33.9	+54.1	119.4	56 03.8	+54.8	120.7	55 32.5	+55.5	122.0	55 00.2	+56.0	123.2	54 26.8	+56.6	124.4	53 52.4	+57.1	125.5	53 17.1	+57.5	126.6	43
44	57 56.1	+53.0	117.3	57 28.0	+53.8	118.7	56 58.6	+54.5	120.0	56 28.0	+55.2	121.3	55 56.2	+55.8	122.6	55 23.4	+56.4	123.8	54 49.5	+56.9	125.0	54 14.6	+57.3	126.1	44
45	58 49.1	+52.6	116.4	58 21.8	+53.4	117.8	57 53.1	+54.3	119.2	57 23.2	+54.9	120.6	56 52.0	+55.7	121.9	56 19.8	+56.1	123.2	55 46.4	+56.7	124.4	55 11.9	+57.2	125.6	45
46	59 41.7	+52.2	115.4	59 15.2	+53.1	116.9	58 47.4	+53.9	118.4	58 18.1	+54.7	119.8	57 47.7	+55.3	121.2	57 15.9	+56.0	122.6	56 43.1	+56.5	123.9	56 09.1	+57.1	125.1	46
47	60 33.9	+51.7	114.4	60 08.3	+52.7	116.0	59 41.3	+53.5	117.6	59 12.8	+54.4	119.1	58 43.0	+55.1	120.5	58 11.9	+55.8	121.9	57 39.6	+56.4	123.2	57 06.2	+56.9	124.5	47
48	61 25.6	+51.2	113.4	61 01.0	+52.2	115.0	60 34.8	+53.2	116.7	60 07.2	+54.0	118.2	59 38.1	+54.8	119.7	59 07.7	+55.5	121.2	58 36.0	+56.2	122.6	58 03.1	+56.7	123.9	48
49	62 16.8	+50.7	112.3	61 53.2	+51.8	114.0	61 28.0	+52.8	115.7	61 01.2	+53.7	117.3	60 32.9	+54.5	118.9	60 03.2	+55.3	120.4	59 32.2	+55.9	121.9	58 59.8	+56.6	123.3	49
50	63 07.5	+50.0	111.1	62 45.0	+51.2	112.9	62 20.8	+52.2	114.7	61 54.9	+53.2	116.4	61 27.4	+54.2	118.0	60 58.5	+55.0	119.6	60 28.1	+55.7	121.2	59 56.4	+56.3	122.7	50
51	63 57.5	+49.4	109.9	63 36.2	+50.6	111.8	63 13.0	+51.8	113.6	62 48.1	+52.9	115.4	62 21.6	+53.8	117.1	61 53.5	+54.6	118.8	61 23.8	+55.4	120.4	60 52.7	+56.1	122.0	51
52	64 46.9	+48.6	108.6	64 26.8	+50.0	110.5	64 04.8	+51.2	112.5	63 41.0	+52.3	114.3	63 15.4	+53.3	116.2	62 48.1	+54.3	117.9	62 19.2	+55.1	119.6	61 48.8	+55.9	121.2	52
53	65 35.5	+47.8	107.2	65 16.8	+49.2	109.2	64 56.0	+50.6	111.3	64 33.3	+51.8	113.2	64 08.7	+52.9	115.1	63 42.4	+53.8	117.0	63 14.3	+54.8	118.7	62 44.7	+55.6	120.4	53
54	66 23.3	+46.9	105.7	66 06.0	+48.5	107.9	65 46.6	+49.8	110.0	65 25.1	+51.1	112.0	65 01.6	+52.4	114.0	64 36.2	+53.5	116.0	64 09.1	+54.4	117.8	63 40.3	+55.2	119.6	54
55	67 10.2	+46.0	104.1	66 54.5	+47.5	106.4	66 36.4	+49.1	108.6	66 16.2	+50.5	110.8	65 54.0	+51.7	112.8	65 29.7	+52.9	114.9	65 03.5	+54.0	116.8	64 35.5	+55.0	118.7	55
56	67 56.2	+44.8	102.4	67 42.0	+46.6	104.8	67 25.5	+48.3	107.1	67 06.7	+49.8	109.4	66 45.7	+51.2	111.6	66 22.6	+52.4	113.7	65 57.5	+53.5	115.8	65 30.5	+54.5	117.8	56
57	68 41.0	+43.5	100.6	68 28.6	+45.5	103.1	68 13.8	+47.3	105.5	67 56.5	+48.9	107.9	67 36.9	+50.4	110.2	67 15.0	+51.8	112.5	66 51.0	+53.0	114.6	66 25.0	+54.1	116.7	57
58	69 24.5	+42.3	98.7	69 14.1	+44.3	101.3	69 01.1	+46.2	103.9	68 45.4	+48.0	106.4	68 27.3	+49.6	108.8	68 06.8	+51.1	111.2	67 44.0	+52.4	113.4	67 19.1	+53.6	115.6	58
59	70 06.8	+40.7	96.6	69 58.4	+42.9	99.4	69 47.3	+45.0	102.0	69 33.4	+46.9	104.7	69 16.9	+48.7	107.2	68 57.9	+50.3	109.7	68 36.4	+51.8	112.1	68 12.7	+53.1	114.4	59
60	70 47.5	+39.0	94.4	70 41.3	+41.4	97.3	70 32.3	+43.6	100.1	70 20.3	+45.8	102.9	70 05.6	+47.7	105.5	69 48.2	+49.4	108.2	69 28.2	+51.0	110.7	69 05.8	+52.4	113.2	60
61	71 26.5	+37.1	92.1	71 22.7	+39.8	95.1	71 15.9	+42.2	98.0	71 06.1	+44.4	100.9	70 53.3	+46.5	103.7	70 37.6	+48.5	106.5	70 19.2	+50.2	109.2	69 58.2	+51.8	111.8	61
62	72 03.6	+35.1	89.6	72 02.5	+37.8	92.7	71 58.1	+40.4	95.7	71 50.5	+42.9	98.8	71 39.8	+45.2	101.8	71 26.1	+47.3	104.7	71 09.4	+49.2	107.5	70 50.0	+50.9	110.3	62
63	72 38.7	+32.9	86.9	72 40.3	+35.8	90.1	72 38.5	+38.6	93.3	72 33.4	+41.2	96.5	72 25.0	+43.7	99.6	72 13.4	+46.0	102.7	71 58.6	+48.1	105.7	71 40.9	+50.0	108.6	63
64	73 11.6	+30.3	84.1	73 16.1	+33.4	87.4	73 17.1	+36.4	90.7	73 14.6	+39.3	94.0	73 08.7	+42.0	97.3	72 59.4	+44.5	100.6	72 46.7	+46.9	103.7	72 30.9	+49.0	106.8	64
65	73 41.9	+27.6	81.0	73 49.5	+30.8	84.4	73 53.5	+34.1	87.9	73 53.9	+37.2	91.3	73 50.7	+40.1	94.8	73 43.9	+42.8	98.2	73 33.6	+45.4	101.6	73 19.9	+47.7	104.9	65
66	74 09.5	+24.5	77.8	74 20.3	+28.1	81.3	74 27.6	+31.4	84.9	74 31.1	+34.7	88.5	74 30.8	+37.9	92.1	74 26.7	+41.0	95.7	74 19.0	+43.7	99.2	74 07.6	+46.3	102.7	66
67	74 34.0	+21.4	74.4	74 48.4	+24.9	78.0	74 59.0	+28.5	81.6	75 05.8	+32.0	85.3	75 08.7	+35.4	89.1	75 07.7	+38.7	92.9	75 02.7	+41.8	96.6	74 53.9	+44.6	100.3	67
68	74 55.4	+17.9	70.9	75 13.3	+21.5	74.5	75 27.5	+25.2	78.2	75 37.8	+29.0	82.0	75 44.1	+32.7	85.9	75 46.4	+36.2	89.8	75 44.5	+39.6	93.8	75 38.5	+42.7	97.7	68
69	75 13.3	+14.2	67.2	75 34.8	+17.9	70.8	75 52.7	+21.8	74.5	76 06.8	+25.6	78.4	76 16.8	+29.5	82.4	76 22.6	+33.3	86.5	76 24.1	+37.0	90.6	76 21.2	+40.5	94.8	69
70	75 27.5	+10.3	63.3	75 52.7	+14.1	66.9	76 14.5	+17.9	70.6	76 32.4	+22.0	74.6	76 46.3	+26.0	78.7	76 55.9	+30.1	82.9	77 01.1	+34.0	87.2	77 01.7	+37.9	91.6	70
71	75 37.8	+6.3	59.4	76 06.8	+10.0	62.9	76 32.4	+13.9	66.6	76 54.4	+17.9	70.5	77 12.3	+22.2	74.7	77 26.0	+26.4	79.0	77 35.1	+30.7	83.5	77 39.6	+34.8	88.0	71
72	75 44.1	+2.3	55.4	76 16.8	+5.8	58.7	76 46.3	+9.6	62.4	77 12.3	+13.7	66.3	77 34.5	+17.9	70.4	77 52.4	+22.4	74.8	78 05.8	+26.9	79.4	78 14.4	+31.4	84.1	72
73	75 46.4	−1.9	51.3	76 22.6	+1.5	54.5	76 55.9	+5.2	58.0	77 26.0	+9.1	61.8	77 52.4	+13.4	65.9	78 14.8	+17.9	70.3	78 32.7	+22.6	75.0	78 45.8	+27.3	79.8	73
74	75 44.5	−6.0	47.2	76 24.1	−2.9	50.3	77 01.1	+0.6	53.6	77 35.1	+4.5	57.3	78 05.8	+8.6	61.3	78 32.7	+13.1	65.6	78 55.3	+17.8	70.2	79 13.1	+22.8	75.2	74
75	75 38.5	−10.0	43.2	76 21.2	−7.1	46.0	77 01.7	−3.9	49.2	77 39.6	−0.3	52.6	78 14.4	+3.7	56.4	78 45.8	+8.0	60.6	79 13.1	+12.7	65.2	79 35.9	+17.8	70.1	75
76	75 28.5	−13.9	39.3	76 14.1	−11.3	41.8	76 57.8	−8.4	44.7	77 39.3	−5.1	47.9	78 18.1	−1.4	51.5	78 53.8	+2.7	55.5	79 25.8	+7.3	59.9	79 53.7	+12.3	64.8	76
77	75 14.6	−17.6	35.4	76 02.8	−15.3	37.7	76 49.4	−12.7	40.3	77 34.2	−9.8	43.3	78 16.7	−6.5	46.6	78 56.5	−2.7	50.3	79 33.1	+1.7	54.5	80 06.0	+6.4	59.1	77
78	74 57.0	−21.0	31.7	75 47.5	−19.0	33.8	76 36.7	−16.8	36.1	77 24.4	−14.2	38.7	78 10.2	−11.3	41.7	78 53.8	−7.9	45.1	79 34.8	−4.1	49.0	80 12.4	+0.5	53.3	78
79	74 36.0	−24.3	28.1	75 28.5	−22.7	29.9	76 19.9	−20.7	32.0	77 10.2	−18.5	34.3	77 58.9	−15.9	37.0	78 45.9	−13.0	40.0	79 30.7	−9.6	43.4	80 12.9	−5.7	47.4	79
80	74 11.7	−27.4	24.7	75 05.8	−25.9	26.3	75 59.2	−24.3	28.1	76 51.7	−22.5	30.1	77 43.0	−20.4	32.4	78 32.9	−17.8	35.0	79 21.1	−14.9	38.1	80 07.2	−11.5	41.6	80
81	73 44.3	−30.1	21.5	74 39.9	−28.9	22.8	75 34.9	−27.6	24.3	76 29.2	−26.1	26.1	77 22.6	−24.3	28.0	78 15.1	−22.3	30.3	79 06.2	−19.9	32.9	79 55.7	−17.0	35.9	81
82	73 14.2	−32.6	18.5	74 11.0	−31.7	19.6	75 07.3	−30.6	20.8	76 03.1	−29.4	22.3	76 58.3	−28.0	23.9	77 52.8	−26.4	25.8	78 46.3	−24.5	28.0	79 38.7	−22.2	30.5	82
83	72 41.6	−34.9	15.6	73 39.3	−34.2	16.5	74 36.7	−33.4	17.5	75 33.7	−32.4	18.7	76 30.3	−31.3	20.0	77 26.4	−30.0	21.6	78 21.8	−28.5	23.4	79 16.5	−26.8	25.4	83
84	72 06.7	−37.0	12.9	73 05.1	−36.4	13.6	74 03.3	−35.8	14.5	75 01.3	−35.1	15.4	75 59.0	−34.3	16.4	76 56.4	−33.3	17.7	77 53.3	−32.2	19.1	78 49.7	−30.8	20.7	84
85	71 29.7	−38.9	10.4	72 28.7	−38.5	10.9	73 27.5	−38.0	11.6	74 26.2	−37.4	12.3	75 24.7	−36.8	13.1	76 23.1	−36.2	14.1	77 21.1	−35.3	15.1	78 18.9	−34.4	16.4	85
86	70 50.8	−40.5	8.0	71 50.2	−40.3	8.4	72 49.5	−39.9	8.9	73 48.8	−39.6	9.4	74 47.9	−39.2	10.1	75 46.9	−38.7	10.7	76 45.8	−38.2	11.5	77 44.5	−37.5	12.4	86
87	70 10.3	−42.1	5.8	71 09.9	−41.9	6.1	72 09.6	−41.7	6.4	73 09.2	−41.5	6.8	74 08.7	−41.2	7.2	75 08.2	−40.9	7.7	76 07.6	−40.5	8.2	77 07.0	−40.2	8.9	87
88	69 28.2	−43.5	3.7	70 28.0	−43.3	3.9	71 27.9	−43.3	4.1	72 27.7	−43.1	4.4	73 27.5	−42.9	4.6	74 27.3	−42.8	4.9	75 27.1	−42.6	5.2	76 26.8	−42.4	5.6	88
89	68 44.7	−44.7	1.8	69 44.7	−44.7	1.9	70 44.6	−44.6	2.0	71 44.6	−44.6	2.1	72 44.6	−44.6	2.2	73 44.5	−44.5	2.3	74 44.5	−44.5	2.5	75 44.4	−44.4	2.7	89
90	68 00.0	−45.8	0.0	69 00.0	−45.8	0.0	70 00.0	−45.9	0.0	71 00.0	−45.9	0.0	72 00.0	−45.9	0.0	73 00.0	−46.0	0.0	74 00.0	−46.0	0.0	75 00.0	−46.1	0.0	90

41°, 319° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 41°, 319°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	16 25.4	−58.1	136.8	15 41.5	−58.2	137.0	14 57.5	−58.3	137.2	14 13.4	−58.5	137.4	13 29.2	−58.7	137.6	12 44.9	−58.9	137.7	12 00.4	−59.0	137.9	11 15.9	−59.1	138.0	0
1	15 27.3	−58.0	137.1	14 43.3	−58.2	137.3	13 59.2	−58.4	137.5	13 14.9	−58.5	137.6	12 30.5	−58.7	137.8	11 46.0	−58.8	137.9	11 01.4	−58.9	138.1	10 16.8	−59.1	138.2	1
2	14 29.3	−58.0	137.4	13 45.1	−58.2	137.5	13 00.8	−58.4	137.7	12 16.4	−58.6	137.9	11 31.8	−58.7	138.0	10 47.2	−58.9	138.1	10 02.5	−59.0	138.3	9 17.7	−59.2	138.4	2
3	13 31.3	−58.1	137.6	12 46.9	−58.2	137.8	12 02.4	−58.4	137.9	11 17.8	−58.6	138.1	10 33.1	−58.7	138.2	9 48.3	−58.8	138.3	9 03.5	−59.0	138.4	8 18.5	−59.1	138.5	3
4	12 33.2	−58.1	137.9	11 48.7	−58.3	138.0	11 04.0	−58.4	138.2	10 19.2	−58.5	138.3	9 34.4	−58.7	138.4	8 49.5	−58.9	138.5	8 04.5	−59.0	138.6	7 19.4	−59.1	138.7	4
5	11 35.1	−58.0	138.2	10 50.4	−58.3	138.3	10 05.6	−58.5	138.4	9 20.7	−58.6	138.5	8 35.7	−58.8	138.6	7 50.6	−58.9	138.7	7 05.5	−59.0	138.8	6 20.3	−59.1	138.9	5
6	10 37.1	−58.1	138.4	9 52.1	−58.2	138.5	9 07.1	−58.4	138.6	8 22.1	−58.6	138.7	7 36.9	−58.7	138.8	6 51.7	−58.8	138.9	6 06.5	−59.0	139.0	5 21.2	−59.1	139.1	6
7	9 39.0	−58.2	138.7	8 53.9	−58.3	138.8	8 08.7	−58.4	138.9	7 23.5	−58.6	139.0	6 38.2	−58.7	139.0	5 52.9	−58.9	139.1	5 07.5	−59.0	139.2	4 22.1	−59.2	139.2	7
8	8 40.8	−58.1	138.9	7 55.6	−58.3	139.0	7 10.3	−58.5	139.1	6 24.9	−58.6	139.2	5 39.5	−58.8	139.2	4 54.0	−58.9	139.3	4 08.5	−59.0	139.4	3 22.9	−59.1	139.4	8
9	7 42.7	−58.1	139.2	6 57.3	−58.3	139.2	6 11.8	−58.4	139.3	5 26.3	−58.6	139.4	4 40.7	−58.7	139.4	3 55.1	−58.9	139.5	3 09.5	−59.0	139.5	2 23.8	−59.1	139.6	9
10	6 44.6	−58.1	139.4	5 59.0	−58.3	139.5	5 13.4	−58.5	139.5	4 27.7	−58.6	139.6	3 42.0	−58.8	139.7	2 56.2	−58.8	139.7	2 10.5	−59.0	139.7	1 24.7	−59.1	139.7	10
11	5 46.5	−58.2	139.7	5 00.7	−58.3	139.7	4 14.9	−58.5	139.8	3 29.1	−58.6	139.8	2 43.2	−58.7	139.9	1 57.4	−58.9	139.9	1 11.5	−59.0	139.9	0 25.6	−59.2	139.9	11
12	4 48.3	−58.1	139.9	4 02.4	−58.3	140.0	3 16.4	−58.4	140.0	2 30.5	−58.6	140.0	1 44.5	−58.8	140.1	0 58.5	−58.9	140.1	0 12.5	−59.1	140.1	0 33.6	+59.1	39.9	12
13	3 50.2	−58.2	140.2	3 04.1	−58.3	140.2	2 18.0	−58.5	140.2	1 31.9	−58.7	140.2	0 45.7	−58.7	140.3	0 00.4	+58.9	39.7	0 46.6	+59.0	39.7	1 32.7	+59.1	39.8	13
14	2 52.0	−58.1	140.4	2 05.8	−58.3	140.4	1 19.5	−58.5	140.5	0 33.2	−58.6	140.5	0 13.0	+58.8	39.5	0 59.3	+58.9	39.5	1 45.6	+59.0	39.6	2 31.8	+59.1	39.6	14
15	1 53.9	−58.2	140.7	1 07.5	−58.4	140.7	0 21.0	−58.4	140.7	0 25.4	+58.6	39.3	1 11.8	+58.7	39.3	1 58.2	+58.9	39.4	2 44.6	+59.0	39.4	3 30.9	+59.2	39.4	15
16	0 55.7	−58.2	140.9	0 09.1	−58.3	140.9	0 37.4	+58.5	39.1	1 24.0	+58.6	39.1	2 10.5	+58.8	39.1	2 57.1	+58.9	39.2	3 43.6	+59.0	39.2	4 30.1	+59.1	39.2	16
17	0 02.5	+58.1	38.9	0 49.2	+58.3	38.9	1 35.9	+58.5	38.9	2 22.6	+58.6	38.9	3 09.3	+58.7	38.9	3 56.0	+58.8	39.0	4 42.6	+59.0	39.0	5 29.2	+59.1	39.1	17
18	1 00.6	+58.2	38.6	1 47.5	+58.3	38.6	2 34.4	+58.4	38.7	3 21.2	+58.6	38.7	4 08.0	+58.8	38.7	4 54.8	+58.9	38.8	5 41.6	+59.0	38.8	6 28.3	+59.1	38.9	18
19	1 58.8	+58.1	38.4	2 45.8	+58.3	38.4	3 32.8	+58.5	38.4	4 19.8	+58.6	38.5	5 06.8	+58.7	38.5	5 53.7	+58.9	38.6	6 40.6	+59.0	38.6	7 27.4	+59.1	38.7	19
20	2 56.9	+58.2	38.1	3 44.1	+58.3	38.2	4 31.3	+58.5	38.2	5 18.4	+58.6	38.3	6 05.5	+58.8	38.3	6 52.6	+58.8	38.4	7 39.6	+59.0	38.5	8 26.5	+59.1	38.6	20
21	3 55.1	+58.1	37.9	4 42.4	+58.3	37.9	5 29.8	+58.4	38.0	6 17.0	+58.6	38.0	7 04.3	+58.7	38.1	7 51.4	+58.9	38.2	8 38.6	+59.0	38.3	9 25.6	+59.1	38.4	21
22	4 53.2	+58.2	37.6	5 40.7	+58.3	37.7	6 28.2	+58.5	37.7	7 15.6	+58.6	37.8	8 03.0	+58.7	37.9	8 50.3	+58.9	38.0	9 37.6	+58.9	38.1	10 24.7	+59.1	38.2	22
23	5 51.4	+58.1	37.4	6 39.0	+58.3	37.4	7 26.7	+58.4	37.5	8 14.2	+58.6	37.6	9 01.7	+58.7	37.7	9 49.2	+58.8	37.8	10 36.5	+59.0	37.9	11 23.8	+59.1	38.0	23
24	6 49.5	+58.1	37.1	7 37.3	+58.3	37.2	8 25.1	+58.4	37.3	9 12.8	+58.6	37.4	10 00.4	+58.8	37.5	10 48.0	+58.9	37.6	11 35.5	+59.0	37.7	12 22.9	+59.1	37.9	24
25	7 47.6	+58.2	36.9	8 35.6	+58.3	37.0	9 23.5	+58.4	37.1	10 11.4	+58.5	37.2	10 59.2	+58.7	37.3	11 46.9	+58.8	37.4	12 34.5	+58.9	37.5	13 22.0	+59.1	37.7	25
26	8 45.8	+58.1	36.6	9 33.9	+58.3	36.7	10 21.9	+58.5	36.8	11 09.9	+58.6	36.9	11 57.9	+58.6	37.1	12 45.7	+58.8	37.2	13 33.4	+59.0	37.3	14 21.1	+59.1	37.5	26
27	9 43.9	+58.1	36.4	10 32.2	+58.2	36.5	11 20.4	+58.4	36.6	12 08.5	+58.5	36.7	12 56.5	+58.7	36.9	13 44.5	+58.8	37.0	14 32.4	+58.9	37.1	15 20.2	+59.0	37.3	27
28	10 42.0	+58.1	36.1	11 30.4	+58.2	36.2	12 18.8	+58.4	36.4	13 07.0	+58.6	36.5	13 55.2	+58.7	36.6	14 43.3	+58.8	36.8	15 31.3	+59.0	37.0	16 19.2	+59.1	37.1	28
29	11 40.1	+58.0	35.9	12 28.6	+58.3	36.0	13 17.2	+58.3	36.1	14 05.6	+58.5	36.3	14 53.9	+58.7	36.4	15 42.1	+58.8	36.6	16 30.3	+58.9	36.8	17 18.3	+59.0	36.9	29
30	12 38.1	+58.1	35.6	13 26.9	+58.2	35.7	14 15.5	+58.4	35.9	15 04.1	+58.5	36.0	15 52.6	+58.6	36.2	16 40.9	+58.8	36.4	17 29.2	+58.9	36.6	18 17.3	+59.0	36.8	30
31	13 36.2	+58.0	35.4	14 25.1	+58.2	35.5	15 13.9	+58.3	35.6	16 02.6	+58.5	35.8	16 51.2	+58.6	36.0	17 39.7	+58.8	36.2	18 28.1	+58.9	36.4	19 16.3	+59.0	36.6	31
32	14 34.2	+58.1	35.1	15 23.3	+58.2	35.2	16 12.2	+58.4	35.4	17 01.1	+58.5	35.6	17 49.8	+58.6	35.8	18 38.5	+58.7	36.0	19 27.0	+58.8	36.2	20 15.3	+59.0	36.4	32
33	15 32.3	+58.0	34.8	16 21.5	+58.1	35.0	17 10.6	+58.3	35.2	17 59.6	+58.4	35.3	18 48.4	+58.6	35.5	19 37.2	+58.7	35.7	20 25.8	+58.9	36.0	21 14.3	+59.0	36.2	33
34	16 30.3	+58.0	34.6	17 19.6	+58.2	34.7	18 08.9	+58.3	34.9	18 58.0	+58.5	35.1	19 47.0	+58.6	35.3	20 35.9	+58.8	35.5	21 24.7	+58.9	35.7	22 13.3	+59.0	36.0	34
35	17 28.3	+57.9	34.3	18 17.8	+58.1	34.5	19 07.2	+58.2	34.7	19 56.5	+58.4	34.9	20 45.6	+58.6	35.1	21 34.7	+58.7	35.3	22 23.6	+58.8	35.5	23 12.3	+59.0	35.8	35
36	18 26.2	+58.0	34.0	19 15.9	+58.1	34.2	20 05.4	+58.3	34.4	20 54.9	+58.4	34.6	21 44.2	+58.5	34.8	22 33.4	+58.6	35.1	23 22.4	+58.8	35.3	24 11.3	+58.9	35.6	36
37	19 24.2	+57.9	33.7	20 14.0	+58.1	33.9	21 03.7	+58.2	34.2	21 53.3	+58.4	34.4	22 42.7	+58.6	34.6	23 32.0	+58.7	34.9	24 21.2	+58.8	35.1	25 10.2	+58.9	35.4	37
38	20 22.1	+57.9	33.5	21 12.1	+58.0	33.7	22 01.9	+58.2	33.9	22 51.7	+58.3	34.1	23 41.3	+58.5	34.4	24 30.7	+58.6	34.6	25 20.0	+58.8	34.9	26 09.1	+58.9	35.2	38
39	21 20.0	+57.8	33.2	22 10.1	+58.0	33.4	23 00.1	+58.2	33.6	23 50.0	+58.3	33.9	24 39.8	+58.4	34.1	25 29.3	+58.7	34.4	26 18.8	+58.7	34.7	27 08.0	+58.9	35.0	39
40	22 17.8	+57.8	32.9	23 08.1	+58.0	33.1	23 58.3	+58.2	33.4	24 48.3	+58.3	33.6	25 38.2	+58.5	33.9	26 28.0	+58.6	34.2	27 17.5	+58.8	34.4	28 06.9	+58.9	34.7	40
41	23 15.6	+57.8	32.6	24 06.1	+58.0	32.8	24 56.5	+58.1	33.1	25 46.6	+58.3	33.4	26 36.7	+58.4	33.6	27 26.6	+58.5	33.9	28 16.3	+58.7	34.2	29 05.8	+58.8	34.5	41
42	24 13.4	+57.8	32.3	25 04.1	+57.9	32.6	25 54.6	+58.1	32.8	26 44.9	+58.3	33.1	27 35.1	+58.4	33.4	28 25.1	+58.6	33.7	29 15.0	+58.7	34.0	30 04.6	+58.9	34.3	42
43	25 11.2	+57.7	32.0	26 02.0	+57.9	32.3	26 52.7	+58.0	32.5	27 43.2	+58.2	32.8	28 33.5	+58.4	33.1	29 23.7	+58.5	33.4	30 13.7	+58.6	33.7	31 03.5	+58.8	34.1	43
44	26 08.9	+57.7	31.7	26 59.9	+57.9	32.0	27 50.7	+58.0	32.3	28 41.4	+58.2	32.5	29 31.9	+58.3	32.8	30 22.2	+58.5	33.2	31 12.3	+58.7	33.5	32 02.3	+58.7	33.8	44
45	27 06.6	+57.7	31.4	27 57.8	+57.8	31.7	28 48.7	+58.0	32.0	29 39.6	+58.1	32.3	30 30.2	+58.3	32.6	31 20.7	+58.4	32.9	32 11.0	+58.5	33.2	33 01.0	+58.8	33.6	45
46	28 04.3	+57.6	31.1	28 55.6	+57.7	31.4	29 46.7	+58.0	31.7	30 37.7	+58.1	32.0	31 28.5	+58.3	32.3	32 19.1	+58.4	32.6	33 09.5	+58.6	33.0	33 09.8	+58.7	33.3	46
47	29 01.9	+57.5	30.8	29 53.3	+57.8	31.1	30 44.7	+57.9	31.4	31 35.8	+58.1	31.7	32 26.8	+58.2	32.0	33 17.5	+58.4	32.4	34 08.1	+58.6	32.7	34 58.5	+58.7	33.1	47
48	29 59.4	+57.5	30.5	30 51.1	+57.7	30.8	31 42.6	+57.8	31.1	32 33.9	+58.0	31.4	33 25.0	+58.2	31.7	34 15.9	+58.4	32.1	35 06.7	+58.4	32.5	35 57.2	+58.6	32.8	48
49	30 56.9	+57.5	30.1	31 48.8	+57.6	30.4	32 40.4	+57.8	30.8	33 31.9	+57.9	31.1	34 23.2	+58.1	31.4	35 14.3	+58.3	31.8	36 05.1	+58.5	32.2	36 55.8	+58.6	32.6	49
50	31 54.4	+57.4	29.8	32 46.4	+57.6	30.1	33 38.2	+57.8	30.4	34 29.8	+58.0	30.8	35 21.3	+58.1	31.1	36 12.6	+58.2	31.5	37 03.6	+58.4	31.9	37 54.4	+58.6	32.3	50
51	32 51.8	+57.3	29.4	33 44.0	+57.5	29.8	34 36.0	+57.7	30.1	35 27.8	+57.8	30.5	36 19.4	+58.0	30.8	37 10.8	+58.2	31.2	38 02.0	+58.4	31.6	38 53.0	+58.5	32.0	51
52	33 49.1	+57.3	29.1	34 41.5	+57.5	29.4	35 33.7	+57.6	29.8	36 25.6	+57.9	30.1	37 17.4	+58.0	30.5	38 09.0	+58.2	30.9	39 00.4	+58.3	31.3	39 51.5	+58.5	31.7	52
53	34 46.4	+57.2	28.7	35 39.0	+57.4	29.1	36 31.3	+57.6	29.4	37 23.5	+57.7	29.8	38 15.4	+58.0	30.2	39 07.2	+58.1	30.6	39 58.7	+58.3	31.0	40 50.0	+58.5	31.5	53
54	35 43.6	+57.2	28.4	36 36.4	+57.3	28.7	37 28.9	+57.5	29.1	38 21.2	+57.7	29.5	39 13.4	+57.9	29.9	40 05.3	+58.1	30.3	40 57.0	+58.2	30.7	41 48.5	+58.4	31.2	54
55	36 40.8	+57.1	28.0	37 33.7	+57.3	28.3	38 26.4	+57.5	28.7	39 18.9	+57.7	29.1	40 11.3	+57.8	29.5	41 03.4	+58.0	29.9	41 55.2	+58.2	30.4	42 46.9	+58.3	30.8	55
56	37 37.9	+57.0	27.6	38 31.0	+57.1	28.0	39 23.9	+57.3	28.3	40 16.6	+57.5	28.7	41 09.1	+57.7	29.2	42 01.4	+57.9	29.6	42 53.4	+58.1	30.0	43 45.2	+58.3	30.5	56
57	38 34.9	+56.9	27.2	39 28.1	+57.2	27.6	40 21.2	+57.3	28.0	41 14.1	+57.5	28.4	42 06.8	+57.7	28.8	42 59.3	+57.9	29.2	43 51.5	+58.1	29.7	44 43.5	+58.2	30.2	57
58	39 31.8	+56.8	26.8	40 25.3	+57.0	27.2	41 18.5	+57.3	27.6	42 11.6	+57.4	28.0	43 04.5	+57.6	28.4	43 57.2	+57.7	28.9	44 49.6	+58.0	29.4	45 41.7	+58.2	29.9	58
59	40 28.6	+56.7	26.4	41 22.3	+56.9	26.8	42 15.8	+57.1	27.2	43 09.0	+57.4	27.6	44 02.1	+57.5	28.0	44 54.9	+57.8	28.5	45 47.6	+57.9	29.0	46 39.9	+58.1	29.5	59
60	41 25.3	+56.7	25.9	42 19.2	+56.8	26.3	43 12.9	+57.0	26.8	44 06.4	+57.2	27.2	44 59.6	+57.5	27.6	45 52.7	+57.6	28.1	46 45.5	+57.8	28.6	47 38.0	+58.0	29.1	60
61	42 22.0	+56.5	25.5	43 16.0	+56.8	25.9	44 09.9	+57.0	26.3	45 03.6	+57.1	26.8	45 57.1	+57.3	27.2	46 50.3	+57.6	27.7	47 43.3	+57.7	28.2	48 36.0	+58.0	28.7	61
