Integer

Sight Reduction Tables

Latitude 63° to 69°

USE OF THE TABLES.

The Greenwich Hour Angle (GHA) and Declination of the SUN are taken from the current year's Sun Almanac for the precise date and time of the observation.
The GHA is combined with an Assumed Longitude, somewhere close to your actual position (obtained from your GPS or, if you are a traditionalist, your Dead Reckoning position) to give your Local Hour Angle (LHA).
The resulting LHA must be a whole degree of latitude.

If LHA and Declination = SAME
Start at the first page and work forward until you find the page with your LHA.
Enter the table with your Declination and Latitude, and read off Hc, d' and Z.
Take care to note whether d' is +ve or -ve.

If LHA and Declination = CONTRARY
Start at the last page and work backwards until you find the page with your LHA.
Enter the table with your Declination and Latitude, and read of Hc, d' and Z.
Take care to note whether d' is +ve or -ve.

NOTE: Values of Hc, d' and Z are always in **BOLD** text whenever LHA and Declination are contrary.

Hc, the computed Altitude, must now be corrected for minutes of Declination by means of the correction table at the end of the tables.
Enter the table with minutes of declination and d'. It doesn't matter which way round you use the table.
If d' is -ve, SUBTRACT the value obtained from the correction table from Hc to determine the corrected value of Hc.
If d' is +ve, ADD the value obtained from the correction table to HC to determine the corrected value of Hc.

Accuracy and Precision
This particular set of tables returns Hc, d' and Z as INTEGERS.
In the majority of situations this will give you satisfactory results as well as simplifying the entire sight reduction process.

These tables have been compared to the US National Imagery and Mapping Agency Sight Reduction Tables for Air Navigation Pub249 with the following results.

No difference for Hc° has been identified by the author.
No difference in D' has been identified by the author.
No difference in Z° has been identified by the author.

Disclaimer
While the author has taken great care with these tables, no warranty is implied or expressed as to their fitness for purpose.

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

0° 360° LHA — Latitude SAME as Declination — 0° 360° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	27°00'	+60'	180°	26°00'	+60'	180°	25°00'	+60'	180°	24°00'	+60'	180°	23°00'	+60'	180°	22°00'	+60'	180°	21°00'	+60'	180°	0
1	28°00'	+60'	180°	27°00'	+60'	180°	26°00'	+60'	180°	25°00'	+60'	180°	24°00'	+60'	180°	23°00'	+60'	180°	22°00'	+60'	180°	1
2	29°00'	+60'	180°	28°00'	+60'	180°	27°00'	+60'	180°	26°00'	+60'	180°	25°00'	+60'	180°	24°00'	+60'	180°	23°00'	+60'	180°	2
3	30°00'	+60'	180°	29°00'	+60'	180°	28°00'	+60'	180°	27°00'	+60'	180°	26°00'	+60'	180°	25°00'	+60'	180°	24°00'	+60'	180°	3
4	31°00'	+60'	180°	30°00'	+60'	180°	29°00'	+60'	180°	28°00'	+60'	180°	27°00'	+60'	180°	26°00'	+60'	180°	25°00'	+60'	180°	4
5	32°00'	+60'	180°	31°00'	+60'	180°	30°00'	+60'	180°	29°00'	+60'	180°	28°00'	+60'	180°	27°00'	+60'	180°	26°00'	+60'	180°	5
6	33°00'	+60'	180°	32°00'	+60'	180°	31°00'	+60'	180°	30°00'	+60'	180°	29°00'	+60'	180°	28°00'	+60'	180°	27°00'	+60'	180°	6
7	34°00'	+60'	180°	33°00'	+60'	180°	32°00'	+60'	180°	31°00'	+60'	180°	30°00'	+60'	180°	29°00'	+60'	180°	28°00'	+60'	180°	7
8	35°00'	+60'	180°	34°00'	+60'	180°	33°00'	+60'	180°	32°00'	+60'	180°	31°00'	+60'	180°	30°00'	+60'	180°	29°00'	+60'	180°	8
9	36°00'	+60'	180°	35°00'	+60'	180°	34°00'	+60'	180°	33°00'	+60'	180°	32°00'	+60'	180°	31°00'	+60'	180°	30°00'	+60'	180°	9
10	37°00'	+60'	180°	36°00'	+60'	180°	35°00'	+60'	180°	34°00'	+60'	180°	33°00'	+60'	180°	32°00'	+60'	180°	31°00'	+60'	180°	10
11	38°00'	+60'	180°	37°00'	+60'	180°	36°00'	+60'	180°	35°00'	+60'	180°	34°00'	+60'	180°	33°00'	+60'	180°	32°00'	+60'	180°	11
12	39°00'	+60'	180°	38°00'	+60'	180°	37°00'	+60'	180°	36°00'	+60'	180°	35°00'	+60'	180°	34°00'	+60'	180°	33°00'	+60'	180°	12
13	40°00'	+60'	180°	39°00'	+60'	180°	38°00'	+60'	180°	37°00'	+60'	180°	36°00'	+60'	180°	35°00'	+60'	180°	34°00'	+60'	180°	13
14	41°00'	+60'	180°	40°00'	+60'	180°	39°00'	+60'	180°	38°00'	+60'	180°	37°00'	+60'	180°	36°00'	+60'	180°	35°00'	+60'	180°	14
15	42°00'	+60'	180°	41°00'	+60'	180°	40°00'	+60'	180°	39°00'	+60'	180°	38°00'	+60'	180°	37°00'	+60'	180°	36°00'	+60'	180°	15
16	43°00'	+60'	180°	42°00'	+60'	180°	41°00'	+60'	180°	40°00'	+60'	180°	39°00'	+60'	180°	38°00'	+60'	180°	37°00'	+60'	180°	16
17	44°00'	+60'	180°	43°00'	+60'	180°	42°00'	+60'	180°	41°00'	+60'	180°	40°00'	+60'	180°	39°00'	+60'	180°	38°00'	+60'	180°	17
18	45°00'	+60'	180°	44°00'	+60'	180°	43°00'	+60'	180°	42°00'	+60'	180°	41°00'	+60'	180°	40°00'	+60'	180°	39°00'	+60'	180°	18
19	46°00'	+60'	180°	45°00'	+60'	180°	44°00'	+60'	180°	43°00'	+60'	180°	42°00'	+60'	180°	41°00'	+60'	180°	40°00'	+60'	180°	19
20	47°00'	+60'	180°	46°00'	+60'	180°	45°00'	+60'	180°	44°00'	+60'	180°	43°00'	+60'	180°	42°00'	+60'	180°	41°00'	+60'	180°	20
21	48°00'	+60'	180°	47°00'	+60'	180°	46°00'	+60'	180°	45°00'	+60'	180°	44°00'	+60'	180°	43°00'	+60'	180°	42°00'	+60'	180°	21
22	49°00'	+60'	180°	48°00'	+60'	180°	47°00'	+60'	180°	46°00'	+60'	180°	45°00'	+60'	180°	44°00'	+60'	180°	43°00'	+60'	180°	22
23	50°00'	+60'	180°	49°00'	+60'	180°	48°00'	+60'	180°	47°00'	+60'	180°	46°00'	+60'	180°	45°00'	+60'	180°	44°00'	+60'	180°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

0° 360° LHA — Latitude SAME as Declination — 0° 360° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

1° 359° LHA — Latitude SAME as Declination — 1° 359° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	27°00'	+60'	179°	26°00'	+60'	179°	25°00'	+60'	179°	24°00'	+60'	179°	23°00'	+60'	179°	22°00'	+60'	179°	21°00'	+60'	179°	0
1	28°00'	+60'	179°	27°00'	+60'	179°	26°00'	+60'	179°	25°00'	+60'	179°	24°00'	+60'	179°	23°00'	+60'	179°	22°00'	+60'	179°	1
2	29°00'	+60'	179°	28°00'	+60'	179°	27°00'	+60'	179°	26°00'	+60'	179°	25°00'	+60'	179°	24°00'	+60'	179°	23°00'	+60'	179°	2
3	30°00'	+60'	179°	29°00'	+60'	179°	28°00'	+60'	179°	27°00'	+60'	179°	26°00'	+60'	179°	25°00'	+60'	179°	24°00'	+60'	179°	3
4	31°00'	+60'	179°	30°00'	+60'	179°	29°00'	+60'	179°	28°00'	+60'	179°	27°00'	+60'	179°	26°00'	+60'	179°	25°00'	+60'	179°	4
5	32°00'	+60'	179°	31°00'	+60'	179°	30°00'	+60'	179°	29°00'	+60'	179°	28°00'	+60'	179°	27°00'	+60'	179°	26°00'	+60'	179°	5
6	33°00'	+60'	179°	32°00'	+60'	179°	31°00'	+60'	179°	30°00'	+60'	179°	29°00'	+60'	179°	28°00'	+60'	179°	27°00'	+60'	179°	6
7	34°00'	+60'	179°	33°00'	+60'	179°	32°00'	+60'	179°	31°00'	+60'	179°	30°00'	+60'	179°	29°00'	+60'	179°	28°00'	+60'	179°	7
8	35°00'	+60'	179°	34°00'	+60'	179°	33°00'	+60'	179°	32°00'	+60'	179°	31°00'	+60'	179°	30°00'	+60'	179°	29°00'	+60'	179°	8
9	36°00'	+60'	179°	35°00'	+60'	179°	34°00'	+60'	179°	33°00'	+60'	179°	32°00'	+60'	179°	31°00'	+60'	179°	30°00'	+60'	179°	9
10	37°00'	+60'	179°	36°00'	+60'	179°	35°00'	+60'	179°	34°00'	+60'	179°	33°00'	+60'	179°	32°00'	+60'	179°	31°00'	+60'	179°	10
11	38°00'	+60'	179°	37°00'	+60'	179°	36°00'	+60'	179°	35°00'	+60'	179°	34°00'	+60'	179°	33°00'	+60'	179°	32°00'	+60'	179°	11
12	39°00'	+60'	179°	38°00'	+60'	179°	37°00'	+60'	179°	36°00'	+60'	179°	35°00'	+60'	179°	34°00'	+60'	179°	33°00'	+60'	179°	12
13	40°00'	+60'	179°	39°00'	+60'	179°	38°00'	+60'	179°	37°00'	+60'	179°	36°00'	+60'	179°	35°00'	+60'	179°	34°00'	+60'	179°	13
14	41°00'	+60'	179°	40°00'	+60'	179°	39°00'	+60'	179°	38°00'	+60'	179°	37°00'	+60'	179°	36°00'	+60'	179°	35°00'	+60'	179°	14
15	42°00'	+60'	179°	41°00'	+60'	179°	40°00'	+60'	179°	39°00'	+60'	179°	38°00'	+60'	179°	37°00'	+60'	179°	36°00'	+60'	179°	15
16	43°00'	+60'	179°	42°00'	+60'	179°	41°00'	+60'	179°	40°00'	+60'	179°	39°00'	+60'	179°	38°00'	+60'	179°	37°00'	+60'	179°	16
17	44°00'	+60'	179°	43°00'	+60'	179°	42°00'	+60'	179°	41°00'	+60'	179°	40°00'	+60'	179°	39°00'	+60'	179°	38°00'	+60'	179°	17
18	45°00'	+60'	179°	44°00'	+60'	179°	43°00'	+60'	179°	42°00'	+60'	179°	41°00'	+60'	179°	40°00'	+60'	179°	39°00'	+60'	179°	18
19	46°00'	+60'	179°	45°00'	+60'	179°	44°00'	+60'	179°	43°00'	+60'	179°	42°00'	+60'	179°	41°00'	+60'	179°	40°00'	+60'	179°	19
20	47°00'	+60'	179°	46°00'	+60'	179°	45°00'	+60'	179°	44°00'	+60'	179°	43°00'	+60'	179°	42°00'	+60'	179°	41°00'	+60'	179°	20
21	48°00'	+60'	179°	47°00'	+60'	179°	46°00'	+60'	179°	45°00'	+60'	179°	44°00'	+60'	179°	43°00'	+60'	179°	42°00'	+60'	179°	21
22	49°00'	+60'	179°	48°00'	+60'	179°	47°00'	+60'	179°	46°00'	+60'	179°	45°00'	+60'	179°	44°00'	+60'	179°	43°00'	+60'	179°	22
23	50°00'	+60'	179°	49°00'	+60'	179°	48°00'	+60'	179°	47°00'	+60'	179°	46°00'	+60'	179°	45°00'	+60'	179°	44°00'	+60'	179°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

1° 359° LHA — Latitude SAME as Declination — 1° 359° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

2° 358° LHA — Latitude SAME as Declination — 2° 358° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	26°59'	+60'	178°	25°59'	+60'	178°	24°59'	+60'	178°	23°59'	+60'	178°	22°59'	+60'	178°	21°59'	+60'	178°	20°59'	+60'	178°	0
1	27°59'	+60'	178°	26°59'	+60'	178°	25°59'	+60'	178°	24°59'	+60'	178°	23°59'	+60'	178°	22°59'	+60'	178°	21°59'	+60'	178°	1
2	28°59'	+60'	178°	27°59'	+60'	178°	26°59'	+60'	178°	25°59'	+60'	178°	24°59'	+60'	178°	23°59'	+60'	178°	22°59'	+60'	178°	2
3	29°59'	+60'	178°	28°59'	+60'	178°	27°59'	+60'	178°	26°59'	+60'	178°	25°59'	+60'	178°	24°59'	+60'	178°	23°59'	+60'	178°	3
4	30°59'	+60'	178°	29°59'	+60'	178°	28°59'	+60'	178°	27°59'	+60'	178°	26°59'	+60'	178°	25°59'	+60'	178°	24°59'	+60'	178°	4
5	31°59'	+61'	178°	30°59'	+61'	178°	29°59'	+61'	178°	28°59'	+61'	178°	27°59'	+61'	178°	26°59'	+61'	178°	25°59'	+61'	178°	5
6	33°00'	+60'	179°	32°00'	+60'	179°	31°00'	+60'	179°	30°00'	+60'	179°	29°00'	+60'	179°	28°00'	+60'	179°	27°00'	+60'	179°	6
7	34°00'	+60'	179°	33°00'	+60'	179°	32°00'	+60'	179°	31°00'	+60'	179°	30°00'	+60'	179°	29°00'	+60'	179°	28°00'	+60'	179°	7
8	35°00'	+60'	179°	34°00'	+60'	179°	33°00'	+60'	179°	32°00'	+60'	179°	31°00'	+60'	179°	30°00'	+60'	179°	29°00'	+60'	179°	8
9	36°00'	+60'	179°	35°00'	+60'	179°	34°00'	+60'	179°	33°00'	+60'	179°	32°00'	+60'	179°	31°00'	+60'	179°	30°00'	+60'	179°	9
10	37°00'	+60'	179°	36°00'	+60'	179°	35°00'	+60'	179°	34°00'	+60'	179°	33°00'	+60'	179°	32°00'	+60'	179°	31°00'	+60'	179°	10
11	38°00'	+60'	179°	37°00'	+60'	179°	36°00'	+60'	179°	35°00'	+60'	179°	34°00'	+60'	179°	33°00'	+60'	179°	32°00'	+60'	179°	11
12	39°00'	+60'	179°	38°00'	+60'	179°	37°00'	+60'	179°	36°00'	+60'	179°	35°00'	+60'	179°	34°00'	+60'	179°	33°00'	+60'	179°	12
13	40°00'	+60'	179°	39°00'	+60'	179°	38°00'	+60'	179°	37°00'	+60'	179°	36°00'	+60'	179°	35°00'	+60'	179°	34°00'	+60'	179°	13
14	41°00'	+60'	179°	40°00'	+60'	179°	39°00'	+60'	179°	38°00'	+60'	179°	37°00'	+60'	179°	36°00'	+60'	179°	35°00'	+60'	179°	14
15	42°00'	+60'	179°	41°00'	+60'	179°	40°00'	+60'	179°	39°00'	+60'	179°	38°00'	+60'	179°	37°00'	+60'	179°	36°00'	+60'	179°	15
16	43°00'	+60'	179°	42°00'	+60'	179°	41°00'	+60'	179°	40°00'	+60'	179°	39°00'	+60'	179°	38°00'	+60'	179°	37°00'	+60'	179°	16
17	44°00'	+60'	179°	43°00'	+60'	179°	42°00'	+60'	179°	41°00'	+60'	179°	40°00'	+60'	179°	39°00'	+60'	179°	38°00'	+60'	179°	17
18	45°00'	+60'	179°	44°00'	+60'	179°	43°00'	+60'	179°	42°00'	+60'	179°	41°00'	+60'	179°	40°00'	+60'	179°	39°00'	+60'	179°	18
19	46°00'	+60'	179°	45°00'	+60'	179°	44°00'	+60'	179°	43°00'	+60'	179°	42°00'	+60'	179°	41°00'	+60'	179°	40°00'	+60'	179°	19
20	47°00'	+60'	179°	46°00'	+60'	179°	45°00'	+60'	179°	44°00'	+60'	179°	43°00'	+60'	179°	42°00'	+60'	179°	41°00'	+60'	179°	20
21	48°00'	+60'	179°	47°00'	+60'	179°	46°00'	+60'	179°	45°00'	+60'	179°	44°00'	+60'	179°	43°00'	+60'	179°	42°00'	+60'	179°	21
22	49°00'	+60'	179°	48°00'	+60'	179°	47°00'	+60'	179°	46°00'	+60'	179°	45°00'	+60'	179°	44°00'	+60'	179°	43°00'	+60'	179°	22
23	50°00'	+60'	179°	49°00'	+60'	179°	48°00'	+60'	179°	47°00'	+60'	179°	46°00'	+60'	179°	45°00'	+60'	179°	44°00'	+60'	179°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

2° 358° LHA — Latitude SAME as Declination — 2° 358° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