62	43 18.5	+56.4	25.0	44 12.8	+56.6	25.4	45 06.9	+56.8	25.9	46 00.7	+57.1	26.3	46 54.4	+57.3	26.8	47 47.9	+57.4	27.3	48 41.0	+57.7	27.8	49 34.0	+57.9	28.4	62
63	44 14.9	+56.3	24.6	45 09.4	+56.5	25.0	46 03.7	+56.7	25.4	46 57.8	+56.9	25.9	47 51.7	+57.1	26.4	48 45.3	+57.4	26.9	49 38.7	+57.6	27.4	50 31.9	+57.7	27.9	63
64	45 11.2	+56.2	24.1	46 05.9	+56.4	24.5	47 00.4	+56.6	24.9	47 54.7	+56.8	25.4	48 48.8	+57.0	25.9	49 42.7	+57.2	26.4	50 36.3	+57.4	26.9	51 29.6	+57.7	27.5	64
65	46 07.4	+56.0	23.6	47 02.3	+56.2	24.0	47 57.0	+56.5	24.5	48 51.5	+56.7	24.9	49 45.8	+56.9	25.4	50 39.9	+57.1	25.9	51 33.7	+57.4	26.5	52 27.3	+57.6	27.1	65
66	47 03.4	+55.9	23.1	47 58.5	+56.1	23.5	48 53.5	+56.3	23.9	49 48.2	+56.6	24.4	50 42.7	+56.8	24.9	51 37.0	+57.0	25.5	52 31.1	+57.2	26.0	53 24.9	+57.4	26.6	66
67	47 59.3	+55.7	22.5	48 54.6	+56.0	23.0	49 49.8	+56.2	23.4	50 44.8	+56.4	23.9	51 39.5	+56.6	24.4	52 34.0	+56.9	24.9	53 28.3	+57.1	25.5	54 22.3	+57.4	26.1	67
68	48 55.0	+55.6	22.0	49 50.6	+55.8	22.4	50 46.0	+56.0	22.9	51 41.2	+56.2	23.4	52 36.1	+56.5	23.9	53 30.9	+56.7	24.4	54 25.4	+57.0	25.0	55 19.7	+57.1	25.6	68
69	49 50.6	+55.4	21.4	50 46.4	+55.6	21.8	51 42.0	+55.8	22.3	52 37.4	+56.1	22.8	53 32.6	+56.3	23.3	54 27.6	+56.6	23.9	55 22.4	+56.8	24.4	56 16.8	+57.1	25.1	69
70	50 46.0	+55.2	20.8	51 42.0	+55.4	21.2	52 37.8	+55.7	21.7	53 33.5	+55.9	22.2	54 28.9	+56.2	22.7	55 24.2	+56.3	23.3	56 19.2	+56.6	23.9	57 13.9	+56.9	24.5	70
71	51 41.2	+54.9	20.2	52 37.4	+55.2	20.6	53 33.5	+55.4	21.1	54 29.4	+55.7	21.6	55 25.1	+55.9	22.1	56 20.5	+56.2	22.7	57 15.8	+56.4	23.3	58 10.8	+56.7	23.9	71
72	52 36.1	+54.8	19.5	53 32.6	+55.0	19.9	54 28.9	+55.3	20.4	55 25.1	+55.4	20.9	56 21.0	+55.7	21.5	57 16.7	+56.0	22.0	58 12.2	+56.3	22.6	59 07.5	+56.5	23.3	72
73	53 30.9	+54.5	18.8	54 27.6	+54.8	19.3	55 24.2	+55.0	19.7	56 20.5	+55.3	20.2	57 16.7	+55.5	20.8	58 12.7	+55.8	21.4	59 08.5	+56.0	22.0	60 04.0	+56.3	22.6	73
74	54 25.4	+54.3	18.1	55 22.4	+54.4	18.6	56 19.2	+54.7	19.0	57 15.8	+55.0	19.5	58 12.2	+55.3	20.1	59 08.5	+55.5	20.6	60 04.5	+55.8	21.3	61 00.3	+56.1	21.9	74
75	55 19.7	+53.9	17.4	56 16.8	+54.3	17.8	57 13.9	+54.5	18.3	58 10.8	+54.7	18.8	59 07.5	+55.0	19.3	60 04.0	+55.3	19.9	61 00.3	+55.6	20.5	61 56.4	+55.8	21.2	75
76	56 13.6	+53.7	16.6	57 11.1	+53.9	17.0	58 08.4	+54.1	17.5	59 05.5	+54.4	18.0	60 02.5	+54.7	18.5	60 59.3	+54.9	19.1	61 55.9	+55.2	19.7	62 52.2	+55.6	20.4	76
77	57 07.3	+53.3	15.8	58 05.0	+53.5	16.2	59 02.5	+53.8	16.7	59 59.9	+54.1	17.2	60 57.2	+54.3	17.7	61 54.2	+54.7	18.3	62 51.1	+54.9	18.9	63 47.8	+55.2	19.5	77
78	58 00.6	+53.0	14.9	58 58.5	+53.2	15.3	59 56.3	+53.5	15.8	60 54.0	+53.7	16.3	61 51.5	+54.0	16.8	62 48.9	+54.2	17.4	63 46.0	+54.6	18.0	64 43.0	+54.9	18.6	78
79	58 53.6	+52.6	14.0	59 51.7	+52.8	14.4	60 49.8	+53.0	14.9	61 47.7	+53.3	15.4	62 45.5	+53.6	15.9	63 43.1	+53.9	16.4	64 40.6	+54.2	17.0	65 37.9	+54.4	17.7	79
80	59 46.2	+52.1	13.1	60 44.5	+52.4	13.5	61 42.8	+52.7	13.9	62 41.0	+52.9	14.4	63 39.1	+53.1	14.9	64 37.0	+53.4	15.4	65 34.8	+53.7	16.0	66 32.3	+54.1	16.6	80
81	60 38.3	+51.7	12.1	61 36.9	+51.9	12.5	62 35.5	+52.1	12.9	63 33.9	+52.4	13.3	64 32.2	+52.7	13.8	65 30.4	+53.0	14.3	66 28.5	+53.2	14.9	67 26.4	+53.5	15.5	81
82	61 30.0	+51.1	11.0	62 28.8	+51.4	11.4	63 27.6	+51.6	11.8	64 26.3	+51.8	12.2	65 24.9	+52.1	12.7	66 23.4	+52.4	13.2	67 21.7	+52.7	13.7	68 19.9	+53.0	14.3	82
83	62 21.1	+50.6	9.9	63 20.2	+50.8	10.3	64 19.2	+51.0	10.6	65 18.1	+51.3	11.0	66 17.0	+51.5	11.5	67 15.8	+51.7	11.9	68 14.4	+52.0	12.5	69 12.9	+52.4	13.0	83
84	63 11.7	+50.0	8.7	64 11.0	+50.2	9.1	65 10.2	+50.4	9.4	66 09.4	+50.6	9.8	67 08.5	+50.8	10.2	68 07.5	+51.1	10.6	69 06.4	+51.4	11.1	70 05.3	+51.6	11.6	84
85	64 01.7	+49.3	7.5	65 01.2	+49.5	7.8	66 00.6	+49.7	8.1	67 00.0	+49.9	8.4	67 59.3	+50.1	8.8	68 58.6	+50.3	9.2	69 57.8	+50.5	9.6	70 56.9	+50.8	10.1	85
86	64 51.0	+48.6	6.2	65 50.7	+48.7	6.4	66 50.3	+48.9	6.7	67 49.9	+49.0	7.0	68 49.4	+49.2	7.3	69 48.9	+49.4	7.6	70 48.3	+49.7	8.0	71 47.7	+49.9	8.4	86
87	65 39.6	+47.7	4.8	66 39.4	+47.8	5.0	67 39.2	+47.9	5.2	68 38.9	+48.1	5.4	69 38.6	+48.3	5.7	70 38.3	+48.4	5.9	71 38.0	+48.6	6.3	72 37.6	+48.8	6.6	87
88	66 27.3	+46.9	3.3	67 27.2	+47.0	3.4	68 27.1	+47.0	3.6	69 27.0	+47.1	3.7	70 26.9	+47.2	3.9	71 26.7	+47.3	4.1	72 26.6	+47.4	4.4	73 26.4	+47.5	4.6	88
89	67 14.2	+45.8	1.7	68 14.2	+45.8	1.8	69 14.1	+45.9	1.9	70 14.1	+45.9	1.9	71 14.1	+45.9	2.0	72 14.0	+46.0	2.2	73 14.0	+46.0	2.3	74 13.9	+46.1	2.4	89
90	68 00.0	+44.7	0.0	69 00.0	+44.7	0.0	70 00.0	+44.6	0.0	71 00.0	+44.6	0.0	72 00.0	+44.6	0.0	73 00.0	+44.5	0.0	74 00.0	+44.5	0.0	75 00.0	+44.4	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 139°, 221°

42°, 318° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.....Zn=360°–Z

Dec. °	68° Hc ° ′	d ′	Z °	69° Hc ° ′	d ′	Z °	70° Hc ° ′	d ′	Z °	71° Hc ° ′	d ′	Z °	72° Hc ° ′	d ′	Z °	73° Hc ° ′	d ′	Z °	74° Hc ° ′	d ′	Z °	75° Hc ° ′	d ′	Z °	Dec. °
0	16 09.8	+57.9	135.8	15 26.7	+58.1	136.0	14 43.5	+58.3	136.2	14 00.1	+58.4	136.4	13 16.6	+58.6	136.6	12 32.9	+58.8	136.7	11 49.2	+58.9	136.9	11 05.4	+59.0	137.0	0
1	17 07.7	+57.9	135.6	16 24.8	+58.1	135.8	15 41.8	+58.2	136.0	14 58.5	+58.5	136.2	14 15.2	+58.6	136.3	13 31.7	+58.8	136.5	12 48.1	+58.9	136.7	12 04.4	+59.1	136.8	1
2	18 05.6	+57.9	135.3	17 22.9	+58.1	135.5	16 40.0	+58.3	135.7	15 57.0	+58.4	135.9	15 13.8	+58.6	136.1	14 30.5	+58.7	136.3	13 47.0	+58.9	136.5	13 03.5	+59.0	136.6	2
3	19 03.5	+57.8	135.0	18 21.0	+58.0	135.3	17 38.3	+58.2	135.5	16 55.4	+58.4	135.7	16 12.4	+58.6	135.9	15 29.2	+58.8	136.1	14 45.9	+58.9	136.3	14 02.5	+59.0	136.5	3
4	20 01.3	+57.8	134.7	19 19.0	+58.0	135.0	18 36.5	+58.2	135.2	17 53.8	+58.4	135.5	17 11.0	+58.6	135.7	16 28.0	+58.7	135.9	15 44.8	+58.9	136.1	15 01.5	+59.1	136.3	4
5	20 59.1	+57.8	134.4	20 17.0	+58.0	134.7	19 34.7	+58.2	135.0	18 52.2	+58.4	135.2	18 09.6	+58.5	135.5	17 26.7	+58.7	135.7	16 43.7	+58.9	135.9	16 00.6	+59.0	136.1	5
6	21 56.9	+57.8	134.2	21 15.0	+58.0	134.4	20 32.9	+58.2	134.7	19 50.6	+58.4	135.0	19 08.1	+58.6	135.2	18 25.4	+58.7	135.5	17 42.6	+58.8	135.7	16 59.6	+59.0	135.9	6
7	22 54.7	+57.7	133.9	22 13.0	+57.9	134.2	21 31.1	+58.1	134.4	20 49.0	+58.3	134.7	20 06.7	+58.5	135.0	19 24.1	+58.7	135.2	18 41.4	+58.9	135.5	17 58.6	+59.0	135.7	7
8	23 52.4	+57.7	133.6	23 10.9	+57.9	133.9	22 29.2	+58.1	134.2	21 47.3	+58.3	134.5	21 05.2	+58.5	134.8	20 22.8	+58.7	135.0	19 40.3	+58.8	135.3	18 57.6	+58.9	135.5	8
9	24 50.1	+57.6	133.3	24 08.8	+57.9	133.6	23 27.3	+58.1	133.9	22 45.6	+58.3	134.2	22 03.7	+58.4	134.5	21 21.5	+58.6	134.8	20 39.1	+58.8	135.1	19 56.5	+59.0	135.3	9
10	25 47.7	+57.6	133.0	25 06.7	+57.9	133.3	24 25.4	+58.1	133.6	23 43.9	+58.3	134.0	23 02.1	+58.5	134.3	22 20.1	+58.7	134.6	21 37.9	+58.8	134.9	20 55.5	+59.0	135.1	10
11	26 45.3	+57.6	132.6	26 04.6	+57.8	133.0	25 23.5	+58.0	133.4	24 42.2	+58.2	133.7	24 00.6	+58.4	134.0	23 18.8	+58.6	134.3	22 36.7	+58.8	134.6	21 54.5	+58.9	134.9	11
12	27 42.9	+57.5	132.3	27 02.4	+57.7	132.7	26 21.5	+58.0	133.1	25 40.4	+58.2	133.4	24 59.0	+58.4	133.8	24 17.4	+58.6	134.1	23 35.5	+58.8	134.4	22 53.4	+58.9	134.7	12
13	28 40.4	+57.5	132.0	28 00.1	+57.7	132.4	27 19.5	+58.0	132.8	26 38.6	+58.2	133.2	25 57.4	+58.4	133.5	25 16.0	+58.6	133.9	24 34.3	+58.7	134.2	23 52.3	+58.9	134.5	13
14	29 37.9	+57.4	131.7	28 57.8	+57.7	132.1	28 17.5	+57.9	132.5	27 36.8	+58.1	132.9	26 55.8	+58.4	133.3	26 14.6	+58.5	133.6	25 33.0	+58.7	134.0	24 51.2	+58.9	134.3	14
15	30 35.3	+57.4	131.3	29 55.5	+57.7	131.8	29 15.4	+57.9	132.2	28 34.9	+58.1	132.6	27 54.2	+58.3	133.0	27 13.1	+58.5	133.4	26 31.7	+58.7	133.7	25 50.1	+58.9	134.1	15
16	31 32.7	+57.3	131.0	30 53.2	+57.5	131.5	30 13.3	+57.8	131.9	29 33.0	+58.1	132.3	28 52.5	+58.3	132.7	28 11.6	+58.5	133.1	27 30.4	+58.7	133.5	26 49.0	+58.8	133.9	16
17	32 30.0	+57.3	130.6	31 50.7	+57.6	131.1	31 11.1	+57.8	131.6	30 31.1	+58.0	132.0	29 50.8	+58.2	132.5	29 10.1	+58.5	132.9	28 29.1	+58.7	133.3	27 47.8	+58.9	133.7	17
18	33 27.3	+57.2	130.3	32 48.3	+57.5	130.8	32 08.9	+57.7	131.3	31 29.1	+58.0	131.7	30 49.0	+58.2	132.2	30 08.6	+58.4	132.6	29 27.8	+58.6	133.0	28 46.7	+58.8	133.4	18
19	34 24.5	+57.1	129.9	33 45.8	+57.4	130.4	33 06.6	+57.7	130.9	32 27.1	+58.0	131.4	31 47.2	+58.2	131.9	31 07.0	+58.4	132.4	30 26.4	+58.6	132.8	29 45.5	+58.8	133.2	19
20	35 21.6	+57.1	129.6	34 43.2	+57.3	130.1	34 04.3	+57.7	130.6	33 25.1	+57.9	131.1	32 45.4	+58.2	131.6	32 05.4	+58.3	132.1	31 25.0	+58.6	132.5	30 44.3	+58.7	133.0	20
21	36 18.7	+57.0	129.2	35 40.5	+57.3	129.7	35 02.0	+57.5	130.3	34 23.0	+57.8	130.8	33 43.6	+58.0	131.3	33 03.7	+58.4	131.8	32 23.6	+58.5	132.3	31 43.0	+58.7	132.7	21
22	37 15.7	+56.9	128.8	36 37.8	+57.3	129.4	35 59.5	+57.6	129.9	35 20.8	+57.8	130.5	34 41.6	+58.1	131.0	34 02.1	+58.3	131.5	33 22.1	+58.5	132.0	32 41.7	+58.7	132.5	22
23	38 12.6	+56.8	128.4	37 35.1	+57.1	129.0	36 57.1	+57.4	129.6	36 18.6	+57.7	130.2	35 39.7	+58.0	130.7	35 00.4	+58.2	131.2	34 20.6	+58.5	131.8	33 40.4	+58.7	132.3	23
24	39 09.4	+56.7	128.0	38 32.2	+57.1	128.6	37 54.5	+57.4	129.2	37 16.3	+57.7	129.8	36 37.7	+57.9	130.4	35 58.6	+58.2	130.9	35 19.1	+58.4	131.5	34 39.1	+58.7	132.0	24
25	40 06.1	+56.7	127.5	39 29.3	+57.0	128.2	38 51.9	+57.3	128.8	38 14.0	+57.6	129.5	37 35.6	+57.9	130.1	36 56.8	+58.1	130.6	36 17.5	+58.4	131.2	35 37.8	+58.6	131.7	25
26	41 02.8	+56.5	127.1	40 26.3	+56.9	127.8	39 49.2	+57.2	128.5	39 11.6	+57.6	129.1	38 33.5	+57.9	129.7	37 54.9	+58.1	130.3	37 15.9	+58.3	130.9	36 36.4	+58.5	131.5	26
27	41 59.3	+56.4	126.7	41 23.2	+56.8	127.4	40 46.4	+57.2	128.1	40 09.2	+57.5	128.7	39 31.4	+57.7	129.4	38 53.0	+58.1	130.0	38 14.2	+58.3	130.6	37 34.9	+58.6	131.2	27
28	42 55.7	+56.3	126.2	42 20.0	+56.7	126.9	41 43.6	+57.1	127.7	41 06.7	+57.4	128.4	40 29.1	+57.7	129.0	39 51.1	+58.0	129.7	39 12.5	+58.3	130.3	38 33.5	+58.4	130.9	28
29	43 52.0	+56.2	125.7	43 16.7	+56.6	126.5	42 40.7	+56.9	127.2	42 04.1	+57.3	128.0	41 26.8	+57.7	128.7	40 49.1	+57.9	129.3	40 10.8	+58.2	130.0	39 31.9	+58.5	130.6	29
30	44 48.2	+56.1	125.2	44 13.3	+56.5	126.0	43 37.6	+56.9	126.8	43 01.4	+57.2	127.6	42 24.5	+57.5	128.3	41 47.0	+57.9	129.0	41 09.0	+58.1	129.7	40 30.4	+58.4	130.3	30
31	45 44.3	+55.9	124.7	45 09.8	+56.3	125.6	44 34.5	+56.8	126.4	43 58.6	+57.1	127.2	43 22.0	+57.5	127.9	42 44.9	+57.8	128.6	42 07.1	+58.1	129.4	41 28.8	+58.3	130.0	31
32	46 40.2	+55.8	124.2	46 06.1	+56.2	125.1	45 31.3	+56.6	125.9	44 55.7	+57.1	126.7	44 19.5	+57.4	127.5	43 42.7	+57.7	128.3	43 05.2	+58.0	129.0	42 27.1	+58.3	129.7	32
33	47 36.0	+55.6	123.7	47 02.3	+56.1	124.6	46 27.9	+56.6	125.4	45 52.8	+56.9	126.3	45 16.9	+57.3	127.1	44 40.4	+57.6	127.9	44 03.2	+58.0	128.7	43 25.4	+58.3	129.4	33
34	48 31.6	+55.5	123.1	47 58.4	+56.0	124.0	47 24.5	+56.4	124.9	46 49.7	+56.8	125.8	46 14.2	+57.2	126.7	45 38.0	+57.6	127.5	45 01.2	+57.9	128.3	44 23.7	+58.2	129.1	34
35	49 27.1	+55.2	122.5	48 54.4	+55.8	123.5	48 20.9	+56.2	124.4	47 46.5	+56.7	125.4	47 11.4	+57.1	126.2	46 35.6	+57.5	127.1	45 59.1	+57.8	127.9	45 21.9	+58.1	128.7	35
36	50 22.3	+55.1	121.9	49 50.2	+55.6	122.9	49 17.1	+56.1	123.9	48 43.2	+56.6	124.9	48 08.5	+57.0	125.8	47 33.1	+57.3	126.7	46 56.9	+57.7	127.5	46 20.0	+58.0	128.4	36
37	51 17.4	+54.9	121.3	50 45.8	+55.4	122.3	50 13.2	+56.0	123.4	49 39.8	+56.4	124.4	49 05.5	+56.9	125.3	48 30.4	+57.3	126.2	47 54.6	+57.6	127.1	47 18.0	+58.0	128.0	37
38	52 12.3	+54.6	120.6	51 41.2	+55.2	121.7	51 09.2	+55.7	122.8	50 36.2	+56.3	123.8	50 02.4	+56.7	124.8	49 27.7	+57.2	125.8	48 52.2	+57.6	126.7	48 16.0	+57.9	127.6	38
39	53 06.9	+54.4	120.0	52 36.4	+55.0	121.1	52 04.9	+55.6	122.2	51 32.5	+56.1	123.3	50 59.1	+56.6	124.3	50 24.9	+57.0	125.3	49 49.8	+57.4	126.3	49 13.9	+57.8	127.2	39
40	54 01.3	+54.1	119.2	53 31.4	+54.8	120.4	53 00.5	+55.4	121.6	52 28.6	+56.0	122.7	51 55.7	+56.5	123.8	51 21.9	+56.9	124.8	50 47.2	+57.4	125.8	50 11.7	+57.7	126.8	40
41	54 55.4	+53.9	118.5	54 26.2	+54.6	119.7	53 55.9	+55.2	120.9	53 24.6	+55.7	122.1	52 52.2	+56.3	123.2	52 18.8	+56.8	124.3	51 44.6	+57.2	125.4	51 09.4	+57.6	126.4	41
42	55 49.3	+53.5	117.7	55 20.8	+54.2	119.0	54 51.1	+54.9	120.3	54 20.3	+55.6	121.5	53 48.5	+56.1	122.6	53 15.6	+56.6	123.8	52 41.8	+57.1	124.9	52 07.0	+57.5	125.9	42
43	56 42.8	+53.2	116.9	56 15.0	+54.0	118.3	55 46.0	+54.7	119.6	55 15.9	+55.3	120.8	54 44.6	+55.9	122.0	54 12.2	+56.5	123.2	53 38.9	+56.9	124.4	53 04.5	+57.4	125.5	43
44	57 36.0	+52.9	116.1	57 09.0	+53.7	117.5	56 40.7	+54.4	118.8	56 11.2	+55.1	120.1	55 40.5	+55.7	121.4	55 08.7	+56.3	122.6	54 35.8	+56.8	123.8	54 01.9	+57.3	125.0	44
45	58 28.9	+52.4	115.2	58 02.7	+53.3	116.6	57 35.1	+54.1	118.0	57 06.3	+54.8	119.4	56 36.2	+55.5	120.7	56 05.0	+56.1	122.0	55 32.6	+56.7	123.3	54 59.2	+57.1	124.4	45
46	59 21.3	+52.0	114.2	58 56.0	+52.9	115.7	58 29.2	+53.8	117.2	58 01.1	+54.5	118.6	57 31.7	+55.2	120.0	57 01.1	+55.9	121.4	56 29.3	+56.4	122.7	55 56.3	+57.0	123.9	46
47	60 13.3	+51.6	113.2	59 48.9	+52.5	114.8	59 23.0	+53.4	116.4	58 55.6	+54.3	117.8	58 26.9	+55.0	119.3	57 57.0	+55.6	120.7	57 25.7	+56.3	122.0	56 53.3	+56.8	123.3	47
48	61 04.9	+51.0	112.2	60 41.4	+52.1	113.8	60 16.4	+53.0	115.5	59 49.9	+53.9	117.0	59 21.9	+54.7	118.5	58 52.6	+55.4	120.0	58 22.0	+56.0	121.4	57 50.1	+56.7	122.7	48
49	61 55.9	+50.5	111.1	61 33.5	+51.6	112.8	61 09.4	+52.6	114.5	60 43.8	+53.5	116.1	60 16.6	+54.4	117.7	59 48.0	+55.2	119.2	59 18.0	+55.9	120.7	58 46.8	+56.4	122.1	49
50	62 46.4	+49.9	109.9	62 25.1	+51.0	111.7	62 02.0	+52.2	113.5	61 37.3	+53.1	115.2	61 11.0	+54.0	116.8	60 43.2	+54.8	118.4	60 13.9	+55.6	120.0	59 43.2	+56.3	121.5	50
51	63 36.3	+49.2	108.7	63 16.1	+50.5	110.6	62 54.2	+51.6	112.4	62 30.4	+52.7	114.2	62 05.0	+53.6	115.9	61 38.0	+54.5	117.6	61 09.5	+55.3	119.2	60 39.5	+56.0	120.8	51
52	64 25.5	+48.5	107.4	64 06.6	+49.8	109.4	63 45.8	+51.0	111.3	63 23.1	+52.2	113.1	62 58.6	+53.2	114.9	62 32.5	+54.1	116.7	62 04.8	+54.9	118.4	61 35.5	+55.7	120.0	52
53	65 14.0	+47.6	106.0	64 56.4	+49.1	108.1	64 36.8	+50.4	110.1	64 15.3	+51.6	112.0	63 51.8	+52.8	113.9	63 26.6	+53.8	115.7	62 59.7	+54.7	117.5	62 31.2	+55.5	119.2	53
54	66 01.6	+46.8	104.5	65 45.5	+48.3	106.7	65 27.2	+49.7	108.8	65 06.9	+51.0	110.8	64 44.6	+52.2	112.8	64 20.4	+53.3	114.7	63 54.4	+54.3	116.6	63 26.7	+55.1	118.4	54
55	66 48.4	+45.8	103.0	66 33.8	+47.4	105.2	66 16.9	+49.0	107.4	65 57.9	+50.3	109.6	65 36.8	+51.6	111.6	65 13.7	+52.8	113.7	64 48.7	+53.8	115.6	64 21.8	+54.8	117.5	55
56	67 34.2	+44.6	101.3	67 21.2	+46.4	103.6	67 05.9	+48.1	106.0	66 48.2	+49.6	108.2	66 28.4	+51.0	110.4	66 06.5	+52.2	112.5	65 42.5	+53.4	114.6	65 16.6	+54.5	116.5	56
57	68 18.8	+43.5	99.5	68 07.6	+45.4	102.0	67 54.0	+47.1	104.4	67 37.8	+48.8	106.7	67 19.4	+50.3	109.0	66 58.7	+51.7	111.3	66 35.9	+52.9	113.4	66 11.1	+53.9	115.5	57
58	69 02.3	+42.1	97.6	68 53.0	+44.2	100.2	68 41.1	+46.0	102.7	68 26.6	+47.8	105.2	68 09.7	+49.4	107.6	67 50.4	+50.9	109.9	67 28.8	+52.3	112.2	67 05.0	+53.5	114.4	58
59	69 44.4	+40.6	95.6	69 37.2	+42.8	98.3	69 27.1	+44.9	100.9	69 14.4	+46.8	103.5	68 59.1	+48.6	106.0	68 41.3	+50.2	108.5	68 21.1	+51.6	110.9	67 58.5	+53.0	113.2	59
60	70 25.0	+39.0	93.4	70 20.0	+41.3	96.2	70 12.0	+43.6	99.0	70 01.2	+45.6	101.7	69 47.7	+47.5	104.4	69 31.5	+49.2	107.0	69 12.7	+50.9	109.5	68 51.5	+52.3	111.9	60
61	71 04.0	+37.2	91.1	71 01.3	+39.7	94.0	70 55.6	+42.0	96.9	70 46.8	+44.3	99.8	70 35.2	+46.4	102.6	70 20.7	+48.3	105.3	70 03.6	+50.0	108.0	69 43.8	+51.6	110.6	61
62	71 41.2	+35.1	88.7	71 41.0	+37.8	91.7	71 37.6	+40.4	94.7	71 31.1	+42.9	97.7	71 21.6	+45.1	100.6	71 09.0	+47.2	103.5	70 53.6	+49.1	106.3	70 35.4	+50.7	109.1	62
63	72 16.3	+32.9	86.1	72 18.8	+35.8	89.2	72 18.0	+38.6	92.3	72 14.0	+41.1	95.4	72 06.7	+43.6	98.5	71 56.2	+45.9	101.6	71 42.7	+47.9	104.5	71 26.1	+49.9	107.4	63
64	72 49.2	+30.5	83.3	72 54.6	+33.5	86.5	72 56.6	+36.4	89.8	72 55.1	+39.3	93.0	72 50.3	+41.9	96.2	72 42.1	+44.4	99.4	72 30.6	+46.7	102.6	72 16.0	+48.8	105.6	64
65	73 19.7	+27.8	80.3	73 28.1	+31.0	83.6	73 33.0	+34.1	87.0	73 34.4	+37.1	90.4	73 32.2	+40.1	93.8	73 26.5	+42.8	97.1	73 17.3	+45.3	100.4	73 04.8	+47.6	103.7	65
66	73 47.5	+24.9	77.2	73 59.1	+28.3	80.6	74 07.1	+31.6	84.0	74 11.5	+34.8	87.6	74 12.3	+37.9	91.1	74 09.3	+40.8	94.6	74 02.6	+43.6	98.1	73 52.4	+46.2	101.5	66
67	74 12.4	+21.8	73.9	74 27.4	+25.2	77.3	74 38.7	+28.7	80.9	74 46.3	+32.2	84.5	74 50.2	+35.5	88.2	74 50.1	+38.7	91.9	74 46.2	+41.8	95.5	74 38.6	+44.5	99.2	67
68	74 34.2	+18.4	70.4	74 52.6	+22.0	73.9	75 07.4	+25.6	77.5	75 18.5	+29.2	81.2	75 25.7	+32.7	85.0	75 28.8	+36.3	88.9	75 28.0	+39.5	92.7	75 23.1	+42.6	96.6	68
69	74 52.6	+14.8	66.8	75 14.6	+18.4	70.3	75 33.0	+22.2	73.9	75 47.7	+25.9	77.7	75 58.4	+29.7	81.6	76 05.1	+33.4	85.6	76 07.5	+37.1	89.7	76 05.7	+40.5	93.7	69
70	75 07.4	+11.1	63.1	75 33.0	+14.7	66.5	75 55.2	+18.4	70.2	76 13.6	+22.4	74.0	76 28.1	+26.4	78.0	76 38.5	+30.3	82.1	76 44.6	+34.1	86.3	76 46.2	+37.9	90.6	70
71	75 18.5	+7.2	59.2	75 47.7	+10.7	62.6	76 13.6	+14.5	66.2	76 36.0	+18.5	70.1	76 54.5	+22.5	74.1	77 08.8	+26.7	78.3	77 18.7	+30.9	82.7	77 24.1	+34.9	87.1	71
72	75 25.7	+3.1	55.3	75 58.4	+6.7	58.6	76 28.1	+10.4	62.1	76 54.5	+14.3	65.9	77 17.0	+18.5	69.9	77 35.5	+22.8	74.2	77 49.6	+27.1	78.7	77 59.0	+31.5	83.3	72
73	75 28.8	−0.8	51.3	76 05.1	+2.4	54.4	76 38.5	+6.1	57.9	77 08.8	+9.9	61.6	77 35.5	+14.1	65.6	77 58.3	+18.4	69.8	78 16.7	+23.0	74.4	78 30.5	+27.6	79.1	73
74	75 28.0	−4.9	47.3	76 07.5	−1.8	50.3	76 44.6	+1.6	53.5	77 18.7	+5.4	57.1	77 49.6	+9.4	61.0	78 16.7	+13.8	65.2	78 39.7	+18.4	69.7	78 58.1	+23.3	74.6	74
75	75 23.1	−8.8	43.3	76 05.7	−6.0	46.1	76 46.2	−2.8	49.2	77 24.1	+0.6	52.6	77 59.0	+4.6	56.3	78 30.5	+8.8	60.4	78 58.1	+13.5	64.8	79 21.4	+18.3	69.7	75
76	75 14.3	−12.7	39.4	75 59.7	−10.1	42.0	76 43.4	−7.3	44.8	77 24.7	−3.9	48.0	78 03.6	−0.4	51.5	78 39.3	+3.7	55.4	79 11.6	+8.1	59.7	79 39.7	+13.0	64.4	76
77	75 01.6	−16.4	35.6	75 49.6	−14.1	37.9	76 36.1	−11.5	40.5	77 20.8	−8.6	43.4	78 03.2	−5.3	46.6	78 43.0	−1.6	50.3	79 19.7	+2.6	54.4	79 52.7	+7.3	58.9	77
78	74 45.2	−19.9	31.9	75 35.5	−17.8	34.0	76 24.6	−15.6	36.3	77 12.2	−13.1	38.9	77 57.9	−10.1	41.9	78 41.4	−6.8	45.2	79 22.3	−3.0	49.0	80 00.0	+1.4	53.2	78
79	74 25.3	−23.1	28.4	75 17.7	−21.4	30.2	76 09.0	−19.5	32.2	76 59.1	−17.3	34.5	77 47.8	−14.8	37.2	78 34.6	−11.8	40.1	79 19.3	−8.4	43.6	80 01.4	−4.5	47.5	79
80	74 02.2	−26.2	25.0	74 56.3	−24.8	26.6	75 49.5	−23.1	28.3	76 41.8	−21.2	30.3	77 33.0	−19.1	32.6	78 22.8	−16.6	35.2	79 10.9	−13.7	38.2	79 56.9	−10.3	41.7	80
81	73 36.0	−28.9	21.8	74 31.5	−27.8	23.1	75 26.4	−26.5	24.6	76 20.6	−24.9	26.3	77 13.9	−23.2	28.3	78 06.2	−21.1	30.5	78 57.2	−18.7	33.1	79 46.6	−15.9	36.1	81
82	73 07.1	−31.6	18.7	74 03.7	−30.6	19.8	74 59.9	−29.5	21.1	75 55.7	−28.3	22.5	76 50.7	−26.8	24.2	77 45.1	−25.2	26.0	78 38.5	−23.3	28.2	79 30.7	−20.9	30.8	82
83	72 35.5	−33.9	15.8	73 33.1	−33.1	16.7	74 30.4	−32.3	17.8	75 27.4	−31.3	18.9	76 23.9	−30.2	20.3	77 19.9	−28.9	21.8	78 15.2	−27.3	23.6	79 09.8	−25.6	25.7	83
84	72 01.6	−36.0	13.1	73 00.0	−35.4	13.8	73 58.1	−34.7	14.7	74 56.1	−34.1	15.6	75 53.7	−33.2	16.7	76 51.0	−32.2	17.9	77 47.9	−31.1	19.3	78 44.2	−29.7	21.0	84
85	71 25.6	−37.9	10.6	72 24.6	−37.6	11.1	73 23.4	−37.1	11.8	74 22.0	−36.5	12.5	75 20.5	−35.9	13.3	76 18.8	−35.2	14.3	77 16.8	−34.4	15.4	78 14.5	−33.4	16.6	85
86	70 47.7	−39.7	8.2	71 47.0	−39.4	8.6	72 46.3	−39.0	9.1	73 45.5	−38.7	9.6	74 44.6	−38.2	10.2	75 43.6	−37.7	10.9	76 42.4	−37.1	11.7	77 41.1	−36.5	12.6	86
87	70 08.0	−41.3	5.9	71 07.6	−41.0	6.2	72 07.3	−40.9	6.5	73 06.8	−40.6	6.9	74 06.4	−40.4	7.3	75 05.9	−40.1	7.8	76 05.3	−39.7	8.4	77 04.6	−39.3	9.0	87
88	69 26.7	−42.7	3.8	70 26.6	−42.6	4.0	71 26.4	−42.5	4.2	72 26.2	−42.3	4.4	73 26.0	−42.2	4.7	74 25.8	−42.0	5.0	75 25.6	−41.9	5.3	76 25.3	−41.6	5.7	88
89	68 44.0	−44.0	1.8	69 44.0	−44.0	1.9	70 43.9	−43.9	2.0	71 43.9	−43.9	2.1	72 43.8	−43.8	2.3	73 43.8	−43.8	2.4	74 43.7	−43.7	2.5	75 43.7	−43.7	2.7	89
90	68 00.0	−45.1	0.0	69 00.0	−45.2	0.0	70 00.0	−45.2	0.0	71 00.0	−45.2	0.0	72 00.0	−45.3	0.0	73 00.0	−45.3	0.0	74 00.0	−45.4	0.0	75 00.0	−45.4	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

42°, 318° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 42°, 318°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	16 09.8	−57.9	135.8	15 26.7	−58.1	136.0	14 43.5	−58.3	136.2	14 00.1	−58.5	136.4	13 16.6	−58.7	136.6	12 32.9	−58.7	136.7	11 49.2	−58.9	136.9	11 05.4	−59.1	137.0	0
1	15 11.9	−57.9	136.1	14 28.6	−58.1	136.3	13 45.2	−58.4	136.5	13 01.6	−58.5	136.6	12 17.9	−58.6	136.8	11 34.2	−58.8	136.9	10 50.3	−59.0	137.1	10 06.3	−59.1	137.2	1
2	14 14.0	−58.0	136.4	13 30.5	−58.2	136.5	12 46.8	−58.3	136.7	12 03.1	−58.5	136.9	11 19.3	−58.7	137.0	10 35.4	−58.8	137.1	9 51.3	−58.9	137.3	9 07.2	−59.0	137.4	2
3	13 16.0	−58.0	136.6	12 32.3	−58.2	136.8	11 48.5	−58.3	136.9	11 04.6	−58.5	137.1	10 20.6	−58.6	137.2	9 36.6	−58.9	137.3	8 52.4	−59.0	137.4	8 08.2	−59.1	137.5	3
4	12 18.0	−58.0	136.9	11 34.1	−58.1	137.1	10 50.2	−58.4	137.2	10 06.1	−58.5	137.3	9 22.0	−58.7	137.4	8 37.7	−58.8	137.5	7 53.4	−58.9	137.6	7 09.1	−59.1	137.7	4
5	11 20.0	−58.0	137.2	10 36.0	−58.2	137.3	9 51.8	−58.3	137.4	9 07.6	−58.5	137.5	8 23.3	−58.7	137.6	7 38.9	−58.8	137.7	6 54.5	−59.0	137.8	6 10.0	−59.1	137.9	5
6	10 22.0	−58.0	137.4	9 37.8	−58.2	137.5	8 53.5	−58.4	137.7	8 09.1	−58.6	137.8	7 24.6	−58.7	137.9	6 40.1	−58.8	137.9	5 55.5	−58.9	138.0	5 10.9	−59.1	138.1	6
7	9 24.0	−58.1	137.7	8 39.6	−58.3	137.8	7 55.1	−58.4	137.9	7 10.5	−58.5	138.0	6 25.9	−58.7	138.1	5 41.3	−58.9	138.1	4 56.6	−59.0	138.2	4 11.8	−59.1	138.2	7
8	8 25.9	−58.0	137.9	7 41.3	−58.2	138.0	6 56.7	−58.4	138.1	6 12.0	−58.5	138.2	5 27.2	−58.6	138.3	4 42.4	−58.8	138.3	3 57.6	−59.0	138.4	3 12.7	−59.0	138.4	8
9	7 27.9	−58.1	138.2	6 43.1	−58.2	138.3	5 58.3	−58.4	138.4	5 13.5	−58.6	138.4	4 28.6	−58.7	138.5	3 43.6	−58.8	138.5	2 58.6	−58.9	138.6	2 13.7	−59.1	138.6	9
10	6 29.8	−58.0	138.5	5 44.9	−58.2	138.5	4 59.9	−58.4	138.6	4 14.9	−58.5	138.6	3 29.9	−58.7	138.7	2 44.8	−58.9	138.7	1 59.7	−59.0	138.7	1 14.6	−59.1	138.8	10
11	5 31.8	−58.1	138.7	4 46.7	−58.3	138.8	4 01.5	−58.4	138.8	3 16.4	−58.6	138.9	2 31.2	−58.7	138.9	1 45.9	−58.8	138.9	1 00.7	−59.0	138.9	0 15.5	−59.1	138.9	11
12	4 33.7	−58.1	139.0	3 48.4	−58.2	139.0	3 03.1	−58.4	139.0	2 17.8	−58.6	139.1	1 32.5	−58.7	139.1	0 47.1	−58.8	139.1	0 01.7	−58.9	139.1	0 43.6	+59.1	40.9	12
13	3 35.6	−58.1	139.2	2 50.2	−58.3	139.2	2 04.7	−58.4	139.3	1 19.2	−58.5	139.3	0 33.8	−58.8	139.3	0 11.7	+58.9	40.7	0 57.2	+59.0	40.7	1 42.7	+59.1	40.7	13
14	2 37.5	−58.0	139.5	1 51.9	−58.2	139.5	1 06.3	−58.4	139.5	0 20.7	−58.6	139.5	0 25.0	+58.7	40.5	1 10.6	+58.8	40.5	1 56.2	+59.0	40.5	2 41.8	+59.1	40.5	14
15	1 39.5	−58.1	139.7	0 53.7	−58.3	139.7	0 07.9	−58.4	139.7	0 37.9	+58.5	40.3	1 23.7	+58.7	40.3	2 09.4	+58.9	40.3	2 55.2	+58.9	40.3	3 40.9	+59.1	40.4	15
16	0 41.4	−58.1	140.0	0 04.6	+58.2	40.0	0 50.5	+58.4	40.0	1 36.4	+58.6	40.1	2 22.4	+58.7	40.1	3 08.3	+58.8	40.1	3 54.1	+59.0	40.1	4 40.0	+59.1	40.2	16
17	0 16.7	+58.1	39.8	1 02.8	+58.3	39.8	1 48.9	+58.4	39.8	2 35.0	+58.5	39.8	3 21.1	+58.7	39.9	4 07.1	+58.8	39.9	4 53.1	+59.0	40.0	5 39.1	+59.1	40.0	17
18	1 14.8	+58.1	39.5	2 01.1	+58.2	39.6	2 47.3	+58.4	39.6	3 33.5	+58.6	39.6	4 19.8	+58.6	39.7	5 05.9	+58.9	39.7	5 52.1	+58.9	39.8	6 38.2	+59.0	39.8	18
19	2 12.9	+58.1	39.3	2 59.3	+58.2	39.3	3 45.7	+58.4	39.3	4 32.1	+58.5	39.4	5 18.4	+58.7	39.4	6 04.8	+58.8	39.5	6 51.0	+59.0	39.6	7 37.2	+59.1	39.7	19
20	3 11.0	+58.0	39.0	3 57.5	+58.3	39.1	4 44.1	+58.4	39.1	5 30.6	+58.6	39.2	6 17.1	+58.7	39.2	7 03.6	+58.8	39.3	7 50.0	+58.9	39.4	8 36.3	+59.1	39.5	20
21	4 09.0	+58.1	38.8	4 55.8	+58.2	38.8	5 42.5	+58.4	38.9	6 29.2	+58.5	39.0	7 15.8	+58.7	39.0	8 02.4	+58.8	39.1	8 48.9	+59.0	39.2	9 35.4	+59.0	39.3	21
22	5 07.1	+58.1	38.5	5 54.0	+58.2	38.6	6 40.9	+58.4	38.7	7 27.7	+58.6	38.7	8 14.5	+58.7	38.8	9 01.2	+58.8	38.9	9 47.9	+58.9	39.0	10 34.4	+59.1	39.1	22
23	6 05.2	+58.0	38.3	6 52.2	+58.3	38.3	7 39.3	+58.4	38.4	8 26.3	+58.5	38.5	9 13.2	+58.6	38.6	10 00.0	+58.8	38.7	10 46.8	+58.9	38.8	11 33.5	+59.1	39.0	23
24	7 03.2	+58.1	38.0	7 50.5	+58.2	38.1	8 37.7	+58.3	38.2	9 24.8	+58.5	38.3	10 11.8	+58.7	38.4	10 58.8	+58.8	38.5	11 45.7	+59.0	38.6	12 32.6	+59.0	38.8	24
25	8 01.3	+58.0	37.8	8 48.7	+58.2	37.9	9 36.0	+58.4	38.0	10 23.3	+58.5	38.1	11 10.5	+58.6	38.2	11 57.6	+58.8	38.3	12 44.7	+58.9	38.4	13 31.6	+59.0	38.6	25
26	8 59.3	+58.0	37.5	9 46.9	+58.2	37.6	10 34.4	+58.3	37.7	11 21.8	+58.5	37.8	12 09.1	+58.7	38.0	12 56.4	+58.8	38.1	13 43.6	+58.9	38.2	14 30.6	+59.1	38.4	26
27	9 57.3	+58.1	37.3	10 45.1	+58.2	37.4	11 32.7	+58.4	37.5	12 20.3	+58.5	37.6	13 07.8	+58.6	37.7	13 55.2	+58.7	37.9	14 42.5	+58.9	38.1	15 29.7	+59.0	38.2	27
28	10 55.4	+58.0	37.0	11 43.3	+58.1	37.1	12 31.1	+58.3	37.2	13 18.8	+58.4	37.4	14 06.4	+58.6	37.5	14 53.9	+58.8	37.7	15 41.4	+58.9	37.9	16 28.7	+59.0	38.0	28
29	11 53.4	+58.0	36.7	12 41.4	+58.2	36.9	13 29.4	+58.3	37.0	14 17.2	+58.5	37.2	15 05.0	+58.6	37.3	15 52.7	+58.7	37.5	16 40.3	+58.8	37.7	17 27.7	+59.0	37.8	29
30	12 51.4	+57.9	36.5	13 39.6	+58.1	36.6	14 27.7	+58.3	36.8	15 15.7	+58.4	36.9	16 03.6	+58.6	37.1	16 51.4	+58.8	37.3	17 39.1	+58.9	37.5	18 26.7	+59.0	37.7	30
31	13 49.3	+58.0	36.2	14 37.7	+58.1	36.4	15 26.0	+58.3	36.5	16 14.1	+58.5	36.7	17 02.2	+58.6	36.9	17 50.2	+58.7	37.1	18 38.0	+58.8	37.2	19 25.7	+58.9	37.5	31
32	14 47.3	+57.9	35.9	15 35.8	+58.1	36.1	16 24.3	+58.2	36.3	17 12.6	+58.4	36.4	18 00.8	+58.5	36.6	18 48.9	+58.7	36.8	19 36.8	+58.9	37.0	20 24.6	+59.0	37.3	32
33	15 45.2	+58.0	35.7	16 33.9	+58.1	35.8	17 22.5	+58.3	36.0	18 11.0	+58.4	36.2	18 59.3	+58.6	36.4	19 47.6	+58.6	36.6	20 35.7	+58.8	36.8	21 23.6	+59.0	37.1	33
34	16 43.2	+57.8	35.4	17 32.0	+58.1	35.6	18 20.8	+58.2	35.8	19 09.4	+58.4	36.0	19 57.9	+58.5	36.2	20 46.2	+58.7	36.4	21 34.5	+58.8	36.6	22 22.6	+58.9	36.9	34
35	17 41.0	+57.9	35.1	18 30.1	+58.0	35.3	19 19.0	+58.2	35.5	20 07.8	+58.3	35.7	20 56.4	+58.5	35.9	21 44.9	+58.7	36.2	22 33.3	+58.8	36.4	23 21.5	+58.9	36.7	35
36	18 38.9	+57.9	34.8	19 28.1	+58.0	35.0	20 17.2	+58.1	35.2	21 06.1	+58.3	35.5	21 54.9	+58.5	35.7	22 43.6	+58.6	35.9	23 32.1	+58.7	36.2	24 20.4	+58.9	36.5	36
37	19 36.8	+57.8	34.6	20 26.1	+58.0	34.8	21 15.3	+58.2	35.0	22 04.4	+58.3	35.2	22 53.4	+58.4	35.5	23 42.2	+58.6	35.7	24 30.8	+58.8	36.0	25 19.3	+58.9	36.2	37
38	20 34.6	+57.8	34.3	21 24.1	+58.0	34.5	22 13.5	+58.1	34.7	23 02.7	+58.3	35.0	23 51.8	+58.5	35.2	24 40.8	+58.6	35.5	25 29.6	+58.7	35.7	26 18.2	+58.8	36.0	38
39	21 32.4	+57.8	34.0	22 22.1	+57.9	34.2	23 11.6	+58.1	34.5	24 01.0	+58.3	34.7	24 50.3	+58.4	35.0	25 39.4	+58.5	35.2	26 28.3	+58.7	35.5	27 17.0	+58.9	35.8	39
40	22 30.2	+57.7	33.7	23 20.0	+57.9	33.9	24 09.7	+58.1	34.2	24 59.3	+58.2	34.4	25 48.7	+58.4	34.7	26 37.9	+58.6	35.0	27 27.0	+58.7	35.3	28 15.9	+58.8	35.6	40
41	23 27.9	+57.7	33.4	24 17.9	+57.9	33.6	25 07.8	+58.0	33.9	25 57.5	+58.2	34.2	26 47.1	+58.3	34.5	27 36.5	+58.5	34.7	28 25.7	+58.6	35.0	29 14.7	+58.8	35.4	41
42	24 25.6	+57.7	33.1	25 15.8	+57.8	33.4	26 05.8	+58.0	33.6	26 55.7	+58.2	33.9	27 45.4	+58.3	34.2	28 35.0	+58.4	34.5	29 24.3	+58.6	34.8	30 13.5	+58.8	35.1	42
43	25 23.3	+57.6	32.8	26 13.6	+57.8	33.1	27 03.8	+58.0	33.3	27 53.9	+58.1	33.6	28 43.7	+58.3	33.9	29 33.4	+58.5	34.2	30 22.9	+58.6	34.6	31 12.3	+58.7	34.9	43
44	26 20.9	+57.6	32.5	27 11.4	+57.8	32.8	28 01.8	+57.9	33.0	28 52.0	+58.1	33.3	29 42.0	+58.3	33.7	30 31.9	+58.4	34.0	31 21.5	+58.6	34.3	32 11.0	+58.7	34.7	44
45	27 18.5	+57.5	32.2	28 09.2	+57.7	32.5	28 59.7	+57.9	32.7	29 50.1	+58.1	33.1	30 40.3	+58.2	33.4	31 30.3	+58.4	33.7	32 20.1	+58.6	34.1	33 09.7	+58.7	34.4	45
46	28 16.0	+57.5	31.9	29 06.9	+57.7	32.1	29 57.6	+57.9	32.4	30 48.2	+58.0	32.8	31 38.5	+58.2	33.1	32 28.7	+58.3	33.4	33 18.7	+58.5	33.8	34 08.4	+58.7	34.2	46
47	29 13.5	+57.4	31.5	30 04.6	+57.6	31.8	30 55.5	+57.8	32.1	31 46.2	+57.9	32.5	32 36.7	+58.1	32.8	33 27.0	+58.3	33.2	34 17.2	+58.4	33.5	35 07.1	+58.6	33.9	47
48	30 10.9	+57.4	31.2	31 02.2	+57.6	31.5	31 53.3	+57.7	31.8	32 44.1	+58.0	32.2	33 34.8	+58.1	32.5	34 25.3	+58.3	32.9	35 15.6	+58.5	33.3	36 05.7	+58.6	33.6	48
49	31 08.3	+57.4	30.9	31 59.8	+57.5	31.2	32 51.0	+57.7	31.5	33 42.1	+57.9	31.8	34 32.9	+58.1	32.2	35 23.6	+58.2	32.6	36 14.1	+58.3	33.0	37 04.3	+58.5	33.4	49
50	32 05.7	+57.3	30.5	32 57.3	+57.5	30.8	33 48.7	+57.7	31.2	34 40.0	+57.8	31.5	35 31.0	+58.0	31.9	36 21.8	+58.2	32.3	37 12.4	+58.4	32.7	38 02.8	+58.5	33.1	50
51	33 03.0	+57.2	30.2	33 54.8	+57.4	30.5	34 46.4	+57.6	30.8	35 37.8	+57.8	31.2	36 29.0	+58.0	31.6	37 20.0	+58.1	32.0	38 10.8	+58.3	32.4	39 01.3	+58.5	32.8	51
52	34 00.2	+57.1	29.8	34 52.2	+57.3	30.1	35 44.0	+57.5	30.5	36 35.6	+57.7	30.9	37 27.0	+57.9	31.3	38 18.1	+58.1	31.7	39 09.1	+58.2	32.1	39 59.8	+58.4	32.5	52
53	34 57.3	+57.1	29.4	35 49.5	+57.3	29.8	36 41.5	+57.5	30.1	37 33.3	+57.6	30.5	38 24.9	+57.8	30.9	39 16.2	+58.0	31.3	40 07.3	+58.2	31.8	40 58.2	+58.4	32.2	53
54	35 54.4	+57.1	29.1	36 46.8	+57.2	29.4	37 39.0	+57.4	29.8	38 30.9	+57.6	30.2	39 22.7	+57.8	30.6	40 14.2	+58.0	31.0	41 05.5	+58.2	31.5	41 56.6	+58.3	31.9	54
55	36 51.5	+56.9	28.7	37 44.0	+57.1	29.0	38 36.4	+57.3	29.4	39 28.5	+57.6	29.8	40 20.5	+57.7	30.2	41 12.2	+57.9	30.7	42 03.7	+58.1	31.1	42 54.9	+58.3	31.6	55
56	37 48.4	+56.9	28.3	38 41.1	+57.1	28.6	39 33.7	+57.3	29.0	40 26.1	+57.4	29.4	41 18.2	+57.6	29.9	42 10.1	+57.9	30.3	43 01.8	+58.0	30.8	43 53.2	+58.2	31.3	56
57	38 45.3	+56.7	27.9	39 38.2	+57.0	28.2	40 31.0	+57.1	28.6	41 23.5	+57.4	29.1	42 15.8	+57.6	29.5	43 08.0	+57.7	30.0	43 59.8	+58.0	30.4	44 51.4	+58.2	30.9	57
58	39 42.0	+56.7	27.4	40 35.2	+56.9	27.8	41 28.1	+57.1	28.2	42 20.9	+57.3	28.7	43 13.4	+57.5	29.1	44 05.7	+57.7	29.6	44 57.8	+57.9	30.1	45 49.6	+58.0	30.6	58
59	40 38.7	+56.6	27.0	41 32.1	+56.8	27.4	42 25.2	+57.0	27.8	43 18.2	+57.2	28.3	44 10.9	+57.4	28.7	45 03.4	+57.6	29.2	45 55.7	+57.8	29.7	46 47.6	+58.1	30.2	59
60	41 35.3	+56.5	26.6	42 28.9	+56.6	27.0	43 22.2	+56.9	27.4	44 15.4	+57.1	27.8	45 08.3	+57.3	28.3	46 01.0	+57.6	28.8	46 53.5	+57.7	29.3	47 45.7	+57.9	29.8	60
61	42 31.8	+56.3	26.1	43 25.5	+56.6	26.5	44 19.1	+56.8	27.0	45 12.5	+57.0	27.4	46 05.6	+57.3	27.9	46 58.6	+57.4	28.4	47 51.2	+57.7	28.9	48 43.6	+57.8	29.5	61
62	43 28.1	+56.3	25.6	44 22.1	+56.5	26.1	45 15.9	+56.7	26.5	46 09.5	+56.9	27.0	47 02.9	+57.1	27.5	47 56.0	+57.3	28.0	48 48.9	+57.5	28.5	49 41.4	+57.8	29.1	62
63	44 24.4	+56.1	25.2	45 18.6	+56.3	25.6	46 12.6	+56.6	26.0	47 06.4	+56.8	26.5	48 00.0	+57.0	27.0	48 53.3	+57.2	27.5	49 46.4	+57.5	28.1	50 39.2	+57.7	28.6	63
64	45 20.5	+56.0	24.7	46 14.9	+56.2	25.1	47 09.2	+56.4	25.6	48 03.2	+56.6	26.0	48 57.0	+56.9	26.5	49 50.5	+57.2	27.1	50 43.9	+57.3	27.6	51 36.9	+57.5	28.2	64
65	46 16.5	+55.8	24.1	47 11.1	+56.1	24.6	48 05.6	+56.3	25.0	48 59.8	+56.6	25.5	49 53.9	+56.7	26.0	50 47.7	+57.0	26.6	51 41.2	+57.2	27.1	52 34.4	+57.5	27.7	65
66	47 12.3	+55.7	23.6	48 07.2	+55.9	24.1	49 01.9	+56.1	24.5	49 56.4	+56.4	25.0	50 50.6	+56.7	25.5	51 44.7	+56.8	26.1	52 38.4	+57.1	26.6	53 31.9	+57.3	27.3	66
67	48 08.0	+55.5	23.1	49 03.1	+55.8	23.5	49 58.0	+56.0	24.0	50 52.8	+56.2	24.5	51 47.3	+56.4	25.0	52 41.5	+56.7	25.6	53 35.5	+57.0	26.1	54 29.2	+57.2	26.7	67
68	49 03.5	+55.4	22.5	49 58.9	+55.6	22.9	50 54.0	+55.9	23.4	51 49.0	+56.1	23.9	52 43.7	+56.3	24.5	53 38.2	+56.6	25.0	54 32.5	+56.8	25.6	55 26.4	+57.1	26.2	68
69	49 58.9	+55.1	21.9	50 54.5	+55.4	22.4	51 49.9	+55.6	22.8	52 45.1	+55.8	23.3	53 40.0	+56.2	23.9	54 34.8	+56.4	24.4	55 29.3	+56.6	25.0	56 23.5	+56.9	25.7	69
70	50 54.0	+55.0	21.3	51 49.9	+55.2	21.7	52 45.5	+55.4	22.2	53 40.9	+55.7	22.7	54 36.2	+55.9	23.3	55 31.2	+56.2	23.8	56 25.9	+56.5	24.5	57 20.4	+56.7	25.1	70
71	51 49.0	+54.7	20.6	52 45.1	+54.9	21.1	53 40.9	+55.3	21.6	54 36.6	+55.5	22.1	55 32.1	+55.8	22.6	56 27.4	+56.0	23.2	57 22.4	+56.3	23.8	58 17.1	+56.6	24.5	71
72	52 43.7	+54.5	20.0	53 40.0	+54.8	20.4	54 36.2	+55.0	20.9	55 32.1	+55.3	21.4	56 27.9	+55.5	22.0	57 23.4	+55.8	22.6	58 18.7	+56.1	23.2	59 13.7	+56.4	23.8	72
73	53 38.2	+54.3	19.3	54 34.8	+54.5	19.7	55 31.2	+54.7	20.2	56 27.4	+55.0	20.7	57 23.4	+55.3	21.3	58 19.2	+55.6	21.9	59 14.8	+55.8	22.5	60 10.1	+56.1	23.2	73
74	54 32.5	+53.9	18.5	55 29.3	+54.2	19.0	56 25.9	+54.5	19.5	57 22.4	+54.7	20.0	58 18.7	+55.0	20.6	59 14.8	+55.3	21.1	60 10.6	+55.6	21.8	61 06.2	+55.9	22.4	74
75	55 26.4	+53.7	17.8	56 23.5	+53.9	18.2	57 20.4	+54.2	18.7	58 17.1	+54.5	19.2	59 13.7	+54.7	19.8	60 10.1	+55.0	20.4	61 06.2	+55.3	21.0	62 02.1	+55.6	21.7	75
76	56 20.1	+53.4	17.0	57 17.4	+53.6	17.4	58 14.6	+53.9	17.9	59 11.6	+54.1	18.4	60 08.4	+54.5	19.0	61 05.1	+54.7	19.6	62 01.5	+55.0	20.2	62 57.7	+55.3	20.9	76
77	57 13.5	+53.0	16.1	58 11.0	+53.3	16.6	59 08.5	+53.5	17.1	60 05.7	+53.8	17.6	61 02.9	+54.0	18.1	61 59.8	+54.4	18.7	62 56.5	+54.7	19.3	63 53.0	+55.0	20.0	77
78	58 06.5	+52.6	15.3	59 04.3	+52.9	15.7	60 02.0	+53.1	16.2	60 59.5	+53.4	16.7	61 56.9	+53.7	17.2	62 54.2	+53.9	17.8	63 51.2	+54.3	18.4	64 48.0	+54.6	19.1	78
79	58 59.1	+52.2	14.3	59 57.2	+52.4	14.8	60 55.1	+52.7	15.2	61 52.9	+53.0	15.7	62 50.6	+53.3	16.2	63 48.1	+53.6	16.8	64 45.5	+53.9	17.4	65 42.6	+54.2	18.1	79
80	59 51.3	+51.8	13.4	60 49.6	+52.0	13.8	61 47.8	+52.3	14.2	62 45.9	+52.6	14.7	63 43.9	+52.8	15.2	64 41.7	+53.1	15.8	65 39.4	+53.4	16.4	66 36.8	+53.8	17.0	80
81	60 43.1	+51.2	12.4	61 41.6	+51.5	12.8	62 40.1	+51.7	13.2	63 38.5	+52.0	13.6	64 36.7	+52.3	14.1	65 34.8	+52.6	14.7	66 32.8	+52.9	15.2	67 30.6	+53.2	15.9	81
82	61 34.3	+50.8	11.3	62 33.1	+51.0	11.7	63 31.8	+51.2	12.1	64 30.5	+51.4	12.5	65 29.0	+51.7	13.0	66 27.4	+52.0	13.5	67 25.7	+52.3	14.0	68 23.8	+52.7	14.7	82
83	62 25.1	+50.1	10.1	63 24.1	+50.3	10.5	64 23.0	+50.6	10.9	65 21.9	+50.9	11.3	66 20.7	+51.1	11.7	67 19.4	+51.4	12.2	68 18.0	+51.7	12.7	69 16.5	+51.9	13.3	83
84	63 15.2	+49.5	8.9	64 14.4	+49.7	9.3	65 13.6	+49.9	9.6	66 12.8	+50.1	10.0	67 11.8	+50.4	10.4	68 10.8	+50.6	10.8	69 09.7	+50.9	11.3	70 08.4	+51.3	11.9	84
85	64 04.7	+48.8	7.7	65 04.1	+49.0	8.0	66 03.5	+49.2	8.3	67 02.9	+49.4	8.6	68 02.2	+49.6	9.0	69 01.4	+49.8	9.4	70 00.6	+50.1	9.8	70 59.7	+50.3	10.3	85
86	64 53.5	+48.0	6.3	65 53.1	+48.2	6.6	66 52.7	+48.3	6.8	67 52.3	+48.5	7.1	68 51.8	+48.7	7.4	69 51.2	+48.9	7.8	70 50.7	+49.1	8.2	71 50.0	+49.4	8.6	86
87	65 41.5	+47.2	4.9	66 41.3	+47.2	5.1	67 41.0	+47.4	5.3	68 40.8	+47.5	5.5	69 40.5	+47.7	5.8	70 40.1	+47.9	6.1	71 39.8	+48.0	6.4	72 39.4	+48.2	6.7	87
88	66 28.7	+46.2	3.4	67 28.5	+46.3	3.5	68 28.4	+46.4	3.6	69 28.3	+46.5	3.8	70 28.2	+46.5	4.0	71 28.0	+46.7	4.2	72 27.8	+46.8	4.4	73 27.6	+47.0	4.7	88
89	67 14.9	+45.1	1.7	68 14.8	+45.2	1.8	69 14.8	+45.2	1.9	70 14.8	+45.2	2.0	71 14.7	+45.3	2.1	72 14.7	+45.3	2.2	73 14.6	+45.4	2.3	74 14.6	+45.4	2.5	89
90	68 00.0	+44.0	0.0	69 00.0	+44.0	0.0	70 00.0	+43.9	0.0	71 00.0	+43.9	0.0	72 00.0	+43.8	0.0	73 00.0	+43.8	0.0	74 00.0	+43.7	0.0	75 00.0	+43.7	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 138°, 222°

43°, 317° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.....Zn=360°–Z

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	15 54.0	+57.9	134.8	15 11.7	+58.0	135.0	14 29.1	+58.3	135.2	13 46.5	+58.4	135.4	13 03.7	+58.6	135.6	12 20.8	+58.7	135.7	11 37.8	+58.9	135.9	10 54.7	+59.0	136.0	0
1	16 51.9	+57.8	134.6	16 09.7	+58.0	134.8	15 27.4	+58.2	135.0	14 44.9	+58.4	135.2	14 02.3	+58.5	135.3	13 19.5	+58.8	135.5	12 36.7	+58.8	135.7	11 53.7	+59.0	135.8	1
2	17 49.7	+57.8	134.3	17 07.7	+58.0	134.5	16 25.6	+58.2	134.7	15 43.3	+58.4	134.9	15 00.8	+58.6	135.1	14 18.3	+58.7	135.3	13 35.5	+58.9	135.5	12 52.7	+59.0	135.6	2
3	18 47.5	+57.7	134.0	18 05.7	+58.0	134.2	17 23.8	+58.1	134.5	16 41.7	+58.3	134.7	15 59.4	+58.5	134.9	15 17.0	+58.7	135.1	14 34.4	+58.9	135.3	13 51.7	+59.0	135.5	3
4	19 45.2	+57.8	133.7	19 03.7	+57.9	134.0	18 21.9	+58.2	134.2	17 40.0	+58.3	134.4	16 57.9	+58.5	134.7	16 15.7	+58.6	134.9	15 33.3	+58.8	135.1	14 50.7	+59.0	135.3	4