3° 357° LHA — Latitude SAME as Declination — 3° 357° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	26°58'	+60'	177°	25°58'	+60'	177°	24°58'	+60'	177°	23°58'	+60'	177°	22°58'	+60'	177°	21°58'	+60'	177°	20°58'	+60'	177°	0
1	27°58'	+60'	177°	26°58'	+60'	177°	25°58'	+60'	177°	24°58'	+60'	177°	23°58'	+60'	177°	22°58'	+60'	177°	21°58'	+60'	177°	1
2	28°58'	+60'	177°	27°58'	+60'	177°	26°58'	+60'	177°	25°58'	+60'	177°	24°58'	+60'	177°	23°58'	+60'	177°	22°58'	+60'	177°	2
3	29°58'	+60'	177°	28°58'	+60'	177°	27°58'	+60'	177°	26°58'	+60'	177°	25°58'	+60'	177°	24°58'	+60'	177°	23°58'	+60'	177°	3
4	30°58'	+60'	177°	29°58'	+60'	177°	28°58'	+60'	177°	27°58'	+60'	177°	26°58'	+60'	177°	25°58'	+60'	177°	24°58'	+60'	177°	4
5	31°57'	+60'	176°	30°58'	+60'	177°	29°58'	+60'	177°	28°58'	+60'	177°	27°58'	+60'	177°	26°58'	+60'	177°	25°58'	+60'	177°	5
6	32°57'	+60'	176°	31°58'	+60'	176°	30°58'	+60'	177°	29°58'	+60'	177°	28°58'	+60'	177°	27°58'	+60'	177°	26°58'	+60'	177°	6
7	33°57'	+60'	176°	32°58'	+60'	176°	31°58'	+60'	176°	30°58'	+60'	177°	29°58'	+60'	177°	28°58'	+60'	177°	27°58'	+60'	177°	7
8	34°57'	+60'	176°	33°58'	+60'	176°	32°58'	+60'	176°	31°58'	+60'	176°	30°58'	+60'	177°	29°58'	+60'	177°	28°58'	+60'	177°	8
9	35°57'	+60'	176°	34°58'	+60'	176°	33°58'	+60'	176°	32°58'	+60'	176°	31°58'	+60'	177°	30°58'	+60'	177°	29°58'	+60'	177°	9
10	36°57'	+60'	176°	35°57'	+60'	176°	34°58'	+60'	176°	33°58'	+60'	176°	32°58'	+60'	176°	31°58'	+60'	177°	30°58'	+60'	177°	10
11	37°57'	+60'	176°	36°57'	+60'	176°	35°58'	+60'	176°	34°58'	+60'	176°	33°58'	+60'	176°	32°58'	+60'	176°	31°58'	+60'	177°	11
12	38°57'	+60'	176°	37°57'	+60'	176°	36°58'	+60'	176°	35°58'	+60'	176°	34°58'	+60'	176°	33°58'	+60'	176°	32°58'	+60'	177°	12
13	39°57'	+60'	176°	38°57'	+60'	176°	37°58'	+60'	176°	36°58'	+60'	176°	35°58'	+60'	176°	34°58'	+60'	176°	33°58'	+60'	176°	13
14	40°57'	+60'	176°	39°57'	+60'	176°	38°58'	+60'	176°	37°58'	+60'	176°	36°58'	+60'	176°	35°58'	+60'	176°	34°58'	+60'	176°	14
15	41°57'	+60'	176°	40°57'	+60'	176°	39°57'	+60'	176°	38°58'	+60'	176°	37°58'	+60'	176°	36°58'	+60'	176°	35°58'	+60'	176°	15
16	42°57'	+60'	176°	41°57'	+60'	176°	40°57'	+60'	176°	39°58'	+60'	176°	38°58'	+60'	176°	37°58'	+60'	176°	36°58'	+60'	176°	16
17	43°57'	+60'	176°	42°57'	+60'	176°	41°57'	+60'	176°	40°58'	+60'	176°	39°58'	+60'	176°	38°58'	+60'	176°	37°58'	+60'	176°	17
18	44°57'	+60'	176°	43°57'	+60'	176°	42°57'	+60'	176°	41°58'	+60'	176°	40°58'	+60'	176°	39°58'	+60'	176°	38°58'	+60'	176°	18
19	45°57'	+60'	176°	44°57'	+60'	176°	43°57'	+60'	176°	42°58'	+60'	176°	41°58'	+60'	176°	40°58'	+60'	176°	39°58'	+60'	176°	19
20	46°57'	+60'	176°	45°57'	+60'	176°	44°57'	+60'	176°	43°57'	+60'	176°	42°58'	+60'	176°	41°58'	+60'	176°	40°58'	+60'	176°	20
21	47°57'	+60'	176°	46°57'	+60'	176°	45°57'	+60'	176°	44°57'	+60'	176°	43°58'	+60'	176°	42°58'	+60'	176°	41°58'	+60'	176°	21
22	48°57'	+60'	176°	47°57'	+60'	176°	46°57'	+60'	176°	45°57'	+60'	176°	44°58'	+60'	176°	43°58'	+60'	176°	42°58'	+60'	176°	22
23	49°57'	+60'	176°	48°57'	+60'	176°	47°57'	+60'	176°	46°57'	+60'	176°	45°58'	+60'	176°	44°58'	+60'	176°	43°58'	+60'	176°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

3° 357° LHA — Latitude SAME as Declination — 3° 357° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

4° 356° LHA — Latitude SAME as Declination — 4° 356° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	26°56'	+60'	176°	25°56'	+60'	176°	24°56'	+60'	176°	23°56'	+60'	176°	22°56'	+60'	176°	21°57'	+60'	176°	20°57'	+60'	176°	0
1	27°56'	+60'	175°	26°56'	+60'	176°	25°56'	+60'	176°	24°56'	+60'	176°	23°56'	+60'	176°	22°57'	+60'	176°	21°57'	+60'	176°	1
2	28°56'	+60'	175°	27°56'	+60'	175°	26°56'	+60'	176°	25°56'	+60'	176°	24°56'	+60'	176°	23°57'	+60'	176°	22°57'	+60'	176°	2
3	29°56'	+60'	175°	28°56'	+60'	175°	27°56'	+60'	175°	26°56'	+60'	176°	25°56'	+60'	176°	24°57'	+60'	176°	23°57'	+60'	176°	3
4	30°56'	+60'	175°	29°56'	+60'	175°	28°56'	+60'	175°	27°56'	+60'	175°	26°56'	+60'	176°	25°57'	+60'	176°	24°57'	+60'	176°	4
5	31°56'	+60'	175°	30°56'	+60'	175°	29°56'	+60'	175°	28°56'	+60'	175°	27°56'	+60'	175°	26°56'	+60'	176°	25°57'	+60'	176°	5
6	32°55'	+60'	175°	31°56'	+60'	175°	30°56'	+60'	175°	29°56'	+60'	175°	28°56'	+60'	175°	27°56'	+60'	175°	26°57'	+60'	176°	6
7	33°55'	+60'	175°	32°56'	+60'	175°	31°56'	+60'	175°	30°56'	+60'	175°	29°56'	+60'	175°	28°56'	+60'	175°	27°57'	+60'	176°	7
8	34°55'	+60'	175°	33°56'	+60'	175°	32°56'	+60'	175°	31°56'	+60'	175°	30°56'	+60'	175°	29°56'	+60'	175°	28°57'	+60'	175°	8
9	35°55'	+60'	175°	34°56'	+60'	175°	33°56'	+60'	175°	32°56'	+60'	175°	31°56'	+60'	175°	30°56'	+60'	175°	29°57'	+60'	175°	9
10	36°55'	+60'	175°	35°56'	+60'	175°	34°56'	+60'	175°	33°56'	+60'	175°	32°56'	+60'	175°	31°56'	+60'	175°	30°57'	+60'	175°	10
11	37°55'	+60'	175°	36°55'	+60'	175°	35°56'	+60'	175°	34°56'	+60'	175°	33°56'	+60'	175°	32°56'	+60'	175°	31°57'	+60'	175°	11
12	38°55'	+60'	175°	37°55'	+60'	175°	36°56'	+60'	175°	35°56'	+60'	175°	34°56'	+60'	175°	33°56'	+60'	175°	32°57'	+60'	175°	12
13	39°55'	+60'	175°	38°55'	+60'	175°	37°56'	+60'	175°	36°56'	+60'	175°	35°56'	+60'	175°	34°56'	+60'	175°	33°56'	+60'	175°	13
14	40°55'	+60'	175°	39°55'	+60'	175°	38°56'	+60'	175°	37°56'	+60'	175°	36°56'	+60'	175°	35°56'	+60'	175°	34°56'	+60'	175°	14
15	41°55'	+60'	175°	40°55'	+60'	175°	39°56'	+60'	175°	38°56'	+60'	175°	37°56'	+60'	175°	36°56'	+60'	175°	35°56'	+60'	175°	15
16	42°55'	+60'	175°	41°55'	+60'	175°	40°55'	+60'	175°	39°56'	+60'	175°	38°56'	+60'	175°	37°56'	+60'	175°	36°56'	+60'	175°	16
17	43°55'	+60'	175°	42°55'	+60'	175°	41°55'	+60'	175°	40°56'	+60'	175°	39°56'	+60'	175°	38°56'	+60'	175°	37°56'	+60'	175°	17
18	44°55'	+60'	175°	43°55'	+60'	175°	42°55'	+60'	175°	41°56'	+60'	175°	40°56'	+60'	175°	39°56'	+60'	175°	38°56'	+60'	175°	18
19	45°55'	+60'	175°	44°55'	+60'	175°	43°55'	+60'	175°	42°56'	+60'	175°	41°56'	+60'	175°	40°56'	+60'	175°	39°56'	+60'	175°	19
20	46°55'	+60'	174°	45°55'	+60'	175°	44°55'	+60'	175°	43°56'	+60'	175°	42°56'	+60'	175°	41°56'	+60'	175°	40°56'	+60'	175°	20
21	47°55'	+60'	174°	46°55'	+60'	175°	45°55'	+60'	175°	44°56'	+60'	175°	43°56'	+60'	175°	42°56'	+60'	175°	41°56'	+60'	175°	21
22	48°55'	+60'	174°	47°55'	+60'	174°	46°55'	+60'	175°	45°55'	+60'	175°	44°56'	+60'	175°	43°56'	+60'	175°	42°56'	+60'	175°	22
23	49°55'	+60'	174°	48°55'	+60'	174°	47°55'	+60'	175°	46°55'	+60'	175°	45°56'	+60'	175°	44°56'	+60'	175°	43°56'	+60'	175°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

4° 356° LHA — Latitude SAME as Declination — 4° 356° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

5° 355° LHA — Latitude SAME as Declination — 5° 355° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	26°53'	+60'	174°	25°54'	+60'	174°	24°54'	+60'	174°	23°54'	+60'	175°	22°54'	+60'	175°	21°55'	+60'	175°	20°55'	+60'	175°	0
1	27°53'	+60'	174°	26°54'	+60'	174°	25°54'	+60'	174°	24°54'	+60'	174°	23°54'	+60'	175°	22°55'	+60'	175°	21°55'	+60'	175°	1
2	28°53'	+60'	174°	27°54'	+60'	174°	26°54'	+60'	174°	25°54'	+60'	174°	24°54'	+60'	174°	23°55'	+60'	175°	22°55'	+60'	175°	2
3	29°53'	+60'	174°	28°53'	+60'	174°	27°54'	+60'	174°	26°54'	+60'	174°	25°54'	+60'	174°	24°55'	+60'	174°	23°55'	+60'	175°	3
4	30°53'	+60'	174°	29°53'	+60'	174°	28°54'	+60'	174°	27°54'	+60'	174°	26°54'	+60'	174°	25°55'	+60'	174°	24°55'	+60'	174°	4
5	31°53'	+60'	174°	30°53'	+60'	174°	29°54'	+60'	174°	28°54'	+60'	174°	27°54'	+60'	174°	26°55'	+60'	174°	25°55'	+60'	174°	5
6	32°53'	+60'	174°	31°53'	+60'	174°	30°54'	+60'	174°	29°54'	+60'	174°	28°54'	+60'	174°	27°54'	+60'	174°	26°55'	+60'	174°	6
7	33°53'	+60'	174°	32°53'	+60'	174°	31°54'	+60'	174°	30°54'	+60'	174°	29°54'	+60'	174°	28°54'	+60'	174°	27°55'	+60'	174°	7
8	34°53'	+60'	174°	33°53'	+60'	174°	32°53'	+60'	174°	31°54'	+60'	174°	30°54'	+60'	174°	29°54'	+60'	174°	28°55'	+60'	174°	8
9	35°53'	+60'	174°	34°53'	+60'	174°	33°53'	+60'	174°	32°54'	+60'	174°	31°54'	+60'	174°	30°54'	+60'	174°	29°55'	+60'	174°	9
10	36°53'	+60'	174°	35°53'	+60'	174°	34°53'	+60'	174°	33°54'	+60'	174°	32°54'	+60'	174°	31°54'	+60'	174°	30°55'	+60'	174°	10
11	37°53'	+60'	174°	36°53'	+60'	174°	35°53'	+60'	174°	34°54'	+60'	174°	33°54'	+60'	174°	32°54'	+60'	174°	31°55'	+60'	174°	11
12	38°53'	+60'	174°	37°53'	+60'	174°	36°53'	+60'	174°	35°54'	+60'	174°	34°54'	+60'	174°	33°54'	+60'	174°	32°55'	+60'	174°	12
13	39°52'	+60'	174°	38°53'	+60'	174°	37°53'	+60'	174°	36°54'	+60'	174°	35°54'	+60'	174°	34°54'	+60'	174°	33°54'	+60'	174°	13
14	40°52'	+60'	174°	39°53'	+60'	174°	38°53'	+60'	174°	37°53'	+60'	174°	36°54'	+60'	174°	35°54'	+60'	174°	34°54'	+60'	174°	14
15	41°52'	+60'	174°	40°53'	+60'	174°	39°53'	+60'	174°	38°53'	+60'	174°	37°54'	+60'	174°	36°54'	+60'	174°	35°54'	+60'	174°	15
16	42°52'	+60'	173°	41°53'	+60'	174°	40°53'	+60'	174°	39°53'	+60'	174°	38°54'	+60'	174°	37°54'	+60'	174°	36°54'	+60'	174°	16
17	43°52'	+60'	173°	42°53'	+60'	173°	41°53'	+60'	174°	40°53'	+60'	174°	39°54'	+60'	174°	38°54'	+60'	174°	37°54'	+60'	174°	17
18	44°52'	+60'	173°	43°52'	+60'	173°	42°53'	+60'	174°	41°53'	+60'	174°	40°54'	+60'	174°	39°54'	+60'	174°	38°54'	+60'	174°	18
19	45°52'	+60'	173°	44°52'	+60'	173°	43°53'	+60'	173°	42°53'	+60'	174°	41°54'	+60'	174°	40°54'	+60'	174°	39°54'	+60'	174°	19
20	46°52'	+60'	173°	45°52'	+60'	173°	44°53'	+60'	173°	43°53'	+60'	173°	42°53'	+60'	174°	41°54'	+60'	174°	40°54'	+60'	174°	20
21	47°52'	+60'	173°	46°52'	+60'	173°	45°53'	+60'	173°	44°53'	+60'	173°	43°53'	+60'	174°	42°54'	+60'	174°	41°54'	+60'	174°	21
22	48°52'	+60'	173°	47°52'	+60'	173°	46°52'	+60'	173°	45°53'	+60'	173°	44°53'	+60'	173°	43°54'	+60'	174°	42°54'	+60'	174°	22
23	49°52'	+60'	173°	48°52'	+60'	173°	47°52'	+60'	173°	46°53'	+60'	173°	45°53'	+60'	173°	44°54'	+60'	173°	43°54'	+60'	174°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

5° 355° LHA — Latitude SAME as Declination — 5° 355° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

6° 354° LHA — Latitude SAME as Declination — 6° 354° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	26°50'	+60'	173°	25°51'	+60'	173°	24°51'	+60'	173°	23°52'	+60'	173°	22°52'	+60'	173°	21°52'	+60'	174°	20°53'	+60'	174°	0
1	27°50'	+60'	173°	26°51'	+60'	173°	25°51'	+60'	173°	24°52'	+60'	173°	23°52'	+60'	173°	22°52'	+60'	173°	21°53'	+60'	174°	1
2	28°50'	+60'	173°	27°51'	+60'	173°	26°51'	+60'	173°	25°51'	+60'	173°	24°52'	+60'	173°	23°52'	+60'	173°	22°53'	+60'	173°	2
3	29°50'	+60'	173°	28°51'	+60'	173°	27°51'	+60'	173°	26°51'	+60'	173°	25°52'	+60'	173°	24°52'	+60'	173°	23°53'	+60'	173°	3
4	30°50'	+60'	173°	29°50'	+60'	173°	28°51'	+60'	173°	27°51'	+60'	173°	26°52'	+60'	173°	25°52'	+60'	173°	24°53'	+60'	173°	4
5	31°50'	+60'	173°	30°50'	+60'	173°	29°51'	+60'	173°	28°51'	+60'	173°	27°52'	+60'	173°	26°52'	+60'	173°	25°53'	+60'	173°	5
6	32°50'	+60'	173°	31°50'	+60'	173°	30°51'	+60'	173°	29°51'	+60'	173°	28°52'	+60'	173°	27°52'	+60'	173°	26°52'	+60'	173°	6
7	33°50'	+60'	173°	32°50'	+60'	173°	31°51'	+60'	173°	30°51'	+60'	173°	29°52'	+60'	173°	28°52'	+60'	173°	27°52'	+60'	173°	7
8	34°50'	+60'	173°	33°50'	+60'	173°	32°51'	+60'	173°	31°51'	+60'	173°	30°52'	+60'	173°	29°52'	+60'	173°	28°52'	+60'	173°	8
9	35°50'	+60'	173°	34°50'	+60'	173°	33°51'	+60'	173°	32°51'	+60'	173°	31°51'	+60'	173°	30°52'	+60'	173°	29°52'	+60'	173°	9
10	36°49'	+60'	173°	35°50'	+60'	173°	34°50'	+60'	173°	33°51'	+60'	173°	32°51'	+60'	173°	31°52'	+60'	173°	30°52'	+60'	173°	10
11	37°49'	+60'	173°	36°50'	+60'	173°	35°50'	+60'	173°	34°51'	+60'	173°	33°51'	+60'	173°	32°52'	+60'	173°	31°52'	+60'	173°	11
12	38°49'	+60'	172°	37°50'	+60'	173°	36°50'	+60'	173°	35°51'	+60'	173°	34°51'	+60'	173°	33°52'	+60'	173°	32°52'	+60'	173°	12
13	39°49'	+60'	172°	38°50'	+60'	172°	37°50'	+60'	173°	36°51'	+60'	173°	35°51'	+60'	173°	34°52'	+60'	173°	33°52'	+60'	173°	13
14	40°49'	+60'	172°	39°50'	+60'	172°	38°50'	+60'	173°	37°51'	+60'	173°	36°51'	+60'	173°	35°52'	+60'	173°	34°52'	+60'	173°	14
15	41°49'	+60'	172°	40°49'	+60'	172°	39°50'	+60'	172°	38°50'	+60'	173°	37°51'	+60'	173°	36°51'	+60'	173°	35°52'	+60'	173°	15
16	42°49'	+60'	172°	41°49'	+60'	172°	40°50'	+60'	172°	39°50'	+60'	172°	38°51'	+60'	173°	37°51'	+60'	173°	36°52'	+60'	173°	16
17	43°49'	+60'	172°	42°49'	+60'	172°	41°50'	+60'	172°	40°50'	+60'	172°	39°51'	+60'	173°	38°51'	+60'	173°	37°52'	+60'	173°	17
18	44°49'	+60'	172°	43°49'	+60'	172°	42°50'	+60'	172°	41°50'	+60'	172°	40°51'	+60'	172°	39°51'	+60'	173°	38°52'	+60'	173°	18
19	45°48'	+60'	172°	44°49'	+60'	172°	43°50'	+60'	172°	42°50'	+60'	172°	41°51'	+60'	172°	40°51'	+60'	172°	39°52'	+60'	173°	19
20	46°48'	+60'	172°	45°49'	+60'	172°	44°49'	+60'	172°	43°50'	+60'	172°	42°51'	+60'	172°	41°51'	+60'	172°	40°52'	+60'	173°	20
21	47°48'	+60'	172°	46°49'	+60'	172°	45°49'	+60'	172°	44°50'	+60'	172°	43°50'	+60'	172°	42°51'	+60'	172°	41°52'	+60'	172°	21
22	48°48'	+60'	172°	47°49'	+60'	172°	46°49'	+60'	172°	45°50'	+60'	172°	44°50'	+60'	172°	43°51'	+60'	172°	42°51'	+60'	172°	22
23	49°48'	+60'	171°	48°48'	+60'	172°	47°49'	+60'	172°	46°50'	+60'	172°	45°50'	+60'	172°	44°51'	+60'	172°	43°51'	+60'	172°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