5	20 43.0	+57.7	133.4	20 01.6	+57.9	133.7	19 20.1	+58.1	133.9	18 38.3	+58.4	134.2	17 56.4	+58.5	134.4	17 14.3	+58.7	134.7	16 32.1	+58.8	134.9	15 49.7	+59.0	135.1	5
6	21 40.7	+57.6	133.1	20 59.5	+57.9	133.4	20 18.2	+58.1	133.7	19 36.7	+58.3	133.9	18 54.9	+58.5	134.2	18 13.0	+58.7	134.4	17 30.9	+58.8	134.7	16 48.7	+58.9	134.9	6
7	22 38.3	+57.7	132.8	21 57.4	+57.9	133.1	21 16.3	+58.1	133.4	20 35.0	+58.2	133.7	19 53.4	+58.5	134.0	19 11.7	+58.6	134.2	18 29.7	+58.8	134.5	17 47.6	+59.0	134.7	7
8	23 36.0	+57.6	132.5	22 55.3	+57.8	132.8	22 14.4	+58.0	133.1	21 33.2	+58.3	133.4	20 51.9	+58.4	133.7	20 10.3	+58.6	134.0	19 28.5	+58.8	134.2	18 46.6	+58.9	134.5	8
9	24 33.6	+57.5	132.2	23 53.1	+57.8	132.5	23 12.4	+58.1	132.9	22 31.5	+58.2	133.2	21 50.3	+58.4	133.5	21 08.9	+58.6	133.8	20 27.3	+58.8	134.0	19 45.5	+59.0	134.3	9
10	25 31.1	+57.6	131.9	24 50.9	+57.8	132.3	24 10.5	+57.9	132.6	23 29.7	+58.2	132.9	22 48.7	+58.4	133.2	22 07.5	+58.6	133.5	21 26.1	+58.8	133.8	20 44.5	+58.9	134.1	10
11	26 28.7	+57.5	131.6	25 48.7	+57.7	132.0	25 08.4	+58.0	132.3	24 27.9	+58.2	132.6	23 47.1	+58.4	133.0	23 06.1	+58.6	133.3	22 24.9	+58.7	133.6	21 43.4	+58.9	133.9	11
12	27 26.2	+57.4	131.3	26 46.4	+57.7	131.7	26 06.4	+57.9	132.0	25 26.1	+58.1	132.4	24 45.5	+58.4	132.7	24 04.7	+58.5	133.1	23 23.6	+58.7	133.4	22 42.3	+58.9	133.7	12
13	28 23.6	+57.4	130.9	27 44.1	+57.7	131.3	27 04.3	+57.9	131.7	26 24.2	+58.2	132.1	25 43.9	+58.3	132.5	25 03.2	+58.5	132.8	24 22.3	+58.7	133.2	23 41.2	+58.8	133.5	13
14	29 21.0	+57.3	130.6	28 41.8	+57.6	131.0	28 02.2	+57.9	131.4	27 22.4	+58.0	131.8	26 42.2	+58.3	132.2	26 01.7	+58.5	132.6	25 21.0	+58.7	132.9	24 40.0	+58.9	133.3	14
15	30 18.3	+57.3	130.3	29 39.4	+57.5	130.7	29 00.1	+57.8	131.1	28 20.4	+58.1	131.5	27 40.5	+58.2	131.9	27 00.2	+58.5	132.3	26 19.7	+58.6	132.7	25 38.9	+58.8	133.0	15
16	31 15.6	+57.2	129.9	30 36.9	+57.5	130.4	29 57.9	+57.7	130.8	29 18.5	+58.0	131.3	28 38.7	+58.3	131.7	27 58.7	+58.4	132.1	27 18.3	+58.7	132.5	26 37.7	+58.8	132.8	16
17	32 12.8	+57.2	129.6	31 34.4	+57.5	130.0	30 55.6	+57.7	130.5	30 16.5	+57.9	131.0	29 37.0	+58.2	131.4	28 57.1	+58.4	131.8	28 17.0	+58.6	132.2	27 36.5	+58.8	132.6	17
18	33 10.0	+57.1	129.2	32 31.9	+57.4	129.7	31 53.3	+57.7	130.2	31 14.4	+58.0	130.7	30 35.2	+58.1	131.1	29 55.5	+58.4	131.5	29 15.6	+58.6	132.0	28 35.3	+58.8	132.4	18
19	34 07.1	+57.0	128.8	33 29.3	+57.3	129.4	32 51.0	+57.6	129.9	32 12.4	+57.8	130.4	31 33.3	+58.1	130.8	30 53.9	+58.4	131.3	30 14.2	+58.5	131.7	29 34.1	+58.7	132.2	19
20	35 04.1	+57.0	128.5	34 26.6	+57.3	129.0	33 48.6	+57.6	129.5	33 10.2	+57.9	130.0	32 31.4	+58.1	130.5	31 52.3	+58.3	131.0	31 12.7	+58.5	131.5	30 32.8	+58.7	131.9	20
21	36 01.1	+56.9	128.1	35 23.9	+57.2	128.6	34 46.2	+57.5	129.2	34 08.1	+57.7	129.7	33 29.5	+58.0	130.2	32 50.6	+58.2	130.7	32 11.2	+58.5	131.2	31 31.5	+58.7	131.7	21
22	36 58.0	+56.8	127.7	36 21.1	+57.1	128.3	35 43.7	+57.4	128.8	35 05.8	+57.8	129.4	34 27.5	+58.0	129.9	33 48.8	+58.3	130.4	33 09.7	+58.5	130.9	32 30.2	+58.7	131.4	22
23	37 54.8	+56.7	127.3	37 18.2	+57.1	127.9	36 41.1	+57.4	128.5	36 03.6	+57.6	129.1	35 25.5	+58.0	129.6	34 47.1	+58.1	130.1	34 08.2	+58.4	130.7	33 28.9	+58.6	131.2	23
24	38 51.5	+56.7	126.9	38 15.3	+57.0	127.5	37 38.5	+57.3	128.1	37 01.2	+57.6	128.7	36 23.5	+57.8	129.3	35 45.2	+58.2	129.8	35 06.6	+58.3	130.4	34 27.5	+58.6	130.9	24
25	39 48.2	+56.5	126.4	39 12.3	+56.8	127.1	38 35.8	+57.2	127.7	37 58.8	+57.6	128.4	37 21.3	+57.9	129.0	36 43.4	+58.1	129.5	36 04.9	+58.4	130.1	35 26.1	+58.5	130.7	25
26	40 44.7	+56.4	126.0	40 09.1	+56.8	126.7	39 33.0	+57.2	127.3	38 56.4	+57.4	128.0	38 19.2	+57.7	128.6	37 41.5	+58.0	129.2	37 03.3	+58.3	129.8	36 24.6	+58.5	130.4	26
27	41 41.1	+56.4	125.5	41 05.9	+56.8	126.3	40 30.2	+57.0	126.9	39 53.8	+57.4	127.6	39 16.9	+57.7	128.3	38 39.5	+58.0	128.9	38 01.6	+58.2	129.5	37 23.1	+58.5	130.1	27
28	42 37.5	+56.2	125.1	42 02.7	+56.6	125.8	41 27.2	+57.0	126.5	40 51.2	+57.3	127.2	40 14.6	+57.7	127.9	39 37.5	+57.9	128.6	38 59.8	+58.2	129.2	38 21.6	+58.5	129.8	28
29	43 33.7	+56.0	124.6	42 59.3	+56.5	125.4	42 24.2	+56.9	126.1	41 48.5	+57.3	126.8	41 12.3	+57.5	127.6	40 35.4	+57.9	128.2	39 58.0	+58.1	128.9	39 20.1	+58.4	129.5	29
30	44 29.7	+56.0	124.1	43 55.8	+56.3	124.9	43 21.1	+56.8	125.7	42 45.8	+57.1	126.4	42 09.8	+57.5	127.2	41 33.3	+57.8	127.9	40 56.1	+58.1	128.6	40 18.5	+58.3	129.2	30
31	45 25.7	+55.8	123.6	44 52.1	+56.3	124.4	44 17.9	+56.6	125.2	43 42.9	+57.1	126.0	43 07.3	+57.4	126.8	42 31.1	+57.7	127.5	41 54.2	+58.0	128.2	41 16.8	+58.3	128.9	31
32	46 21.5	+55.7	123.1	45 48.4	+56.1	123.9	45 14.5	+56.6	124.8	44 40.0	+56.9	125.6	44 04.7	+57.3	126.4	43 28.8	+57.6	127.1	42 52.2	+58.0	127.9	42 15.1	+58.2	128.6	32
33	47 17.2	+55.5	122.5	46 44.5	+56.0	123.4	46 11.1	+56.4	124.3	45 36.9	+56.9	125.1	45 02.0	+57.2	126.0	44 26.4	+57.6	126.8	43 50.2	+57.9	127.5	43 13.3	+58.2	128.3	33
34	48 12.7	+55.3	122.0	47 40.5	+55.8	122.9	47 07.5	+56.3	123.8	46 33.8	+56.7	124.7	45 59.2	+57.2	125.5	45 24.0	+57.5	126.4	44 48.1	+57.8	127.2	44 11.5	+58.1	127.9	34
35	49 08.0	+55.1	121.4	48 36.3	+55.7	122.3	48 03.8	+56.2	123.3	47 30.5	+56.6	124.2	46 56.4	+57.0	125.1	46 21.5	+57.4	126.0	45 45.9	+57.8	126.8	45 09.6	+58.1	127.6	35
36	50 03.1	+55.0	120.8	49 32.0	+55.5	121.8	49 00.0	+56.0	122.8	48 27.1	+56.5	123.7	47 53.4	+56.9	124.6	47 18.9	+57.3	125.5	46 43.7	+57.6	126.4	46 07.7	+58.0	127.2	36
37	50 58.1	+54.7	120.1	50 27.5	+55.3	121.2	49 56.0	+55.8	122.2	49 23.6	+56.3	123.2	48 50.3	+56.8	124.2	48 16.2	+57.2	125.1	47 41.3	+57.6	126.0	47 05.7	+57.9	126.9	37
38	51 52.8	+54.5	119.5	51 22.8	+55.1	120.6	50 51.8	+55.7	121.6	50 19.9	+56.2	122.7	49 47.1	+56.6	123.7	49 13.4	+57.1	124.6	48 38.9	+57.5	125.6	48 03.6	+57.8	126.5	38
39	52 47.3	+54.3	118.8	52 17.9	+54.9	119.9	51 47.5	+55.4	121.0	51 16.1	+56.0	122.1	50 43.7	+56.5	123.1	50 10.5	+56.9	124.2	49 36.4	+57.3	125.1	49 01.4	+57.8	126.1	39
40	53 41.6	+54.0	118.1	53 12.8	+54.6	119.3	52 42.9	+55.3	120.4	52 12.1	+55.8	121.5	51 40.2	+56.4	122.6	51 07.4	+56.8	123.7	50 33.7	+57.3	124.7	49 59.2	+57.6	125.7	40
41	54 35.6	+53.7	117.3	54 07.4	+54.5	118.6	53 38.2	+55.1	119.8	53 07.9	+55.6	120.9	52 36.6	+56.1	122.0	52 04.2	+56.7	123.1	51 31.0	+57.1	124.2	50 56.8	+57.6	125.2	41
42	55 29.3	+53.4	116.6	55 01.9	+54.1	117.8	54 33.3	+54.8	119.1	54 03.5	+55.5	120.3	53 32.7	+56.1	121.5	53 00.9	+56.6	122.6	52 28.1	+57.0	123.7	51 54.4	+57.4	124.8	42
43	56 22.7	+53.0	115.7	55 56.0	+53.8	117.1	55 28.1	+54.5	118.4	54 59.0	+55.2	119.6	54 28.8	+55.8	120.9	53 57.5	+56.3	122.0	53 25.1	+56.9	123.2	52 51.8	+57.3	124.3	43
44	57 15.7	+52.7	114.9	56 49.8	+53.5	116.3	56 22.6	+54.3	117.6	55 54.2	+55.0	118.9	55 24.6	+55.6	120.2	54 53.8	+56.2	121.4	54 22.0	+56.7	122.6	53 49.1	+57.2	123.8	44
45	58 08.4	+52.3	114.0	57 43.3	+53.2	115.4	57 16.9	+54.0	116.8	56 49.2	+54.7	118.2	56 20.2	+55.4	119.5	55 50.0	+56.0	120.8	55 18.7	+56.5	122.1	54 46.3	+57.1	123.3	45
46	59 00.7	+51.9	113.0	58 36.5	+52.8	114.6	58 10.9	+53.6	116.0	57 43.9	+54.4	117.5	57 15.6	+55.1	118.8	56 46.0	+55.8	120.2	56 15.2	+56.4	121.5	55 43.4	+56.8	122.7	46
47	59 52.6	+51.4	112.1	59 29.3	+52.4	113.6	59 04.5	+53.3	115.2	58 38.3	+54.1	116.7	58 10.7	+54.8	118.1	57 41.8	+55.5	119.5	57 11.6	+56.2	120.9	56 40.2	+56.8	122.2	47
48	60 44.0	+50.9	111.0	60 21.7	+51.9	112.7	59 57.8	+52.9	114.3	59 32.4	+53.7	115.8	59 05.5	+54.6	117.3	58 37.3	+55.3	118.8	58 07.8	+55.9	120.2	57 37.0	+56.5	121.6	48
49	61 34.9	+50.3	109.9	61 13.6	+51.4	111.6	60 50.7	+52.4	113.3	60 26.1	+53.4	114.9	60 00.1	+54.3	116.5	59 32.6	+55.0	118.0	59 03.7	+55.8	119.5	58 33.5	+56.4	120.9	49
50	62 25.2	+49.7	108.8	62 05.0	+50.9	110.6	61 43.1	+52.0	112.3	61 19.5	+53.0	114.0	60 54.4	+53.8	115.6	60 27.6	+54.8	117.2	59 59.5	+55.4	118.8	59 29.9	+56.1	120.3	50
51	63 14.9	+49.1	107.5	62 55.9	+50.3	109.4	62 35.1	+51.5	111.2	62 12.5	+52.5	113.0	61 48.2	+53.5	114.7	61 22.4	+54.3	116.4	60 54.9	+55.2	118.0	60 26.0	+56.0	119.6	51
52	64 04.0	+48.3	106.2	63 46.2	+49.7	108.2	63 26.6	+50.9	110.1	63 05.0	+52.1	111.9	62 41.7	+53.1	113.7	62 16.7	+54.1	115.5	61 50.1	+54.9	117.2	61 22.0	+55.6	118.8	52
53	64 52.3	+47.5	104.9	64 35.9	+48.9	106.9	64 17.5	+50.2	108.9	63 57.1	+51.5	110.8	63 34.8	+52.6	112.7	63 10.8	+53.6	114.5	62 45.0	+54.5	116.3	62 17.6	+55.4	118.0	53
54	65 39.8	+46.6	103.4	65 24.8	+48.2	105.5	65 07.7	+49.6	107.6	64 48.6	+50.8	109.6	64 27.4	+52.1	111.6	64 04.4	+53.1	113.5	63 39.5	+54.2	115.4	63 13.0	+55.0	117.2	54
55	66 26.4	+45.7	101.9	66 13.0	+47.3	104.1	65 57.3	+48.8	106.3	65 39.4	+50.2	108.4	65 19.5	+51.5	110.4	64 57.5	+52.7	112.5	64 33.7	+53.7	114.4	64 08.0	+54.7	116.3	55
56	67 12.1	+44.5	100.2	67 00.3	+46.3	102.5	66 46.1	+47.9	104.8	66 29.6	+49.5	107.0	66 11.0	+50.8	109.2	65 50.2	+52.1	111.3	65 27.4	+53.3	113.3	65 02.7	+54.3	115.3	56
57	67 56.6	+43.4	98.4	67 46.6	+45.2	100.9	67 34.0	+47.0	103.2	67 19.1	+48.6	105.6	67 01.8	+50.1	107.9	66 42.3	+51.5	110.1	66 20.7	+52.7	112.2	65 57.0	+53.8	114.3	57
58	68 40.0	+42.0	96.6	68 31.8	+44.1	99.1	68 21.0	+46.0	101.6	68 07.7	+47.7	104.0	67 51.9	+49.4	106.4	67 33.8	+50.8	108.7	67 13.4	+52.2	111.0	66 50.8	+53.4	113.2	58
59	69 22.0	+40.6	94.6	69 15.9	+42.7	97.2	69 07.0	+44.7	99.8	68 55.4	+46.7	102.4	68 41.3	+48.4	104.9	68 24.6	+50.0	107.3	68 05.6	+51.4	109.7	67 44.2	+52.8	112.0	59
60	70 02.6	+38.9	92.5	69 58.6	+41.2	95.2	69 51.7	+43.5	97.9	69 42.1	+45.5	100.6	69 29.7	+47.4	103.2	69 14.6	+49.2	105.8	68 57.0	+50.8	108.3	68 37.0	+52.2	110.7	60
61	70 41.5	+37.2	90.2	70 39.8	+39.7	93.0	70 35.2	+42.0	95.9	70 27.6	+44.2	98.7	70 17.1	+46.2	101.4	70 03.8	+48.1	104.2	69 47.8	+49.9	106.8	69 29.2	+51.4	109.4	61
62	71 18.7	+35.2	87.8	71 19.5	+37.8	90.7	71 17.2	+40.3	93.7	71 11.8	+42.7	96.6	71 03.3	+45.0	99.5	70 51.9	+47.1	102.4	70 37.7	+48.9	105.1	70 20.6	+50.7	107.9	62
63	71 53.9	+33.0	85.2	71 57.3	+35.8	88.3	71 57.5	+38.5	91.3	71 54.5	+41.1	94.4	71 48.3	+43.5	97.4	71 39.0	+45.8	100.4	71 26.6	+47.8	103.4	71 11.3	+49.7	106.2	63
64	72 26.9	+30.7	82.5	72 33.1	+33.6	85.6	72 36.0	+36.5	88.8	72 35.6	+39.2	92.0	72 31.8	+41.9	95.2	72 24.8	+44.3	98.3	72 14.4	+46.6	101.4	72 01.0	+48.7	104.5	64
65	72 57.6	+28.0	79.6	73 06.7	+31.2	82.8	73 12.5	+34.2	86.1	73 14.8	+37.2	89.4	73 13.7	+40.0	92.8	73 09.1	+42.7	96.1	73 01.0	+45.2	99.3	72 49.7	+47.4	102.5	65
66	73 25.6	+25.3	76.5	73 37.9	+28.5	79.8	73 46.7	+31.8	83.2	73 52.0	+34.9	86.7	73 53.7	+37.9	90.1	73 51.8	+40.8	93.6	73 46.2	+43.6	97.0	73 37.1	+46.1	100.4	66
67	73 50.9	+22.1	73.3	74 06.4	+25.6	76.7	74 18.5	+28.9	80.1	74 26.9	+32.3	83.7	74 31.6	+35.6	87.3	74 32.6	+38.7	90.9	74 29.8	+41.7	94.5	74 23.2	+44.5	98.1	67
68	74 13.0	+19.0	69.9	74 32.0	+22.3	73.3	74 47.4	+25.9	76.9	74 59.2	+29.4	80.5	75 07.2	+32.9	84.2	75 11.3	+36.3	88.0	75 11.5	+39.5	91.7	75 07.7	+42.5	95.5	68
69	74 32.0	+15.4	66.4	74 54.3	+19.0	69.8	75 13.3	+22.6	73.4	75 28.6	+26.3	77.1	75 40.1	+29.9	80.9	75 47.6	+33.5	84.8	75 51.0	+37.1	88.7	75 50.2	+40.4	92.7	69
70	74 47.4	+11.8	62.8	75 13.3	+15.3	66.1	75 35.9	+19.0	69.7	75 54.9	+22.7	73.4	76 10.0	+26.7	77.3	76 21.1	+30.5	81.3	76 28.1	+34.2	85.4	76 30.6	+38.0	89.6	70
71	74 59.2	+8.0	59.0	75 28.6	+11.5	62.3	75 54.9	+15.1	65.8	76 17.6	+19.1	69.6	76 36.7	+22.9	73.5	76 51.6	+27.0	77.6	77 02.3	+31.1	81.9	77 08.6	+35.0	86.2	71
72	75 07.2	+4.1	55.2	75 40.1	+7.5	58.4	76 10.0	+11.1	61.8	76 36.7	+14.9	65.5	76 59.6	+19.0	69.5	77 18.6	+23.2	73.6	77 33.4	+27.4	78.0	77 43.6	+31.7	82.5	72
73	75 11.3	+0.2	51.3	75 47.6	+3.4	54.3	76 21.1	+7.0	57.7	76 51.6	+10.7	61.3	77 18.6	+14.8	65.2	77 41.8	+19.0	69.4	78 00.8	+23.4	73.8	78 15.3	+27.9	78.4	73
74	75 11.5	−3.8	47.3	75 51.0	−0.8	50.3	76 28.1	+2.5	53.5	77 02.3	+6.3	56.9	77 33.4	+10.2	60.7	78 00.8	+14.5	64.8	78 24.2	+19.0	69.3	78 43.2	+23.6	74.0	74
75	75 07.7	−7.8	43.4	75 50.2	−4.9	46.2	76 30.6	−1.7	49.2	77 08.6	+1.6	52.5	77 43.6	+5.5	56.1	78 15.3	+9.6	60.1	78 43.2	+14.1	64.5	79 06.8	+18.9	69.2	75
76	74 59.9	−11.5	39.6	75 45.3	−8.9	42.1	76 28.9	−6.1	44.9	77 10.2	−2.9	48.0	77 49.1	+0.6	51.4	78 24.9	+4.6	55.2	78 57.3	+8.9	59.5	79 25.7	+13.7	64.1	76
77	74 48.4	−15.1	35.8	75 36.4	−12.9	38.1	76 22.8	−10.4	40.7	77 07.3	−7.4	43.5	77 49.7	−4.2	46.7	78 29.5	−0.5	50.3	79 06.2	+3.6	54.3	79 39.4	+8.2	58.7	77
78	74 33.3	−18.7	32.2	75 23.5	−16.7	34.2	76 12.4	−14.4	36.5	76 59.9	−11.9	39.1	77 45.5	−9.0	42.0	78 29.0	−5.7	45.2	79 09.8	−1.9	49.0	79 47.6	+2.4	53.1	78
79	74 14.6	−21.9	28.6	75 06.8	−20.2	30.4	75 58.0	−18.3	32.5	76 48.0	−16.1	34.7	77 36.5	−13.5	37.3	78 23.3	−10.6	40.3	79 07.9	−7.2	43.6	79 50.0	−3.5	47.5	79
80	73 52.7	−25.0	25.2	74 46.6	−23.6	26.8	75 39.7	−21.9	28.6	76 31.9	−20.0	30.6	77 23.0	−17.9	32.8	78 12.7	−15.4	35.4	79 00.7	−12.6	38.4	79 46.5	−9.1	41.9	80
81	73 27.7	−27.9	22.0	74 23.0	−26.6	23.3	75 17.8	−25.3	24.9	76 11.9	−23.8	26.6	77 05.1	−22.0	28.5	77 57.3	−19.9	30.7	78 48.1	−17.4	33.3	79 37.4	−14.6	36.3	81
82	72 59.8	−30.4	18.9	73 56.4	−29.5	20.1	74 52.5	−28.4	21.3	75 48.1	−27.1	22.8	76 43.1	−25.7	24.4	77 37.4	−24.1	26.3	78 30.7	−22.1	28.5	79 22.8	−19.8	31.0	82
83	72 29.4	−32.9	16.0	73 26.9	−32.1	17.0	74 24.1	−31.2	18.0	75 21.0	−30.2	19.2	76 17.4	−29.1	20.5	77 13.3	−27.7	22.1	78 08.6	−26.2	23.9	79 03.0	−24.4	25.9	83
84	71 56.5	−35.0	13.3	72 54.8	−34.4	14.0	73 52.9	−33.8	14.9	74 50.8	−33.0	15.8	75 48.3	−32.1	16.9	76 45.6	−31.2	18.1	77 42.4	−30.0	19.6	78 38.6	−28.6	21.2	84
85	71 21.5	−37.0	10.7	72 20.4	−36.6	11.3	73 19.1	−36.0	12.0	74 17.8	−35.6	12.7	75 16.2	−34.9	13.5	76 14.4	−34.1	14.5	77 12.4	−33.3	15.6	78 10.0	−32.3	16.8	85
86	70 44.5	−38.9	8.3	71 43.8	−38.5	8.7	72 43.1	−38.2	9.2	73 42.2	−37.7	9.8	74 41.3	−37.3	10.4	75 40.3	−36.9	11.1	76 39.1	−36.3	11.9	77 37.7	−35.6	12.8	86
87	70 05.6	−40.4	6.0	71 05.3	−40.3	6.3	72 04.9	−40.0	6.7	73 04.5	−39.8	7.0	74 04.0	−39.5	7.5	75 03.4	−39.1	8.0	76 02.8	−38.8	8.5	77 02.1	−38.4	9.2	87
88	69 25.2	−41.9	3.9	70 25.0	−41.8	4.1	71 24.9	−41.7	4.3	72 24.7	−41.6	4.5	73 24.5	−41.4	4.8	74 24.3	−41.3	5.1	75 24.0	−41.0	5.4	76 23.7	−40.8	5.8	88
89	68 43.3	−43.3	1.9	69 43.2	−43.2	2.0	70 43.2	−43.2	2.1	71 43.1	−43.1	2.2	72 43.1	−43.1	2.3	73 43.0	−43.0	2.4	74 43.0	−43.0	2.6	75 42.9	−42.9	2.8	89
90	68 00.0	−44.5	0.0	69 00.0	−44.5	0.0	70 00.0	−44.5	0.0	71 00.0	−44.6	0.0	72 00.0	−44.6	0.0	73 00.0	−44.6	0.0	74 00.0	−44.7	0.0	75 00.0	−44.7	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

43°, 317° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 43°, 317°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	15 54.0	−57.8	134.8	15 11.7	−58.1	135.0	14 29.1	−58.2	135.2	13 46.5	−58.4	135.4	13 03.7	−58.6	135.6	12 20.8	−58.7	135.7	11 37.8	−58.9	135.9	10 54.7	−59.1	136.0	0
1	14 56.2	−57.9	135.1	14 13.6	−58.1	135.3	13 30.9	−58.3	135.5	12 48.1	−58.5	135.6	12 05.1	−58.6	135.8	11 22.1	−58.8	135.9	10 38.9	−58.9	136.1	9 55.6	−59.0	136.2	1
2	13 58.3	−57.9	135.4	13 15.5	−58.0	135.6	12 32.6	−58.2	135.7	11 49.6	−58.4	135.9	11 06.5	−58.6	136.0	10 23.3	−58.7	136.1	9 40.0	−58.9	136.3	8 56.6	−59.0	136.4	2
3	13 00.4	−57.9	135.7	12 17.5	−58.1	135.8	11 34.4	−58.3	136.0	10 51.2	−58.5	136.1	10 07.9	−58.6	136.2	9 24.6	−58.8	136.3	8 41.1	−58.9	136.5	7 57.6	−59.1	136.6	3
4	12 02.5	−57.9	135.9	11 19.4	−58.2	136.1	10 36.1	−58.3	136.2	9 52.7	−58.4	136.3	9 09.3	−58.6	136.4	8 25.8	−58.8	136.5	7 42.2	−58.9	136.6	6 58.5	−59.0	136.7	4
5	11 04.6	−58.0	136.2	10 21.2	−58.1	136.3	9 37.8	−58.3	136.4	8 54.3	−58.5	136.6	8 10.7	−58.6	136.7	7 27.0	−58.8	136.7	6 43.3	−58.9	136.8	5 59.5	−59.1	136.9	5
6	10 06.6	−57.9	136.5	9 23.1	−58.1	136.6	8 39.5	−58.3	136.7	7 55.8	−58.5	136.8	7 12.1	−58.7	136.9	6 28.2	−58.7	137.0	5 44.4	−59.0	137.0	5 00.4	−59.0	137.1	6
7	9 08.7	−58.0	136.7	8 25.0	−58.2	136.8	7 41.2	−58.3	136.9	6 57.3	−58.4	137.0	6 13.4	−58.6	137.1	5 29.5	−58.8	137.2	4 45.4	−58.9	137.2	4 01.4	−59.1	137.3	7
8	8 10.7	−57.9	137.0	7 26.8	−58.1	137.1	6 42.9	−58.4	137.2	5 58.9	−58.5	137.2	5 14.8	−58.7	137.3	4 30.7	−58.8	137.4	3 46.5	−58.9	137.4	3 02.3	−59.0	137.4	8
9	7 12.8	−58.0	137.2	6 28.7	−58.2	137.3	5 44.5	−58.3	137.4	5 00.4	−58.5	137.5	4 16.1	−58.6	137.5	3 31.9	−58.8	137.6	2 47.6	−58.9	137.6	2 03.3	−59.1	137.6	9
10	6 14.8	−58.0	137.5	5 30.5	−58.1	137.6	4 46.2	−58.3	137.6	4 01.9	−58.5	137.7	3 17.5	−58.7	137.7	2 33.1	−58.8	137.8	1 48.7	−59.0	137.8	1 04.2	−59.0	137.8	10
11	5 16.8	−58.0	137.8	4 32.4	−58.2	137.8	3 47.9	−58.4	137.9	3 03.4	−58.5	137.9	2 18.8	−58.6	137.9	1 34.3	−58.8	138.0	0 49.7	−58.9	138.0	0 05.2	−59.1	138.0	11
12	4 18.8	−58.0	138.0	3 34.2	−58.2	138.1	2 49.5	−58.3	138.1	2 04.9	−58.5	138.1	1 20.2	−58.7	138.1	0 35.5	−58.8	138.2	0 09.2	+58.9	41.8	0 53.9	+59.0	41.8	12
13	3 20.8	−58.0	138.3	2 36.0	−58.2	138.3	1 51.2	−58.3	138.3	1 06.4	−58.5	138.3	0 21.5	−58.6	138.4	0 23.3	+58.8	41.6	1 08.1	+59.0	41.7	1 52.9	+59.1	41.7	13
14	2 22.8	−58.0	138.5	1 37.8	−58.1	138.5	0 52.9	−58.4	138.6	0 07.9	−58.5	138.6	0 37.1	+58.7	41.4	1 22.1	+58.8	41.4	2 07.1	+58.9	41.5	2 52.0	+59.1	41.5	14
15	1 24.8	−58.0	138.8	0 39.7	−58.2	138.8	0 05.5	+58.3	41.2	0 50.6	+58.5	41.2	1 35.8	+58.6	41.2	2 20.9	+58.8	41.2	3 06.0	+58.9	41.3	3 51.1	+59.0	41.3	15
16	0 26.8	−58.0	139.0	0 18.5	+58.2	41.0	1 03.8	+58.4	41.0	1 49.1	+58.5	41.0	2 34.4	+58.7	41.0	3 19.7	+58.8	41.0	4 04.9	+58.9	41.1	4 50.1	+59.1	41.1	16
17	0 31.2	+58.0	40.7	1 16.7	+58.2	40.7	2 02.2	+58.3	40.7	2 47.6	+58.5	40.8	3 33.1	+58.6	40.8	4 18.5	+58.7	40.8	5 03.8	+59.0	40.9	5 49.2	+59.0	41.0	17
18	1 29.2	+58.0	40.5	2 14.9	+58.2	40.5	3 00.5	+58.4	40.5	3 46.1	+58.5	40.5	4 31.7	+58.6	40.6	5 17.2	+58.8	40.6	6 02.8	+58.9	40.7	6 48.2	+59.0	40.8	18
19	2 27.2	+58.0	40.2	3 13.1	+58.1	40.2	3 58.9	+58.3	40.3	4 44.6	+58.5	40.3	5 30.3	+58.7	40.4	6 16.0	+58.8	40.4	7 01.7	+58.9	40.5	7 47.2	+59.1	40.6	19
20	3 25.2	+58.0	39.9	4 11.2	+58.2	40.0	4 57.2	+58.3	40.0	5 43.1	+58.5	40.1	6 29.0	+58.6	40.2	7 14.8	+58.8	40.2	8 00.6	+58.9	40.3	8 46.3	+59.0	40.4	20
21	4 23.2	+58.0	39.7	5 09.4	+58.2	39.7	5 55.5	+58.3	39.8	6 41.6	+58.5	39.9	7 27.6	+58.6	40.0	8 13.6	+58.7	40.0	8 59.5	+58.9	40.1	9 45.3	+59.0	40.2	21
22	5 21.2	+58.0	39.4	6 07.6	+58.1	39.5	6 53.8	+58.4	39.6	7 40.1	+58.4	39.6	8 26.2	+58.7	39.7	9 12.3	+58.8	39.8	9 58.4	+58.9	39.9	10 44.3	+59.1	40.1	22
23	6 19.2	+58.0	39.2	7 05.7	+58.2	39.2	7 52.2	+58.3	39.3	8 38.5	+58.5	39.4	9 24.9	+58.6	39.5	10 11.1	+58.8	39.6	10 57.3	+58.9	39.7	11 43.4	+59.0	39.9	23
24	7 17.2	+58.0	38.9	8 03.9	+58.1	39.0	8 50.5	+58.3	39.1	9 37.0	+58.5	39.2	10 23.5	+58.6	39.3	11 09.9	+58.7	39.4	11 56.2	+58.8	39.6	12 42.4	+59.0	39.7	24
25	8 15.2	+57.9	38.7	9 02.0	+58.1	38.7	9 48.8	+58.3	38.8	10 35.5	+58.4	39.0	11 22.1	+58.6	39.1	12 08.6	+58.7	39.2	12 55.0	+58.9	39.4	13 41.4	+59.0	39.5	25
26	9 13.1	+58.0	38.4	10 00.1	+58.2	38.5	10 47.1	+58.2	38.6	11 33.9	+58.4	38.7	12 20.7	+58.5	38.9	13 07.3	+58.8	39.0	13 53.9	+58.9	39.2	14 40.4	+59.0	39.3	26
27	10 11.1	+57.9	38.1	10 58.3	+58.1	38.2	11 45.3	+58.3	38.4	12 32.3	+58.5	38.5	13 19.2	+58.6	38.6	14 06.1	+58.7	38.8	14 52.8	+58.8	39.0	15 39.4	+58.9	39.1	27
28	11 09.0	+57.9	37.9	11 56.4	+58.0	38.0	12 43.6	+58.3	38.1	13 30.8	+58.4	38.3	14 17.8	+58.6	38.4	15 04.8	+58.7	38.6	15 51.6	+58.9	38.8	16 38.3	+59.0	38.9	28
29	12 06.9	+58.0	37.6	12 54.4	+58.1	37.7	13 41.9	+58.2	37.9	14 29.2	+58.4	38.0	15 16.4	+58.5	38.2	16 03.5	+58.7	38.4	16 50.5	+58.8	38.6	17 37.3	+59.0	38.7	29
30	13 04.9	+57.8	37.3	13 52.5	+58.1	37.5	14 40.1	+58.2	37.6	15 27.6	+58.3	37.8	16 14.9	+58.5	38.0	17 02.2	+58.6	38.2	17 49.3	+58.8	38.3	18 36.3	+58.9	38.5	30
31	14 02.7	+57.9	37.1	14 50.6	+58.0	37.2	15 38.3	+58.2	37.4	16 25.9	+58.4	37.6	17 13.4	+58.6	37.7	18 00.8	+58.7	37.9	18 48.1	+58.8	38.1	19 35.2	+58.9	38.4	31
32	15 00.6	+57.9	36.8	15 48.6	+58.0	36.9	16 36.5	+58.2	37.1	17 24.3	+58.3	37.3	18 12.0	+58.5	37.5	18 59.5	+58.6	37.7	19 46.9	+58.8	37.9	20 34.1	+59.0	38.2	32
33	15 58.5	+57.8	36.5	16 46.6	+58.0	36.7	17 34.7	+58.2	36.9	18 22.6	+58.4	37.1	19 10.5	+58.4	37.3	19 58.1	+58.7	37.5	20 45.7	+58.7	37.7	21 33.1	+58.9	37.9	33
34	16 56.3	+57.8	36.2	17 44.6	+58.0	36.4	18 32.9	+58.1	36.6	19 21.0	+58.3	36.8	20 08.9	+58.5	37.0	20 56.8	+58.6	37.3	21 44.4	+58.8	37.5	22 32.0	+58.9	37.7	34
35	17 54.1	+57.8	36.0	18 42.6	+58.0	36.1	19 31.0	+58.1	36.3	20 19.3	+58.3	36.6	21 07.4	+58.4	36.8	21 55.4	+58.6	37.0	22 43.2	+58.7	37.3	23 30.9	+58.8	37.5	35
36	18 51.9	+57.8	35.7	19 40.6	+57.9	35.9	20 29.1	+58.1	36.1	21 17.6	+58.2	36.3	22 05.8	+58.4	36.5	22 54.0	+58.5	36.8	23 41.9	+58.7	37.1	24 29.7	+58.9	37.3	36
37	19 49.7	+57.7	35.4	20 38.5	+57.9	35.6	21 27.2	+58.1	35.8	22 15.8	+58.2	36.1	23 04.2	+58.4	36.3	23 52.5	+58.6	36.6	24 40.6	+58.7	36.8	25 28.6	+58.8	37.1	37
38	20 47.4	+57.7	35.1	21 36.4	+57.9	35.3	22 25.3	+58.0	35.5	23 14.0	+58.3	35.8	24 02.6	+58.4	36.0	24 51.1	+58.5	36.3	25 39.3	+58.7	36.6	26 27.4	+58.8	36.9	38
39	21 45.1	+57.7	34.8	22 34.3	+57.8	35.0	23 23.3	+58.1	35.3	24 12.3	+58.1	35.5	25 01.0	+58.3	35.8	25 49.6	+58.5	36.1	26 38.0	+58.6	36.4	27 26.2	+58.8	36.7	39
40	22 42.8	+57.6	34.5	23 32.1	+57.8	34.7	24 21.4	+57.9	35.0	25 10.4	+58.2	35.3	25 59.3	+58.4	35.5	26 48.1	+58.5	35.8	27 36.6	+58.7	36.1	28 25.0	+58.8	36.4	40
41	23 40.4	+57.6	34.2	24 29.9	+57.8	34.4	25 19.3	+58.0	34.7	26 08.6	+58.1	35.0	26 57.7	+58.2	35.3	27 46.6	+58.4	35.6	28 35.3	+58.6	35.9	29 23.8	+58.7	36.2	41
42	24 38.0	+57.6	33.9	25 27.7	+57.8	34.1	26 17.3	+57.9	34.4	27 06.7	+58.1	34.7	27 55.9	+58.3	35.0	28 45.0	+58.4	35.3	29 33.9	+58.5	35.6	30 22.5	+58.7	36.0	42
43	25 35.6	+57.5	33.6	26 25.5	+57.7	33.8	27 15.2	+57.9	34.1	28 04.8	+58.0	34.4	28 54.2	+58.2	34.7	29 43.4	+58.4	35.1	30 32.4	+58.6	35.4	31 21.2	+58.7	35.7	43
44	26 33.1	+57.5	33.3	27 23.2	+57.6	33.5	28 13.1	+57.8	33.8	29 02.8	+58.1	34.1	29 52.4	+58.2	34.5	30 41.8	+58.3	34.8	31 31.0	+58.5	35.1	32 19.9	+58.7	35.5	44
45	27 30.6	+57.4	32.9	28 20.8	+57.6	33.2	29 10.9	+57.8	33.5	30 00.9	+57.9	33.8	30 50.6	+58.1	34.2	31 40.1	+58.4	34.5	32 29.5	+58.4	34.9	33 18.6	+58.6	35.2	45
46	28 28.0	+57.4	32.6	29 18.4	+57.6	32.9	30 08.7	+57.8	33.2	30 58.8	+58.0	33.5	31 48.7	+58.1	33.9	32 38.5	+58.2	34.2	33 27.9	+58.5	34.6	34 17.2	+58.6	35.0	46
47	29 25.4	+57.3	32.3	30 16.0	+57.5	32.6	31 06.5	+57.7	32.9	31 56.8	+57.9	33.2	32 46.8	+58.1	33.6	33 36.7	+58.3	34.0	34 26.4	+58.4	34.3	35 15.8	+58.6	34.7	47
48	30 22.7	+57.3	31.9	31 13.5	+57.5	32.3	32 04.2	+57.6	32.6	32 54.7	+57.8	32.9	33 44.9	+58.0	33.3	34 35.0	+58.2	33.7	35 24.8	+58.3	34.1	36 14.4	+58.5	34.5	48
49	31 20.0	+57.2	31.6	32 11.0	+57.4	31.9	33 01.8	+57.7	32.3	33 52.5	+57.8	32.6	34 42.9	+58.0	33.0	35 33.2	+58.1	33.4	36 23.1	+58.4	33.8	37 12.9	+58.5	34.2	49
50	32 17.2	+57.2	31.2	33 08.4	+57.4	31.6	33 59.5	+57.5	31.9	34 50.3	+57.7	32.3	35 40.9	+57.9	32.7	36 31.3	+58.1	33.1	37 21.5	+58.2	33.5	38 11.4	+58.4	33.9	50
51	33 14.4	+57.1	30.9	34 05.8	+57.3	31.2	34 57.0	+57.5	31.6	35 48.0	+57.7	31.9	36 38.8	+57.9	32.3	37 29.4	+58.0	32.7	38 19.7	+58.3	33.2	39 09.8	+58.4	33.6	51
52	34 11.5	+57.0	30.5	35 03.1	+57.2	30.9	35 54.5	+57.4	31.2	36 45.7	+57.6	31.6	37 36.7	+57.8	32.0	38 27.4	+58.0	32.4	39 18.0	+58.1	32.9	40 08.2	+58.4	33.3	52
53	35 08.5	+57.0	30.1	36 00.3	+57.2	30.5	36 51.9	+57.4	30.9	37 43.3	+57.6	31.3	38 34.5	+57.7	31.7	39 25.4	+58.0	32.1	40 16.1	+58.2	32.5	41 06.6	+58.3	33.0	53
54	36 05.5	+56.9	29.7	36 57.5	+57.1	30.1	37 49.3	+57.3	30.5	38 40.9	+57.5	30.9	39 32.2	+57.7	31.3	40 23.4	+57.9	31.8	41 14.3	+58.0	32.2	42 04.9	+58.3	32.7	54
55	37 02.4	+56.8	29.3	37 54.6	+57.0	29.7	38 46.6	+57.2	30.1	39 38.4	+57.4	30.5	40 29.9	+57.6	31.0	41 21.3	+57.8	31.4	42 12.3	+58.0	31.9	43 03.2	+58.1	32.4	55
56	37 59.2	+56.7	28.9	38 51.6	+56.9	29.3	39 43.8	+57.1	29.7	40 35.8	+57.3	30.1	41 27.5	+57.6	30.6	42 19.1	+57.7	31.0	43 10.3	+58.0	31.5	44 01.3	+58.2	32.0	56
57	38 55.9	+56.6	28.5	39 48.5	+56.8	28.9	40 40.9	+57.1	29.3	41 33.1	+57.3	29.8	42 25.1	+57.4	30.2	43 16.8	+57.7	30.7	44 08.3	+57.8	31.2	44 59.5	+58.0	31.7	57
58	39 52.5	+56.5	28.1	40 45.3	+56.8	28.5	41 38.0	+56.9	28.9	42 30.4	+57.1	29.4	43 22.5	+57.4	29.8	44 14.5	+57.6	30.3	45 06.1	+57.8	30.8	45 57.5	+58.0	31.3	58
59	40 49.0	+56.5	27.7	41 42.1	+56.6	28.1	42 34.9	+56.9	28.5	43 27.5	+57.1	28.9	44 19.9	+57.3	29.4	45 12.1	+57.5	29.9	46 03.9	+57.8	30.4	46 55.5	+58.0	31.0	59
60	41 45.5	+56.3	27.2	42 38.7	+56.6	27.6	43 31.8	+56.7	28.1	44 24.6	+57.0	28.5	45 17.2	+57.2	29.0	46 09.6	+57.4	29.5	47 01.7	+57.6	30.0	47 53.5	+57.8	30.6	60
61	42 41.8	+56.2	26.7	43 35.3	+56.4	27.2	44 28.5	+56.7	27.6	45 21.6	+56.9	28.1	46 14.4	+57.1	28.6	47 07.0	+57.3	29.1	47 59.3	+57.5	29.6	48 51.3	+57.8	30.2	61
62	43 38.0	+56.0	26.3	44 31.7	+56.3	26.7	45 25.2	+56.5	27.1	46 18.5	+56.7	27.6	47 11.5	+57.0	28.1	48 04.3	+57.2	28.6	48 56.8	+57.5	29.2	49 49.1	+57.6	29.8	62
63	44 34.0	+56.0	25.8	45 28.0	+56.2	26.2	46 21.7	+56.4	26.7	47 15.2	+56.7	27.1	48 08.5	+56.9	27.6	49 01.5	+57.1	28.2	49 54.3	+57.3	28.7	50 46.7	+57.6	29.3	63
64	45 30.0	+55.8	25.2	46 24.2	+56.0	25.7	47 18.1	+56.3	26.2	48 11.9	+56.5	26.6	49 05.4	+56.7	27.2	49 58.6	+57.0	27.7	50 51.6	+57.2	28.3	51 44.3	+57.5	28.9	64
65	46 25.8	+55.6	24.7	47 20.2	+55.9	25.2	48 14.4	+56.1	25.6	49 08.4	+56.3	26.1	50 02.1	+56.6	26.7	50 55.6	+56.8	27.2	51 48.8	+57.1	27.8	52 41.8	+57.3	28.4	65
66	47 21.4	+55.5	24.2	48 16.1	+55.7	24.6	49 10.5	+56.0	25.1	50 04.7	+56.2	25.6	50 58.7	+56.5	26.1	51 52.4	+56.8	26.7	52 45.9	+57.0	27.3	53 39.1	+57.2	27.9	66
67	48 16.9	+55.3	23.6	49 11.8	+55.6	24.1	50 06.5	+55.8	24.6	51 00.9	+56.1	25.1	51 55.2	+56.3	25.6	52 49.2	+56.5	26.2	53 42.9	+56.8	26.8	54 36.3	+57.1	27.4	67
68	49 12.2	+55.2	23.0	50 07.4	+55.3	23.5	51 02.3	+55.6	24.0	51 57.0	+55.9	24.5	52 51.5	+56.1	25.0	53 45.7	+56.4	25.6	54 39.7	+56.7	26.2	55 33.4	+56.9	26.9	68
69	50 07.4	+54.9	22.4	51 02.7	+55.2	22.9	51 57.9	+55.5	23.4	52 52.9	+55.7	23.9	53 47.6	+56.0	24.4	54 42.1	+56.2	25.0	55 36.4	+56.5	25.6	56 30.3	+56.8	26.3	69
70	51 02.3	+54.7	21.8	51 57.9	+55.0	22.2	52 53.4	+55.2	22.7	53 48.6	+55.5	23.3	54 43.6	+55.7	23.8	55 38.3	+56.1	24.4	56 32.9	+56.3	25.0	57 27.1	+56.6	25.7	70
71	51 57.0	+54.5	21.1	52 52.9	+54.7	21.6	53 48.6	+55.0	22.1	54 44.1	+55.2	22.6	55 39.3	+55.6	23.2	56 34.4	+55.8	23.8	57 29.2	+56.1	24.4	58 23.7	+56.4	25.1	71
72	52 51.5	+54.2	20.4	53 47.6	+54.5	20.9	54 43.6	+54.7	21.4	55 39.3	+55.1	21.9	56 34.9	+55.3	22.5	57 30.2	+55.6	23.1	58 25.3	+55.9	23.7	59 20.1	+56.1	24.4	72
73	53 45.7	+54.0	19.7	54 42.1	+54.3	20.2	55 38.3	+54.6	20.7	56 34.4	+54.8	21.2	57 30.2	+55.1	21.8	58 25.8	+55.4	22.4	59 21.2	+55.6	23.0	60 16.2	+56.0	23.7	73
74	54 39.7	+53.7	19.0	55 36.4	+53.9	19.4	56 32.9	+54.2	19.9	57 29.2	+54.5	20.5	58 25.3	+54.8	21.0	59 21.2	+55.0	21.6	60 16.8	+55.4	22.3	61 12.2	+55.7	23.0	74
75	55 33.4	+53.3	18.2	56 30.3	+53.6	18.7	57 27.1	+53.9	19.2	58 23.7	+54.1	19.7	59 20.1	+54.4	20.2	60 16.2	+54.8	20.9	61 12.2	+55.1	21.5	62 07.9	+55.4	22.2	75
76	56 26.7	+53.1	17.4	57 23.9	+53.3	17.8	58 21.0	+53.6	18.3	59 17.8	+53.9	18.9	60 14.5	+54.2	19.4	61 11.0	+54.5	20.0	62 07.3	+54.8	20.7	63 03.3	+55.1	21.4	76
77	57 19.8	+52.6	16.5	58 17.2	+53.0	17.0	59 14.6	+53.2	17.5	60 11.7	+53.5	18.0	61 08.7	+53.8	18.5	62 05.5	+54.1	19.1	63 02.1	+54.4	19.8	63 58.4	+54.7	20.5	77
78	58 12.4	+52.3	15.6	59 10.2	+52.5	16.1	60 07.8	+52.8	16.5	61 05.2	+53.1	17.1	62 02.5	+53.4	17.6	62 59.6	+53.7	18.2	63 56.5	+54.0	18.8	64 53.1	+54.4	19.5	78
79	59 04.7	+51.9	14.7	60 02.7	+52.1	15.1	61 00.6	+52.3	15.6	61 58.3	+52.6	16.1	62 55.9	+52.9	16.6	63 53.3	+53.2	17.2	64 50.5	+53.6	17.8	65 47.5	+53.9	18.5	79
80	59 56.6	+51.3	13.7	60 54.8	+51.6	14.1	61 52.9	+51.9	14.6	62 50.9	+52.2	15.0	63 48.8	+52.5	15.6	64 46.5	+52.8	16.1	65 44.1	+53.1	16.7	66 41.4	+53.5	17.4	80
81	60 47.9	+50.9	12.6	61 46.4	+51.1	13.0	62 44.8	+51.4	13.5	63 43.1	+51.6	13.9	64 41.3	+51.9	14.5	65 39.3	+52.2	15.0	66 37.2	+52.5	15.6	67 34.9	+52.9	16.2	81
82	61 38.8	+50.3	11.5	62 37.5	+50.5	11.9	63 36.2	+50.8	12.3	64 34.7	+51.1	12.8	65 33.2	+51.3	13.3	66 31.5	+51.7	13.8	67 29.7	+52.0	14.4	68 27.8	+52.3	15.0	82
83	62 29.1	+49.6	10.4	63 28.0	+49.9	10.7	64 27.0	+50.1	11.1	65 25.8	+50.4	11.5	66 24.5	+50.7	12.0	67 23.2	+50.9	12.5	68 21.7	+51.3	13.0	69 20.1	+51.6	13.6	83
84	63 18.7	+49.0	9.1	64 17.9	+49.3	9.5	65 17.1	+49.4	9.8	66 16.2	+49.6	10.2	67 15.2	+49.9	10.6	68 14.1	+50.2	11.1	69 13.0	+50.4	11.6	70 11.7	+50.8	12.1	84
85	64 07.7	+48.3	7.8	65 07.2	+48.4	8.1	66 06.5	+48.7	8.4	67 05.8	+48.9	8.8	68 05.1	+49.1	9.2	69 04.3	+49.4	9.6	70 03.4	+49.6	10.0	71 02.5	+49.9	10.5	85
86	64 56.0	+47.4	6.4	65 55.6	+47.6	6.7	66 55.2	+47.7	7.0	67 54.7	+48.0	7.3	68 54.2	+48.2	7.6	69 53.7	+48.3	8.0	70 53.0	+48.7	8.4	71 52.4	+48.8	8.8	86
87	65 43.4	+46.6	5.0	66 43.2	+46.7	5.2	67 42.9	+46.8	5.4	68 42.7	+46.9	5.6	69 42.4	+47.1	5.9	70 42.0	+47.3	6.2	71 41.7	+47.4	6.5	72 41.2	+47.7	6.9	87
88	66 30.0	+45.5	3.4	67 29.9	+45.6	3.6	68 29.7	+45.8	3.7	69 29.6	+45.8	3.9	70 29.5	+45.9	4.1	71 29.3	+46.1	4.3	72 29.1	+46.2	4.5	73 28.9	+46.4	4.8	88
89	67 15.5	+44.5	1.8	68 15.5	+44.5	1.8	69 15.5	+44.5	1.9	70 15.4	+44.6	2.0	71 15.4	+44.6	2.1	72 15.4	+44.6	2.2	73 15.3	+44.7	2.4	74 15.3	+44.7	2.5	89
90	68 00.0	+43.3	0.0	69 00.0	+43.2	0.0	70 00.0	+43.2	0.0	71 00.0	+43.1	0.0	72 00.0	+43.1	0.0	73 00.0	+43.0	0.0	74 00.0	+43.0	0.0	75 00.0	+42.9	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 137°, 223°

44°, 316° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.....Zn=360°–Z

Dec. °	68° Hc ° ′	d ′	Z °	69° Hc ° ′	d ′	Z °	70° Hc ° ′	d ′	Z °	71° Hc ° ′	d ′	Z °	72° Hc ° ′	d ′	Z °	73° Hc ° ′	d ′	Z °	74° Hc ° ′	d ′	Z °	75° Hc ° ′	d ′	Z °	Dec. °
0	15 38.0	+57.7	133.8	14 56.3	+58.0	134.0	14 14.6	+58.1	134.2	13 32.6	+58.4	134.4	12 50.6	+58.5	134.6	12 08.4	+58.7	134.7	11 26.2	+58.8	134.9	10 43.8	+59.0	135.0	0
1	16 35.7	+57.8	133.6	15 54.3	+57.9	133.8	15 12.7	+58.2	134.0	14 31.0	+58.3	134.2	13 49.1	+58.5	134.3	13 07.1	+58.7	134.5	12 25.0	+58.8	134.7	11 42.8	+59.0	134.8	1
2	17 33.5	+57.7	133.3	16 52.2	+58.0	133.5	16 10.9	+58.1	133.7	15 29.3	+58.3	133.9	14 47.6	+58.5	134.1	14 05.8	+58.7	134.3	13 23.8	+58.9	134.5	12 41.8	+58.9	134.6	2
3	18 31.2	+57.6	133.0	17 50.2	+57.9	133.2	17 09.0	+58.1	133.4	16 27.6	+58.3	133.7	15 46.1	+58.5	133.9	15 04.5	+58.6	134.1	14 22.7	+58.8	134.3	13 40.7	+59.0	134.4	3
4	19 28.8	+57.7	132.7	18 48.1	+57.8	132.9	18 07.1	+58.1	133.2	17 25.9	+58.3	133.4	16 44.6	+58.5	133.6	16 03.1	+58.7	133.9	15 21.5	+58.8	134.1	14 39.7	+58.9	134.3	4
5	20 26.5	+57.6	132.4	19 45.9	+57.9	132.7	19 05.2	+58.0	132.9	18 24.2	+58.3	133.2	17 43.1	+58.4	133.4	17 01.8	+58.6	133.6	16 20.3	+58.8	133.9	15 38.6	+59.0	134.1	5
6	21 24.1	+57.6	132.1	20 43.8	+57.8	132.4	20 03.2	+58.1	132.7	19 22.5	+58.2	132.9	18 41.5	+58.5	133.2	18 00.4	+58.6	133.4	17 19.1	+58.7	133.6	16 37.6	+58.9	133.9	6
7	22 21.7	+57.6	131.8	21 41.6	+57.8	132.1	21 01.3	+58.0	132.4	20 20.7	+58.2	132.7	19 40.0	+58.4	132.9	18 59.0	+58.6	133.2	18 17.8	+58.8	133.4	17 36.5	+58.9	133.7	7
8	23 19.3	+57.5	131.5	22 39.4	+57.8	131.8	21 59.3	+58.0	132.1	21 18.9	+58.2	132.4	20 38.4	+58.4	132.7	19 57.6	+58.6	133.0	19 16.6	+58.7	133.2	18 35.4	+58.9	133.5	8
9	24 16.8	+57.5	131.2	23 37.2	+57.7	131.5	22 57.3	+57.9	131.8	22 17.1	+58.2	132.1	21 36.8	+58.3	132.4	20 56.2	+58.5	132.7	20 15.3	+58.8	133.0	19 34.3	+58.9	133.3	9
10	25 14.3	+57.4	130.9	24 34.9	+57.7	131.2	23 55.2	+57.9	131.5	23 15.3	+58.1	131.9	22 35.1	+58.4	132.2	21 54.7	+58.5	132.5	21 14.1	+58.7	132.8	20 33.2	+58.9	133.1	10
11	26 11.7	+57.4	130.5	25 32.6	+57.6	130.9	24 53.1	+57.9	131.3	24 13.4	+58.1	131.6	23 33.5	+58.3	131.9	22 53.2	+58.6	132.3	22 12.8	+58.7	132.6	21 32.1	+58.8	132.9	11
12	27 09.1	+57.4	130.2	26 30.2	+57.6	130.6	25 51.0	+57.9	131.0	25 11.5	+58.1	131.3	24 31.8	+58.3	131.7	23 51.8	+58.4	132.0	23 11.5	+58.6	132.3	22 30.9	+58.9	132.6	12
13	28 06.5	+57.3	129.9	27 27.8	+57.6	130.3	26 48.9	+57.8	130.7	26 09.6	+58.1	131.1	25 30.1	+58.2	131.4	24 50.2	+58.5	131.8	24 10.1	+58.7	132.1	23 29.8	+58.8	132.4	13
14	29 03.8	+57.2	129.5	28 25.4	+57.5	130.0	27 46.7	+57.8	130.4	27 07.7	+58.0	130.8	26 28.3	+58.3	131.2	25 48.7	+58.5	131.5	25 08.8	+58.6	131.9	24 28.6	+58.8	132.2	14
15	30 01.0	+57.2	129.2	29 22.9	+57.5	129.6	28 44.5	+57.7	130.1	28 05.7	+58.0	130.5	27 26.6	+58.2	130.9	26 47.2	+58.4	131.3	26 07.4	+58.6	131.6	25 27.4	+58.8	132.0	15
16	30 58.2	+57.2	128.9	30 20.4	+57.4	129.3	29 42.2	+57.7	129.8	29 03.7	+57.9	130.2	28 24.8	+58.1	130.6	27 45.6	+58.4	131.0	27 06.0	+58.6	131.4	26 26.2	+58.8	131.8	16
17	31 55.4	+57.1	128.5	31 17.8	+57.4	129.0	30 39.9	+57.6	129.4	30 01.6	+57.9	129.9	29 22.9	+58.2	130.3	28 44.0	+58.3	130.7	28 04.6	+58.6	131.2	27 25.0	+58.7	131.6	17
18	32 52.5	+57.0	128.1	32 15.2	+57.3	128.6	31 37.5	+57.6	129.1	30 59.5	+57.9	129.6	30 21.1	+58.1	130.0	29 42.3	+58.3	130.5	29 03.2	+58.5	130.9	28 23.7	+58.7	131.3	18
19	33 49.5	+56.9	127.8	33 12.5	+57.3	128.3	32 35.1	+57.6	128.8	31 57.4	+57.8	129.3	31 19.2	+58.0	129.7	30 40.6	+58.3	130.2	30 01.7	+58.5	130.7	29 22.4	+58.7	131.1	19
20	34 46.4	+56.9	127.4	34 09.8	+57.2	127.9	33 32.7	+57.5	128.4	32 55.2	+57.7	129.0	32 17.2	+58.0	129.5	31 38.9	+58.3	129.9	31 00.2	+58.5	130.4	30 21.1	+58.7	130.8	20
21	35 43.3	+56.8	127.0	35 07.0	+57.1	127.6	34 30.2	+57.4	128.1	33 52.9	+57.7	128.6	33 15.2	+58.0	129.1	32 37.2	+58.2	129.6	31 58.7	+58.4	130.1	31 19.8	+58.7	130.6	21
22	36 40.1	+56.7	126.6	36 04.1	+57.0	127.2	35 27.6	+57.3	127.7	34 50.6	+57.7	128.3	34 13.2	+57.9	128.8	33 35.4	+58.1	129.4	32 57.1	+58.4	129.9	32 18.5	+58.6	130.4	22
23	37 36.8	+56.6	126.2	37 01.1	+57.0	126.8	36 24.9	+57.3	127.4	35 48.3	+57.6	128.0	35 11.1	+57.9	128.5	34 33.5	+58.2	129.1	33 55.5	+58.4	129.6	33 17.1	+58.5	130.1	23
24	38 33.4	+56.6	125.8	37 58.1	+56.9	126.4	37 22.2	+57.2	127.0	36 45.9	+57.5	127.6	36 09.0	+57.8	128.2	35 31.7	+58.0	128.8	34 53.9	+58.3	129.3	34 15.6	+58.6	129.8	24
25	39 30.0	+56.4	125.3	38 55.0	+56.8	126.0	38 19.4	+57.2	126.6	37 43.4	+57.4	127.3	37 06.8	+57.8	127.9	36 29.7	+58.1	128.5	35 52.2	+58.3	129.0	35 14.2	+58.5	129.6	25
26	40 26.4	+56.3	124.9	39 51.8	+56.7	125.6	39 16.6	+57.1	126.2	38 40.8	+57.4	126.9	38 04.6	+57.7	127.5	37 27.8	+57.9	128.1	36 50.5	+58.2	128.7	36 12.7	+58.5	129.3	26
27	41 22.7	+56.2	124.4	40 48.5	+56.6	125.1	40 13.7	+56.9	125.8	39 38.2	+57.4	126.5	39 02.3	+57.6	127.2	38 25.7	+58.0	127.8	37 48.7	+58.2	128.4	37 11.2	+58.4	129.0	27
28	42 18.9	+56.1	124.0	41 45.1	+56.5	124.7	41 10.6	+56.9	125.4	40 35.6	+57.2	126.1	39 59.9	+57.5	126.8	39 23.7	+57.8	127.5	38 46.9	+58.1	128.1	38 09.6	+58.4	128.7	28
29	43 15.0	+56.0	123.5	42 41.6	+56.4	124.2	42 07.5	+56.8	125.0	41 32.8	+57.1	125.7	40 57.4	+57.5	126.4	40 21.5	+57.8	127.1	39 45.0	+58.1	127.8	39 08.0	+58.3	128.4	29
30	44 11.0	+55.9	123.0	43 38.0	+56.3	123.8	43 04.3	+56.7	124.6	42 29.9	+57.1	125.3	41 54.9	+57.4	126.1	41 19.3	+57.8	126.8	40 43.1	+58.0	127.5	40 06.3	+58.3	128.1	30
31	45 06.9	+55.7	122.5	44 34.3	+56.1	123.3	44 01.0	+56.6	124.1	43 27.0	+57.0	124.9	42 52.3	+57.4	125.7	42 17.1	+57.6	126.4	41 41.1	+58.0	127.1	41 04.6	+58.3	127.8	31
32	46 02.6	+55.5	121.9	45 30.4	+56.1	122.8	44 57.6	+56.4	123.6	44 24.0	+56.8	124.5	43 49.7	+57.2	125.3	43 14.7	+57.6	126.0	42 39.1	+57.9	126.8	42 02.9	+58.2	127.5	32
33	46 58.1	+55.4	121.4	46 26.5	+55.8	122.3	45 54.0	+56.4	123.2	45 20.8	+56.8	124.0	44 46.9	+57.2	124.8	44 12.3	+57.5	125.6	43 37.0	+57.8	126.4	43 01.1	+58.1	127.2	33
34	47 53.5	+55.2	120.8	47 22.3	+55.7	121.7	46 50.4	+56.1	122.7	46 17.6	+56.6	123.5	45 44.1	+57.0	124.4	45 09.8	+57.4	125.2	44 34.8	+57.8	126.0	43 59.2	+58.1	126.8	34
35	48 48.7	+55.0	120.2	48 18.0	+55.6	121.2	47 46.5	+56.1	122.1	47 14.2	+56.5	123.1	46 41.1	+56.9	124.0	46 07.2	+57.3	124.8	45 32.6	+57.7	125.7	44 57.3	+57.9	126.5	35
36	49 43.7	+54.8	119.6	49 13.6	+55.4	120.6	48 42.6	+55.9	121.6	48 10.7	+56.4	122.6	47 38.0	+56.8	123.5	47 04.5	+57.2	124.4	46 30.3	+57.5	125.3	45 55.2	+58.0	126.1	36
37	50 38.5	+54.6	119.0	50 09.0	+55.2	120.0	49 38.5	+55.7	121.1	49 07.1	+56.2	122.0	48 34.8	+56.7	123.0	48 01.7	+57.2	123.9	47 27.8	+57.5	124.9	46 53.2	+57.8	125.7	37
38	51 33.1	+54.4	118.3	51 04.2	+55.0	119.4	50 34.2	+55.6	120.5	50 03.3	+56.1	121.5	49 31.5	+56.6	122.5	48 58.9	+56.9	123.5	48 25.3	+57.4	124.4	47 51.0	+57.8	125.3	38