6° 354° LHA — Latitude SAME as Declination — 6° 354° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

7° 353° LHA — Latitude SAME as Declination — 7° 353° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	26°47'	+60'	172°	25°48'	+60'	172°	24°48'	+60'	172°	23°49'	+60'	172°	22°49'	+60'	172°	21°50'	+60'	172°	20°50'	+60'	173°	0
1	27°47'	+60'	172°	26°47'	+60'	172°	25°48'	+60'	172°	24°49'	+60'	172°	23°49'	+60'	172°	22°50'	+60'	172°	21°50'	+60'	172°	1
2	28°47'	+60'	172°	27°47'	+60'	172°	26°48'	+60'	172°	25°48'	+60'	172°	24°49'	+60'	172°	23°50'	+60'	172°	22°50'	+60'	172°	2
3	29°47'	+60'	172°	28°47'	+60'	172°	27°48'	+60'	172°	26°48'	+60'	172°	25°49'	+60'	172°	24°49'	+60'	172°	23°50'	+60'	172°	3
4	30°46'	+60'	172°	29°47'	+60'	172°	28°48'	+60'	172°	27°48'	+60'	172°	26°49'	+60'	172°	25°49'	+60'	172°	24°50'	+60'	172°	4
5	31°46'	+60'	172°	30°47'	+60'	172°	29°48'	+60'	172°	28°48'	+60'	172°	27°49'	+60'	172°	26°49'	+60'	172°	25°50'	+60'	172°	5
6	32°46'	+60'	172°	31°47'	+60'	172°	30°47'	+60'	172°	29°48'	+60'	172°	28°49'	+60'	172°	27°49'	+60'	172°	26°50'	+60'	172°	6
7	33°46'	+60'	172°	32°47'	+60'	172°	31°47'	+60'	172°	30°48'	+60'	172°	29°49'	+60'	172°	28°49'	+60'	172°	27°50'	+60'	172°	7
8	34°46'	+60'	172°	33°47'	+60'	172°	32°47'	+60'	172°	31°48'	+60'	172°	30°48'	+60'	172°	29°49'	+60'	172°	28°50'	+60'	172°	8
9	35°46'	+60'	171°	34°46'	+60'	172°	33°47'	+60'	172°	32°48'	+60'	172°	31°48'	+60'	172°	30°49'	+60'	172°	29°50'	+60'	172°	9
10	36°46'	+60'	171°	35°46'	+60'	171°	34°47'	+60'	172°	33°48'	+60'	172°	32°48'	+60'	172°	31°49'	+60'	172°	30°49'	+60'	172°	10
11	37°46'	+60'	171°	36°46'	+60'	171°	35°47'	+60'	172°	34°48'	+60'	172°	33°48'	+60'	172°	32°49'	+60'	172°	31°49'	+60'	172°	11
12	38°45'	+60'	171°	37°46'	+60'	171°	36°47'	+60'	171°	35°47'	+60'	172°	34°48'	+60'	172°	33°49'	+60'	172°	32°49'	+60'	172°	12
13	39°45'	+60'	171°	38°46'	+60'	171°	37°47'	+60'	171°	36°47'	+60'	171°	35°48'	+60'	172°	34°49'	+60'	172°	33°49'	+60'	172°	13
14	40°45'	+60'	171°	39°46'	+60'	171°	38°47'	+60'	171°	37°47'	+60'	171°	36°48'	+60'	172°	35°49'	+60'	172°	34°49'	+60'	172°	14
15	41°45'	+60'	171°	40°46'	+60'	171°	39°46'	+60'	171°	38°47'	+60'	171°	37°48'	+60'	171°	36°48'	+60'	172°	35°49'	+60'	172°	15
16	42°45'	+60'	171°	41°45'	+60'	171°	40°46'	+60'	171°	39°47'	+60'	171°	38°48'	+60'	171°	37°48'	+60'	171°	36°49'	+60'	172°	16
17	43°45'	+60'	171°	42°45'	+60'	171°	41°46'	+60'	171°	40°47'	+60'	171°	39°48'	+60'	171°	38°48'	+60'	171°	37°49'	+60'	172°	17
18	44°44'	+60'	171°	43°45'	+60'	171°	42°46'	+60'	171°	41°47'	+60'	171°	40°47'	+60'	171°	39°48'	+60'	171°	38°49'	+60'	171°	18
19	45°44'	+60'	170°	44°45'	+60'	171°	43°46'	+60'	171°	42°47'	+60'	171°	41°47'	+60'	171°	40°48'	+60'	171°	39°49'	+60'	171°	19
20	46°44'	+60'	170°	45°45'	+60'	171°	44°46'	+60'	171°	43°46'	+60'	171°	42°47'	+60'	171°	41°48'	+60'	171°	40°49'	+60'	171°	20
21	47°44'	+60'	170°	46°45'	+60'	170°	45°45'	+60'	171°	44°46'	+60'	171°	43°47'	+60'	171°	42°48'	+60'	171°	41°48'	+60'	171°	21
22	48°44'	+60'	170°	47°44'	+60'	170°	46°45'	+60'	171°	45°46'	+60'	171°	44°47'	+60'	171°	43°48'	+60'	171°	42°48'	+60'	171°	22
23	49°43'	+60'	170°	48°44'	+60'	170°	47°45'	+60'	170°	46°46'	+60'	171°	45°47'	+60'	171°	44°48'	+60'	171°	43°48'	+60'	171°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

7° 353° LHA — Latitude SAME as Declination — 7° 353° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

8° 352° LHA — Latitude SAME as Declination — 8° 352° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°43'	+60'	171°	25°44'	+60'	171°	24°44'	+60'	171°	23°45'	+60'	171°	22°46'	+60'	171°	21°46'	+60'	171°	20°47'	+60'	171°	0
1	27°43'	+60'	171°	26°44'	+60'	171°	25°44'	+60'	171°	24°45'	+60'	171°	23°46'	+60'	171°	22°46'	+60'	171°	21°47'	+60'	171°	1
2	28°43'	+60'	171°	27°43'	+60'	171°	26°44'	+60'	171°	25°45'	+60'	171°	24°46'	+60'	171°	23°46'	+60'	171°	22°47'	+60'	171°	2
3	29°43'	+60'	171°	28°43'	+60'	171°	27°44'	+60'	171°	26°45'	+60'	171°	25°45'	+60'	171°	24°46'	+60'	171°	23°47'	+60'	171°	3
4	30°42'	+60'	171°	29°43'	+60'	171°	28°44'	+60'	171°	27°45'	+60'	171°	26°45'	+60'	171°	25°46'	+60'	171°	24°47'	+60'	171°	4
5	31°42'	+60'	171°	30°43'	+60'	171°	29°44'	+60'	171°	28°45'	+60'	171°	27°45'	+60'	171°	26°46'	+60'	171°	25°47'	+60'	171°	5
6	32°42'	+60'	171°	31°43'	+60'	171°	30°44'	+60'	171°	29°44'	+60'	171°	28°45'	+60'	171°	27°46'	+60'	171°	26°47'	+60'	171°	6
7	33°42'	+60'	170°	32°43'	+60'	171°	31°43'	+60'	171°	30°44'	+60'	171°	29°45'	+60'	171°	28°46'	+60'	171°	27°47'	+60'	171°	7
8	34°42'	+60'	170°	33°43'	+60'	170°	32°43'	+60'	171°	31°44'	+60'	171°	30°45'	+60'	171°	29°46'	+60'	171°	28°46'	+60'	171°	8
9	35°41'	+60'	170°	34°42'	+60'	170°	33°43'	+60'	170°	32°44'	+60'	171°	31°45'	+60'	171°	30°46'	+60'	171°	29°46'	+60'	171°	9
10	36°41'	+60'	170°	35°42'	+60'	170°	34°43'	+60'	170°	33°44'	+60'	171°	32°45'	+60'	171°	31°45'	+60'	171°	30°46'	+60'	171°	10
11	37°41'	+60'	170°	36°42'	+60'	170°	35°43'	+60'	170°	34°44'	+60'	170°	33°45'	+60'	171°	32°45'	+60'	171°	31°46'	+60'	171°	11
12	38°41'	+60'	170°	37°42'	+60'	170°	36°43'	+60'	170°	35°44'	+60'	170°	34°44'	+60'	170°	33°45'	+60'	171°	32°46'	+60'	171°	12
13	39°41'	+60'	170°	38°42'	+60'	170°	37°43'	+60'	170°	36°43'	+60'	170°	35°44'	+60'	170°	34°45'	+60'	171°	33°46'	+60'	171°	13
14	40°41'	+60'	170°	39°41'	+60'	170°	38°42'	+60'	170°	37°43'	+60'	170°	36°44'	+60'	170°	35°45'	+60'	170°	34°46'	+60'	171°	14
15	41°40'	+60'	170°	40°41'	+60'	170°	39°42'	+60'	170°	38°43'	+60'	170°	37°44'	+60'	170°	36°45'	+60'	170°	35°46'	+60'	170°	15
16	42°40'	+60'	170°	41°41'	+60'	170°	40°42'	+60'	170°	39°43'	+60'	170°	38°44'	+60'	170°	37°45'	+60'	170°	36°46'	+60'	170°	16
17	43°40'	+60'	169°	42°41'	+60'	170°	41°42'	+60'	170°	40°43'	+60'	170°	39°44'	+60'	170°	38°45'	+60'	170°	37°45'	+60'	170°	17
18	44°40'	+60'	169°	43°41'	+60'	169°	42°42'	+60'	170°	41°43'	+60'	170°	40°44'	+60'	170°	39°44'	+60'	170°	38°45'	+60'	170°	18
19	45°39'	+60'	169°	44°40'	+60'	169°	43°41'	+60'	170°	42°42'	+60'	170°	41°43'	+60'	170°	40°44'	+60'	170°	39°45'	+60'	170°	19
20	46°39'	+60'	169°	45°40'	+60'	169°	44°41'	+60'	169°	43°42'	+60'	170°	42°43'	+60'	170°	41°44'	+60'	170°	40°45'	+60'	170°	20
21	47°39'	+60'	169°	46°40'	+60'	169°	45°41'	+60'	169°	44°42'	+60'	169°	43°43'	+60'	170°	42°44'	+60'	170°	41°45'	+60'	170°	21
22	48°39'	+60'	169°	47°40'	+60'	169°	46°41'	+60'	169°	45°42'	+60'	169°	44°43'	+60'	170°	43°44'	+60'	170°	42°45'	+60'	170°	22
23	49°38'	+60'	169°	48°39'	+60'	169°	47°41'	+60'	169°	46°42'	+60'	169°	45°43'	+60'	169°	44°44'	+60'	170°	43°45'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

8° 352° LHA — Latitude SAME as Declination — 8° 352° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

9° 351° LHA — Latitude SAME as Declination — 9° 351° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°38'	+60'	170°	25°39'	+60'	170°	24°40'	+60'	170°	23°41'	+60'	170°	22°42'	+60'	170°	21°43'	+60'	170°	20°44'	+60'	170°	0
1	27°38'	+60'	170°	26°39'	+60'	170°	25°40'	+60'	170°	24°41'	+60'	170°	23°42'	+60'	170°	22°43'	+60'	170°	21°44'	+60'	170°	1
2	28°38'	+60'	170°	27°39'	+60'	170°	26°40'	+60'	170°	25°41'	+60'	170°	24°42'	+60'	170°	23°43'	+60'	170°	22°44'	+60'	170°	2
3	29°38'	+60'	170°	28°39'	+60'	170°	27°40'	+60'	170°	26°41'	+60'	170°	25°42'	+60'	170°	24°43'	+60'	170°	23°43'	+60'	170°	3
4	30°38'	+60'	170°	29°39'	+60'	170°	28°40'	+60'	170°	27°41'	+60'	170°	26°42'	+60'	170°	25°42'	+60'	170°	24°43'	+60'	170°	4
5	31°37'	+60'	169°	30°38'	+60'	170°	29°39'	+60'	170°	28°40'	+60'	170°	27°41'	+60'	170°	26°42'	+60'	170°	25°43'	+60'	170°	5
6	32°37'	+60'	169°	31°38'	+60'	169°	30°39'	+60'	170°	29°40'	+60'	170°	28°41'	+60'	170°	27°42'	+60'	170°	26°43'	+60'	170°	6
7	33°37'	+60'	169°	32°38'	+60'	169°	31°39'	+60'	169°	30°40'	+60'	170°	29°41'	+60'	170°	28°42'	+60'	170°	27°43'	+60'	170°	7
8	34°37'	+60'	169°	33°38'	+60'	169°	32°39'	+60'	169°	31°40'	+60'	170°	30°41'	+60'	170°	29°42'	+60'	170°	28°43'	+60'	170°	8
9	35°37'	+60'	169°	34°38'	+60'	169°	33°39'	+60'	169°	32°40'	+60'	169°	31°41'	+60'	170°	30°42'	+60'	170°	29°43'	+60'	170°	9
10	36°36'	+60'	169°	35°37'	+60'	169°	34°39'	+60'	169°	33°40'	+60'	169°	32°41'	+60'	169°	31°42'	+60'	170°	30°43'	+60'	170°	10
11	37°36'	+60'	169°	36°37'	+60'	169°	35°38'	+60'	169°	34°39'	+60'	169°	33°40'	+60'	169°	32°41'	+60'	169°	31°42'	+60'	170°	11
12	38°36'	+60'	169°	37°37'	+60'	169°	36°38'	+60'	169°	35°39'	+60'	169°	34°40'	+60'	169°	33°41'	+60'	169°	32°42'	+60'	170°	12
13	39°36'	+60'	169°	38°37'	+60'	169°	37°38'	+60'	169°	36°39'	+60'	169°	35°40'	+60'	169°	34°41'	+60'	169°	33°42'	+60'	169°	13
14	40°35'	+60'	168°	39°37'	+60'	169°	38°38'	+60'	169°	37°39'	+60'	169°	36°40'	+60'	169°	35°41'	+60'	169°	34°42'	+60'	169°	14
15	41°35'	+60'	168°	40°36'	+60'	169°	39°38'	+60'	169°	38°39'	+60'	169°	37°40'	+60'	169°	36°41'	+60'	169°	35°42'	+60'	169°	15
16	42°35'	+60'	168°	41°36'	+60'	168°	40°37'	+60'	169°	39°38'	+60'	169°	38°40'	+60'	169°	37°41'	+60'	169°	36°42'	+60'	169°	16
17	43°35'	+60'	168°	42°36'	+60'	168°	41°37'	+60'	168°	40°38'	+60'	169°	39°39'	+60'	169°	38°41'	+60'	169°	37°42'	+60'	169°	17
18	44°34'	+60'	168°	43°36'	+60'	168°	42°37'	+60'	168°	41°38'	+60'	169°	40°39'	+60'	169°	39°40'	+60'	169°	38°41'	+60'	169°	18
19	45°34'	+60'	168°	44°35'	+60'	168°	43°37'	+60'	168°	42°38'	+60'	168°	41°39'	+60'	169°	40°40'	+60'	169°	39°41'	+60'	169°	19
20	46°34'	+60'	168°	45°35'	+60'	168°	44°36'	+60'	168°	43°38'	+60'	168°	42°39'	+60'	168°	41°40'	+60'	169°	40°41'	+60'	169°	20
21	47°33'	+60'	168°	46°35'	+60'	168°	45°36'	+60'	168°	44°37'	+60'	168°	43°39'	+60'	168°	42°40'	+60'	169°	41°41'	+60'	169°	21
22	48°33'	+60'	167°	47°34'	+60'	168°	46°36'	+60'	168°	45°37'	+60'	168°	44°38'	+60'	168°	43°40'	+60'	168°	42°41'	+60'	169°	22
23	49°33'	+60'	167°	48°34'	+60'	167°	47°35'	+60'	168°	46°37'	+60'	168°	45°38'	+60'	168°	44°39'	+60'	168°	43°41'	+60'	169°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

9° 351° LHA — Latitude SAME as Declination — 9° 351° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

10° 350° LHA — Latitude SAME as Declination — 10° 350° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	26°33'	+60'	169°	25°35'	+60'	169°	24°36'	+60'	169°	23°37'	+60'	169°	22°38'	+60'	169°	21°39'	+60'	169°	20°40'	+60'	169°	0
1	27°33'	+60'	169°	26°34'	+60'	169°	25°35'	+60'	169°	24°37'	+60'	169°	23°38'	+60'	169°	22°39'	+60'	169°	21°40'	+60'	169°	1
2	28°33'	+60'	169°	27°34'	+60'	169°	26°35'	+60'	169°	25°36'	+60'	169°	24°38'	+60'	169°	23°39'	+60'	169°	22°40'	+60'	169°	2
3	29°33'	+60'	169°	28°34'	+60'	169°	27°35'	+60'	169°	26°36'	+60'	169°	25°37'	+60'	169°	24°38'	+60'	169°	23°40'	+60'	169°	3
4	30°32'	+60'	168°	29°34'	+60'	169°	28°35'	+60'	169°	27°36'	+60'	169°	26°37'	+60'	169°	25°38'	+60'	169°	24°39'	+60'	169°	4
5	31°32'	+60'	168°	30°33'	+60'	168°	29°35'	+60'	169°	28°36'	+60'	169°	27°37'	+60'	169°	26°38'	+60'	169°	25°39'	+60'	169°	5
6	32°32'	+60'	168°	31°33'	+60'	168°	30°34'	+60'	168°	29°36'	+60'	169°	28°37'	+60'	169°	27°38'	+60'	169°	26°39'	+60'	169°	6
7	33°32'	+60'	168°	32°33'	+60'	168°	31°34'	+60'	168°	30°35'	+60'	168°	29°37'	+60'	169°	28°38'	+60'	169°	27°39'	+60'	169°	7
8	34°31'	+60'	168°	33°33'	+60'	168°	32°34'	+60'	168°	31°35'	+60'	168°	30°36'	+60'	168°	29°38'	+60'	169°	28°39'	+60'	169°	8
9	35°31'	+60'	168°	34°32'	+60'	168°	33°34'	+60'	168°	32°35'	+60'	168°	31°36'	+60'	168°	30°38'	+60'	169°	29°39'	+60'	169°	9
10	36°31'	+60'	168°	35°32'	+60'	168°	34°34'	+60'	168°	33°35'	+60'	168°	32°36'	+60'	168°	31°37'	+60'	168°	30°39'	+60'	169°	10
11	37°31'	+60'	168°	36°32'	+60'	168°	35°33'	+60'	168°	34°35'	+60'	168°	33°36'	+60'	168°	32°37'	+60'	168°	31°38'	+60'	168°	11
12	38°30'	+60'	167°	37°32'	+60'	168°	36°33'	+60'	168°	35°34'	+60'	168°	34°36'	+60'	168°	33°37'	+60'	168°	32°38'	+60'	168°	12
13	39°30'	+60'	167°	38°31'	+60'	168°	37°33'	+60'	168°	36°34'	+60'	168°	35°35'	+60'	168°	34°37'	+60'	168°	33°38'	+60'	168°	13
14	40°30'	+60'	167°	39°31'	+60'	167°	38°33'	+60'	168°	37°34'	+60'	168°	36°35'	+60'	168°	35°37'	+60'	168°	34°38'	+60'	168°	14
15	41°29'	+60'	167°	40°31'	+60'	167°	39°32'	+60'	167°	38°34'	+60'	168°	37°35'	+60'	168°	36°36'	+60'	168°	35°38'	+60'	168°	15
16	42°29'	+60'	167°	41°30'	+60'	167°	40°32'	+60'	167°	39°33'	+60'	167°	38°35'	+60'	168°	37°36'	+60'	168°	36°38'	+60'	168°	16
17	43°29'	+60'	167°	42°30'	+60'	167°	41°32'	+60'	167°	40°33'	+60'	167°	39°35'	+60'	168°	38°36'	+60'	168°	37°37'	+60'	168°	17
18	44°28'	+60'	167°	43°30'	+60'	167°	42°31'	+60'	167°	41°33'	+60'	167°	40°34'	+60'	167°	39°36'	+60'	168°	38°37'	+60'	168°	18
19	45°28'	+60'	166°	44°30'	+60'	167°	43°31'	+60'	167°	42°33'	+60'	167°	41°34'	+60'	167°	40°36'	+60'	168°	39°37'	+60'	168°	19
20	46°27'	+60'	166°	45°29'	+60'	167°	44°31'	+60'	167°	43°32'	+60'	167°	42°34'	+60'	167°	41°35'	+60'	167°	40°37'	+60'	168°	20
21	47°27'	+60'	166°	46°29'	+60'	166°	45°30'	+60'	167°	44°32'	+60'	167°	43°34'	+60'	167°	42°35'	+60'	167°	41°37'	+60'	167°	21
22	48°27'	+60'	166°	47°28'	+60'	166°	46°30'	+60'	166°	45°32'	+60'	167°	44°33'	+60'	167°	43°35'	+60'	167°	42°36'	+60'	167°	22
23	49°26'	+60'	166°	48°28'	+60'	166°	47°30'	+60'	166°	46°31'	+60'	167°	45°33'	+60'	167°	44°35'	+60'	167°	43°36'	+60'	167°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