39	52 27.5	+54.1	117.6	51 59.2	+54.7	118.8	51 29.8	+55.3	119.9	50 59.4	+55.9	120.9	50 28.1	+56.4	122.0	49 55.8	+56.9	123.0	49 22.7	+57.3	124.0	48 48.8	+57.7	124.9	39
40	53 21.6	+53.9	116.9	52 53.9	+54.6	118.1	52 25.1	+55.2	119.2	51 55.3	+55.7	120.4	51 24.5	+56.2	121.4	50 52.7	+56.8	122.5	50 20.0	+57.2	123.5	49 46.5	+57.5	124.5	40
41	54 15.5	+53.6	116.2	53 48.5	+54.2	117.4	53 20.3	+54.9	118.6	52 51.0	+55.6	119.8	52 20.7	+56.1	120.9	51 49.5	+56.6	122.0	51 17.2	+57.1	123.0	50 44.0	+57.5	124.1	41
42	55 09.1	+53.2	115.4	54 42.7	+54.0	116.7	54 15.2	+54.7	117.9	53 46.6	+55.3	119.1	53 16.8	+55.9	120.3	52 46.1	+56.4	121.4	52 14.3	+56.9	122.5	51 41.5	+57.4	123.6	42
43	56 02.3	+52.9	114.6	55 36.7	+53.7	115.9	55 09.9	+54.4	117.2	54 41.9	+55.1	118.5	54 12.7	+55.8	119.7	53 42.5	+56.3	120.9	53 11.2	+56.8	122.0	52 38.9	+57.2	123.1	43
44	56 55.2	+52.6	113.7	56 30.4	+53.4	115.1	56 04.3	+54.2	116.5	55 37.0	+54.9	117.8	55 08.5	+55.5	119.0	54 38.8	+56.1	120.3	54 08.0	+56.6	121.5	53 36.1	+57.1	122.6	44
45	57 47.8	+52.2	112.8	57 23.8	+53.1	114.3	56 58.5	+53.8	115.7	56 31.9	+54.5	117.0	56 04.0	+55.2	118.4	55 34.9	+55.8	119.7	55 04.6	+56.5	120.9	54 33.2	+57.0	122.1	45
46	58 40.0	+51.7	111.9	58 16.9	+52.6	113.4	57 52.3	+53.5	114.9	57 26.4	+54.3	116.3	56 59.2	+55.0	117.7	56 30.7	+55.7	119.0	56 01.1	+56.2	120.3	55 30.2	+56.8	121.6	46
47	59 31.7	+51.2	110.9	59 09.5	+52.2	112.5	58 45.8	+53.2	114.0	58 20.7	+54.0	115.5	57 54.2	+54.8	116.9	57 26.4	+55.5	118.3	56 57.3	+56.1	119.7	56 27.0	+56.7	121.0	47
48	60 22.9	+50.8	109.9	60 01.7	+51.8	111.5	59 39.0	+52.7	113.1	59 14.7	+53.6	114.6	58 49.0	+54.4	116.1	58 21.9	+55.1	117.6	57 53.4	+55.9	119.0	57 23.7	+56.4	120.4	48
49	61 13.7	+50.2	108.8	60 53.5	+51.3	110.5	60 31.7	+52.4	112.1	60 08.3	+53.3	113.7	59 43.4	+54.2	115.3	59 17.0	+55.0	116.8	58 49.3	+55.6	118.3	58 20.1	+56.3	119.8	49
50	62 03.9	+49.5	107.6	61 44.8	+50.8	109.4	61 24.1	+51.8	111.1	61 01.6	+52.9	112.8	60 37.6	+53.7	114.5	60 12.0	+54.6	116.0	59 44.9	+55.4	117.6	59 16.4	+56.1	119.1	50
51	62 53.4	+49.0	106.4	62 35.6	+50.1	108.2	62 15.9	+51.3	110.1	61 54.5	+52.3	111.8	61 31.3	+53.4	113.5	61 06.6	+54.2	115.2	60 40.3	+55.0	116.8	60 12.5	+55.8	118.4	51
52	63 42.4	+48.1	105.1	63 25.7	+49.6	107.0	63 07.2	+50.8	108.9	62 46.8	+51.9	110.8	62 24.7	+52.9	112.6	62 00.8	+53.9	114.3	61 35.3	+54.8	116.0	61 08.3	+55.5	117.6	52
53	64 30.5	+47.4	103.7	64 15.3	+48.8	105.8	63 58.0	+50.1	107.7	63 38.7	+51.4	109.7	63 17.6	+52.5	111.5	62 54.7	+53.5	113.4	62 30.1	+54.4	115.1	62 03.8	+55.3	116.8	53
54	65 17.9	+46.5	102.3	65 04.1	+48.0	104.4	64 48.1	+49.4	106.5	64 30.1	+50.7	108.5	64 10.1	+51.9	110.4	63 48.2	+53.1	112.3	63 24.5	+54.1	114.2	62 59.1	+54.9	116.0	54
55	66 04.4	+45.5	100.8	65 52.1	+47.1	103.0	65 37.5	+48.7	105.1	65 20.8	+50.1	107.2	65 02.0	+51.4	109.3	64 41.3	+52.5	111.3	64 18.6	+53.6	113.2	63 54.0	+54.6	115.1	55
56	66 49.9	+44.5	99.1	66 39.2	+46.2	101.4	66 26.2	+47.8	103.7	66 10.9	+49.3	105.9	65 53.4	+50.7	108.0	65 33.8	+52.0	110.1	65 12.2	+53.1	112.2	64 48.6	+54.2	114.1	56
57	67 34.4	+43.2	97.4	67 25.4	+45.1	99.8	67 14.0	+46.9	102.1	67 00.2	+48.5	104.4	66 44.1	+50.0	106.7	66 25.8	+51.3	108.9	66 05.3	+52.6	111.0	65 42.8	+53.7	113.1	57
58	68 17.6	+42.0	95.5	68 10.5	+44.0	98.0	68 00.9	+45.8	100.5	67 48.7	+47.6	102.9	67 34.1	+49.2	105.3	67 17.1	+50.7	107.6	66 57.9	+52.0	109.8	66 36.5	+53.2	112.0	58
59	68 59.6	+40.5	93.6	68 54.5	+42.6	96.2	68 46.7	+44.7	98.7	68 36.3	+46.5	101.3	68 23.3	+48.3	103.7	68 07.8	+49.9	106.2	67 49.9	+51.4	108.5	67 29.7	+52.7	110.8	59
60	69 40.1	+39.0	91.5	69 37.1	+41.3	94.2	69 31.4	+43.3	96.9	69 22.8	+45.4	99.5	69 11.6	+47.3	102.1	68 57.7	+49.0	104.6	68 41.3	+50.6	107.1	68 22.4	+52.1	109.5	60
61	70 19.1	+37.2	89.3	70 18.4	+39.6	92.1	70 14.7	+42.0	94.8	70 08.2	+44.1	97.6	69 58.9	+46.1	100.3	69 46.7	+48.1	103.0	69 31.9	+49.8	105.6	69 14.5	+51.3	108.2	61
62	70 56.3	+35.2	86.9	70 58.0	+37.8	89.8	70 56.7	+40.3	92.7	70 52.3	+42.7	95.6	70 45.0	+44.9	98.4	70 34.8	+46.9	101.2	70 21.7	+48.8	104.0	70 05.8	+50.5	106.7	62
63	71 31.5	+33.2	84.4	71 35.8	+35.9	87.4	71 37.0	+38.5	90.4	71 35.0	+41.1	93.4	71 29.9	+43.4	96.4	71 21.7	+45.7	99.3	71 10.5	+47.7	102.2	70 56.3	+49.6	105.1	63
64	72 04.7	+30.8	81.7	72 11.7	+33.7	84.8	72 15.5	+36.6	87.9	72 16.1	+39.2	91.0	72 13.3	+41.9	94.2	72 07.4	+44.2	97.3	71 58.2	+46.5	100.3	71 45.9	+48.6	103.3	64
65	72 35.5	+28.3	78.9	72 45.4	+31.4	82.1	72 52.1	+34.3	85.3	72 55.3	+37.2	88.5	72 55.2	+40.0	91.8	72 51.6	+42.7	95.0	72 44.7	+45.1	98.2	72 34.5	+47.3	101.4	65
66	73 03.8	+25.6	75.9	73 16.8	+28.7	79.1	73 26.4	+31.9	82.4	73 32.5	+35.0	85.8	73 35.2	+37.9	89.2	73 34.3	+40.8	92.6	73 29.8	+43.5	95.9	73 21.8	+46.0	99.3	66
67	73 29.4	+22.6	72.8	73 45.5	+25.9	76.0	73 58.3	+29.1	79.4	74 07.5	+32.5	82.9	74 13.1	+35.7	86.4	74 15.1	+38.7	89.9	74 13.3	+41.6	93.5	74 07.8	+44.4	97.0	67
68	73 52.0	+19.4	69.5	74 11.4	+22.8	72.8	74 27.4	+26.3	76.2	74 40.0	+29.6	79.7	74 48.8	+33.0	83.4	74 53.8	+36.3	87.1	74 54.9	+39.6	90.8	74 52.2	+42.5	94.5	68
69	74 11.4	+16.0	66.0	74 34.2	+19.5	69.3	74 53.7	+23.0	72.8	75 09.6	+26.6	76.4	75 21.8	+30.2	80.1	75 30.1	+33.7	83.9	75 34.5	+37.1	87.8	75 34.7	+40.4	91.7	69
70	74 27.4	+12.6	62.5	74 53.7	+15.9	65.7	75 16.7	+19.5	69.2	75 36.2	+23.2	72.9	75 52.0	+26.9	76.6	76 03.8	+30.7	80.6	76 11.6	+34.4	84.6	76 15.1	+38.0	88.7	70
71	74 40.0	+8.8	58.8	75 09.6	+12.2	62.0	75 36.2	+15.8	65.4	75 59.4	+19.5	69.1	76 18.9	+23.4	72.9	76 34.5	+27.3	76.9	76 46.0	+31.2	81.1	76 53.1	+35.1	85.3	71
72	74 48.8	+5.0	55.0	75 21.8	+8.3	58.2	75 52.0	+11.8	61.5	76 18.9	+15.6	65.1	76 42.3	+19.5	69.0	77 01.8	+23.7	73.0	77 17.2	+27.8	77.3	77 28.2	+31.9	81.7	72
73	74 53.8	+1.1	51.2	75 30.1	+4.4	54.2	76 03.8	+7.8	57.5	76 34.5	+11.5	61.0	77 01.8	+15.4	64.8	77 25.5	+19.5	68.9	77 45.0	+23.8	73.2	78 00.1	+28.2	77.7	73
74	74 54.9	−2.7	47.4	75 34.5	+0.2	50.2	76 11.6	+3.5	53.4	76 46.0	+7.1	56.8	77 17.2	+11.0	60.5	77 45.0	+15.1	64.5	78 08.8	+19.5	68.8	78 28.3	+24.0	73.3	74
75	74 52.2	−6.6	43.5	75 34.7	−3.8	46.2	76 15.1	−0.7	49.2	76 53.1	+2.6	52.4	77 28.2	+6.4	56.0	78 00.1	+10.4	59.9	78 28.3	+14.8	64.1	78 52.3	+19.5	68.7	75
76	74 45.6	−10.3	39.7	75 30.9	−7.8	42.2	76 14.4	−5.0	45.0	76 55.7	−1.8	48.0	77 34.6	+1.6	51.4	78 10.5	+5.5	55.1	78 43.1	+9.7	59.2	79 11.8	+14.4	63.7	76
77	74 35.3	−14.0	36.0	75 23.1	−11.7	38.3	76 09.4	−9.2	40.8	76 53.9	−6.4	43.6	77 36.2	−3.1	46.7	78 16.0	+0.5	50.2	78 52.8	+4.6	54.1	79 26.2	+8.9	58.5	77
78	74 21.3	−17.5	32.4	75 11.4	−15.5	34.4	76 00.2	−13.2	36.7	76 47.5	−10.7	39.2	77 33.1	−7.8	42.1	78 16.5	−4.5	45.3	78 57.4	−0.9	48.9	79 35.1	+3.4	53.0	78
79	74 03.8	−20.8	28.9	74 55.9	−19.0	30.7	75 47.0	−17.1	32.7	76 36.8	−14.8	34.9	77 25.3	−12.4	37.5	78 12.0	−9.5	40.4	78 56.5	−6.1	43.7	79 38.5	−2.3	47.5	79
80	73 43.0	−23.8	25.5	74 36.9	−22.4	27.0	75 29.9	−20.8	28.8	76 22.0	−18.9	30.8	77 12.9	−16.7	33.0	78 02.5	−14.2	35.6	78 50.4	−11.4	38.5	79 36.2	−8.0	41.9	80
81	73 19.2	−26.7	22.2	74 14.5	−25.5	23.6	75 09.1	−24.1	25.1	76 03.1	−22.6	26.8	76 56.2	−20.8	28.7	77 48.3	−18.7	31.0	78 39.0	−16.3	33.5	79 28.2	−13.5	36.5	81
82	72 52.5	−29.4	19.2	73 49.0	−28.4	20.3	74 45.0	−27.3	21.6	75 40.5	−26.0	23.0	76 35.4	−24.5	24.6	77 29.6	−22.9	26.5	78 22.7	−20.8	28.7	79 14.7	−18.5	31.2	82
83	72 23.1	−31.8	16.2	73 20.6	−31.0	17.2	74 17.7	−30.1	18.2	75 14.5	−29.1	19.4	76 10.9	−28.0	20.8	77 06.7	−26.6	22.3	78 01.9	−25.1	24.1	78 56.2	−23.3	26.2	83
84	71 51.3	−34.0	13.5	72 49.6	−33.5	14.2	73 47.6	−32.7	15.1	74 45.4	−32.0	16.0	75 42.9	−31.1	17.1	76 40.1	−30.1	18.4	77 36.8	−28.9	19.8	78 32.9	−27.4	21.5	84
85	71 17.3	−36.1	10.9	72 16.1	−35.6	11.5	73 14.9	−35.2	12.1	74 13.4	−34.5	12.9	75 11.8	−33.9	13.7	76 10.0	−33.1	14.7	77 07.9	−32.3	15.8	78 05.5	−31.3	17.1	85
86	70 41.2	−37.9	8.4	71 40.5	−37.6	8.9	72 39.7	−37.2	9.4	73 38.9	−36.8	9.9	74 37.9	−36.3	10.5	75 36.9	−35.9	11.2	76 35.6	−35.2	12.1	77 34.2	−34.6	13.0	86
87	70 03.3	−39.7	6.1	71 02.9	−39.4	6.4	72 02.5	−39.2	6.8	73 02.1	−39.0	7.2	74 01.6	−38.7	7.6	75 01.0	−38.3	8.1	76 00.4	−37.9	8.6	76 59.6	−37.4	9.3	87
88	69 23.6	−41.1	3.9	70 23.5	−41.0	4.1	71 23.3	−40.9	4.4	72 23.1	−40.7	4.6	73 22.9	−40.5	4.9	74 22.7	−40.4	5.2	75 22.5	−40.3	5.5	76 22.2	−40.0	5.9	88
89	68 42.5	−42.5	1.9	69 42.5	−42.5	2.0	70 42.4	−42.4	2.1	71 42.4	−42.4	2.2	72 42.4	−42.4	2.3	73 42.3	−42.3	2.5	74 42.2	−42.2	2.6	75 42.2	−42.2	2.8	89
90	68 00.0	−43.8	0.0	69 00.0	−43.8	0.0	70 00.0	−43.8	0.0	71 00.0	−43.9	0.0	72 00.0	−43.9	0.0	73 00.0	−44.0	0.0	74 00.0	−44.0	0.0	75 00.0	−44.1	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

44°, 316° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 44°, 316°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	15 38.0	−57.8	133.8	14 56.3	−58.0	134.0	14 14.6	−58.2	134.2	13 32.6	−58.3	134.4	12 50.6	−58.5	134.6	12 08.4	−58.6	134.7	11 26.2	−58.9	134.9	10 43.8	−59.0	135.0	0
1	14 40.2	−57.8	134.1	13 58.3	−58.0	134.3	13 16.4	−58.2	134.5	12 34.3	−58.4	134.6	11 52.1	−58.6	134.8	11 09.8	−58.8	134.9	10 27.3	−58.8	135.1	9 44.8	−59.0	135.2	1
2	13 42.4	−57.8	134.4	13 00.3	−58.0	134.6	12 18.2	−58.2	134.7	11 35.9	−58.4	134.9	10 53.5	−58.5	135.0	10 11.0	−58.7	135.1	9 28.5	−58.9	135.3	8 45.8	−59.0	135.4	2
3	12 44.6	−57.9	134.7	12 02.3	−58.0	134.8	11 20.0	−58.2	135.0	10 37.5	−58.4	135.1	9 55.0	−58.6	135.2	9 12.3	−58.7	135.4	8 29.6	−58.9	135.5	7 46.8	−59.0	135.6	3
4	11 46.7	−57.8	134.9	11 04.3	−58.0	135.1	10 21.8	−58.3	135.2	9 39.1	−58.4	135.3	8 56.4	−58.6	135.5	8 13.6	−58.7	135.6	7 30.7	−58.8	135.7	6 47.8	−59.0	135.7	4
5	10 48.9	−57.9	135.2	10 06.3	−58.1	135.3	9 23.5	−58.2	135.5	8 40.7	−58.4	135.6	7 57.8	−58.5	135.7	7 14.9	−58.7	135.8	6 31.9	−58.9	135.9	5 48.8	−59.0	135.9	5
6	9 51.0	−57.9	135.5	9 08.2	−58.1	135.6	8 25.3	−58.3	135.7	7 42.3	−58.4	135.8	6 59.3	−58.6	135.9	6 16.2	−58.8	136.0	5 33.0	−58.9	136.0	4 49.8	−59.0	136.1	6
7	8 53.1	−57.8	135.7	8 10.1	−58.0	135.8	7 27.0	−58.2	135.9	6 43.9	−58.4	136.0	6 00.7	−58.6	136.1	5 17.4	−58.7	136.2	4 34.1	−58.9	136.2	3 50.8	−59.1	136.3	7
8	7 55.3	−57.9	136.0	7 12.1	−58.1	136.1	6 28.8	−58.3	136.2	5 45.5	−58.5	136.3	5 02.1	−58.6	136.3	4 18.7	−58.8	136.4	3 35.2	−58.9	136.4	2 51.7	−59.0	136.5	8
9	6 57.4	−57.9	136.3	6 14.0	−58.1	136.4	5 30.5	−58.2	136.4	4 47.0	−58.4	136.5	4 03.5	−58.6	136.5	3 19.9	−58.7	136.6	2 36.3	−58.8	136.6	1 52.7	−59.0	136.6	9
10	5 59.5	−58.0	136.5	5 15.9	−58.1	136.6	4 32.3	−58.3	136.7	3 48.6	−58.4	136.7	3 04.9	−58.6	136.8	2 21.2	−58.8	136.8	1 37.5	−58.9	136.8	0 53.7	−59.0	136.8	10
11	5 01.5	−57.9	136.8	4 17.8	−58.1	136.9	3 34.0	−58.3	136.9	2 50.2	−58.5	136.9	2 06.3	−58.6	137.0	1 22.4	−58.7	137.0	0 38.6	−58.9	137.0	0 05.3	+59.0	43.0	11
12	4 03.6	−57.9	137.1	3 19.7	−58.1	137.1	2 35.7	−58.3	137.1	1 51.7	−58.4	137.2	1 07.7	−58.6	137.2	0 23.7	−58.8	137.2	0 20.3	+58.9	42.8	1 04.3	+59.1	42.8	12
13	3 05.7	−57.9	137.3	2 21.6	−58.1	137.4	1 37.4	−58.2	137.4	0 53.3	−58.5	137.4	0 09.1	−58.6	137.4	0 35.1	+58.7	42.6	1 19.2	+58.9	42.6	2 03.4	+59.0	42.6	13
14	2 07.8	−58.0	137.6	1 23.5	−58.1	137.6	0 39.2	−58.3	137.6	0 05.2	+58.4	42.4	0 49.5	+58.6	42.4	1 33.8	+58.8	42.4	2 18.1	+58.9	42.4	3 02.4	+59.0	42.5	14
15	1 09.8	−57.9	137.8	0 25.4	−58.2	137.9	0 19.1	+58.3	42.1	1 03.6	+58.5	42.2	1 48.1	+58.6	42.2	2 32.6	+58.7	42.2	3 17.0	+58.9	42.2	4 01.4	+59.0	42.3	15
16	0 11.9	−57.9	138.1	0 32.8	+58.1	41.9	1 17.4	+58.3	41.9	2 02.1	+58.4	41.9	2 46.7	+58.6	42.0	3 31.3	+58.7	42.0	4 15.9	+58.9	42.0	5 00.4	+59.0	42.1	16
17	0 46.0	+58.0	41.6	1 30.9	+58.1	41.6	2 15.7	+58.3	41.7	3 00.5	+58.4	41.7	3 45.3	+58.6	41.7	4 30.0	+58.8	41.8	5 14.8	+58.8	41.8	5 59.4	+59.0	41.9	17
18	1 44.0	+57.9	41.4	2 29.0	+58.1	41.4	3 14.0	+58.2	41.4	3 58.9	+58.5	41.5	4 43.9	+58.6	41.5	5 28.8	+58.7	41.6	6 13.6	+58.9	41.7	6 58.4	+59.1	41.7	18
19	2 41.9	+57.9	41.1	3 27.1	+58.1	41.1	4 12.2	+58.3	41.2	4 57.4	+58.4	41.2	5 42.5	+58.6	41.3	6 27.5	+58.7	41.4	7 12.5	+58.9	41.5	7 57.5	+59.0	41.5	19
20	3 39.8	+57.9	40.9	4 25.2	+58.1	40.9	5 10.5	+58.3	41.0	5 55.8	+58.4	41.0	6 41.1	+58.5	41.1	7 26.2	+58.8	41.2	8 11.4	+58.8	41.3	8 56.5	+58.9	41.4	20
21	4 37.7	+57.9	40.6	5 23.3	+58.1	40.6	6 08.8	+58.2	40.7	6 54.2	+58.5	40.8	7 39.6	+58.6	40.9	8 25.0	+58.7	41.0	9 10.2	+58.9	41.1	9 55.4	+59.0	41.2	21
22	5 35.6	+58.0	40.3	6 21.4	+58.1	40.4	7 07.0	+58.3	40.5	7 52.7	+58.4	40.6	8 38.2	+58.6	40.7	9 23.7	+58.7	40.8	10 09.1	+58.9	40.9	10 54.4	+59.0	41.0	22
23	6 33.6	+57.9	40.1	7 19.5	+58.0	40.1	8 05.3	+58.2	40.2	8 51.1	+58.4	40.3	9 36.8	+58.5	40.4	10 22.4	+58.7	40.5	11 08.0	+58.8	40.7	11 53.4	+59.0	40.8	23
24	7 31.5	+57.9	39.8	8 17.5	+58.1	39.9	9 03.5	+58.3	40.0	9 49.5	+58.4	40.1	10 35.3	+58.6	40.2	11 21.1	+58.7	40.3	12 06.8	+58.8	40.5	12 52.4	+59.0	40.6	24
25	8 29.4	+57.8	39.5	9 15.6	+58.0	39.6	10 01.8	+58.2	39.7	10 47.9	+58.3	39.9	11 33.9	+58.5	40.0	12 19.8	+58.7	40.1	13 05.6	+58.9	40.3	13 51.4	+58.9	40.4	25
26	9 27.2	+57.9	39.3	10 13.6	+58.1	39.4	11 00.0	+58.2	39.5	11 46.2	+58.4	39.6	12 32.4	+58.5	39.8	13 18.5	+58.7	39.9	14 04.5	+58.8	40.1	14 50.3	+59.0	40.2	26
27	10 25.1	+57.9	39.0	11 11.7	+58.0	39.1	11 58.2	+58.2	39.2	12 44.6	+58.4	39.4	13 30.9	+58.6	39.5	14 17.2	+58.6	39.7	15 03.3	+58.8	39.9	15 49.3	+58.9	40.0	27
28	11 23.0	+57.8	38.7	12 09.7	+58.0	38.9	12 56.4	+58.2	39.0	13 43.0	+58.3	39.1	14 29.5	+58.4	39.3	15 15.8	+58.7	39.5	16 02.1	+58.8	39.7	16 48.2	+58.9	39.8	28
29	12 20.8	+57.8	38.5	13 07.7	+58.0	38.6	13 54.6	+58.1	38.7	14 41.3	+58.3	38.9	15 27.9	+58.5	39.1	16 14.5	+58.6	39.3	17 00.9	+58.7	39.4	17 47.1	+58.9	39.6	29
30	13 18.6	+57.8	38.2	14 05.7	+58.0	38.3	14 52.7	+58.2	38.5	15 39.6	+58.4	38.7	16 26.4	+58.5	38.8	17 13.1	+58.6	39.0	17 59.6	+58.8	39.2	18 46.0	+58.9	39.4	30
31	14 16.4	+57.8	37.9	15 03.7	+58.0	38.1	15 50.9	+58.1	38.2	16 38.0	+58.3	38.4	17 24.9	+58.5	38.6	18 11.7	+58.6	38.8	18 58.4	+58.8	39.0	19 44.9	+58.9	39.2	31
32	15 14.2	+57.8	37.6	16 01.7	+57.9	37.8	16 49.0	+58.1	38.0	17 36.3	+58.2	38.2	18 23.4	+58.4	38.4	19 10.3	+58.6	38.6	19 57.2	+58.7	38.8	20 43.8	+58.9	39.0	32
33	16 12.0	+57.7	37.3	16 59.6	+57.9	37.5	17 47.1	+58.1	37.7	18 34.5	+58.3	37.9	19 21.8	+58.4	38.1	20 08.9	+58.6	38.4	20 55.9	+58.7	38.6	21 42.7	+58.9	38.8	33
34	17 09.7	+57.7	37.1	17 57.5	+57.9	37.3	18 45.2	+58.1	37.5	19 32.8	+58.2	37.7	20 20.2	+58.4	37.9	21 07.5	+58.5	38.1	21 54.6	+58.7	38.4	22 41.6	+58.8	38.6	34
35	18 07.4	+57.7	36.8	18 55.4	+57.9	37.0	19 43.3	+58.0	37.2	20 31.0	+58.2	37.4	21 18.6	+58.4	37.6	22 06.0	+58.6	37.9	22 53.3	+58.7	38.1	23 40.4	+58.8	38.4	35
36	19 05.1	+57.7	36.5	19 53.3	+57.9	36.7	20 41.3	+58.1	36.9	21 29.2	+58.2	37.2	22 17.0	+58.3	37.4	23 04.6	+58.5	37.7	23 52.0	+58.6	37.9	24 39.2	+58.8	38.2	36
37	20 02.8	+57.6	36.2	20 51.2	+57.8	36.4	21 39.4	+58.0	36.6	22 27.4	+58.2	36.9	23 15.3	+58.4	37.1	24 03.1	+58.5	37.4	24 50.6	+58.7	37.7	25 38.0	+58.8	38.0	37
38	21 00.4	+57.6	35.9	21 49.0	+57.8	36.1	22 37.4	+57.9	36.4	23 25.6	+58.1	36.6	24 13.7	+58.3	36.9	25 01.6	+58.4	37.2	25 49.3	+58.6	37.5	26 36.8	+58.8	37.8	38
39	21 58.0	+57.6	35.6	22 46.8	+57.7	35.8	23 35.3	+58.0	36.1	24 23.7	+58.1	36.4	25 12.0	+58.2	36.6	26 00.0	+58.5	36.9	26 47.9	+58.6	37.2	27 35.6	+58.7	37.5	39
40	22 55.6	+57.6	35.3	23 44.5	+57.7	35.5	24 33.3	+57.9	35.8	25 21.8	+58.1	36.1	26 10.2	+58.3	36.4	26 58.5	+58.4	36.7	27 46.5	+58.6	37.0	28 34.3	+58.7	37.3	40
41	23 53.2	+57.5	35.0	24 42.2	+57.7	35.2	25 31.2	+57.8	35.5	26 19.9	+58.0	35.8	27 08.5	+58.2	36.1	27 56.9	+58.3	36.4	28 45.1	+58.5	36.7	29 33.0	+58.7	37.1	41
42	24 50.7	+57.4	34.7	25 39.9	+57.7	34.9	26 29.0	+57.8	35.2	27 17.9	+58.1	35.5	28 06.7	+58.2	35.8	28 55.2	+58.4	36.1	29 43.6	+58.5	36.5	30 31.7	+58.7	36.8	42
43	25 48.1	+57.4	34.4	26 37.6	+57.6	34.6	27 26.8	+57.8	34.9	28 16.0	+57.9	35.2	29 04.9	+58.1	35.5	29 53.6	+58.3	35.9	30 42.1	+58.5	36.2	31 30.4	+58.6	36.6	43
44	26 45.5	+57.4	34.0	27 35.2	+57.5	34.3	28 24.6	+57.8	34.6	29 13.9	+58.0	34.9	30 03.0	+58.1	35.3	30 51.9	+58.3	35.6	31 40.6	+58.4	36.0	32 29.0	+58.6	36.3	44
45	27 42.9	+57.3	33.7	28 32.7	+57.5	34.0	29 22.4	+57.7	34.3	30 11.9	+57.8	34.6	31 01.1	+58.1	35.0	31 50.2	+58.2	35.3	32 39.0	+58.4	35.7	33 27.6	+58.6	36.1	45
46	28 40.2	+57.3	33.4	29 30.2	+57.5	33.7	30 20.1	+57.6	34.0	31 09.7	+57.9	34.3	31 59.2	+58.0	34.7	32 48.4	+58.2	35.0	33 37.4	+58.4	35.4	34 26.2	+58.6	35.8	46
47	29 37.5	+57.2	33.0	30 27.7	+57.4	33.3	31 17.7	+57.7	33.7	32 07.6	+57.8	34.0	32 57.2	+58.0	34.4	33 46.6	+58.2	34.7	34 35.8	+58.3	35.1	35 24.8	+58.5	35.5	47
48	30 34.7	+57.2	32.7	31 25.1	+57.4	33.0	32 15.4	+57.5	33.3	33 05.4	+57.7	33.7	33 55.2	+57.9	34.1	34 44.8	+58.1	34.5	35 34.1	+58.3	34.9	36 23.3	+58.4	35.3	48
49	31 31.9	+57.1	32.3	32 22.5	+57.3	32.7	33 12.9	+57.5	33.0	34 03.1	+57.7	33.4	34 53.1	+57.9	33.8	35 42.9	+58.1	34.1	36 32.4	+58.3	34.6	37 21.7	+58.4	35.0	49
50	32 29.0	+57.0	32.0	33 19.8	+57.2	32.3	34 10.4	+57.5	32.7	35 00.8	+57.7	33.0	35 51.0	+57.8	33.4	36 41.0	+58.0	33.8	37 30.7	+58.2	34.3	38 20.1	+58.4	34.7	50
51	33 26.0	+57.0	31.6	34 17.0	+57.2	31.9	35 07.9	+57.3	32.3	35 58.5	+57.5	32.7	36 48.8	+57.8	33.1	37 39.0	+58.0	33.5	38 28.9	+58.1	33.9	39 18.5	+58.4	34.4	51
52	34 23.0	+56.9	31.2	35 14.2	+57.1	31.6	36 05.2	+57.4	32.0	36 56.0	+57.6	32.3	37 46.6	+57.7	32.8	38 37.0	+57.9	33.2	39 27.0	+58.1	33.6	40 16.9	+58.2	34.1	52
53	35 19.9	+56.8	30.8	36 11.3	+57.1	31.2	37 02.6	+57.2	31.6	37 53.6	+57.4	32.0	38 44.3	+57.7	32.4	39 34.9	+57.8	32.8	40 25.1	+58.1	33.3	41 15.1	+58.3	33.8	53
54	36 16.7	+56.8	30.4	37 08.4	+56.9	30.8	37 59.8	+57.2	31.2	38 51.0	+57.4	31.6	39 42.0	+57.6	32.1	40 32.7	+57.8	32.5	41 23.2	+58.0	33.0	42 13.4	+58.2	33.5	54
55	37 13.5	+56.6	30.0	38 05.3	+56.9	30.4	38 57.0	+57.1	30.8	39 48.4	+57.3	31.2	40 39.6	+57.5	31.7	41 30.5	+57.7	32.1	42 21.2	+57.9	32.6	43 11.6	+58.1	33.1	55
56	38 10.1	+56.6	29.6	39 02.2	+56.8	30.0	39 54.1	+57.0	30.4	40 45.7	+57.2	30.9	41 37.1	+57.4	31.3	42 28.2	+57.7	31.8	43 19.1	+57.8	32.3	44 09.7	+58.0	32.8	56
57	39 06.7	+56.5	29.2	39 59.0	+56.7	29.6	40 51.1	+56.9	30.0	41 42.9	+57.1	30.5	42 34.5	+57.4	30.9	43 25.9	+57.5	31.4	44 16.9	+57.8	31.9	45 07.7	+58.0	32.4	57
58	40 03.2	+56.4	28.7	40 55.7	+56.6	29.2	41 48.0	+56.8	29.6	42 40.0	+57.1	30.0	43 31.9	+57.2	30.5	44 23.4	+57.5	31.0	45 14.7	+57.7	31.5	46 05.7	+57.9	32.1	58
59	40 59.6	+56.2	28.3	41 52.3	+56.5	28.7	42 44.8	+56.7	29.2	43 37.1	+56.9	29.6	44 29.1	+57.2	30.1	45 20.9	+57.4	30.6	46 12.4	+57.6	31.1	47 03.6	+57.8	31.7	59
60	41 55.8	+56.2	27.8	42 48.8	+56.4	28.3	43 41.5	+56.6	28.7	44 34.0	+56.9	29.2	45 26.3	+57.1	29.7	46 18.3	+57.3	30.2	47 10.0	+57.5	30.7	48 01.4	+57.8	31.3	60
61	42 52.0	+56.0	27.4	43 45.2	+56.2	27.8	44 38.1	+56.5	28.2	45 30.9	+56.7	28.7	46 23.4	+56.9	29.2	47 15.6	+57.2	29.8	48 07.5	+57.5	30.3	48 59.2	+57.7	30.9	61
62	43 48.0	+55.9	26.9	44 41.4	+56.2	27.3	45 34.6	+56.4	27.8	46 27.6	+56.6	28.3	47 20.3	+56.9	28.8	48 12.8	+57.1	29.3	49 05.0	+57.3	29.9	49 56.9	+57.5	30.5	62
63	44 43.9	+55.8	26.4	45 37.6	+56.0	26.8	46 31.0	+56.3	27.3	47 24.2	+56.5	27.8	48 17.2	+56.7	28.3	49 09.9	+57.0	28.8	50 02.3	+57.2	29.4	50 54.4	+57.5	30.0	63
64	45 39.7	+55.6	25.8	46 33.6	+55.8	26.3	47 27.3	+56.1	26.8	48 20.7	+56.4	27.3	49 13.9	+56.6	27.8	50 06.9	+56.8	28.4	50 59.5	+57.1	28.9	51 51.9	+57.3	29.5	64
65	46 35.3	+55.4	25.3	47 29.4	+55.7	25.8	48 23.4	+55.9	26.2	49 17.1	+56.2	26.7	50 10.5	+56.5	27.3	51 03.7	+56.7	27.8	51 56.6	+57.0	28.4	52 49.2	+57.2	29.1	65
66	47 30.7	+55.3	24.7	48 25.1	+55.6	25.2	49 19.3	+55.8	25.7	50 13.3	+56.0	26.2	51 07.0	+56.3	26.7	52 00.4	+56.6	27.3	52 53.6	+56.8	27.9	53 46.4	+57.1	28.6	66
67	48 26.0	+55.1	24.1	49 20.7	+55.3	24.6	50 15.1	+55.6	25.1	51 09.3	+55.9	25.6	52 03.3	+56.1	26.2	52 57.0	+56.4	26.8	53 50.4	+56.7	27.4	54 43.5	+57.0	28.0	67
68	49 21.1	+54.9	23.5	50 16.0	+55.2	24.0	51 10.7	+55.4	24.5	52 05.2	+55.7	25.1	52 59.4	+56.0	25.6	53 53.4	+56.2	26.2	54 47.1	+56.5	26.8	55 40.5	+56.8	27.5	68
69	50 16.0	+54.7	22.9	51 11.2	+54.9	23.4	52 06.1	+55.3	23.9	53 00.9	+55.5	24.4	53 55.4	+55.8	25.0	54 49.6	+56.1	25.6	55 43.6	+56.3	26.2	56 37.3	+56.6	26.9	69
70	51 10.7	+54.5	22.3	52 06.1	+54.8	22.8	53 01.4	+55.0	23.3	53 56.4	+55.3	23.8	54 51.2	+55.5	24.4	55 45.7	+55.8	25.0	56 39.9	+56.2	25.6	57 33.9	+56.4	26.3	70
71	52 05.2	+54.2	21.6	53 00.9	+54.5	22.1	53 56.4	+54.8	22.6	54 51.7	+55.0	23.1	55 46.7	+55.4	23.7	56 41.5	+55.7	24.3	57 36.1	+55.9	25.0	58 30.3	+56.2	25.7	71
72	52 59.4	+54.0	20.9	53 55.4	+54.2	21.4	54 51.2	+54.5	21.9	55 46.7	+54.8	22.4	56 42.1	+55.1	23.0	57 37.2	+55.4	23.6	58 32.0	+55.7	24.3	59 26.5	+56.0	25.0	72
73	53 53.4	+53.7	20.2	54 49.6	+54.0	20.6	55 45.7	+54.2	21.2	56 41.5	+54.6	21.7	57 37.2	+54.8	22.3	58 32.6	+55.1	22.9	59 27.7	+55.4	23.6	60 22.5	+55.8	24.3	73
74	54 47.1	+53.4	19.4	55 43.6	+53.7	19.9	56 39.9	+54.0	20.4	57 36.1	+54.2	20.9	58 32.0	+54.5	21.5	59 27.7	+54.8	22.1	60 23.1	+55.2	22.8	61 18.3	+55.5	23.5	74
75	55 40.5	+53.0	18.6	56 37.3	+53.3	19.1	57 33.9	+53.6	19.6	58 30.3	+53.9	20.1	59 26.5	+54.3	20.7	60 22.5	+54.6	21.3	61 18.3	+54.9	22.0	62 13.8	+55.2	22.7	75
76	56 33.5	+52.7	17.8	57 30.6	+53.0	18.2	58 27.5	+53.3	18.7	59 24.2	+53.6	19.3	60 20.8	+53.8	19.9	61 17.1	+54.2	20.5	62 13.2	+54.5	21.1	63 09.0	+54.9	21.8	76
77	57 26.2	+52.4	16.9	58 23.6	+52.6	17.3	59 20.8	+52.9	17.8	60 17.8	+53.2	18.4	61 14.6	+53.5	19.0	62 11.3	+53.8	19.6	63 07.7	+54.2	20.2	64 03.9	+54.5	20.9	77
78	58 18.6	+51.9	16.0	59 16.2	+52.2	16.4	60 13.7	+52.4	16.9	61 11.0	+52.8	17.4	62 08.1	+53.1	18.0	63 05.1	+53.4	18.6	64 01.9	+53.7	19.3	64 58.4	+54.1	20.0	78
79	59 10.5	+51.4	15.0	60 08.4	+51.7	15.4	61 06.1	+52.0	15.9	62 03.8	+52.3	16.4	63 01.2	+52.6	17.0	63 58.5	+53.0	17.6	64 55.6	+53.3	18.2	65 52.5	+53.6	18.9	79
80	60 01.9	+51.0	14.0	61 00.1	+51.2	14.4	61 58.1	+51.6	14.9	62 56.1	+51.8	15.4	63 53.8	+52.2	15.9	64 51.5	+52.4	16.5	65 48.9	+52.8	17.1	66 46.1	+53.2	17.8	80
81	60 52.9	+50.4	12.9	61 51.3	+50.7	13.3	62 49.7	+50.9	13.8	63 47.9	+51.2	14.2	64 46.0	+51.5	14.8	65 43.9	+51.9	15.3	66 41.7	+52.2	15.9	67 39.3	+52.5	16.6	81
82	61 43.3	+49.8	11.8	62 42.0	+50.1	12.2	63 40.6	+50.4	12.6	64 39.1	+50.6	13.1	65 37.5	+50.9	13.5	66 35.8	+51.2	14.1	67 33.9	+51.6	14.7	68 31.8	+52.0	15.3	82
83	62 33.1	+49.2	10.6	63 32.1	+49.4	11.0	64 31.0	+49.6	11.3	65 29.7	+50.0	11.8	66 28.4	+50.3	12.2	67 27.0	+50.5	12.8	68 25.5	+50.8	13.3	69 23.8	+51.2	13.9	83
84	63 22.3	+48.5	9.3	64 21.5	+48.7	9.7	65 20.6	+49.0	10.0	66 19.7	+49.2	10.4	67 18.7	+49.4	10.9	68 17.5	+49.8	11.3	69 16.3	+50.1	11.8	70 15.0	+50.3	12.4	84
85	64 10.8	+47.7	8.0	65 10.2	+47.9	8.3	66 09.6	+48.1	8.6	67 08.9	+48.3	9.0	68 08.1	+48.6	9.4	69 07.3	+48.8	9.8	70 06.4	+49.1	10.2	71 05.3	+49.5	10.8	85
86	64 58.5	+46.9	6.6	65 58.1	+47.1	6.8	66 57.7	+47.2	7.1	67 57.2	+47.4	7.4	68 56.7	+47.6	7.8	69 56.1	+47.8	8.1	70 55.5	+48.1	8.5	71 54.8	+48.3	9.0	86
87	65 45.4	+45.9	5.1	66 45.2	+46.0	5.3	67 44.9	+46.2	5.5	68 44.6	+46.4	5.8	69 44.3	+46.5	6.0	70 43.9	+46.7	6.3	71 43.6	+46.9	6.7	72 43.1	+47.1	7.0	87
88	66 31.3	+44.9	3.5	67 31.2	+45.0	3.6	68 31.1	+45.1	3.8	69 31.0	+45.1	4.0	70 30.8	+45.3	4.2	71 30.6	+45.4	4.4	72 30.5	+45.5	4.6	73 30.2	+45.7	4.9	88
89	67 16.2	+43.8	1.8	68 16.2	+43.8	1.9	69 16.2	+43.9	2.0	70 16.1	+43.9	2.1	71 16.1	+43.9	2.2	72 16.0	+44.0	2.3	73 16.0	+44.0	2.4	74 15.9	+44.1	2.6	89
90	68 00.0	+42.5	0.0	69 00.0	+42.5	0.0	70 00.0	+42.4	0.0	71 00.0	+42.4	0.0	72 00.0	+42.4	0.0	73 00.0	+42.3	0.0	74 00.0	+42.2	0.0	75 00.0	*+42.2•*	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 136°, 224°

45°, 315° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.....Zn=360°–Z

Dec. °	68° Hc ° ′	d ′	Z °	69° Hc ° ′	d ′	Z °	70° Hc ° ′	d ′	Z °	71° Hc ° ′	d ′	Z °	72° Hc ° ′	d ′	Z °	73° Hc ° ′	d ′	Z °	74° Hc ° ′	d ′	Z °	75° Hc ° ′	d ′	Z °	Dec. °
0	15 21.6	+57.7	132.8	14 40.7	+57.9	133.0	13 59.7	+58.1	133.2	13 18.6	+58.3	133.4	12 37.3	+58.5	133.6	11 55.9	+58.6	133.7	11 14.4	+58.7	133.9	10 32.7	+59.0	134.0	0
1	16 19.3	+57.7	132.5	15 38.6	+57.9	132.8	14 57.8	+58.1	133.0	14 16.9	+58.2	133.2	13 35.8	+58.4	133.3	12 54.5	+58.6	133.5	12 13.1	+58.8	133.7	11 31.7	+58.9	133.8	1
2	17 17.0	+57.6	132.3	16 36.5	+57.9	132.5	15 55.9	+58.1	132.7	15 15.1	+58.3	132.9	14 34.2	+58.5	133.1	13 53.1	+58.7	133.3	13 11.9	+58.8	133.5	12 30.6	+58.9	133.6	2
3	18 14.6	+57.6	132.0	17 34.4	+57.8	132.2	16 54.0	+58.0	132.4	16 13.4	+58.2	132.7	15 32.7	+58.4	132.9	14 51.8	+58.6	133.1	14 10.7	+58.8	133.3	13 29.5	+59.0	133.4	3
4	19 12.2	+57.6	131.7	18 32.2	+57.8	131.9	17 52.0	+58.0	132.2	17 11.6	+58.3	132.4	16 31.1	+58.4	132.6	15 50.4	+58.6	132.8	15 09.5	+58.7	133.0	14 28.5	+58.9	133.2	4
5	20 09.8	+57.5	131.4	19 30.0	+57.8	131.6	18 50.0	+58.0	131.9	18 09.9	+58.2	132.2	17 29.5	+58.4	132.4	16 49.0	+58.5	132.6	16 08.2	+58.8	132.8	15 27.4	+58.9	133.0	5
6	21 07.3	+57.5	131.1	20 27.8	+57.7	131.4	19 48.0	+58.0	131.6	19 08.1	+58.1	131.9	18 27.9	+58.4	132.1	17 47.5	+58.6	132.4	17 07.0	+58.7	132.6	16 26.3	+58.9	132.8	6
7	22 04.8	+57.5	130.8	21 25.5	+57.7	131.1	20 46.0	+57.9	131.4	20 06.2	+58.2	131.6	19 26.3	+58.3	131.9	18 46.1	+58.5	132.2	18 05.7	+58.7	132.4	17 25.2	+58.8	132.6	7
8	23 02.3	+57.4	130.5	22 23.2	+57.7	130.8	21 43.9	+58.0	131.1	21 04.4	+58.1	131.4	20 24.6	+58.4	131.7	19 44.6	+58.6	131.9	19 04.4	+58.7	132.2	18 24.0	+58.9	132.4	8
9	23 59.7	+57.4	130.1	23 20.9	+57.7	130.5	22 41.9	+57.8	130.8	22 02.5	+58.1	131.1	21 23.0	+58.3	131.4	20 43.2	+58.5	131.7	20 03.1	+58.7	132.0	19 22.9	+58.9	132.2	9
10	24 57.1	+57.4	129.8	24 18.6	+57.6	130.2	23 39.7	+57.9	130.5	23 00.6	+58.1	130.8	22 21.3	+58.3	131.2	21 41.7	+58.5	131.5	21 01.8	+58.7	131.7	20 21.8	+58.8	132.0	10
11	25 54.5	+57.3	129.5	25 16.2	+57.6	129.9	24 37.6	+57.8	130.2	23 58.7	+58.1	130.6	23 19.6	+58.2	130.9	22 40.2	+58.4	131.2	22 00.5	+58.6	131.5	21 20.6	+58.8	131.8	11
12	26 51.8	+57.3	129.2	26 13.8	+57.5	129.6	25 35.4	+57.8	129.9	24 56.8	+58.0	130.3	24 17.8	+58.3	130.6	23 38.6	+58.5	131.0	22 59.1	+58.7	131.3	22 19.4	+58.8	131.6	12
13	27 49.1	+57.2	128.8	27 11.3	+57.5	129.2	26 33.2	+57.7	129.6	25 54.8	+58.0	130.0	25 16.1	+58.2	130.4	24 37.1	+58.4	130.7	23 57.8	+58.6	131.1	23 18.2	+58.8	131.4	13
14	28 46.3	+57.2	128.5	28 08.8	+57.4	128.9	27 30.9	+57.8	129.3	26 52.8	+57.9	129.7	26 14.3	+58.1	130.1	25 35.5	+58.4	130.5	24 56.4	+58.6	130.8	24 17.0	+58.8	131.2	14
15	29 43.5	+57.1	128.1	29 06.2	+57.4	128.6	28 28.7	+57.6	129.0	27 50.7	+57.9	129.4	27 12.4	+58.2	129.8	26 33.9	+58.3	130.2	25 55.0	+58.5	130.6	25 15.8	+58.7	131.0	15
16	30 40.6	+57.1	127.8	30 03.6	+57.4	128.2	29 26.3	+57.6	128.7	28 48.6	+57.9	129.1	28 10.6	+58.1	129.5	27 32.2	+58.4	130.0	26 53.5	+58.6	130.3	26 14.5	+58.8	130.7	16
17	31 37.7	+56.9	127.4	31 01.0	+57.3	127.9	30 23.9	+57.6	128.4	29 46.5	+57.8	128.8	29 08.7	+58.1	129.3	28 30.6	+58.3	129.7	27 52.1	+58.5	130.1	27 13.3	+58.7	130.5	17
18	32 34.6	+57.0	127.1	31 58.3	+57.2	127.6	31 21.5	+57.5	128.0	30 44.3	+57.8	128.5	30 06.8	+58.0	129.0	29 28.9	+58.2	129.4	28 50.6	+58.5	129.8	28 12.0	+58.6	130.3	18
19	33 31.6	+56.8	126.7	32 55.5	+57.2	127.2	32 19.0	+57.5	127.7	31 42.1	+57.8	128.2	31 04.8	+58.0	128.7	30 27.1	+58.3	129.1	29 49.1	+58.4	129.6	29 10.6	+58.7	130.0	19
20	34 28.4	+56.8	126.3	33 52.7	+57.1	126.8	33 16.5	+57.4	127.4	32 39.9	+57.6	127.9	32 02.8	+58.0	128.4	31 25.4	+58.1	128.9	30 47.5	+58.4	129.3	30 09.3	+58.6	129.8	20
21	35 25.2	+56.7	125.9	34 49.8	+57.0	126.5	34 13.9	+57.3	127.0	33 37.5	+57.7	127.6	33 00.8	+57.9	128.1	32 23.5	+58.2	128.6	31 45.9	+58.4	129.1	31 07.9	+58.6	129.5	21
22	36 21.9	+56.6	125.5	35 46.8	+57.0	126.1	35 11.2	+57.3	126.7	34 35.2	+57.6	127.2	33 58.7	+57.8	127.8	33 21.7	+58.1	128.3	32 44.3	+58.4	128.8	32 06.5	+58.6	129.3	22
23	37 18.5	+56.6	125.1	36 43.8	+56.9	125.7	36 08.5	+57.2	126.3	35 32.8	+57.5	126.9	34 56.5	+57.8	127.4	34 19.8	+58.1	128.0	33 42.7	+58.3	128.5	33 05.1	+58.5	129.0	23
24	38 15.1	+56.4	124.7	37 40.7	+56.8	125.3	37 05.7	+57.2	125.9	36 30.3	+57.4	126.5	35 54.3	+57.8	127.1	35 17.9	+58.0	127.7	34 41.0	+58.2	128.2	34 03.6	+58.5	128.8	24
25	39 11.5	+56.3	124.2	38 37.5	+56.7	124.9	38 02.9	+57.0	125.5	37 27.7	+57.4	126.2	36 52.1	+57.7	126.8	36 15.9	+58.0	127.4	35 39.2	+58.3	127.9	35 02.1	+58.5	128.5	25
26	40 07.8	+56.3	123.8	39 34.2	+56.6	124.5	38 59.9	+57.0	125.1	38 25.1	+57.3	125.8	37 49.8	+57.6	126.4	37 13.9	+57.9	127.0	36 37.5	+58.2	127.6	36 00.6	+58.4	128.2	26
27	41 04.1	+56.1	123.3	40 30.8	+56.5	124.0	39 56.9	+56.9	124.7	39 22.4	+57.3	125.4	38 47.4	+57.5	126.1	38 11.8	+57.8	126.7	37 35.7	+58.1	127.3	36 59.0	+58.4	127.9	27
28	42 00.2	+56.0	122.8	41 27.3	+56.4	123.6	40 53.8	+56.8	124.3	40 19.7	+57.1	125.0	39 44.9	+57.5	125.7	39 09.6	+57.8	126.4	38 33.8	+58.1	127.0	37 57.4	+58.3	127.6	28
29	42 56.2	+55.8	122.4	42 23.7	+56.3	123.1	41 50.6	+56.7	123.9	41 16.8	+57.1	124.6	40 42.4	+57.4	125.3	40 07.4	+57.8	126.0	39 31.9	+58.0	126.7	38 55.7	+58.3	127.3	29
30	43 52.0	+55.8	121.9	43 20.0	+56.2	122.7	42 47.3	+56.6	123.4	42 13.9	+57.0	124.2	41 39.8	+57.4	124.9	41 05.2	+57.6	125.7	40 29.9	+58.0	126.4	39 54.0	+58.3	127.0	30
31	44 47.8	+55.6	121.3	44 16.2	+56.0	122.2	43 43.9	+56.5	123.0	43 10.9	+56.9	123.8	42 37.2	+57.2	124.5	42 02.8	+57.6	125.3	41 27.9	+57.9	126.0	40 52.3	+58.2	126.7	31
32	45 43.4	+55.4	120.8	45 12.2	+56.0	121.7	44 40.4	+56.3	122.5	44 07.8	+56.7	123.3	43 34.4	+57.2	124.1	43 00.4	+57.5	124.9	42 25.8	+57.8	125.7	41 50.5	+58.1	126.4	32
33	46 38.8	+55.3	120.2	46 08.2	+55.7	121.2	45 36.7	+56.3	122.0	45 04.5	+56.7	122.9	44 31.6	+57.1	123.7	43 57.9	+57.5	124.5	43 23.6	+57.8	125.3	42 48.6	+58.1	126.1	33
34	47 34.1	+55.1	119.7	47 03.9	+55.6	120.6	46 33.0	+56.1	121.5	46 01.2	+56.5	122.4	45 28.7	+56.9	123.3	44 55.4	+57.3	124.1	44 21.4	+57.6	124.9	43 46.7	+58.0	125.7	34
35	48 29.2	+54.9	119.1	47 59.5	+55.5	120.1	47 29.1	+55.9	121.0	46 57.7	+56.5	121.9	46 25.6	+56.9	122.8	45 52.7	+57.2	123.7	45 19.0	+57.7	124.5	44 44.7	+57.9	125.4	35
36	49 24.1	+54.7	118.5	48 55.0	+55.3	119.5	48 25.0	+55.8	120.5	47 54.2	+56.2	121.4	47 22.5	+56.7	122.4	46 49.9	+57.2	123.3	46 16.7	+57.5	124.1	45 42.6	+57.9	125.0	36
37	50 18.8	+54.4	117.8	49 50.3	+55.0	118.9	49 20.8	+55.6	119.9	48 50.4	+56.2	120.9	48 19.2	+56.6	121.9	47 47.1	+57.0	122.8	47 14.2	+57.4	123.7	46 40.5	+57.8	124.6	37
38	51 13.2	+54.3	117.2	50 45.3	+54.9	118.3	50 16.4	+55.5	119.3	49 46.6	+56.0	120.4	49 15.8	+56.5	121.4	48 44.1	+56.9	122.3	48 11.6	+57.3	123.3	47 38.3	+57.7	124.2	38
39	52 07.5	+54.0	116.5	51 40.2	+54.7	117.6	51 11.9	+55.2	118.7	50 42.6	+55.8	119.8	50 12.3	+56.3	120.8	49 41.0	+56.8	121.9	49 08.9	+57.2	122.8	48 36.0	+57.6	123.8	39
40	53 01.5	+53.7	115.8	52 34.9	+54.4	116.9	52 07.1	+55.1	118.1	51 38.4	+55.6	119.2	51 08.6	+56.1	120.3	50 37.8	+56.7	121.4	50 06.1	+57.2	122.4	49 33.6	+57.5	123.4	40
41	53 55.2	+53.5	115.0	53 29.3	+54.1	116.2	53 02.2	+54.8	117.4	52 34.0	+55.4	118.6	52 04.7	+56.0	119.7	51 34.5	+56.5	120.8	51 03.3	+56.9	121.9	50 31.1	+57.4	122.9	41
42	54 48.7	+53.1	114.2	54 23.4	+53.9	115.5	53 57.0	+54.6	116.8	53 29.4	+55.2	118.0	53 00.7	+55.8	119.1	52 31.0	+56.3	120.3	52 00.2	+56.9	121.4	51 28.5	+57.3	122.5	42
43	55 41.8	+52.8	113.4	55 17.3	+53.6	114.7	54 51.6	+54.3	116.0	54 24.6	+55.0	117.3	53 56.5	+55.7	118.5	53 27.3	+56.2	119.7	52 57.1	+56.7	120.9	52 25.8	+57.2	122.0	43
44	56 34.6	+52.4	112.6	56 10.9	+53.2	113.9	55 45.9	+54.0	115.3	55 19.6	+54.8	116.6	54 52.2	+55.4	117.9	54 23.5	+56.0	119.1	53 53.8	+56.5	120.3	53 23.0	+57.0	121.5	44
45	57 27.0	+52.0	111.7	57 04.1	+52.9	113.1	56 39.9	+53.7	114.5	56 14.4	+54.4	115.9	55 47.6	+55.1	117.2	55 19.5	+55.8	118.5	54 50.3	+56.4	119.7	54 20.0	+56.9	121.0	45
46	58 19.0	+51.6	110.7	57 57.0	+52.6	112.2	57 33.6	+53.4	113.7	57 08.8	+54.2	115.1	56 42.7	+54.9	116.5	56 15.3	+55.6	117.8	55 46.7	+56.2	119.1	55 16.9	+56.7	120.4	46
47	59 10.6	+51.1	109.8	58 49.6	+52.1	111.3	58 27.0	+53.0	112.8	58 03.0	+53.9	114.3	57 37.6	+54.7	115.8	57 10.9	+55.3	117.2	56 42.9	+56.0	118.5	56 13.6	+56.6	119.8	47
48	60 01.7	+50.6	108.7	59 41.7	+51.6	110.3	59 20.0	+52.7	111.9	58 56.9	+53.5	113.5	58 32.3	+54.3	115.0	58 06.2	+55.1	116.4	57 38.9	+55.7	117.8	57 10.2	+56.4	119.2	48
49	60 52.3	+50.1	107.6	60 33.3	+51.2	109.3	60 12.7	+52.1	111.0	59 50.4	+53.1	112.6	59 26.6	+54.0	114.1	59 01.3	+54.8	115.7	58 34.6	+55.6	117.2	58 06.6	+56.2	118.6	49
50	61 42.4	+49.4	106.5	61 24.5	+50.6	108.2	61 04.8	+51.8	110.0	60 43.5	+52.7	111.6	60 20.6	+53.6	113.3	59 56.1	+54.5	114.9	59 30.2	+55.2	116.4	59 02.8	+55.9	117.9	50
51	62 31.8	+48.8	105.3	62 15.1	+50.0	107.1	61 56.6	+51.1	108.9	61 36.2	+52.3	110.7	61 14.2	+53.3	112.4	60 50.6	+54.2	114.0	60 25.4	+55.0	115.6	59 58.7	+55.7	117.2	51
52	63 20.6	+48.1	104.0	63 05.1	+49.4	105.9	62 47.7	+50.7	107.8	62 28.5	+51.8	109.6	62 07.5	+52.8	111.4	61 44.8	+53.8	113.1	61 20.4	+54.7	114.8	60 54.4	+55.5	116.4	52
53	64 08.7	+47.2	102.6	63 54.5	+48.7	104.6	63 38.4	+50.0	106.6	63 20.3	+51.2	108.5	63 00.3	+52.4	110.4	62 38.6	+53.3	112.2	62 15.1	+54.3	113.9	61 49.9	+55.1	115.7	53
54	64 55.9	+46.4	101.2	64 43.2	+47.9	103.3	64 28.4	+49.3	105.3	64 11.5	+50.6	107.3	63 52.7	+51.8	109.3	63 31.9	+52.9	111.2	63 09.4	+53.9	113.0	62 45.0	+54.9	114.8	54
55	65 42.3	+45.4	99.7	65 31.1	+47.0	101.8	65 17.7	+48.5	104.0	65 02.1	+50.0	106.1	64 44.5	+51.2	108.1	64 24.8	+52.5	110.1	64 03.3	+53.5	112.0	63 39.9	+54.4	113.9	55
56	66 27.7	+44.4	98.1	66 18.1	+46.1	100.3	66 06.2	+47.7	102.5	65 52.1	+49.2	104.7	65 35.7	+50.6	106.9	65 17.3	+51.8	108.9	64 56.8	+53.0	111.0	64 34.3	+54.1	112.9	56
57	67 12.1	+43.1	96.4	67 04.2	+45.0	98.7	66 53.9	+46.8	101.0	66 41.3	+48.3	103.3	66 26.3	+49.9	105.5	66 09.1	+51.3	107.7	65 49.8	+52.5	109.8	65 28.4	+53.6	111.9	57
58	67 55.2	+42.0	94.5	67 49.2	+43.9	97.0	67 40.7	+45.7	99.4	67 29.6	+47.5	101.8	67 16.2	+49.0	104.1	67 00.4	+50.5	106.4	66 42.3	+51.9	108.6	66 22.0	+53.2	110.8	58
59	68 37.2	+40.5	92.6	68 33.1	+42.6	95.1	68 26.4	+44.6	97.7	68 17.1	+46.4	100.2	68 05.2	+48.2	102.6	67 50.9	+49.8	105.0	67 34.2	+51.2	107.4	67 15.2	+52.5	109.6	59
60	69 17.7	+38.9	90.5	69 15.7	+41.2	93.2	69 11.0	+43.3	95.8	69 03.5	+45.3	98.4	68 53.4	+47.2	101.0	68 40.7	+48.9	103.5	68 25.4	+50.5	106.0	68 07.7	+52.0	108.4	60
61	69 56.6	+37.2	88.4	69 56.9	+39.6	91.1	69 54.3	+41.9	93.8	69 48.8	+44.1	96.6	69 40.6	+46.1	99.2	69 29.6	+47.9	101.9	69 15.9	+49.7	104.5	68 59.7	+51.2	107.0	61
62	70 33.8	+35.4	86.0	70 36.5	+37.9	88.9	70 36.2	+40.3	91.7	70 32.9	+42.6	94.6	70 26.7	+44.8	97.4	70 17.5	+46.9	100.1	70 05.6	+48.7	102.9	69 50.9	+50.4	105.5	62
63	71 09.2	+33.2	83.6	71 14.4	+35.9	86.5	71 16.5	+38.5	89.4	71 15.5	+41.0	92.4	71 11.5	+43.3	95.3	71 04.4	+45.5	98.2	70 54.3	+47.6	101.1	70 41.3	+49.5	103.9	63
64	71 42.4	+31.1	81.0	71 50.3	+33.9	84.0	71 55.0	+36.6	87.0	71 56.5	+39.3	90.1	71 54.8	+41.8	93.2	71 49.9	+44.2	96.2	71 41.9	+46.4	99.2	71 30.8	+48.4	102.2	64
65	72 13.5	+28.5	78.2	72 24.2	+31.5	81.3	72 31.6	+34.5	84.4	72 35.8	+37.3	87.6	72 36.6	+40.0	90.8	72 34.1	+42.6	94.0	72 28.3	+45.0	97.1	72 19.2	+47.3	100.3	65
66	72 42.0	+25.9	75.3	72 55.7	+29.0	78.4	73 06.1	+32.0	81.7	73 13.1	+35.0	84.9	73 16.6	+38.0	88.3	73 16.7	+40.8	91.6	73 13.3	+43.5	94.9	73 06.5	+45.9	98.2	66
67	73 07.9	+23.1	72.2	73 24.7	+26.2	75.4	73 38.1	+29.4	78.7	73 48.1	+32.7	82.1	73 54.6	+35.8	85.5	73 57.5	+38.8	89.0	73 56.8	+41.6	92.5	73 52.4	+44.3	95.9	67
68	73 31.0	+19.9	69.0	73 50.9	+23.2	72.2	74 07.5	+26.6	75.6	74 20.8	+29.8	79.0	74 30.4	+33.2	82.6	74 36.3	+36.4	86.2	74 38.4	+39.5	89.8	74 36.7	+42.5	93.4	68
69	73 50.9	+16.6	65.6	74 14.1	+20.0	68.9	74 34.1	+23.4	72.2	74 50.6	+26.9	75.8	75 03.6	+30.4	79.4	75 12.7	+33.8	83.1	75 17.9	+37.2	86.9	75 19.2	+40.4	90.7	69
70	74 07.5	+13.3	62.1	74 34.1	+16.5	65.4	74 57.5	+20.0	68.7	75 17.5	+23.7	72.3	75 34.0	+27.2	76.0	75 46.5	+31.0	79.8	75 55.1	+34.5	83.7	75 59.6	+38.0	87.7	70
71	74 20.8	+9.6	58.6	74 50.6	+13.0	61.7	75 17.5	+16.5	65.1	75 41.2	+20.0	68.6	76 01.2	+23.8	72.4	76 17.5	+27.6	76.3	76 29.6	+31.5	80.3	76 37.6	+35.2	84.5	71
72	74 30.4	+5.9	54.9	75 03.6	+9.1	57.9	75 34.0	+12.5	61.2	76 01.2	+16.3	64.8	76 25.0	+20.1	68.5	76 45.1	+24.0	72.5	77 01.1	+28.1	76.6	77 12.8	+32.1	80.9	72