10° 350° LHA — Latitude SAME as Declination — 10° 350° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

11° 349° LHA — Latitude SAME as Declination — 11° 349° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	26°28'	+60'	168°	25°29'	+60'	168°	24°31'	+60'	168°	23°32'	+60'	168°	22°33'	+60'	168°	21°35'	+60'	168°	20°36'	+60'	168°	0
1	27°28'	+60'	168°	26°29'	+60'	168°	25°30'	+60'	168°	24°32'	+60'	168°	23°33'	+60'	168°	22°34'	+60'	168°	21°36'	+60'	168°	1
2	28°27'	+60'	167°	27°29'	+60'	168°	26°30'	+60'	168°	25°31'	+60'	168°	24°33'	+60'	168°	23°34'	+60'	168°	22°35'	+60'	168°	2
3	29°27'	+60'	167°	28°28'	+60'	167°	27°30'	+60'	168°	26°31'	+60'	168°	25°33'	+60'	168°	24°34'	+60'	168°	23°35'	+60'	168°	3
4	30°27'	+60'	167°	29°28'	+60'	167°	28°30'	+60'	167°	27°31'	+60'	168°	26°32'	+60'	168°	25°34'	+60'	168°	24°35'	+60'	168°	4
5	31°26'	+60'	167°	30°28'	+60'	167°	29°29'	+60'	167°	28°31'	+60'	168°	27°32'	+60'	168°	26°34'	+60'	168°	25°35'	+60'	168°	5
6	32°26'	+60'	167°	31°28'	+60'	167°	30°29'	+60'	167°	29°31'	+60'	167°	28°32'	+60'	168°	27°33'	+60'	168°	26°35'	+60'	168°	6
7	33°26'	+60'	167°	32°27'	+60'	167°	31°29'	+60'	167°	30°30'	+60'	167°	29°32'	+60'	167°	28°33'	+60'	168°	27°35'	+60'	168°	7
8	34°25'	+60'	167°	33°27'	+60'	167°	32°29'	+60'	167°	31°30'	+60'	167°	30°32'	+60'	167°	29°33'	+60'	167°	28°34'	+60'	168°	8
9	35°25'	+60'	167°	34°27'	+60'	167°	33°28'	+60'	167°	32°30'	+60'	167°	31°31'	+60'	167°	30°33'	+60'	167°	29°34'	+60'	167°	9
10	36°25'	+60'	166°	35°26'	+60'	167°	34°28'	+60'	167°	33°30'	+60'	167°	32°31'	+60'	167°	31°33'	+60'	167°	30°34'	+60'	167°	10
11	37°24'	+60'	166°	36°26'	+60'	167°	35°28'	+60'	167°	34°29'	+60'	167°	33°31'	+60'	167°	32°32'	+60'	167°	31°34'	+60'	167°	11
12	38°24'	+60'	166°	37°26'	+60'	166°	36°27'	+60'	167°	35°29'	+60'	167°	34°31'	+60'	167°	33°32'	+60'	167°	32°34'	+60'	167°	12
13	39°24'	+60'	166°	38°25'	+60'	166°	37°27'	+60'	166°	36°29'	+60'	167°	35°30'	+60'	167°	34°32'	+60'	167°	33°33'	+60'	167°	13
14	40°23'	+60'	166°	39°25'	+60'	166°	38°27'	+60'	166°	37°28'	+60'	167°	36°30'	+60'	167°	35°32'	+60'	167°	34°33'	+60'	167°	14
15	41°23'	+60'	166°	40°25'	+60'	166°	39°26'	+60'	166°	38°28'	+60'	166°	37°30'	+60'	167°	36°31'	+60'	167°	35°33'	+60'	167°	15
16	42°23'	+60'	166°	41°24'	+60'	166°	40°26'	+60'	166°	39°28'	+60'	166°	38°30'	+60'	166°	37°31'	+60'	167°	36°33'	+60'	167°	16
17	43°22'	+60'	165°	42°24'	+60'	166°	41°26'	+60'	166°	40°28'	+60'	166°	39°29'	+60'	166°	38°31'	+60'	167°	37°33'	+60'	167°	17
18	44°22'	+60'	165°	43°24'	+60'	166°	42°25'	+60'	166°	41°27'	+60'	166°	40°29'	+60'	166°	39°31'	+60'	166°	38°32'	+60'	167°	18
19	45°21'	+60'	165°	44°23'	+60'	165°	43°25'	+60'	166°	42°27'	+60'	166°	41°29'	+60'	166°	40°30'	+60'	166°	39°32'	+60'	166°	19
20	46°21'	+60'	165°	45°23'	+60'	165°	44°25'	+60'	165°	43°27'	+60'	166°	42°28'	+60'	166°	41°30'	+60'	166°	40°32'	+60'	166°	20
21	47°20'	+59'	165°	46°22'	+60'	165°	45°24'	+60'	165°	44°26'	+60'	166°	43°28'	+60'	166°	42°30'	+60'	166°	41°32'	+60'	166°	21
22	48°20'	+59'	165°	47°22'	+60'	165°	46°24'	+60'	165°	45°26'	+60'	165°	44°28'	+60'	166°	43°30'	+60'	166°	42°31'	+60'	166°	22
23	49°19'	+59'	164°	48°21'	+60'	165°	47°23'	+60'	165°	46°26'	+60'	165°	45°27'	+60'	165°	44°29'	+60'	166°	43°31'	+60'	166°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

11° 349° LHA — Latitude SAME as Declination — 11° 349° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

12° 348° LHA — Latitude SAME as Declination — 12° 348° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°22'	+60'	167°	25°23'	+60'	167°	24°25'	+60'	167°	23°27'	+60'	167°	22°28'	+60'	167°	21°30'	+60'	167°	20°31'	+60'	167°	0
1	27°21'	+60'	166°	26°23'	+60'	167°	25°25'	+60'	167°	24°26'	+60'	167°	23°28'	+60'	167°	22°29'	+60'	167°	21°31'	+60'	167°	1
2	28°21'	+60'	166°	27°23'	+60'	166°	26°24'	+60'	167°	25°26'	+60'	167°	24°28'	+60'	167°	23°29'	+60'	167°	22°31'	+60'	167°	2
3	29°21'	+60'	166°	28°23'	+60'	166°	27°24'	+60'	166°	26°26'	+60'	167°	25°27'	+60'	167°	24°29'	+60'	167°	23°31'	+60'	167°	3
4	30°20'	+60'	166°	29°22'	+60'	166°	28°24'	+60'	166°	27°26'	+60'	166°	26°27'	+60'	167°	25°29'	+60'	167°	24°30'	+60'	167°	4
5	31°20'	+60'	166°	30°22'	+60'	166°	29°24'	+60'	166°	28°25'	+60'	166°	27°27'	+60'	167°	26°29'	+60'	167°	25°30'	+60'	167°	5
6	32°20'	+60'	166°	31°22'	+60'	166°	30°23'	+60'	166°	29°25'	+60'	166°	28°27'	+60'	166°	27°28'	+60'	167°	26°30'	+60'	167°	6
7	33°19'	+60'	166°	32°21'	+60'	166°	31°23'	+60'	166°	30°25'	+60'	166°	29°26'	+60'	166°	28°28'	+60'	166°	27°30'	+60'	167°	7
8	34°19'	+60'	166°	33°21'	+60'	166°	32°23'	+60'	166°	31°24'	+60'	166°	30°26'	+60'	166°	29°28'	+60'	166°	28°30'	+60'	166°	8
9	35°19'	+60'	165°	34°20'	+60'	166°	33°22'	+60'	166°	32°24'	+60'	166°	31°26'	+60'	166°	30°28'	+60'	166°	29°29'	+60'	166°	9
10	36°18'	+60'	165°	35°20'	+60'	165°	34°22'	+60'	166°	33°24'	+60'	166°	32°26'	+60'	166°	31°27'	+60'	166°	30°29'	+60'	166°	10
11	37°18'	+60'	165°	36°20'	+60'	165°	35°22'	+60'	166°	34°24'	+60'	166°	33°25'	+60'	166°	32°27'	+60'	166°	31°29'	+60'	166°	11
12	38°17'	+60'	165°	37°19'	+60'	165°	36°21'	+60'	165°	35°23'	+60'	166°	34°25'	+60'	166°	33°27'	+60'	166°	32°29'	+60'	166°	12
13	39°17'	+60'	165°	38°19'	+60'	165°	37°21'	+60'	165°	36°23'	+60'	165°	35°25'	+60'	166°	34°27'	+60'	166°	33°28'	+60'	166°	13
14	40°16'	+60'	165°	39°18'	+60'	165°	38°21'	+60'	165°	37°23'	+60'	165°	36°24'	+60'	165°	35°26'	+60'	166°	34°28'	+60'	166°	14
15	41°16'	+60'	165°	40°18'	+60'	165°	39°20'	+60'	165°	38°22'	+60'	165°	37°24'	+60'	165°	36°26'	+60'	166°	35°28'	+60'	166°	15
16	42°15'	+60'	164°	41°18'	+60'	165°	40°20'	+60'	165°	39°22'	+60'	165°	38°24'	+60'	165°	37°26'	+60'	165°	36°28'	+60'	166°	16
17	43°15'	+59'	164°	42°17'	+60'	164°	41°19'	+60'	165°	40°21'	+60'	165°	39°24'	+60'	165°	38°26'	+60'	165°	37°27'	+60'	165°	17
18	44°14'	+59'	164°	43°17'	+60'	164°	42°19'	+60'	164°	41°21'	+60'	165°	40°23'	+60'	165°	39°25'	+60'	165°	38°27'	+60'	165°	18
19	45°14'	+59'	164°	44°16'	+60'	164°	43°19'	+60'	164°	42°21'	+60'	165°	41°23'	+60'	165°	40°25'	+60'	165°	39°27'	+60'	165°	19
20	46°13'	+59'	164°	45°16'	+59'	164°	44°18'	+60'	164°	43°20'	+60'	164°	42°22'	+60'	165°	41°25'	+60'	165°	40°27'	+60'	165°	20
21	47°13'	+59'	163°	46°15'	+59'	164°	45°18'	+60'	164°	44°20'	+60'	164°	43°22'	+60'	165°	42°24'	+60'	165°	41°26'	+60'	165°	21
22	48°12'	+59'	163°	47°15'	+59'	164°	46°17'	+60'	164°	45°19'	+60'	164°	44°22'	+60'	164°	43°24'	+60'	165°	42°26'	+60'	165°	22
23	49°12'	+59'	163°	48°14'	+59'	163°	47°17'	+59'	164°	46°19'	+60'	164°	45°21'	+60'	164°	44°24'	+60'	164°	43°26'	+60'	165°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

12° 348° LHA — Latitude SAME as Declination — 12° 348° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

13° 347° LHA — Latitude SAME as Declination — 13° 347° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°15'	+60'	165°	25°17'	+60'	166°	24°19'	+60'	166°	23°21'	+60'	166°	22°23'	+60'	166°	21°24'	+60'	166°	20°26'	+60'	166°	0
1	27°15'	+60'	165°	26°17'	+60'	165°	25°19'	+60'	166°	24°21'	+60'	166°	23°22'	+60'	166°	22°24'	+60'	166°	21°26'	+60'	166°	1
2	28°14'	+60'	165°	27°16'	+60'	165°	26°18'	+60'	165°	25°20'	+60'	166°	24°22'	+60'	166°	23°24'	+60'	166°	22°26'	+60'	166°	2
3	29°14'	+60'	165°	28°16'	+60'	165°	27°18'	+60'	165°	26°20'	+60'	165°	25°22'	+60'	166°	24°24'	+60'	166°	23°26'	+60'	166°	3
4	30°14'	+60'	165°	29°16'	+60'	165°	28°18'	+60'	165°	27°20'	+60'	165°	26°22'	+60'	165°	25°23'	+60'	166°	24°25'	+60'	166°	4
5	31°13'	+60'	165°	30°15'	+60'	165°	29°17'	+60'	165°	28°19'	+60'	165°	27°21'	+60'	165°	26°23'	+60'	166°	25°25'	+60'	166°	5
6	32°13'	+60'	165°	31°15'	+60'	165°	30°17'	+60'	165°	29°19'	+60'	165°	28°21'	+60'	165°	27°23'	+60'	165°	26°25'	+60'	166°	6
7	33°12'	+60'	165°	32°14'	+60'	165°	31°17'	+60'	165°	30°19'	+60'	165°	29°21'	+60'	165°	28°23'	+60'	165°	27°25'	+60'	165°	7
8	34°12'	+60'	164°	33°14'	+60'	165°	32°16'	+60'	165°	31°18'	+60'	165°	30°20'	+60'	165°	29°22'	+60'	165°	28°24'	+60'	165°	8
9	35°11'	+60'	164°	34°14'	+60'	164°	33°16'	+60'	165°	32°18'	+60'	165°	31°20'	+60'	165°	30°22'	+60'	165°	29°24'	+60'	165°	9
10	36°11'	+60'	164°	35°13'	+60'	164°	34°15'	+60'	164°	33°18'	+60'	165°	32°20'	+60'	165°	31°22'	+60'	165°	30°24'	+60'	165°	10
11	37°10'	+59'	164°	36°13'	+60'	164°	35°15'	+60'	164°	34°17'	+60'	164°	33°19'	+60'	165°	32°22'	+60'	165°	31°24'	+60'	165°	11
12	38°10'	+59'	164°	37°12'	+60'	164°	36°15'	+60'	164°	35°17'	+60'	164°	34°19'	+60'	165°	33°21'	+60'	165°	32°23'	+60'	165°	12
13	39°09'	+59'	164°	38°12'	+60'	164°	37°14'	+60'	164°	36°16'	+60'	164°	35°19'	+60'	164°	34°21'	+60'	165°	33°23'	+60'	165°	13
14	40°09'	+59'	163°	39°11'	+60'	164°	38°14'	+60'	164°	37°16'	+60'	164°	36°18'	+60'	164°	35°21'	+60'	164°	34°23'	+60'	165°	14
15	41°08'	+59'	163°	40°11'	+59'	163°	39°13'	+60'	164°	38°16'	+60'	164°	37°18'	+60'	164°	36°20'	+60'	164°	35°22'	+60'	165°	15
16	42°08'	+59'	163°	41°10'	+59'	163°	40°13'	+60'	164°	39°15'	+60'	164°	38°18'	+60'	164°	37°20'	+60'	164°	36°22'	+60'	164°	16
17	43°07'	+59'	163°	42°10'	+59'	163°	41°12'	+60'	163°	40°15'	+60'	164°	39°17'	+60'	164°	38°20'	+60'	164°	37°22'	+60'	164°	17
18	44°07'	+59'	163°	43°09'	+59'	163°	42°12'	+59'	163°	41°14'	+60'	163°	40°17'	+60'	164°	39°19'	+60'	164°	38°22'	+60'	164°	18
19	45°06'	+59'	162°	44°09'	+59'	163°	43°11'	+59'	163°	42°14'	+60'	163°	41°16'	+60'	164°	40°19'	+60'	164°	39°21'	+60'	164°	19
20	46°05'	+59'	162°	45°08'	+59'	163°	44°11'	+59'	163°	43°13'	+60'	163°	42°16'	+60'	163°	41°18'	+60'	164°	40°21'	+60'	164°	20
21	47°05'	+59'	162°	46°08'	+59'	162°	45°10'	+59'	163°	44°13'	+60'	163°	43°16'	+60'	163°	42°18'	+60'	164°	41°21'	+60'	164°	21
22	48°04'	+59'	162°	47°07'	+59'	162°	46°10'	+59'	162°	45°13'	+59'	163°	44°15'	+60'	163°	43°18'	+60'	163°	42°20'	+60'	164°	22
23	49°03'	+59'	162°	48°06'	+59'	162°	47°09'	+59'	162°	46°12'	+59'	163°	45°15'	+60'	163°	44°17'	+60'	163°	43°20'	+60'	163°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

13° 347° LHA — Latitude SAME as Declination — 13° 347° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