73	74 36.3	+2.1	51.1	75 12.7	+5.2	54.1	75 46.5	+8.6	57.3	76 17.5	+12.1	60.7	76 45.1	+16.0	64.4	77 09.1	+20.1	68.4	77 29.2	+24.2	72.6	77 44.9	+28.5	77.0	73
74	74 38.4	−1.7	47.4	75 17.9	+1.3	50.2	75 55.1	+4.5	53.2	76 29.6	+8.0	56.6	77 01.1	+11.7	60.2	77 29.2	+15.7	64.1	77 53.4	+20.0	68.3	78 13.4	+24.5	72.7	74
75	74 36.7	−5.5	43.6	75 19.2	−2.8	46.2	75 59.6	+0.3	49.1	76 37.6	+3.6	52.3	77 12.8	+7.3	55.8	77 44.9	+11.2	59.6	78 13.4	+15.5	63.7	78 37.9	+20.0	68.2	75
76	74 31.2	−9.2	39.9	75 16.4	−6.6	42.3	75 59.9	−3.9	45.0	76 41.2	−0.8	48.0	77 20.1	+2.6	51.3	77 56.1	+6.4	54.9	78 28.9	+10.5	58.9	78 57.9	+15.0	63.3	76
77	74 22.0	−12.8	36.2	75 09.8	−10.6	38.4	75 56.0	−8.1	40.9	76 40.4	−5.2	43.6	77 22.7	−2.0	46.7	78 02.5	+1.5	50.1	78 39.4	+5.5	54.0	79 12.9	+9.9	58.2	77
78	74 09.2	−16.3	32.6	74 59.2	−14.3	34.6	75 47.9	−12.0	36.8	76 35.2	−9.6	39.3	77 20.7	−6.7	42.1	78 04.0	−3.4	45.3	78 44.9	+0.2	48.9	79 22.8	+4.3	52.9	78
79	73 52.9	−19.6	29.1	74 44.9	−17.9	30.9	75 35.9	−15.9	32.9	76 25.6	−13.7	35.1	77 14.0	−11.2	37.6	78 00.6	−8.4	40.5	78 45.1	−5.1	43.8	79 27.1	−1.3	47.5	79
80	73 33.3	−22.6	25.7	74 27.0	−21.2	27.3	75 20.0	−19.6	29.0	76 11.9	−17.6	31.0	77 02.8	−15.5	33.2	77 52.2	−13.0	35.8	78 40.0	−10.1	38.7	79 25.8	−6.9	42.0	80
81	73 10.7	−25.6	22.5	74 05.8	−24.3	23.8	75 00.4	−23.0	25.3	75 54.3	−21.4	27.0	76 47.3	−19.6	28.9	77 39.2	−17.5	31.2	78 29.9	−15.1	33.7	79 18.9	−12.2	36.6	81
82	72 45.1	−28.3	19.4	73 41.5	−27.3	20.5	74 37.4	−26.1	21.8	75 32.9	−24.9	23.2	76 27.7	−23.4	24.9	77 21.7	−21.7	26.7	78 14.8	−19.7	28.9	79 06.7	−17.4	31.4	82
83	72 16.8	−30.8	16.4	73 14.2	−30.0	17.4	74 11.3	−29.1	18.4	75 08.0	−28.0	19.6	76 04.3	−26.9	21.0	77 00.0	−25.5	22.5	77 55.1	−23.9	24.3	78 49.3	−22.1	26.4	83
84	71 46.0	−33.0	13.7	72 44.2	−32.4	14.4	73 42.2	−31.7	15.3	74 40.0	−30.9	16.2	75 37.4	−30.0	17.3	76 34.5	−29.0	18.6	77 31.2	−27.8	20.0	78 27.2	−26.3	21.7	84
85	71 13.0	−35.1	11.0	72 11.8	−34.6	11.6	73 10.5	−34.1	12.3	74 09.1	−33.6	13.0	75 07.4	−32.9	13.9	76 05.5	−32.1	14.9	77 03.4	−31.2	16.0	78 00.9	−30.2	17.3	85
86	70 37.9	−37.1	8.6	71 37.2	−36.7	9.0	72 36.4	−36.3	9.5	73 35.5	−35.9	10.1	74 34.5	−35.4	10.7	75 33.4	−34.9	11.4	76 32.2	−34.3	12.2	77 30.7	−33.6	13.2	86
87	70 00.8	−38.7	6.2	71 00.5	−38.6	6.5	72 00.1	−38.3	6.9	72 59.6	−38.0	7.3	73 59.1	−37.7	7.7	74 58.5	−37.4	8.2	75 57.9	−37.0	8.8	76 57.1	−36.6	9.4	87
88	69 22.1	−40.3	4.0	70 21.9	−40.2	4.2	71 21.8	−40.1	4.4	72 21.6	−40.0	4.7	73 21.4	−39.8	4.9	74 21.1	−39.6	5.2	75 20.9	−39.4	5.6	76 20.5	−39.1	6.0	88
89	68 41.8	−41.8	1.9	69 41.7	−41.7	2.0	70 41.7	−41.7	2.1	71 41.6	−41.6	2.3	72 41.6	−41.6	2.4	73 41.5	−41.5	2.5	74 41.5	−41.5	2.7	75 41.4	−41.4	2.9	89
90	68 00.0	−43.1	0.0	69 00.0	−43.1	0.0	70 00.0	−43.1	0.0	71 00.0	−43.2	0.0	72 00.0	−43.2	0.0	73 00.0	−43.2	0.0	74 00.0	−43.3	0.0	75 00.0	−43.4	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

45°, 315° L.H.A. LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 45°, 315°

Dec.	68° Hc	d	Z	69° Hc	d	Z	70° Hc	d	Z	71° Hc	d	Z	72° Hc	d	Z	73° Hc	d	Z	74° Hc	d	Z	75° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	15 21.6	−57.7	132.8	14 40.7	−57.9	133.0	13 59.7	−58.1	133.2	13 18.6	−58.3	133.4	12 37.3	−58.5	133.6	11 55.9	−58.7	133.7	11 14.4	−58.9	133.9	10 32.7	−58.9	134.0	0
1	14 23.9	−57.7	133.1	13 42.8	−57.9	133.3	13 01.6	−58.1	133.5	12 20.3	−58.3	133.6	11 38.8	−58.5	133.8	10 57.2	−58.6	133.9	10 15.5	−58.8	134.1	9 33.8	−59.0	134.2	1
2	13 26.2	−57.8	133.4	12 44.9	−57.9	133.6	12 03.5	−58.2	133.7	11 22.0	−58.4	133.9	10 40.3	−58.5	134.0	9 58.6	−58.7	134.1	9 16.7	−58.8	134.3	8 34.8	−59.0	134.4	2
3	12 28.4	−57.7	133.7	11 47.0	−58.0	133.8	11 05.3	−58.1	134.0	10 23.6	−58.3	134.1	9 41.8	−58.5	134.2	8 59.9	−58.7	134.4	8 17.9	−58.8	134.5	7 35.8	−58.9	134.6	3
4	11 30.7	−57.8	134.0	10 49.0	−58.0	134.1	10 07.2	−58.2	134.2	9 25.3	−58.4	134.4	8 43.3	−58.5	134.5	8 01.2	−58.7	134.6	7 19.1	−58.9	134.7	6 36.9	−59.0	134.8	4
5	10 32.9	−57.8	134.2	9 51.0	−58.0	134.4	9 09.0	−58.2	134.5	8 26.9	−58.3	134.6	7 44.8	−58.5	134.7	7 02.5	−58.6	134.8	6 20.2	−58.8	134.9	5 37.9	−59.0	134.9	5
6	9 35.1	−57.8	134.5	8 53.0	−58.0	134.6	8 10.8	−58.1	134.7	7 28.6	−58.4	134.8	6 46.3	−58.6	134.9	6 03.9	−58.7	135.0	5 21.4	−58.8	135.1	4 38.9	−59.0	135.1	6
7	8 37.3	−57.8	134.8	7 55.0	−58.0	134.9	7 12.7	−58.2	135.0	6 30.2	−58.4	135.1	5 47.7	−58.5	135.1	5 05.2	−58.7	135.2	4 22.6	−58.9	135.3	3 39.9	−59.0	135.3	7
8	7 39.5	−57.8	135.0	6 57.0	−58.0	135.1	6 14.5	−58.2	135.2	5 31.8	−58.3	135.3	4 49.2	−58.6	135.4	4 06.5	−58.7	135.4	3 23.7	−58.8	135.5	2 40.9	−58.9	135.5	8
9	6 41.7	−57.8	135.3	5 59.0	−58.0	135.4	5 16.3	−58.2	135.5	4 33.5	−58.4	135.5	3 50.6	−58.5	135.6	3 07.8	−58.7	135.6	2 24.9	−58.9	135.7	1 42.0	−59.0	135.7	9
10	5 43.9	−57.9	135.6	5 01.0	−58.0	135.6	4 18.1	−58.3	135.7	3 35.1	−58.4	135.8	2 52.1	−58.6	135.8	2 09.1	−58.7	135.8	1 26.0	−58.8	135.8	0 43.0	−59.0	135.9	10
11	4 46.0	−57.8	135.9	4 03.0	−58.1	135.9	3 19.8	−58.2	135.9	2 36.7	−58.4	136.0	1 53.5	−58.5	136.0	1 10.4	−58.7	136.0	0 27.2	−58.9	136.0	0 16.0	+59.0	44.0	11
12	3 48.2	−57.9	136.1	3 04.9	−58.0	136.2	2 21.6	−58.2	136.2	1 38.3	−58.4	136.2	0 55.0	−58.6	136.2	0 11.7	−58.7	136.2	0 31.7	+58.8	43.8	1 15.0	+59.0	43.8	12
13	2 50.3	−57.8	136.4	2 06.9	−58.1	136.4	1 23.4	−58.2	136.4	0 39.9	−58.4	136.4	0 03.6	+58.5	43.5	0 47.0	+58.7	43.6	1 30.5	+58.9	43.6	2 14.0	+59.0	43.6	13
14	1 52.5	−57.9	136.6	1 08.8	−58.0	136.7	0 25.2	−58.2	136.7	0 18.5	+58.3	43.3	1 02.1	+58.6	43.3	1 45.7	+58.7	43.3	2 29.4	+58.8	43.4	3 13.0	+58.9	43.4	14
15	0 54.6	−57.8	136.9	0 10.8	−58.0	136.9	0 33.0	+58.2	43.1	1 16.8	+58.4	43.1	2 00.7	+58.5	43.1	2 44.4	+58.7	43.1	3 28.2	+58.9	43.2	4 11.9	+59.0	43.2	15
16	0 03.2	+57.9	42.8	0 47.2	+58.1	42.8	1 31.2	+58.3	42.8	2 15.2	+58.4	42.9	2 59.2	+58.5	42.9	3 43.1	+58.7	42.9	4 27.1	+58.8	43.0	5 10.9	+59.0	43.0	16
17	1 01.1	+57.8	42.6	1 45.3	+58.0	42.6	2 29.5	+58.2	42.6	3 13.6	+58.4	42.6	3 57.7	+58.6	42.7	4 41.8	+58.7	42.7	5 25.9	+58.8	42.8	6 09.9	+59.0	42.9	17
18	1 58.9	+57.9	42.3	2 43.3	+58.1	42.3	3 27.7	+58.2	42.4	4 12.0	+58.4	42.4	4 56.3	+58.5	42.5	5 40.5	+58.7	42.5	6 24.7	+58.9	42.6	7 08.9	+58.9	42.7	18
19	2 56.8	+57.8	42.0	3 41.4	+58.0	42.1	4 25.9	+58.2	42.1	5 10.4	+58.3	42.2	5 54.8	+58.6	42.2	6 39.2	+58.7	42.3	7 23.6	+58.8	42.4	8 07.8	+59.0	42.5	19
20	3 54.6	+57.9	41.8	4 39.4	+58.0	41.8	5 24.1	+58.2	41.9	6 08.7	+58.4	41.9	6 53.4	+58.5	42.0	7 37.9	+58.7	42.1	8 22.4	+58.8	42.2	9 06.8	+59.0	42.3	20
21	4 52.5	+57.8	41.5	5 37.4	+58.0	41.6	6 22.3	+58.2	41.6	7 07.1	+58.4	41.7	7 51.9	+58.5	41.8	8 36.6	+58.7	41.9	9 21.2	+58.8	42.0	10 05.8	+58.9	42.1	21
22	5 50.3	+57.9	41.2	6 35.4	+58.0	41.3	7 20.5	+58.2	41.4	8 05.5	+58.3	41.5	8 50.4	+58.5	41.6	9 35.3	+58.6	41.7	10 20.0	+58.8	41.8	11 04.7	+59.0	41.9	22
23	6 48.2	+57.8	41.0	7 33.4	+58.0	41.0	8 18.7	+58.1	41.1	9 03.8	+58.4	41.2	9 48.9	+58.5	41.3	10 33.9	+58.7	41.5	11 18.8	+58.8	41.6	12 03.7	+58.9	41.7	23
24	7 46.0	+57.8	40.7	8 31.4	+58.0	40.8	9 16.8	+58.2	40.9	10 02.2	+58.3	41.0	10 47.4	+58.5	41.1	11 32.6	+58.6	41.2	12 17.6	+58.8	41.4	13 02.6	+58.9	41.5	24
25	8 43.8	+57.8	40.4	9 29.4	+58.0	40.5	10 15.0	+58.2	40.6	11 00.5	+58.3	40.8	11 45.9	+58.5	40.9	12 31.2	+58.6	41.0	13 16.4	+58.8	41.2	14 01.5	+58.9	41.3	25
26	9 41.6	+57.8	40.1	10 27.4	+58.0	40.3	11 13.2	+58.1	40.4	11 58.8	+58.3	40.5	12 44.4	+58.5	40.7	13 29.8	+58.7	40.8	14 15.2	+58.8	41.0	15 00.4	+59.0	41.1	26
27	10 39.4	+57.7	39.9	11 25.4	+57.9	40.0	12 11.3	+58.1	40.1	12 57.1	+58.3	40.3	13 42.9	+58.4	40.4	14 28.5	+58.6	40.6	15 14.0	+58.7	40.8	15 59.4	+58.8	40.9	27
28	11 37.1	+57.8	39.6	12 23.3	+58.0	39.7	13 09.4	+58.1	39.9	13 55.4	+58.3	40.0	14 41.3	+58.4	40.2	15 27.1	+58.6	40.4	16 12.7	+58.8	40.6	16 58.2	+58.9	40.8	28
29	12 34.9	+57.7	39.3	13 21.3	+57.9	39.5	14 07.5	+58.1	39.6	14 53.7	+58.3	39.8	15 39.7	+58.5	40.0	16 25.7	+58.6	40.1	17 11.5	+58.7	40.3	17 57.1	+58.9	40.5	29
30	13 32.6	+57.8	39.0	14 19.2	+57.9	39.2	15 05.6	+58.1	39.4	15 52.0	+58.2	39.5	16 38.2	+58.4	39.7	17 24.3	+58.5	39.9	18 10.2	+58.7	40.1	18 56.0	+58.9	40.3	30
31	14 30.4	+57.7	38.8	15 17.1	+57.9	38.9	16 03.7	+58.1	39.1	16 50.2	+58.2	39.3	17 36.6	+58.4	39.5	18 22.8	+58.6	39.7	19 08.9	+58.7	39.9	19 54.9	+58.8	40.1	31
32	15 28.1	+57.6	38.5	16 15.0	+57.8	38.7	17 01.8	+58.0	38.8	17 48.4	+58.3	39.0	18 35.0	+58.4	39.2	19 21.4	+58.5	39.5	20 07.6	+58.7	39.7	20 53.7	+58.8	39.9	32
33	16 25.7	+57.7	38.2	17 12.8	+57.9	38.4	17 59.8	+58.0	38.6	18 46.7	+58.1	38.8	19 33.4	+58.3	39.0	20 19.9	+58.5	39.2	21 06.3	+58.7	39.5	21 52.5	+58.9	39.7	33
34	17 23.4	+57.6	37.9	18 10.7	+57.8	38.1	18 57.8	+58.0	38.3	19 44.8	+58.2	38.5	20 31.7	+58.3	38.8	21 18.4	+58.5	39.0	22 05.0	+58.6	39.2	22 51.4	+58.7	39.5	34
35	18 21.0	+57.6	37.6	19 08.5	+57.8	37.8	19 55.8	+58.0	38.0	20 43.0	+58.1	38.3	21 30.0	+58.4	38.5	22 16.9	+58.5	38.8	23 03.6	+58.6	39.0	23 50.1	+58.8	39.3	35
36	19 18.6	+57.6	37.3	20 06.3	+57.7	37.5	20 53.8	+57.9	37.8	21 41.1	+58.2	38.0	22 28.4	+58.2	38.2	23 15.4	+58.4	38.5	24 02.2	+58.7	38.8	24 48.9	+58.8	39.1	36
37	20 16.2	+57.5	37.0	21 04.0	+57.8	37.2	21 51.7	+57.9	37.5	22 39.3	+58.1	37.7	23 26.6	+58.3	38.0	24 13.8	+58.5	38.3	25 00.9	+58.5	38.5	25 47.7	+58.7	38.8	37
38	21 13.7	+57.6	36.7	22 01.8	+57.7	36.9	22 49.6	+57.9	37.2	23 37.4	+58.0	37.5	24 24.9	+58.2	37.7	25 12.3	+58.4	38.0	25 59.4	+58.6	38.3	26 46.4	+58.7	38.6	38
39	22 11.3	+57.4	36.4	22 59.5	+57.6	36.7	23 47.5	+57.9	36.9	24 35.4	+58.0	37.2	25 23.1	+58.2	37.5	26 10.7	+58.3	37.8	26 58.0	+58.5	38.1	27 45.1	+58.7	38.4	39
40	23 08.7	+57.5	36.1	23 57.1	+57.7	36.4	24 45.4	+57.8	36.6	25 33.4	+58.0	36.9	26 21.3	+58.2	37.2	27 09.0	+58.4	37.5	27 56.5	+58.5	37.8	28 43.8	+58.7	38.2	40
41	24 06.2	+57.4	35.8	24 54.8	+57.6	36.0	25 43.2	+57.8	36.3	26 31.4	+58.0	36.6	27 19.5	+58.1	36.9	28 07.4	+58.3	37.2	28 55.0	+58.5	37.6	29 42.5	+58.6	37.9	41
42	25 03.6	+57.3	35.5	25 52.4	+57.5	35.7	26 41.0	+57.7	36.0	27 29.4	+57.9	36.3	28 17.6	+58.2	36.6	29 05.7	+58.3	37.0	29 53.5	+58.5	37.3	30 41.1	+58.6	37.7	42
43	26 00.9	+57.3	35.1	26 49.9	+57.5	35.4	27 38.7	+57.7	35.7	28 27.3	+57.9	36.0	29 15.8	+58.0	36.4	30 04.0	+58.2	36.7	30 52.0	+58.4	37.0	31 39.7	+58.6	37.4	43
44	26 58.2	+57.3	34.8	27 47.4	+57.5	35.1	28 36.4	+57.7	35.4	29 25.2	+57.9	35.7	30 13.8	+58.1	36.1	31 02.2	+58.2	36.4	31 50.4	+58.4	36.8	32 38.3	+58.6	37.2	44
45	27 55.5	+57.2	34.5	28 44.9	+57.4	34.8	29 34.1	+57.6	35.1	30 23.1	+57.8	35.4	31 11.9	+57.9	35.8	32 00.4	+58.2	36.1	32 48.8	+58.3	36.5	33 36.9	+58.5	36.9	45
46	28 52.7	+57.2	34.1	29 42.3	+57.4	34.4	30 31.7	+57.5	34.8	31 20.9	+57.7	35.1	32 09.8	+58.0	35.5	32 58.6	+58.1	35.8	33 47.1	+58.3	36.2	34 35.4	+58.5	36.6	46
47	29 49.9	+57.1	33.8	30 39.7	+57.3	34.1	31 29.2	+57.5	34.4	32 18.6	+57.7	34.8	33 07.8	+57.9	35.2	33 56.7	+58.1	35.5	34 45.4	+58.3	35.9	35 33.9	+58.4	36.4	47
48	30 47.0	+57.0	33.4	31 37.0	+57.2	33.8	32 26.7	+57.5	34.1	33 16.3	+57.7	34.5	34 05.7	+57.8	34.8	34 54.8	+58.0	35.2	35 43.7	+58.2	35.7	36 32.3	+58.4	36.1	48
49	31 44.0	+57.0	33.1	32 34.2	+57.2	33.4	33 24.2	+57.4	33.8	34 14.0	+57.6	34.1	35 03.5	+57.8	34.5	35 52.8	+58.0	34.9	36 41.9	+58.2	35.4	37 30.7	+58.4	35.8	49
50	32 41.0	+56.9	32.7	33 31.4	+57.1	33.0	34 21.6	+57.3	33.4	35 11.6	+57.5	33.8	36 01.3	+57.8	34.2	36 50.8	+58.0	34.6	37 40.1	+58.1	35.0	38 29.1	+58.3	35.5	50
51	33 37.9	+56.9	32.3	34 28.5	+57.1	32.7	35 18.9	+57.3	33.0	36 09.1	+57.5	33.4	36 59.1	+57.6	33.9	37 48.8	+57.9	34.3	38 38.2	+58.1	34.7	39 27.4	+58.3	35.2	51
52	34 34.8	+56.7	31.9	35 25.6	+57.0	32.3	36 16.2	+57.2	32.7	37 06.6	+57.4	33.1	37 56.7	+57.7	33.5	38 46.7	+57.8	33.9	39 36.3	+58.0	34.4	40 25.7	+58.2	34.9	52
53	35 31.5	+56.7	31.5	36 22.6	+56.9	31.9	37 13.4	+57.1	32.3	38 04.0	+57.4	32.7	38 54.4	+57.5	33.2	39 44.5	+57.7	33.6	40 34.3	+58.0	34.1	41 23.9	+58.1	34.6	53
54	36 28.2	+56.6	31.1	37 19.5	+56.8	31.5	38 10.5	+57.1	31.9	39 01.4	+57.2	32.3	39 51.9	+57.5	32.8	40 42.2	+57.7	33.2	41 32.3	+57.9	33.7	42 22.0	+58.1	34.2	54
55	37 24.8	+56.6	30.7	38 16.3	+56.8	31.1	39 07.6	+57.0	31.5	39 58.6	+57.2	32.0	40 49.4	+57.4	32.4	41 39.9	+57.6	32.9	42 30.2	+57.8	33.4	43 20.1	+58.1	33.9	55
56	38 21.4	+56.4	30.3	39 13.1	+56.6	30.7	40 04.6	+56.8	31.1	40 55.8	+57.1	31.6	41 46.8	+57.3	32.0	42 37.5	+57.6	32.5	43 28.0	+57.8	33.0	44 18.2	+57.9	33.5	56
57	39 17.8	+56.3	29.8	40 09.7	+56.6	30.3	41 01.4	+56.8	30.7	41 52.9	+57.0	31.1	42 44.1	+57.3	31.6	43 35.1	+57.4	32.1	44 25.8	+57.6	32.6	45 16.1	+57.9	33.2	57
58	40 14.1	+56.2	29.4	41 06.3	+56.4	29.8	41 58.2	+56.7	30.3	42 49.9	+56.9	30.7	43 41.4	+57.1	31.2	44 32.5	+57.4	31.7	45 23.4	+57.6	32.2	46 14.0	+57.9	32.8	58
59	41 10.3	+56.1	28.9	42 02.7	+56.4	29.4	42 54.9	+56.6	29.8	43 46.8	+56.9	30.3	44 38.5	+57.1	30.8	45 29.9	+57.3	31.3	46 21.0	+57.6	31.8	47 11.9	+57.7	32.4	59
60	42 06.4	+56.0	28.5	42 59.1	+56.2	28.9	43 51.5	+56.5	29.4	44 43.7	+56.7	29.8	45 35.6	+56.9	30.3	46 27.2	+57.2	30.9	47 18.6	+57.4	31.4	48 09.6	+57.6	32.0	60
61	43 02.4	+55.9	28.0	43 55.3	+56.1	28.4	44 48.0	+56.3	28.9	45 40.4	+56.6	29.4	46 32.5	+56.9	29.9	47 24.4	+57.1	30.4	48 16.0	+57.3	31.0	49 07.2	+57.6	31.6	61
62	43 58.3	+55.7	27.5	44 51.4	+56.0	27.9	45 44.3	+56.2	28.4	46 37.0	+56.4	28.9	47 29.4	+56.7	29.4	48 21.5	+56.9	30.0	49 13.3	+57.2	30.5	50 04.8	+57.5	31.2	62
63	44 54.0	+55.6	26.9	45 47.4	+55.8	27.4	46 40.5	+56.1	27.9	47 33.4	+56.4	28.4	48 26.1	+56.6	28.9	49 18.4	+56.9	29.5	50 10.5	+57.1	30.1	51 02.3	+57.3	30.7	63
64	45 49.6	+55.4	26.4	46 43.2	+55.7	26.9	47 36.6	+55.9	27.4	48 29.8	+56.1	27.9	49 22.7	+56.4	28.4	50 15.3	+56.7	29.0	51 07.6	+57.0	29.6	51 59.6	+57.2	30.2	64
65	46 45.0	+55.2	25.9	47 38.9	+55.5	26.3	48 32.5	+55.8	26.8	49 25.9	+56.1	27.4	50 19.1	+56.3	27.9	51 12.0	+56.6	28.5	52 04.6	+56.8	29.1	52 56.8	+57.1	29.7	65
66	47 40.2	+55.1	25.3	48 34.4	+55.3	25.8	49 28.3	+55.6	26.3	50 22.0	+55.9	26.8	51 15.4	+56.1	27.4	52 08.6	+56.4	27.9	53 01.4	+56.7	28.6	53 53.9	+57.0	29.2	66
67	48 35.3	+54.9	24.7	49 29.7	+55.2	25.2	50 23.9	+55.4	25.7	51 17.9	+55.6	26.2	52 11.5	+56.0	26.8	53 05.0	+56.2	27.4	53 58.1	+56.5	28.0	54 50.9	+56.8	28.7	67
68	49 30.2	+54.7	24.1	50 24.9	+54.9	24.6	51 19.3	+55.2	25.1	52 13.5	+55.6	25.6	53 07.5	+55.8	26.2	54 01.2	+56.1	26.8	54 54.6	+56.4	27.4	55 47.7	+56.7	28.1	68
69	50 24.9	+54.4	23.4	51 19.8	+54.7	23.9	52 14.5	+55.1	24.4	53 09.1	+55.2	25.0	54 03.3	+55.6	25.6	54 57.3	+55.9	26.2	55 51.0	+56.2	26.8	56 44.4	+56.4	27.5	69
70	51 19.3	+54.2	22.8	52 14.5	+54.6	23.3	53 09.6	+54.7	23.8	54 04.3	+55.1	24.3	54 58.9	+55.4	24.9	55 53.2	+55.6	25.5	56 47.2	+55.9	26.2	57 40.8	+56.3	26.9	70
71	52 13.5	+54.0	22.1	53 09.1	+54.2	22.6	54 04.3	+54.6	23.1	54 59.4	+54.9	23.7	55 54.3	+55.1	24.2	56 48.8	+55.5	24.9	57 43.1	+55.8	25.5	58 37.1	+56.1	26.2	71
72	53 07.5	+53.7	21.4	54 03.3	+54.0	21.9	54 58.9	+54.3	22.4	55 54.3	+54.5	22.9	56 49.4	+54.9	23.5	57 44.3	+55.2	24.2	58 38.9	+55.5	24.8	59 33.2	+55.8	25.5	72
73	54 01.2	+53.4	20.6	54 57.3	+53.7	21.1	55 53.2	+54.0	21.6	56 48.8	+54.3	22.2	57 44.3	+54.6	22.8	58 39.5	+54.9	23.4	59 34.4	+55.2	24.1	60 29.0	+55.6	24.8	73
74	54 54.6	+53.1	19.8	55 51.0	+53.4	20.3	56 47.2	+53.6	20.8	57 43.1	+54.0	21.4	58 38.9	+54.3	22.0	59 34.4	+54.6	22.6	60 29.6	+55.0	23.3	61 24.6	+55.3	24.0	74
75	55 47.7	+52.8	19.0	56 44.4	+53.0	19.5	57 40.8	+53.4	20.0	58 37.1	+53.6	20.6	59 33.2	+53.9	21.2	60 29.0	+54.3	21.8	61 24.6	+54.6	22.5	62 19.9	+54.9	23.2	75
76	56 40.5	+52.3	18.1	57 37.4	+52.7	18.6	58 34.2	+52.9	19.2	59 30.7	+53.3	19.7	60 27.1	+53.6	20.3	61 23.3	+53.9	20.9	62 19.2	+54.3	21.6	63 14.8	+54.7	22.3	76
77	57 32.8	+52.0	17.2	58 30.1	+52.2	17.7	59 27.1	+52.6	18.2	60 24.0	+52.9	18.8	61 20.7	+53.2	19.4	62 17.2	+53.6	20.0	63 13.5	+53.9	20.7	64 09.5	+54.2	21.4	77
78	58 24.8	+51.5	16.3	59 22.3	+51.9	16.8	60 19.7	+52.1	17.3	61 16.9	+52.4	17.8	62 13.9	+52.8	18.4	63 10.8	+53.1	19.0	64 07.4	+53.4	19.7	65 03.7	+53.9	20.4	78
79	59 16.3	+51.1	15.3	60 14.2	+51.3	15.8	61 11.8	+51.7	16.3	62 09.3	+52.0	16.8	63 06.7	+52.3	17.4	64 03.9	+52.6	18.0	65 00.8	+53.0	18.6	65 57.6	+53.3	19.3	79
80	60 07.4	+50.6	14.3	61 05.5	+50.8	14.7	62 03.5	+51.1	15.2	63 01.3	+51.4	15.7	63 59.0	+51.7	16.3	64 56.5	+52.1	16.9	65 53.8	+52.5	17.5	66 50.9	+52.9	18.2	80
81	60 58.0	+49.9	13.2	61 56.3	+50.3	13.6	62 54.6	+50.5	14.1	63 52.7	+50.9	14.6	64 50.7	+51.2	15.1	65 48.6	+51.5	15.7	66 46.3	+51.8	16.3	67 43.8	+52.2	17.0	81
82	61 47.9	+49.4	12.0	62 46.6	+49.6	12.4	63 45.1	+49.9	12.9	64 43.6	+50.2	13.3	65 41.9	+50.5	13.8	66 40.1	+50.8	14.4	67 38.1	+51.2	15.0	68 36.0	+51.5	15.6	82
83	62 37.3	+48.7	10.8	63 36.2	+49.0	11.2	64 35.0	+49.2	11.6	65 33.8	+49.4	12.0	66 32.4	+49.8	12.5	67 30.9	+50.1	13.0	68 29.3	+50.4	13.6	69 27.5	+50.8	14.2	83
84	63 26.0	+48.0	9.5	64 25.2	+48.2	9.9	65 24.2	+48.5	10.2	66 23.2	+48.7	10.6	67 22.2	+48.9	11.1	68 21.0	+49.3	11.6	69 19.7	+49.6	12.1	70 18.3	+50.0	12.7	84
85	64 14.0	+47.1	8.2	65 13.4	+47.3	8.5	66 12.7	+47.6	8.8	67 11.9	+47.8	9.2	68 11.1	+48.1	9.5	69 10.3	+48.3	10.0	70 09.3	+48.6	10.5	71 08.3	+48.9	11.0	85
86	65 01.1	+46.3	6.7	66 00.7	+46.5	7.0	67 00.3	+46.6	7.3	67 59.7	+46.9	7.6	68 59.2	+47.1	7.9	69 58.6	+47.3	8.3	70 57.9	+47.6	8.7	71 57.2	+47.8	9.2	86
87	65 47.4	+45.3	5.2	66 47.2	+45.4	5.4	67 46.9	+45.6	5.6	68 46.6	+45.7	5.9	69 46.3	+45.9	6.1	70 45.9	+46.1	6.4	71 45.5	+46.3	6.8	72 45.0	+46.6	7.2	87
88	66 32.7	+44.2	3.6	67 32.6	+44.3	3.7	68 32.5	+44.4	3.9	69 32.3	+44.5	4.0	70 32.2	+44.6	4.2	71 32.0	+44.8	4.5	72 31.8	+44.9	4.7	73 31.6	+45.0	5.0	88
89	67 16.9	+43.1	1.8	68 16.9	+43.1	1.9	69 16.9	+43.1	2.0	70 16.8	+43.2	2.1	71 16.8	+43.2	2.2	72 16.8	+43.2	2.3	73 16.7	+43.3	2.5	74 16.6	+43.4	2.6	89
90	68 00.0	+41.8	0.0	69 00.0	+41.7	0.0	70 00.0	+41.7	0.0	71 00.0	+41.6	0.0	72 00.0	+41.6	0.0	73 00.0	+41.5	0.0	74 00.0	+41.5	0.0	75 00.0	*+41.4* •	0.0	90
	68°			69°			70°			71°			72°			73°			74°			75°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z
L.H.A. less than 180°.....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 135°, 225°