14° 346° LHA — Latitude SAME as Declination — 14° 346° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	26°08'	+60'	164°	25°10'	+60'	164°	24°13'	+60'	165°	23°15'	+60'	165°	22°17'	+60'	165°	21°19'	+60'	165°	20°21'	+60'	165°	0
1	27°08'	+60'	164°	26°10'	+60'	164°	25°12'	+60'	164°	24°14'	+60'	165°	23°16'	+60'	165°	22°19'	+60'	165°	21°21'	+60'	165°	1
2	28°07'	+60'	164°	27°10'	+60'	164°	26°12'	+60'	164°	25°14'	+60'	164°	24°16'	+60'	165°	23°18'	+60'	165°	22°20'	+60'	165°	2
3	29°07'	+60'	164°	28°09'	+60'	164°	27°11'	+60'	164°	26°14'	+60'	164°	25°16'	+60'	165°	24°18'	+60'	165°	23°20'	+60'	165°	3
4	30°06'	+60'	164°	29°09'	+60'	164°	28°11'	+60'	164°	27°13'	+60'	164°	26°15'	+60'	164°	25°18'	+60'	165°	24°20'	+60'	165°	4
5	31°06'	+59'	164°	30°08'	+60'	164°	29°11'	+60'	164°	28°13'	+60'	164°	27°15'	+60'	164°	26°17'	+60'	164°	25°20'	+60'	165°	5
6	32°05'	+59'	164°	31°08'	+60'	164°	30°10'	+60'	164°	29°12'	+60'	164°	28°15'	+60'	164°	27°17'	+60'	164°	26°19'	+60'	164°	6
7	33°05'	+59'	163°	32°07'	+60'	164°	31°10'	+60'	164°	30°12'	+60'	164°	29°14'	+60'	164°	28°17'	+60'	164°	27°19'	+60'	164°	7
8	34°04'	+59'	163°	33°07'	+60'	163°	32°09'	+60'	164°	31°12'	+60'	164°	30°14'	+60'	164°	29°16'	+60'	164°	28°19'	+60'	164°	8
9	35°04'	+59'	163°	34°06'	+59'	163°	33°09'	+60'	163°	32°11'	+60'	164°	31°14'	+60'	164°	30°16'	+60'	164°	29°18'	+60'	164°	9
10	36°03'	+59'	163°	35°06'	+59'	163°	34°08'	+60'	163°	33°11'	+60'	163°	32°13'	+60'	164°	31°16'	+60'	164°	30°18'	+60'	164°	10
11	37°03'	+59'	163°	36°05'	+59'	163°	35°08'	+60'	163°	34°10'	+60'	163°	33°13'	+60'	164°	32°15'	+60'	164°	31°18'	+60'	164°	11
12	38°02'	+59'	163°	37°05'	+59'	163°	36°07'	+60'	163°	35°10'	+60'	163°	34°13'	+60'	163°	33°15'	+60'	164°	32°17'	+60'	164°	12
13	39°01'	+59'	162°	38°04'	+59'	163°	37°07'	+59'	163°	36°10'	+60'	163°	35°12'	+60'	163°	34°15'	+60'	163°	33°17'	+60'	164°	13
14	40°01'	+59'	162°	39°04'	+59'	162°	38°06'	+59'	163°	37°09'	+60'	163°	36°12'	+60'	163°	35°14'	+60'	163°	34°17'	+60'	163°	14
15	41°00'	+59'	162°	40°03'	+59'	162°	39°06'	+59'	162°	38°09'	+60'	163°	37°11'	+60'	163°	36°14'	+60'	163°	35°17'	+60'	163°	15
16	42°00'	+59'	162°	41°03'	+59'	162°	40°05'	+59'	162°	39°08'	+60'	163°	38°11'	+60'	163°	37°14'	+60'	163°	36°16'	+60'	163°	16
17	42°59'	+59'	162°	42°02'	+59'	162°	41°05'	+59'	162°	40°08'	+59'	162°	39°10'	+60'	163°	38°13'	+60'	163°	37°16'	+60'	163°	17
18	43°58'	+59'	161°	43°01'	+59'	162°	42°04'	+59'	162°	41°07'	+59'	162°	40°10'	+60'	162°	39°13'	+60'	163°	38°15'	+60'	163°	18
19	44°57'	+59'	161°	44°01'	+59'	161°	43°04'	+59'	162°	42°07'	+59'	162°	41°10'	+60'	162°	40°12'	+60'	163°	39°15'	+60'	163°	19
20	45°57'	+59'	161°	45°00'	+59'	161°	44°03'	+59'	162°	43°06'	+59'	162°	42°09'	+60'	162°	41°12'	+60'	162°	40°15'	+60'	163°	20
21	46°56'	+59'	161°	45°59'	+59'	161°	45°02'	+59'	161°	44°06'	+59'	162°	43°09'	+59'	162°	42°11'	+60'	162°	41°14'	+60'	163°	21
22	47°55'	+59'	160°	46°59'	+59'	161°	46°02'	+59'	161°	45°05'	+59'	161°	44°08'	+59'	162°	43°11'	+60'	162°	42°14'	+60'	162°	22
23	48°54'	+59'	160°	47°58'	+59'	161°	47°01'	+59'	161°	46°04'	+59'	161°	45°08'	+59'	162°	44°11'	+60'	162°	43°13'	+60'	162°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

14° 346° LHA — Latitude SAME as Declination — 14° 346° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

15° 345° LHA — Latitude SAME as Declination — 15° 345° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	26°01'	+59'	163°	25°03'	+60'	163°	24°06'	+60'	164°	23°08'	+60'	164°	22°10'	+60'	164°	21°13'	+60'	164°	20°15'	+60'	164°	0
1	27°00'	+59'	163°	26°03'	+60'	163°	25°05'	+60'	163°	24°08'	+60'	164°	23°10'	+60'	164°	22°12'	+60'	164°	21°15'	+60'	164°	1
2	28°00'	+59'	163°	27°02'	+60'	163°	26°05'	+60'	163°	25°07'	+60'	163°	24°10'	+60'	164°	23°12'	+60'	164°	22°15'	+60'	164°	2
3	28°59'	+59'	163°	28°02'	+59'	163°	27°04'	+60'	163°	26°07'	+60'	163°	25°09'	+60'	163°	24°12'	+60'	164°	23°14'	+60'	164°	3
4	29°58'	+59'	163°	29°01'	+59'	163°	28°04'	+60'	163°	27°06'	+60'	163°	26°09'	+60'	163°	25°11'	+60'	163°	24°14'	+60'	164°	4
5	30°58'	+59'	163°	30°01'	+59'	163°	29°03'	+60'	163°	28°06'	+60'	163°	27°09'	+60'	163°	26°11'	+60'	163°	25°14'	+60'	163°	5
6	31°57'	+59'	162°	31°00'	+59'	163°	30°03'	+60'	163°	29°06'	+60'	163°	28°08'	+60'	163°	27°11'	+60'	163°	26°13'	+60'	163°	6
7	32°57'	+59'	162°	32°00'	+59'	162°	31°02'	+60'	163°	30°05'	+60'	163°	29°08'	+60'	163°	28°10'	+60'	163°	27°13'	+60'	163°	7
8	33°56'	+59'	162°	32°59'	+59'	162°	32°02'	+59'	162°	31°05'	+60'	163°	30°07'	+60'	163°	29°10'	+60'	163°	28°13'	+60'	163°	8
9	34°56'	+59'	162°	33°58'	+59'	162°	33°01'	+59'	162°	32°04'	+60'	162°	31°07'	+60'	163°	30°10'	+60'	163°	29°12'	+60'	163°	9
10	35°55'	+59'	162°	34°58'	+59'	162°	34°01'	+59'	162°	33°04'	+60'	162°	32°07'	+60'	162°	31°09'	+60'	163°	30°12'	+60'	163°	10
11	36°54'	+59'	161°	35°57'	+59'	162°	35°00'	+59'	162°	34°03'	+60'	162°	33°06'	+60'	162°	32°09'	+60'	163°	31°12'	+60'	163°	11
12	37°54'	+59'	161°	36°57'	+59'	162°	36°00'	+59'	162°	35°03'	+59'	162°	34°06'	+60'	162°	33°08'	+60'	162°	32°11'	+60'	163°	12
13	38°53'	+59'	161°	37°56'	+59'	161°	36°59'	+59'	162°	36°02'	+59'	162°	35°05'	+60'	162°	34°08'	+60'	162°	33°11'	+60'	162°	13
14	39°52'	+59'	161°	38°55'	+59'	161°	37°59'	+59'	161°	37°02'	+59'	162°	36°05'	+60'	162°	35°08'	+60'	162°	34°11'	+60'	162°	14
15	40°51'	+59'	161°	39°55'	+59'	161°	38°58'	+59'	161°	38°01'	+59'	161°	37°04'	+60'	162°	36°07'	+60'	162°	35°10'	+60'	162°	15
16	41°51'	+59'	160°	40°54'	+59'	161°	39°57'	+59'	161°	39°01'	+59'	161°	38°04'	+59'	162°	37°07'	+60'	162°	36°10'	+60'	162°	16
17	42°50'	+59'	160°	41°53'	+59'	161°	40°57'	+59'	161°	40°00'	+59'	161°	39°03'	+59'	161°	38°06'	+60'	162°	37°09'	+60'	162°	17
18	43°49'	+59'	160°	42°53'	+59'	160°	41°56'	+59'	161°	41°00'	+59'	161°	40°03'	+59'	161°	39°06'	+60'	162°	38°09'	+60'	162°	18
19	44°48'	+59'	160°	43°52'	+59'	160°	42°56'	+59'	160°	41°59'	+59'	161°	41°02'	+59'	161°	40°05'	+60'	161°	39°09'	+60'	162°	19
20	45°48'	+59'	160°	44°51'	+59'	160°	43°55'	+59'	160°	42°58'	+59'	161°	42°02'	+59'	161°	41°05'	+59'	161°	40°08'	+60'	161°	20
21	46°47'	+59'	159°	45°50'	+59'	160°	44°54'	+59'	160°	43°58'	+59'	160°	43°01'	+59'	161°	42°04'	+59'	161°	41°08'	+60'	161°	21
22	47°46'	+59'	159°	46°50'	+59'	159°	45°53'	+59'	160°	44°57'	+59'	160°	44°00'	+59'	161°	43°04'	+59'	161°	42°07'	+60'	161°	22
23	48°45'	+59'	159°	47°49'	+59'	159°	46°53'	+59'	160°	45°56'	+59'	160°	45°00'	+59'	160°	44°03'	+59'	161°	43°07'	+60'	161°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

15° 345° LHA — Latitude SAME as Declination — 15° 345° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

16° 344° LHA — Latitude SAME as Declination — 16° 344° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	25°52'	+59'	162°	24°55'	+59'	162°	23°58'	+60'	162°	23°01'	+60'	163°	22°04'	+60'	163°	21°06'	+60'	163°	20°09'	+60'	163°	0
1	26°52'	+59'	162°	25°55'	+59'	162°	24°58'	+59'	162°	24°00'	+60'	162°	23°03'	+60'	163°	22°06'	+60'	163°	21°09'	+60'	163°	1
2	27°51'	+59'	162°	26°54'	+59'	162°	25°57'	+59'	162°	25°00'	+60'	162°	24°03'	+60'	162°	23°06'	+60'	163°	22°08'	+60'	163°	2
3	28°51'	+59'	162°	27°54'	+59'	162°	26°57'	+59'	162°	26°00'	+60'	162°	25°02'	+60'	162°	24°05'	+60'	162°	23°08'	+60'	163°	3
4	29°50'	+59'	162°	28°53'	+59'	162°	27°56'	+59'	162°	26°59'	+60'	162°	26°02'	+60'	162°	25°05'	+60'	162°	24°08'	+60'	162°	4
5	30°49'	+59'	161°	29°53'	+59'	162°	28°56'	+59'	162°	27°59'	+60'	162°	27°02'	+60'	162°	26°04'	+60'	162°	25°07'	+60'	162°	5
6	31°49'	+59'	161°	30°52'	+59'	161°	29°55'	+59'	162°	28°58'	+60'	162°	28°01'	+60'	162°	27°04'	+60'	162°	26°07'	+60'	162°	6
7	32°48'	+59'	161°	31°51'	+59'	161°	30°55'	+59'	161°	29°58'	+59'	162°	29°01'	+60'	162°	28°04'	+60'	162°	27°07'	+60'	162°	7
8	33°47'	+59'	161°	32°51'	+59'	161°	31°54'	+59'	161°	30°57'	+59'	161°	30°00'	+60'	162°	29°03'	+60'	162°	28°06'	+60'	162°	8
9	34°47'	+59'	161°	33°50'	+59'	161°	32°53'	+59'	161°	31°57'	+59'	161°	31°00'	+60'	161°	30°03'	+60'	162°	29°06'	+60'	162°	9
10	35°46'	+59'	160°	34°49'	+59'	161°	33°53'	+59'	161°	32°56'	+59'	161°	31°59'	+60'	161°	31°02'	+60'	162°	30°05'	+60'	162°	10
11	36°45'	+59'	160°	35°49'	+59'	161°	34°52'	+59'	161°	33°56'	+59'	161°	32°59'	+59'	161°	32°02'	+60'	161°	31°05'	+60'	162°	11
12	37°45'	+59'	160°	36°48'	+59'	160°	35°52'	+59'	161°	34°55'	+59'	161°	33°58'	+59'	161°	33°01'	+60'	161°	32°05'	+60'	161°	12
13	38°44'	+59'	160°	37°47'	+59'	160°	36°51'	+59'	160°	35°54'	+59'	161°	34°58'	+59'	161°	34°01'	+60'	161°	33°04'	+60'	161°	13
14	39°43'	+59'	160°	38°47'	+59'	160°	37°50'	+59'	160°	36°54'	+59'	160°	35°57'	+59'	161°	35°01'	+60'	161°	34°04'	+60'	161°	14
15	40°42'	+59'	159°	39°46'	+59'	160°	38°50'	+59'	160°	37°53'	+59'	160°	36°57'	+59'	161°	36°00'	+60'	161°	35°03'	+60'	161°	15
16	41°41'	+59'	159°	40°45'	+59'	160°	39°49'	+59'	160°	38°53'	+59'	160°	37°56'	+59'	160°	37°00'	+59'	161°	36°03'	+60'	161°	16
17	42°41'	+59'	159°	41°44'	+59'	159°	40°48'	+59'	160°	39°52'	+59'	160°	38°56'	+59'	160°	37°59'	+59'	160°	37°02'	+60'	161°	17
18	43°40'	+59'	159°	42°44'	+59'	159°	41°48'	+59'	159°	40°51'	+59'	160°	39°55'	+59'	160°	38°59'	+59'	160°	38°02'	+60'	161°	18
19	44°39'	+59'	159°	43°43'	+59'	159°	42°47'	+59'	159°	41°51'	+59'	160°	40°54'	+59'	160°	39°58'	+59'	160°	39°02'	+60'	160°	19
20	45°38'	+59'	158°	44°42'	+59'	159°	43°46'	+59'	159°	42°50'	+59'	159°	41°54'	+59'	160°	40°57'	+59'	160°	40°01'	+59'	160°	20
21	46°37'	+59'	158°	45°41'	+59'	158°	44°45'	+59'	159°	43°49'	+59'	159°	42°53'	+59'	159°	41°57'	+59'	160°	41°01'	+59'	160°	21
22	47°36'	+59'	158°	46°40'	+59'	158°	45°44'	+59'	159°	44°48'	+59'	159°	43°52'	+59'	159°	42°56'	+59'	160°	42°00'	+59'	160°	22
23	48°35'	+59'	157°	47°39'	+59'	158°	46°44'	+59'	158°	45°48'	+59'	159°	44°52'	+59'	159°	43°56'	+59'	159°	42°59'	+59'	160°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

16° 344° LHA — Latitude SAME as Declination — 16° 344° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

17° 343° LHA — Latitude SAME as Declination — 17° 343° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	25°44'	+59'	161°	24°47'	+59'	161°	23°50'	+59'	161°	22°53'	+59'	161°	21°56'	+60'	162°	21°00'	+60'	162°	20°03'	+60'	162°	0
1	26°43'	+59'	161°	25°47'	+59'	161°	24°50'	+59'	161°	23°53'	+59'	161°	22°56'	+60'	161°	21°59'	+60'	162°	21°02'	+60'	162°	1
2	27°43'	+59'	161°	26°46'	+59'	161°	25°49'	+59'	161°	24°52'	+59'	161°	23°56'	+60'	161°	22°59'	+60'	161°	22°02'	+60'	162°	2
3	28°42'	+59'	161°	27°45'	+59'	161°	26°49'	+59'	161°	25°52'	+59'	161°	24°55'	+60'	161°	23°58'	+60'	161°	23°01'	+60'	162°	3
4	29°41'	+59'	160°	28°45'	+59'	161°	27°48'	+59'	161°	26°51'	+59'	161°	25°55'	+60'	161°	24°58'	+60'	161°	24°01'	+60'	161°	4
5	30°40'	+59'	160°	29°44'	+59'	160°	28°47'	+59'	161°	27°51'	+59'	161°	26°54'	+60'	161°	25°57'	+60'	161°	25°01'	+60'	161°	5
6	31°40'	+59'	160°	30°43'	+59'	160°	29°47'	+59'	160°	28°50'	+59'	161°	27°54'	+59'	161°	26°57'	+60'	161°	26°00'	+60'	161°	6
7	32°39'	+59'	160°	31°43'	+59'	160°	30°46'	+59'	160°	29°50'	+59'	160°	28°53'	+59'	161°	27°56'	+60'	161°	27°00'	+60'	161°	7
8	33°38'	+59'	160°	32°42'	+59'	160°	31°46'	+59'	160°	30°49'	+59'	160°	29°53'	+59'	160°	28°56'	+60'	161°	27°59'	+60'	161°	8
9	34°37'	+59'	159°	33°41'	+59'	160°	32°45'	+59'	160°	31°49'	+59'	160°	30°52'	+59'	160°	29°56'	+60'	161°	28°59'	+60'	161°	9
10	35°37'	+59'	159°	34°41'	+59'	160°	33°44'	+59'	160°	32°48'	+59'	160°	31°52'	+59'	160°	30°55'	+60'	160°	29°58'	+60'	161°	10
11	36°36'	+59'	159°	35°40'	+59'	159°	34°44'	+59'	160°	33°47'	+59'	160°	32°51'	+59'	160°	31°55'	+59'	160°	30°58'	+60'	160°	11
12	37°35'	+59'	159°	36°39'	+59'	159°	35°43'	+59'	159°	34°47'	+59'	160°	33°50'	+59'	160°	32°54'	+59'	160°	31°58'	+60'	160°	12
13	38°34'	+59'	159°	37°38'	+59'	159°	36°42'	+59'	159°	35°46'	+59'	159°	34°50'	+59'	160°	33°54'	+59'	160°	32°57'	+60'	160°	13
14	39°33'	+59'	158°	38°37'	+59'	159°	37°41'	+59'	159°	36°45'	+59'	159°	35°49'	+59'	160°	34°53'	+59'	160°	33°57'	+60'	160°	14
15	40°32'	+59'	158°	39°37'	+59'	158°	38°41'	+59'	159°	37°45'	+59'	159°	36°49'	+59'	159°	35°52'	+59'	160°	34°56'	+60'	160°	15
16	41°31'	+59'	158°	40°36'	+59'	158°	39°40'	+59'	159°	38°44'	+59'	159°	37°48'	+59'	159°	36°52'	+59'	159°	35°56'	+59'	160°	16
17	42°30'	+59'	158°	41°35'	+59'	158°	40°39'	+59'	158°	39°43'	+59'	159°	38°47'	+59'	159°	37°51'	+59'	159°	36°55'	+59'	160°	17
18	43°29'	+59'	157°	42°34'	+59'	158°	41°38'	+59'	158°	40°43'	+59'	158°	39°47'	+59'	159°	38°51'	+59'	159°	37°55'	+59'	159°	18
19	44°28'	+59'	157°	43°33'	+59'	158°	42°38'	+59'	158°	41°42'	+59'	158°	40°46'	+59'	159°	39°50'	+59'	159°	38°54'	+59'	159°	19
20	45°27'	+59'	157°	44°32'	+59'	157°	43°37'	+59'	158°	42°41'	+59'	158°	41°45'	+59'	158°	40°49'	+59'	159°	39°54'	+59'	159°	20
21	46°26'	+59'	157°	45°31'	+59'	157°	44°36'	+59'	157°	43°40'	+59'	158°	42°45'	+59'	158°	41°49'	+59'	159°	40°53'	+59'	159°	21
22	47°25'	+59'	156°	46°30'	+59'	157°	45°35'	+59'	157°	44°39'	+59'	158°	43°44'	+59'	158°	42°48'	+59'	158°	41°52'	+59'	159°	22
23	48°24'	+59'	156°	47°29'	+59'	157°	46°34'	+59'	157°	45°39'	+59'	157°	44°43'	+59'	158°	43°48'	+59'	158°	42°52'	+59'	158°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

17° 343° LHA — Latitude SAME as Declination — 17° 343° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

18° 342° LHA — Latitude SAME as Declination — 18° 342° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	25°35'	+59'	160°	24°38'	+59'	160°	23°42'	+59'	160°	22°45'	+59'	160°	21°49'	+59'	161°	20°52'	+60'	161°	19°56'	+60'	161°	0
1	26°34'	+59'	160°	25°38'	+59'	160°	24°41'	+59'	160°	23°45'	+59'	160°	22°48'	+59'	160°	21°52'	+60'	161°	20°55'	+60'	161°	1
2	27°33'	+59'	160°	26°37'	+59'	160°	25°41'	+59'	160°	24°44'	+59'	160°	23°48'	+59'	160°	22°51'	+60'	160°	21°55'	+60'	161°	2
3	28°33'	+59'	159°	27°36'	+59'	160°	26°40'	+59'	160°	25°44'	+59'	160°	24°47'	+59'	160°	23°51'	+60'	160°	22°54'	+60'	160°	3
4	29°32'	+59'	159°	28°36'	+59'	159°	27°39'	+59'	160°	26°43'	+59'	160°	25°47'	+59'	160°	24°50'	+60'	160°	23°54'	+60'	160°	4
5	30°31'	+59'	159°	29°35'	+59'	159°	28°39'	+59'	159°	27°43'	+59'	160°	26°46'	+59'	160°	25°50'	+59'	160°	24°53'	+60'	160°	5
6	31°30'	+59'	159°	30°34'	+59'	159°	29°38'	+59'	159°	28°42'	+59'	159°	27°46'	+59'	160°	26°49'	+59'	160°	25°53'	+60'	160°	6
7	32°29'	+59'	159°	31°33'	+59'	159°	30°37'	+59'	159°	29°41'	+59'	159°	28°45'	+59'	160°	27°49'	+59'	160°	26°53'	+60'	160°	7
8	33°28'	+59'	158°	32°33'	+59'	159°	31°37'	+59'	159°	30°41'	+59'	159°	29°45'	+59'	159°	28°48'	+59'	160°	27°52'	+60'	160°	8
9	34°28'	+59'	158°	33°32'	+59'	159°	32°36'	+59'	159°	31°40'	+59'	159°	30°44'	+59'	159°	29°48'	+59'	159°	28°52'	+60'	160°	9
10	35°27'	+59'	158°	34°31'	+59'	158°	33°35'	+59'	159°	32°39'	+59'	159°	31°43'	+59'	159°	30°47'	+59'	159°	29°51'	+60'	159°	10
11	36°26'	+59'	158°	35°30'	+59'	158°	34°34'	+59'	158°	33°39'	+59'	159°	32°43'	+59'	159°	31°47'	+59'	159°	30°51'	+59'	159°	11
12	37°25'	+59'	158°	36°29'	+59'	158°	35°34'	+59'	158°	34°38'	+59'	158°	33°42'	+59'	159°	32°46'	+59'	159°	31°50'	+59'	159°	12
13	38°24'	+59'	157°	37°28'	+59'	158°	36°33'	+59'	158°	35°37'	+59'	158°	34°41'	+59'	159°	33°46'	+59'	159°	32°50'	+59'	159°	13
14	39°23'	+59'	157°	38°28'	+59'	157°	37°32'	+59'	158°	36°37'	+59'	158°	35°41'	+59'	158°	34°45'	+59'	159°	33°49'	+59'	159°	14
15	40°22'	+59'	157°	39°27'	+59'	157°	38°31'	+59'	158°	37°36'	+59'	158°	36°40'	+59'	158°	35°44'	+59'	158°	34°49'	+59'	159°	15
16	41°21'	+59'	157°	40°26'	+59'	157°	39°30'	+59'	157°	38°35'	+59'	158°	37°39'	+59'	158°	36°44'	+59'	158°	35°48'	+59'	159°	16
17	42°20'	+59'	156°	41°25'	+59'	157°	40°30'	+59'	157°	39°34'	+59'	157°	38°39'	+59'	158°	37°43'	+59'	158°	36°47'	+59'	158°	17
18	43°19'	+59'	156°	42°24'	+59'	157°	41°29'	+59'	157°	40°33'	+59'	157°	39°38'	+59'	158°	38°42'	+59'	158°	37°47'	+59'	158°	18
19	44°18'	+59'	156°	43°23'	+59'	156°	42°28'	+59'	157°	41°33'	+59'	157°	40°37'	+59'	157°	39°42'	+59'	158°	38°46'	+59'	158°	19
20	45°16'	+59'	156°	44°22'	+59'	156°	43°27'	+59'	156°	42°32'	+59'	157°	41°36'	+59'	157°	40°41'	+59'	157°	39°46'	+59'	158°	20
21	46°15'	+59'	155°	45°21'	+59'	156°	44°26'	+59'	156°	43°31'	+59'	157°	42°36'	+59'	157°	41°40'	+59'	157°	40°45'	+59'	158°	21
22	47°14'	+59'	155°	46°19'	+59'	155°	45°25'	+59'	156°	44°30'	+59'	156°	43°35'	+59'	157°	42°40'	+59'	157°	41°44'	+59'	157°	22
23	48°13'	+59'	155°	47°18'	+59'	155°	46°24'	+59'	156°	45°29'	+59'	156°	44°34'	+59'	156°	43°39'	+59'	157°	42°44'	+59'	157°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

18° 342° LHA — Latitude SAME as Declination — 18° 342° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

19° 341° LHA — Latitude SAME as Declination — 19° 341° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	25°25'	+59'	159°	24°29'	+59'	159°	23°33'	+59'	159°	22°37'	+59'	159°	21°41'	+59'	159°	20°45'	+59'	160°	19°48'	+60'	160°	0
1	26°24'	+59'	159°	25°28'	+59'	159°	24°32'	+59'	159°	23°36'	+59'	159°	22°40'	+59'	159°	21°44'	+59'	159°	20°48'	+60'	160°	1
2	27°24'	+59'	159°	26°28'	+59'	159°	25°32'	+59'	159°	24°36'	+59'	159°	23°40'	+59'	159°	22°44'	+59'	159°	21°47'	+60'	159°	2
3	28°23'	+59'	158°	27°27'	+59'	159°	26°31'	+59'	159°	25°35'	+59'	159°	24°39'	+59'	159°	23°43'	+59'	159°	22°47'	+60'	159°	3
4	29°22'	+59'	158°	28°26'	+59'	158°	27°30'	+59'	159°	26°34'	+59'	159°	25°39'	+59'	159°	24°43'	+59'	159°	23°46'	+60'	159°	4
5	30°21'	+59'	158°	29°25'	+59'	158°	28°30'	+59'	158°	27°34'	+59'	159°	26°38'	+59'	159°	25°42'	+59'	159°	24°46'	+59'	159°	5
6	31°20'	+59'	158°	30°25'	+59'	158°	29°29'	+59'	158°	28°33'	+59'	158°	27°37'	+59'	159°	26°41'	+59'	159°	25°45'	+59'	159°	6
7	32°19'	+59'	158°	31°24'	+59'	158°	30°28'	+59'	158°	29°32'	+59'	158°	28°37'	+59'	158°	27°41'	+59'	159°	26°45'	+59'	159°	7
8	33°18'	+59'	157°	32°23'	+59'	158°	31°27'	+59'	158°	30°32'	+59'	158°	29°36'	+59'	158°	28°40'	+59'	158°	27°44'	+59'	159°	8
9	34°17'	+59'	157°	33°22'	+59'	157°	32°27'	+59'	158°	31°31'	+59'	158°	30°35'	+59'	158°	29°40'	+59'	158°	28°44'	+59'	158°	9
10	35°16'	+59'	157°	34°21'	+59'	157°	33°26'	+59'	157°	32°30'	+59'	158°	31°35'	+59'	158°	30°39'	+59'	158°	29°43'	+59'	158°	10
11	36°15'	+59'	157°	35°20'	+59'	157°	34°25'	+59'	157°	33°30'	+59'	157°	32°34'	+59'	158°	31°38'	+59'	158°	30°43'	+59'	158°	11
12	37°14'	+59'	156°	36°19'	+59'	157°	35°24'	+59'	157°	34°29'	+59'	157°	33°33'	+59'	158°	32°38'	+59'	158°	31°42'	+59'	158°	12
13	38°13'	+59'	156°	37°18'	+59'	156°	36°23'	+59'	157°	35°28'	+59'	157°	34°33'	+59'	157°	33°37'	+59'	158°	32°42'	+59'	158°	13
14	39°12'	+59'	156°	38°17'	+59'	156°	37°22'	+59'	157°	36°27'	+59'	157°	35°32'	+59'	157°	34°37'	+59'	157°	33°41'	+59'	158°	14
15	40°11'	+59'	156°	39°16'	+59'	156°	38°21'	+59'	156°	37°26'	+59'	157°	36°31'	+59'	157°	35°36'	+59'	157°	34°41'	+59'	158°	15
16	41°10'	+59'	155°	40°15'	+59'	156°	39°20'	+59'	156°	38°25'	+59'	156°	37°30'	+59'	157°	36°35'	+59'	157°	35°40'	+59'	157°	16
17	42°09'	+59'	155°	41°14'	+59'	156°	40°19'	+59'	156°	39°25'	+59'	156°	38°30'	+59'	157°	37°35'	+59'	157°	36°39'	+59'	157°	17
18	43°07'	+59'	155°	42°13'	+59'	155°	41°18'	+59'	156°	40°24'	+59'	156°	39°29'	+59'	156°	38°34'	+59'	157°	37°39'	+59'	157°	18
19	44°06'	+59'	155°	43°12'	+59'	155°	42°17'	+59'	155°	41°23'	+59'	156°	40°28'	+59'	156°	39°33'	+59'	156°	38°38'	+59'	157°	19
20	45°05'	+59'	154°	44°11'	+59'	155°	43°16'	+59'	155°	42°22'	+59'	156°	41°27'	+59'	156°	40°32'	+59'	156°	39°37'	+59'	157°	20
21	46°04'	+59'	154°	45°09'	+59'	154°	44°15'	+59'	155°	43°21'	+59'	155°	42°26'	+59'	156°	41°31'	+59'	156°	40°37'	+59'	156°	21
22	47°02'	+59'	154°	46°08'	+59'	154°	45°14'	+59'	155°	44°20'	+59'	155°	43°25'	+59'	155°	42°31'	+59'	156°	41°36'	+59'	156°	22
23	48°01'	+58'	153°	47°07'	+59'	154°	46°13'	+59'	154°	45°19'	+59'	155°	44°24'	+59'	155°	43°30'	+59'	156°	42°35'	+59'	156°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

19° 341° LHA — Latitude SAME as Declination — 19° 341° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

20° 340° LHA — Latitude SAME as Declination — 20° 340° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	25°15'	+59'	158°	24°20'	+59'	158°	23°24'	+59'	158°	22°28'	+59'	158°	21°32'	+59'	158°	20°37'	+59'	159°	19°41'	+59'	159°	0
1	26°14'	+59'	158°	25°19'	+59'	158°	24°23'	+59'	158°	23°28'	+59'	158°	22°32'	+59'	158°	21°36'	+59'	158°	20°40'	+59'	159°	1
2	27°13'	+59'	157°	26°18'	+59'	158°	25°22'	+59'	158°	24°27'	+59'	158°	23°31'	+59'	158°	22°35'	+59'	158°	21°40'	+59'	158°	2
3	28°12'	+59'	157°	27°17'	+59'	157°	26°22'	+59'	158°	25°26'	+59'	158°	24°31'	+59'	158°	23°35'	+59'	158°	22°39'	+59'	158°	3
4	29°11'	+59'	157°	28°16'	+59'	157°	27°21'	+59'	157°	26°25'	+59'	158°	25°30'	+59'	158°	24°34'	+59'	158°	23°39'	+59'	158°	4
5	30°11'	+59'	157°	29°15'	+59'	157°	28°20'	+59'	157°	27°25'	+59'	157°	26°29'	+59'	158°	25°34'	+59'	158°	24°38'	+59'	158°	5
6	31°10'	+59'	157°	30°14'	+59'	157°	29°19'	+59'	157°	28°24'	+59'	157°	27°29'	+59'	157°	26°33'	+59'	158°	25°38'	+59'	158°	6
7	32°09'	+59'	156°	31°13'	+59'	157°	30°18'	+59'	157°	29°23'	+59'	157°	28°28'	+59'	157°	27°32'	+59'	157°	26°37'	+59'	158°	7
8	33°07'	+59'	156°	32°13'	+59'	156°	31°18'	+59'	157°	30°22'	+59'	157°	29°27'	+59'	157°	28°32'	+59'	157°	27°36'	+59'	158°	8
9	34°06'	+59'	156°	33°12'	+59'	156°	32°17'	+59'	156°	31°22'	+59'	157°	30°26'	+59'	157°	29°31'	+59'	157°	28°36'	+59'	157°	9
10	35°05'	+59'	156°	34°11'	+59'	156°	33°16'	+59'	156°	32°21'	+59'	157°	31°26'	+59'	157°	30°31'	+59'	157°	29°35'	+59'	157°	10
11	36°04'	+59'	155°	35°10'	+59'	156°	34°15'	+59'	156°	33°20'	+59'	156°	32°25'	+59'	157°	31°30'	+59'	157°	30°35'	+59'	157°	11
12	37°03'	+59'	155°	36°09'	+59'	156°	35°14'	+59'	156°	34°19'	+59'	156°	33°24'	+59'	156°	32°29'	+59'	157°	31°34'	+59'	157°	12
13	38°02'	+59'	155°	37°08'	+59'	155°	36°13'	+59'	156°	35°18'	+59'	156°	34°23'	+59'	156°	33°28'	+59'	156°	32°33'	+59'	157°	13
14	39°01'	+59'	155°	38°06'	+59'	155°	37°12'	+59'	155°	36°17'	+59'	156°	35°23'	+59'	156°	34°28'	+59'	156°	33°33'	+59'	157°	14
15	40°00'	+59'	154°	39°05'	+59'	155°	38°11'	+59'	155°	37°16'	+59'	155°	36°22'	+59'	156°	35°27'	+59'	156°	34°32'	+59'	156°	15
16	40°58'	+59'	154°	40°04'	+59'	155°	39°10'	+59'	155°	38°16'	+59'	155°	37°21'	+59'	156°	36°26'	+59'	156°	35°31'	+59'	156°	16
17	41°57'	+59'	154°	41°03'	+59'	154°	40°09'	+59'	155°	39°15'	+59'	155°	38°20'	+59'	155°	37°25'	+59'	156°	36°31'	+59'	156°	17
18	42°56'	+59'	154°	42°02'	+59'	154°	41°08'	+59'	154°	40°14'	+59'	155°	39°19'	+59'	155°	38°25'	+59'	155°	37°30'	+59'	156°	18
19	43°54'	+59'	153°	43°01'	+59'	154°	42°07'	+59'	154°	41°13'	+59'	155°	40°18'	+59'	155°	39°24'	+59'	155°	38°29'	+59'	156°	19
20	44°53'	+59'	153°	43°59'	+59'	153°	43°05'	+59'	154°	42°11'	+59'	154°	41°17'	+59'	155°	40°23'	+59'	155°	39°29'	+59'	155°	20
21	45°51'	+58'	153°	44°58'	+59'	153°	44°04'	+59'	154°	43°10'	+59'	154°	42°16'	+59'	154°	41°22'	+59'	155°	40°28'	+59'	155°	21
22	46°50'	+58'	152°	45°57'	+59'	153°	45°03'	+59'	153°	44°09'	+59'	154°	43°15'	+59'	154°	42°21'	+59'	155°	41°27'	+59'	155°	22
23	47°48'	+58'	152°	46°55'	+59'	153°	46°02'	+59'	153°	45°08'	+59'	153°	44°14'	+59'	154°	43°20'	+59'	154°	42°26'	+59'	155°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

20° 340° LHA — Latitude SAME as Declination — 20° 340° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

21° 339° LHA — Latitude SAME as Declination — 21° 339° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	25°05'	+59'	157°	24°09'	+59'	157°	23°14'	+59'	157°	22°19'	+59'	157°	21°24'	+59'	157°	20°28'	+59'	158°	19°33'	+59'	158°	0
1	26°04'	+59'	156°	25°09'	+59'	157°	24°13'	+59'	157°	23°18'	+59'	157°	22°23'	+59'	157°	21°28'	+59'	157°	20°32'	+59'	158°	1
2	27°03'	+59'	156°	26°08'	+59'	156°	25°13'	+59'	157°	24°17'	+59'	157°	23°22'	+59'	157°	22°27'	+59'	157°	21°32'	+59'	157°	2
3	28°02'	+59'	156°	27°07'	+59'	156°	26°12'	+59'	156°	25°17'	+59'	157°	24°22'	+59'	157°	23°26'	+59'	157°	22°31'	+59'	157°	3
4	29°01'	+59'	156°	28°06'	+59'	156°	27°11'	+59'	156°	26°16'	+59'	157°	25°21'	+59'	157°	24°26'	+59'	157°	23°30'	+59'	157°	4
5	30°00'	+59'	156°	29°05'	+59'	156°	28°10'	+59'	156°	27°15'	+59'	156°	26°20'	+59'	157°	25°25'	+59'	157°	24°30'	+59'	157°	5
6	30°58'	+59'	155°	30°04'	+59'	156°	29°09'	+59'	156°	28°14'	+59'	156°	27°19'	+59'	156°	26°24'	+59'	157°	25°29'	+59'	157°	6
7	31°57'	+59'	155°	31°03'	+59'	155°	30°08'	+59'	156°	29°13'	+59'	156°	28°19'	+59'	156°	27°24'	+59'	156°	26°29'	+59'	157°	7
8	32°56'	+59'	155°	32°02'	+59'	155°	31°07'	+59'	156°	30°13'	+59'	156°	29°18'	+59'	156°	28°23'	+59'	156°	27°28'	+59'	156°	8
9	33°55'	+59'	155°	33°01'	+59'	155°	32°06'	+59'	155°	31°12'	+59'	156°	30°17'	+59'	156°	29°22'	+59'	156°	28°27'	+59'	156°	9
10	34°54'	+59'	155°	34°00'	+59'	155°	33°05'	+59'	155°	32°11'	+59'	155°	31°16'	+59'	156°	30°22'	+59'	156°	29°27'	+59'	156°	10
11	35°53'	+59'	154°	34°59'	+59'	155°	34°04'	+59'	155°	33°10'	+59'	155°	32°15'	+59'	155°	31°21'	+59'	156°	30°26'	+59'	156°	11
12	36°51'	+59'	154°	35°57'	+59'	154°	35°03'	+59'	155°	34°09'	+59'	155°	33°15'	+59'	155°	32°20'	+59'	155°	31°25'	+59'	156°	12
13	37°50'	+59'	154°	36°56'	+59'	154°	36°02'	+59'	154°	35°08'	+59'	155°	34°14'	+59'	155°	33°19'	+59'	155°	32°25'	+59'	156°	13
14	38°49'	+59'	153°	37°55'	+59'	154°	37°01'	+59'	154°	36°07'	+59'	155°	35°13'	+59'	155°	34°18'	+59'	155°	33°24'	+59'	155°	14
15	39°48'	+59'	153°	38°54'	+59'	154°	38°00'	+59'	154°	37°06'	+59'	154°	36°12'	+59'	155°	35°18'	+59'	155°	34°23'	+59'	155°	15
16	40°46'	+59'	153°	39°53'	+59'	153°	38°59'	+59'	154°	38°05'	+59'	154°	37°11'	+59'	154°	36°17'	+59'	155°	35°23'	+59'	155°	16
17	41°45'	+59'	153°	40°51'	+59'	153°	39°58'	+59'	153°	39°04'	+59'	154°	38°10'	+59'	154°	37°16'	+59'	154°	36°22'	+59'	155°	17
18	42°43'	+58'	152°	41°50'	+59'	153°	40°57'	+59'	153°	40°03'	+59'	154°	39°09'	+59'	154°	38°15'	+59'	154°	37°21'	+59'	155°	18
19	43°42'	+58'	152°	42°49'	+59'	152°	41°55'	+59'	153°	41°02'	+59'	153°	40°08'	+59'	154°	39°14'	+59'	154°	38°20'	+59'	154°	19
20	44°40'	+58'	152°	43°47'	+59'	152°	42°54'	+59'	153°	42°01'	+59'	153°	41°07'	+59'	153°	40°13'	+59'	154°	39°19'	+59'	154°	20
21	45°39'	+58'	151°	44°46'	+58'	152°	43°53'	+59'	152°	42°59'	+59'	153°	42°06'	+59'	153°	41°12'	+59'	154°	40°19'	+59'	154°	21
22	46°37'	+58'	151°	45°44'	+58'	152°	44°51'	+59'	152°	43°58'	+59'	153°	43°05'	+59'	153°	42°11'	+59'	153°	41°18'	+59'	154°	22
23	47°35'	+58'	151°	46°43'	+58'	151°	45°50'	+59'	152°	44°57'	+59'	152°	44°04'	+59'	153°	43°10'	+59'	153°	42°17'	+59'	154°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

21° 339° LHA — Latitude SAME as Declination — 21° 339° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

22° 338° LHA — Latitude SAME as Declination — 22° 338° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	24°54'	+59'	156°	23°59'	+59'	156°	23°04'	+59'	156°	22°09'	+59'	156°	21°14'	+59'	156°	20°19'	+59'	156°	19°24'	+59'	157°	0
1	25°53'	+59'	155°	24°58'	+59'	156°	24°03'	+59'	156°	23°08'	+59'	156°	22°14'	+59'	156°	21°19'	+59'	156°	20°24'	+59'	156°	1
2	26°51'	+59'	155°	25°57'	+59'	155°	25°02'	+59'	156°	24°08'	+59'	156°	23°13'	+59'	156°	22°18'	+59'	156°	21°23'	+59'	156°	2
3	27°50'	+59'	155°	26°56'	+59'	155°	26°01'	+59'	155°	25°07'	+59'	156°	24°12'	+59'	156°	23°17'	+59'	156°	22°23'	+59'	156°	3
4	28°49'	+59'	155°	27°55'	+59'	155°	27°00'	+59'	155°	26°06'	+59'	155°	25°11'	+59'	156°	24°17'	+59'	156°	23°22'	+59'	156°	4
5	29°48'	+59'	155°	28°54'	+59'	155°	28°00'	+59'	155°	27°05'	+59'	155°	26°11'	+59'	155°	25°16'	+59'	156°	24°21'	+59'	156°	5
6	30°47'	+59'	154°	29°53'	+59'	155°	28°59'	+59'	155°	28°04'	+59'	155°	27°10'	+59'	155°	26°15'	+59'	155°	25°21'	+59'	156°	6
7	31°46'	+59'	154°	30°52'	+59'	154°	29°58'	+59'	155°	29°03'	+59'	155°	28°09'	+59'	155°	27°14'	+59'	155°	26°20'	+59'	155°	7
8	32°44'	+59'	154°	31°51'	+59'	154°	30°56'	+59'	154°	30°02'	+59'	155°	29°08'	+59'	155°	28°14'	+59'	155°	27°19'	+59'	155°	8
9	33°43'	+59'	154°	32°49'	+59'	154°	31°55'	+59'	154°	31°01'	+59'	154°	30°07'	+59'	155°	29°13'	+59'	155°	28°19'	+59'	155°	9
10	34°42'	+59'	153°	33°48'	+59'	154°	32°54'	+59'	154°	32°00'	+59'	154°	31°06'	+59'	154°	30°12'	+59'	155°	29°18'	+59'	155°	10
11	35°41'	+59'	153°	34°47'	+59'	153°	33°53'	+59'	154°	32°59'	+59'	154°	32°05'	+59'	154°	31°11'	+59'	155°	30°17'	+59'	155°	11
12	36°39'	+59'	153°	35°46'	+59'	153°	34°52'	+59'	153°	33°58'	+59'	154°	33°05'	+59'	154°	32°11'	+59'	154°	31°16'	+59'	155°	12
13	37°38'	+59'	153°	36°45'	+59'	153°	35°51'	+59'	153°	34°57'	+59'	154°	34°04'	+59'	154°	33°10'	+59'	154°	32°16'	+59'	154°	13
14	38°36'	+59'	152°	37°43'	+59'	153°	36°50'	+59'	153°	35°56'	+59'	153°	35°03'	+59'	154°	34°09'	+59'	154°	33°15'	+59'	154°	14
15	39°35'	+58'	152°	38°42'	+59'	152°	37°49'	+59'	153°	36°55'	+59'	153°	36°02'	+59'	153°	35°08'	+59'	154°	34°14'	+59'	154°	15
16	40°33'	+58'	152°	39°41'	+59'	152°	38°47'	+59'	152°	37°54'	+59'	153°	37°01'	+59'	153°	36°07'	+59'	154°	35°13'	+59'	154°	16
17	41°32'	+58'	151°	40°39'	+59'	152°	39°46'	+59'	152°	38°53'	+59'	153°	38°00'	+59'	153°	37°06'	+59'	153°	36°12'	+59'	154°	17
18	42°30'	+58'	151°	41°38'	+59'	152°	40°45'	+59'	152°	39°52'	+59'	152°	38°59'	+59'	153°	38°05'	+59'	153°	37°12'	+59'	153°	18
19	43°29'	+58'	151°	42°36'	+58'	151°	41°44'	+59'	152°	40°51'	+59'	152°	39°57'	+59'	152°	39°04'	+59'	153°	38°11'	+59'	153°	19
20	44°27'	+58'	150°	43°35'	+58'	151°	42°42'	+59'	151°	41°49'	+59'	152°	40°56'	+59'	152°	40°03'	+59'	153°	39°10'	+59'	153°	20
21	45°25'	+58'	150°	44°33'	+58'	151°	43°41'	+59'	151°	42°48'	+59'	152°	41°55'	+59'	152°	41°02'	+59'	152°	40°09'	+59'	153°	21
22	46°23'	+58'	150°	45°31'	+58'	150°	44°39'	+58'	151°	43°47'	+59'	151°	42°54'	+59'	152°	42°01'	+59'	152°	41°08'	+59'	153°	22
23	47°22'	+58'	149°	46°30'	+58'	150°	45°38'	+58'	150°	44°45'	+59'	151°	43°53'	+59'	151°	43°00'	+59'	152°	42°07'	+59'	152°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

22° 338° LHA — Latitude SAME as Declination — 22° 338° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

23° 337° LHA — Latitude SAME as Declination — 23° 337° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	24°42'	+59'	155°	23°48'	+59'	155°	22°54'	+59'	155°	21°59'	+59'	155°	21°05'	+59'	155°	20°10'	+59'	155°	19°16'	+59'	156°	0
1	25°41'	+59'	154°	24°47'	+59'	155°	23°53'	+59'	155°	22°58'	+59'	155°	22°04'	+59'	155°	21°10'	+59'	155°	20°15'	+59'	155°	1
2	26°40'	+59'	154°	25°46'	+59'	154°	24°52'	+59'	155°	23°57'	+59'	155°	23°03'	+59'	155°	22°09'	+59'	155°	21°14'	+59'	155°	2
3	27°39'	+59'	154°	26°45'	+59'	154°	25°51'	+59'	154°	24°57'	+59'	155°	24°02'	+59'	155°	23°08'	+59'	155°	22°14'	+59'	155°	3
4	28°37'	+59'	154°	27°44'	+59'	154°	26°50'	+59'	154°	25°56'	+59'	154°	25°01'	+59'	155°	24°07'	+59'	155°	23°13'	+59'	155°	4
5	29°36'	+59'	153°	28°42'	+59'	154°	27°49'	+59'	154°	26°55'	+59'	154°	26°01'	+59'	154°	25°06'	+59'	155°	24°12'	+59'	155°	5
6	30°35'	+59'	153°	29°41'	+59'	153°	28°47'	+59'	154°	27°54'	+59'	154°	27°00'	+59'	154°	26°06'	+59'	154°	25°12'	+59'	155°	6
7	31°34'	+59'	153°	30°40'	+59'	153°	29°46'	+59'	153°	28°53'	+59'	154°	27°59'	+59'	154°	27°05'	+59'	154°	26°11'	+59'	154°	7
8	32°32'	+59'	153°	31°39'	+59'	153°	30°45'	+59'	153°	29°52'	+59'	154°	28°58'	+59'	154°	28°04'	+59'	154°	27°10'	+59'	154°	8
9	33°31'	+59'	152°	32°38'	+59'	153°	31°44'	+59'	153°	30°51'	+59'	153°	29°57'	+59'	154°	29°03'	+59'	154°	28°09'	+59'	154°	9
10	34°29'	+59'	152°	33°36'	+59'	152°	32°43'	+59'	153°	31°50'	+59'	153°	30°56'	+59'	153°	30°02'	+59'	154°	29°09'	+59'	154°	10
11	35°28'	+59'	152°	34°35'	+59'	152°	33°42'	+59'	153°	32°49'	+59'	153°	31°55'	+59'	153°	31°01'	+59'	153°	30°08'	+59'	154°	11
12	36°27'	+59'	152°	35°34'	+59'	152°	34°41'	+59'	152°	33°47'	+59'	153°	32°54'	+59'	153°	32°01'	+59'	153°	31°07'	+59'	153°	12
13	37°25'	+58'	151°	36°32'	+59'	152°	35°39'	+59'	152°	34°46'	+59'	152°	33°53'	+59'	153°	33°00'	+59'	153°	32°06'	+59'	153°	13
14	38°24'	+58'	151°	37°31'	+59'	151°	36°38'	+59'	152°	35°45'	+59'	152°	34°52'	+59'	152°	33°59'	+59'	153°	33°05'	+59'	153°	14
15	39°22'	+58'	151°	38°29'	+59'	151°	37°37'	+59'	152°	36°44'	+59'	152°	35°51'	+59'	152°	34°58'	+59'	153°	34°04'	+59'	153°	15
16	40°20'	+58'	150°	39°28'	+58'	151°	38°35'	+59'	151°	37°43'	+59'	152°	36°50'	+59'	152°	35°57'	+59'	152°	35°04'	+59'	153°	16
17	41°19'	+58'	150°	40°26'	+58'	151°	39°34'	+59'	151°	38°42'	+59'	151°	37°49'	+59'	152°	36°56'	+59'	152°	36°03'	+59'	152°	17
18	42°17'	+58'	150°	41°25'	+58'	150°	40°33'	+59'	151°	39°40'	+59'	151°	38°48'	+59'	152°	37°55'	+59'	152°	37°02'	+59'	152°	18
19	43°15'	+58'	150°	42°23'	+58'	150°	41°31'	+58'	150°	40°39'	+59'	151°	39°46'	+59'	151°	38°54'	+59'	152°	38°01'	+59'	152°	19
20	44°13'	+58'	149°	43°22'	+58'	150°	42°30'	+58'	150°	41°38'	+59'	151°	40°45'	+59'	151°	39°53'	+59'	151°	39°00'	+59'	152°	20
21	45°11'	+58'	149°	44°20'	+58'	149°	43°28'	+58'	150°	42°36'	+59'	150°	41°44'	+59'	151°	40°52'	+59'	151°	39°59'	+59'	152°	21
22	46°09'	+58'	148°	45°18'	+58'	149°	44°27'	+58'	150°	43°35'	+59'	150°	42°43'	+59'	150°	41°50'	+59'	151°	40°58'	+59'	151°	22
23	47°07'	+58'	148°	46°16'	+58'	149°	45°25'	+58'	149°	44°33'	+58'	150°	43°41'	+59'	150°	42°49'	+59'	151°	41°57'	+59'	151°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

23° 337° LHA — Latitude SAME as Declination — 23° 337° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

24° 336° LHA — Latitude SAME as Declination — 24° 336° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	24°30'	+59'	153°	23°36'	+59'	154°	22°43'	+59'	154°	21°49'	+59'	154°	20°55'	+59'	154°	20°01'	+59'	154°	19°07'	+59'	155°	0
1	25°29'	+59'	153°	24°35'	+59'	153°	23°42'	+59'	154°	22°48'	+59'	154°	21°54'	+59'	154°	21°00'	+59'	154°	20°06'	+59'	154°	1
2	26°28'	+59'	153°	25°34'	+59'	153°	24°41'	+59'	153°	23°47'	+59'	154°	22°53'	+59'	154°	21°59'	+59'	154°	21°05'	+59'	154°	2
3	27°26'	+59'	153°	26°33'	+59'	153°	25°39'	+59'	153°	24°46'	+59'	153°	23°52'	+59'	154°	22°58'	+59'	154°	22°04'	+59'	154°	3
4	28°25'	+59'	153°	27°32'	+59'	153°	26°38'	+59'	153°	25°45'	+59'	153°	24°51'	+59'	153°	23°57'	+59'	154°	23°04'	+59'	154°	4
5	29°24'	+59'	152°	28°30'	+59'	153°	27°37'	+59'	153°	26°44'	+59'	153°	25°50'	+59'	153°	24°57'	+59'	153°	24°03'	+59'	154°	5
6	30°22'	+59'	152°	29°29'	+59'	152°	28°36'	+59'	153°	27°43'	+59'	153°	26°49'	+59'	153°	25°56'	+59'	153°	25°02'	+59'	153°	6
7	31°21'	+59'	152°	30°28'	+59'	152°	29°35'	+59'	152°	28°42'	+59'	153°	27°48'	+59'	153°	26°55'	+59'	153°	26°01'	+59'	153°	7
8	32°19'	+59'	152°	31°27'	+59'	152°	30°34'	+59'	152°	29°41'	+59'	152°	28°47'	+59'	153°	27°54'	+59'	153°	27°01'	+59'	153°	8
9	33°18'	+59'	151°	32°25'	+59'	152°	31°32'	+59'	152°	30°39'	+59'	152°	29°46'	+59'	152°	28°53'	+59'	153°	28°00'	+59'	153°	9
10	34°16'	+58'	151°	33°24'	+59'	151°	32°31'	+59'	152°	31°38'	+59'	152°	30°45'	+59'	152°	29°52'	+59'	152°	28°59'	+59'	153°	10
11	35°15'	+58'	151°	34°23'	+59'	151°	33°30'	+59'	151°	32°37'	+59'	152°	31°44'	+59'	152°	30°51'	+59'	152°	29°58'	+59'	153°	11
12	36°13'	+58'	150°	35°21'	+59'	151°	34°29'	+59'	151°	33°36'	+59'	151°	32°43'	+59'	152°	31°50'	+59'	152°	30°57'	+59'	152°	12
13	37°12'	+58'	150°	36°20'	+58'	151°	35°27'	+59'	151°	34°35'	+59'	151°	33°42'	+59'	152°	32°49'	+59'	152°	31°56'	+59'	152°	13
14	38°10'	+58'	150°	37°18'	+58'	150°	36°26'	+59'	151°	35°34'	+59'	151°	34°41'	+59'	151°	33°48'	+59'	152°	32°55'	+59'	152°	14
15	39°08'	+58'	150°	38°17'	+58'	150°	37°25'	+59'	150°	36°32'	+59'	151°	35°40'	+59'	151°	34°47'	+59'	151°	33°54'	+59'	152°	15
16	40°07'	+58'	149°	39°15'	+58'	150°	38°23'	+59'	150°	37°31'	+59'	150°	36°39'	+59'	151°	35°46'	+59'	151°	34°54'	+59'	152°	16
17	41°05'	+58'	149°	40°13'	+58'	149°	39°22'	+58'	150°	38°30'	+59'	150°	37°37'	+59'	151°	36°45'	+59'	151°	35°53'	+59'	151°	17
18	42°03'	+58'	149°	41°12'	+58'	149°	40°20'	+58'	150°	39°28'	+59'	150°	38°36'	+59'	150°	37°44'	+59'	151°	36°52'	+59'	151°	18
19	43°01'	+58'	148°	42°10'	+58'	149°	41°19'	+58'	149°	40°27'	+59'	150°	39°35'	+59'	150°	38°43'	+59'	150°	37°51'	+59'	151°	19
20	43°59'	+58'	148°	43°08'	+58'	148°	42°17'	+58'	149°	41°25'	+58'	149°	40°34'	+59'	150°	39°42'	+59'	150°	38°50'	+59'	151°	20
21	44°57'	+58'	148°	44°06'	+58'	148°	43°15'	+58'	149°	42°24'	+58'	149°	41°32'	+59'	150°	40°40'	+59'	150°	39°48'	+59'	150°	21
22	45°55'	+58'	147°	45°04'	+58'	148°	44°13'	+58'	148°	43°22'	+58'	149°	42°31'	+59'	149°	41°39'	+59'	150°	40°47'	+59'	150°	22
23	46°53'	+58'	147°	46°02'	+58'	147°	45°12'	+58'	148°	44°21'	+58'	148°	43°29'	+59'	149°	42°38'	+59'	149°	41°46'	+59'	150°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

24° 336° LHA — Latitude SAME as Declination — 24° 336° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

25° 335° LHA — Latitude SAME as Declination — 25° 335° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	24°18'	+59'	152°	23°25'	+59'	153°	22°31'	+59'	153°	21°38'	+59'	153°	20°44'	+59'	153°	19°51'	+59'	153°	18°57'	+59'	153°	0
1	25°16'	+59'	152°	24°23'	+59'	152°	23°30'	+59'	153°	22°37'	+59'	153°	21°43'	+59'	153°	20°50'	+59'	153°	19°56'	+59'	153°	1
2	26°15'	+59'	152°	25°22'	+59'	152°	24°29'	+59'	152°	23°36'	+59'	153°	22°42'	+59'	153°	21°49'	+59'	153°	20°56'	+59'	153°	2
3	27°14'	+59'	152°	26°21'	+59'	152°	25°28'	+59'	152°	24°35'	+59'	152°	23°41'	+59'	153°	22°48'	+59'	153°	21°55'	+59'	153°	3
4	28°12'	+59'	151°	27°19'	+59'	152°	26°27'	+59'	152°	25°34'	+59'	152°	24°41'	+59'	152°	23°47'	+59'	153°	22°54'	+59'	153°	4
5	29°11'	+59'	151°	28°18'	+59'	151°	27°25'	+59'	152°	26°32'	+59'	152°	25°39'	+59'	152°	24°46'	+59'	152°	23°53'	+59'	153°	5
6	30°09'	+58'	151°	29°17'	+59'	151°	28°24'	+59'	151°	27°31'	+59'	152°	26°38'	+59'	152°	25°45'	+59'	152°	24°52'	+59'	152°	6
7	31°08'	+58'	151°	30°15'	+59'	151°	29°23'	+59'	151°	28°30'	+59'	151°	27°37'	+59'	152°	26°45'	+59'	152°	25°51'	+59'	152°	7
8	32°06'	+58'	150°	31°14'	+59'	151°	30°22'	+59'	151°	29°29'	+59'	151°	28°36'	+59'	152°	27°44'	+59'	152°	26°51'	+59'	152°	8
9	33°05'	+58'	150°	32°13'	+59'	150°	31°20'	+59'	151°	30°28'	+59'	151°	29°35'	+59'	151°	28°43'	+59'	152°	27°50'	+59'	152°	9
10	34°03'	+58'	150°	33°11'	+58'	150°	32°19'	+59'	150°	31°27'	+59'	151°	30°34'	+59'	151°	29°42'	+59'	151°	28°49'	+59'	152°	10
11	35°01'	+58'	150°	34°10'	+58'	150°	33°18'	+59'	150°	32°25'	+59'	151°	31°33'	+59'	151°	30°41'	+59'	151°	29°48'	+59'	151°	11
12	36°00'	+58'	149°	35°08'	+58'	150°	34°16'	+59'	150°	33°24'	+59'	150°	32°32'	+59'	151°	31°40'	+59'	151°	30°47'	+59'	151°	12
13	36°58'	+58'	149°	36°06'	+58'	149°	35°15'	+59'	150°	34°23'	+59'	150°	33°31'	+59'	150°	32°38'	+59'	151°	31°46'	+59'	151°	13
14	37°56'	+58'	149°	37°05'	+58'	149°	36°13'	+58'	149°	35°21'	+59'	150°	34°30'	+59'	150°	33°37'	+59'	150°	32°45'	+59'	151°	14
15	38°54'	+58'	148°	38°03'	+58'	149°	37°12'	+58'	149°	36°20'	+59'	150°	35°28'	+59'	150°	34°36'	+59'	150°	33°44'	+59'	151°	15
16	39°52'	+58'	148°	39°01'	+58'	148°	38°10'	+58'	149°	37°19'	+59'	149°	36°27'	+59'	150°	35°35'	+59'	150°	34°43'	+59'	150°	16
17	40°51'	+58'	148°	40°00'	+58'	148°	39°09'	+58'	149°	38°17'	+59'	149°	37°26'	+59'	149°	36°34'	+59'	150°	35°42'	+59'	150°	17
18	41°49'	+58'	147°	40°58'	+58'	148°	40°07'	+58'	148°	39°16'	+58'	149°	38°24'	+59'	149°	37°33'	+59'	150°	36°41'	+59'	150°	18
19	42°47'	+58'	147°	41°56'	+58'	148°	41°05'	+58'	148°	40°14'	+58'	148°	39°23'	+59'	149°	38°32'	+59'	149°	37°40'	+59'	150°	19
20	43°44'	+58'	147°	42°54'	+58'	147°	42°04'	+58'	148°	41°13'	+58'	148°	40°22'	+59'	149°	39°30'	+59'	149°	38°39'	+59'	149°	20
21	44°42'	+58'	146°	43°52'	+58'	147°	43°02'	+58'	147°	42°11'	+58'	148°	41°20'	+59'	148°	40°29'	+59'	149°	39°38'	+59'	149°	21
22	45°40'	+58'	146°	44°50'	+58'	146°	44°00'	+58'	147°	43°09'	+58'	148°	42°19'	+58'	148°	41°28'	+59'	148°	40°36'	+59'	149°	22
23	46°38'	+58'	145°	45°48'	+58'	146°	44°58'	+58'	147°	44°08'	+58'	147°	43°17'	+58'	148°	42°26'	+59'	148°	41°35'	+59'	149°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

25° 335° LHA — Latitude SAME as Declination — 25° 335° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

26° 334° LHA — Latitude SAME as Declination — 26° 334° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	24°05'	+59'	151°	23°12'	+59'	152°	22°19'	+59'	152°	21°27'	+59'	152°	20°34'	+59'	152°	19°41'	+59'	152°	18°47'	+59'	152°	0
1	25°03'	+59'	151°	24°11'	+59'	151°	23°18'	+59'	151°	22°25'	+59'	152°	21°33'	+59'	152°	20°40'	+59'	152°	19°47'	+59'	152°	1
2	26°02'	+58'	151°	25°10'	+59'	151°	24°17'	+59'	151°	23°24'	+59'	151°	22°32'	+59'	152°	21°39'	+59'	152°	20°46'	+59'	152°	2
3	27°00'	+58'	151°	26°08'	+59'	151°	25°16'	+59'	151°	24°23'	+59'	151°	23°30'	+59'	151°	22°38'	+59'	152°	21°45'	+59'	152°	3
4	27°59'	+58'	150°	27°07'	+59'	151°	26°14'	+59'	151°	25°22'	+59'	151°	24°29'	+59'	151°	23°37'	+59'	151°	22°44'	+59'	152°	4
5	28°57'	+58'	150°	28°05'	+59'	150°	27°13'	+59'	151°	26°21'	+59'	151°	25°28'	+59'	151°	24°36'	+59'	151°	23°43'	+59'	152°	5
6	29°56'	+58'	150°	29°04'	+59'	150°	28°12'	+59'	150°	27°20'	+59'	151°	26°27'	+59'	151°	25°35'	+59'	151°	24°42'	+59'	151°	6
7	30°54'	+58'	150°	30°02'	+58'	150°	29°10'	+59'	150°	28°18'	+59'	150°	27°26'	+59'	151°	26°34'	+59'	151°	25°41'	+59'	151°	7
8	31°53'	+58'	149°	31°01'	+58'	150°	30°09'	+59'	150°	29°17'	+59'	150°	28°25'	+59'	150°	27°33'	+59'	151°	26°40'	+59'	151°	8
9	32°51'	+58'	149°	31°59'	+58'	149°	31°08'	+59'	150°	30°16'	+59'	150°	29°24'	+59'	150°	28°32'	+59'	150°	27°39'	+59'	151°	9
10	33°49'	+58'	149°	32°58'	+58'	149°	32°06'	+59'	149°	31°15'	+59'	150°	30°23'	+59'	150°	29°31'	+59'	150°	28°38'	+59'	151°	10
11	34°47'	+58'	148°	33°56'	+58'	149°	33°05'	+58'	149°	32°13'	+59'	149°	31°21'	+59'	150°	30°30'	+59'	150°	29°37'	+59'	150°	11
12	35°46'	+58'	148°	34°55'	+58'	148°	34°03'	+58'	149°	33°12'	+59'	149°	32°20'	+59'	150°	31°28'	+59'	150°	30°36'	+59'	150°	12
13	36°44'	+58'	148°	35°53'	+58'	148°	35°02'	+58'	149°	34°10'	+59'	149°	33°19'	+59'	149°	32°27'	+59'	150°	31°35'	+59'	150°	13
14	37°42'	+58'	147°	36°51'	+58'	148°	36°00'	+58'	148°	35°09'	+59'	149°	34°18'	+59'	149°	33°26'	+59'	149°	32°34'	+59'	150°	14
15	38°40'	+58'	147°	37°49'	+58'	148°	36°59'	+58'	148°	36°08'	+59'	148°	35°16'	+59'	149°	34°25'	+59'	149°	33°33'	+59'	149°	15
16	39°38'	+58'	147°	38°47'	+58'	147°	37°57'	+58'	148°	37°06'	+58'	148°	36°15'	+59'	148°	35°24'	+59'	149°	34°32'	+59'	149°	16
17	40°36'	+58'	146°	39°46'	+58'	147°	38°55'	+58'	147°	38°05'	+58'	148°	37°14'	+59'	148°	36°22'	+59'	149°	35°31'	+59'	149°	17
18	41°34'	+58'	146°	40°44'	+58'	147°	39°53'	+58'	147°	39°03'	+58'	148°	38°12'	+59'	148°	37°21'	+59'	148°	36°30'	+59'	149°	18
19	42°31'	+58'	146°	41°42'	+58'	146°	40°52'	+58'	147°	40°01'	+58'	147°	39°11'	+58'	148°	38°20'	+59'	148°	37°29'	+59'	149°	19
20	43°29'	+58'	145°	42°40'	+58'	146°	41°50'	+58'	146°	41°00'	+58'	147°	40°09'	+58'	147°	39°19'	+59'	148°	38°28'	+59'	148°	20
21	44°27'	+58'	145°	43°37'	+58'	146°	42°48'	+58'	146°	41°58'	+58'	147°	41°08'	+58'	147°	40°17'	+59'	148°	39°26'	+59'	148°	21
22	45°24'	+57'	145°	44°35'	+58'	145°	43°46'	+58'	146°	42°56'	+58'	146°	42°06'	+58'	147°	41°16'	+59'	147°	40°25'	+59'	148°	22
23	46°22'	+57'	144°	45°33'	+58'	145°	44°44'	+58'	145°	43°54'	+58'	146°	43°04'	+58'	146°	42°14'	+58'	147°	41°24'	+59'	147°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

26° 334° LHA — Latitude SAME as Declination — 26° 334° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

27° 333° LHA — Latitude SAME as Declination — 27° 333° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	23°52'	+58'	150°	22°59'	+59'	150°	22°07'	+59'	151°	21°15'	+59'	151°	20°22'	+59'	151°	19°30'	+59'	151°	18°37'	+59'	151°	0
1	24°50'	+58'	150°	23°58'	+59'	150°	23°06'	+59'	150°	22°14'	+59'	151°	21°21'	+59'	151°	20°29'	+59'	151°	19°36'	+59'	151°	1
2	25°48'	+58'	150°	24°57'	+59'	150°	24°05'	+59'	150°	23°12'	+59'	150°	22°20'	+59'	151°	21°28'	+59'	151°	20°35'	+59'	151°	2
3	26°47'	+58'	149°	25°55'	+59'	150°	25°03'	+59'	150°	24°11'	+59'	150°	23°19'	+59'	150°	22°27'	+59'	151°	21°35'	+59'	151°	3
4	27°45'	+58'	149°	26°54'	+58'	149°	26°02'	+59'	150°	25°10'	+59'	150°	24°18'	+59'	150°	23°26'	+59'	150°	22°34'	+59'	151°	4
5	28°44'	+58'	149°	27°52'	+58'	149°	27°00'	+59'	149°	26°09'	+59'	150°	25°17'	+59'	150°	24°25'	+59'	150°	23°33'	+59'	150°	5
6	29°42'	+58'	149°	28°51'	+58'	149°	27°59'	+59'	149°	27°07'	+59'	150°	26°16'	+59'	150°	25°24'	+59'	150°	24°32'	+59'	150°	6
7	30°40'	+58'	148°	29°49'	+58'	149°	28°58'	+59'	149°	28°06'	+59'	149°	27°14'	+59'	150°	26°23'	+59'	150°	25°31'	+59'	150°	7
8	31°38'	+58'	148°	30°47'	+58'	148°	29°56'	+58'	149°	29°05'	+59'	149°	28°13'	+59'	149°	27°22'	+59'	150°	26°30'	+59'	150°	8
9	32°37'	+58'	148°	31°46'	+58'	148°	30°55'	+58'	148°	30°03'	+59'	149°	29°12'	+59'	149°	28°20'	+59'	149°	27°29'	+59'	150°	9
10	33°35'	+58'	148°	32°44'	+58'	148°	31°53'	+58'	148°	31°02'	+59'	149°	30°11'	+59'	149°	29°19'	+59'	149°	28°28'	+59'	149°	10
11	34°33'	+58'	147°	33°42'	+58'	148°	32°52'	+58'	148°	32°01'	+59'	148°	31°09'	+59'	149°	30°18'	+59'	149°	29°27'	+59'	149°	11
12	35°31'	+58'	147°	34°41'	+58'	147°	33°50'	+58'	148°	32°59'	+59'	148°	32°08'	+59'	148°	31°17'	+59'	149°	30°26'	+59'	149°	12
13	36°29'	+58'	147°	35°39'	+58'	147°	34°48'	+58'	147°	33°58'	+58'	148°	33°07'	+59'	148°	32°16'	+59'	148°	31°25'	+59'	149°	13
14	37°27'	+58'	146°	36°37'	+58'	147°	35°47'	+58'	147°	34°56'	+58'	147°	34°05'	+59'	148°	33°14'	+59'	148°	32°23'	+59'	149°	14
15	38°25'	+58'	146°	37°35'	+58'	146°	36°45'	+58'	147°	35°55'	+58'	147°	35°04'	+59'	148°	34°13'	+59'	148°	33°22'	+59'	148°	15
16	39°23'	+58'	146°	38°33'	+58'	146°	37°43'	+58'	147°	36°53'	+58'	147°	36°03'	+59'	147°	35°12'	+59'	148°	34°21'	+59'	148°	16
17	40°20'	+58'	145°	39°31'	+58'	146°	38°41'	+58'	146°	37°51'	+58'	147°	37°01'	+58'	147°	36°11'	+59'	147°	35°20'	+59'	148°	17
18	41°18'	+58'	145°	40°29'	+58'	145°	39°39'	+58'	146°	38°50'	+58'	146°	38°00'	+58'	147°	37°09'	+59'	147°	36°19'	+59'	148°	18
19	42°16'	+58'	145°	41°27'	+58'	145°	40°37'	+58'	146°	39°48'	+58'	146°	38°58'	+58'	146°	38°08'	+59'	147°	37°17'	+59'	147°	19
20	43°13'	+58'	144°	42°25'	+58'	145°	41°36'	+58'	145°	40°46'	+58'	146°	39°56'	+58'	146°	39°06'	+59'	147°	38°16'	+59'	147°	20
21	44°11'	+57'	144°	43°22'	+58'	144°	42°33'	+58'	145°	41°44'	+58'	145°	40°55'	+58'	146°	40°05'	+58'	146°	39°15'	+59'	147°	21
22	45°08'	+57'	143°	44°20'	+58'	144°	43°31'	+58'	145°	42°42'	+58'	145°	41°53'	+58'	146°	41°03'	+58'	146°	40°13'	+59'	147°	22
23	46°06'	+57'	143°	45°18'	+58'	144°	44°29'	+58'	144°	43°40'	+58'	145°	42°51'	+58'	145°	42°02'	+58'	146°	41°12'	+59'	146°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

27° 333° LHA — Latitude SAME as Declination — 27° 333° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

28° 332° LHA — Latitude SAME as Declination — 28° 332° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	23°38'	+58'	149°	22°46'	+58'	149°	21°55'	+59'	150°	21°03'	+59'	150°	20°11'	+59'	150°	19°19'	+59'	150°	18°27'	+59'	150°	0
1	24°36'	+58'	149°	23°45'	+58'	149°	22°53'	+59'	149°	22°02'	+59'	150°	21°10'	+59'	150°	20°18'	+59'	150°	19°26'	+59'	150°	1
2	25°35'	+58'	149°	24°43'	+58'	149°	23°52'	+59'	149°	23°00'	+59'	149°	22°09'	+59'	150°	21°17'	+59'	150°	20°25'	+59'	150°	2
3	26°33'	+58'	148°	25°42'	+58'	149°	24°50'	+59'	149°	23°59'	+59'	149°	23°07'	+59'	149°	22°16'	+59'	150°	21°24'	+59'	150°	3
4	27°31'	+58'	148°	26°40'	+58'	148°	25°49'	+59'	149°	24°58'	+59'	149°	24°06'	+59'	149°	23°15'	+59'	149°	22°23'	+59'	150°	4
5	28°29'	+58'	148°	27°38'	+58'	148°	26°47'	+58'	148°	25°56'	+59'	149°	25°05'	+59'	149°	24°13'	+59'	149°	23°22'	+59'	149°	5
6	29°27'	+58'	148°	28°37'	+58'	148°	27°46'	+58'	148°	26°55'	+59'	148°	26°04'	+59'	149°	25°12'	+59'	149°	24°21'	+59'	149°	6
7	30°26'	+58'	147°	29°35'	+58'	148°	28°44'	+58'	148°	27°53'	+59'	148°	27°02'	+59'	148°	26°11'	+59'	149°	25°20'	+59'	149°	7
8	31°24'	+58'	147°	30°33'	+58'	147°	29°43'	+58'	148°	28°52'	+59'	148°	28°01'	+59'	148°	27°10'	+59'	148°	26°19'	+59'	149°	8
9	32°22'	+58'	147°	31°32'	+58'	147°	30°41'	+58'	147°	29°51'	+59'	148°	29°00'	+59'	148°	28°09'	+59'	148°	27°18'	+59'	149°	9
10	33°20'	+58'	146°	32°30'	+58'	147°	31°40'	+58'	147°	30°49'	+58'	147°	29°58'	+59'	148°	29°08'	+59'	148°	28°17'	+59'	148°	10
11	34°18'	+58'	146°	33°28'	+58'	146°	32°38'	+58'	147°	31°48'	+58'	147°	30°57'	+59'	147°	30°06'	+59'	148°	29°15'	+59'	148°	11
12	35°16'	+58'	146°	34°26'	+58'	146°	33°36'	+58'	147°	32°46'	+58'	147°	31°56'	+59'	147°	31°05'	+59'	148°	30°14'	+59'	148°	12
13	36°14'	+58'	145°	35°24'	+58'	146°	34°34'	+58'	146°	33°44'	+58'	147°	32°54'	+59'	147°	32°04'	+59'	147°	31°13'	+59'	148°	13
14	37°12'	+58'	145°	36°22'	+58'	146°	35°33'	+58'	146°	34°43'	+58'	146°	33°53'	+58'	147°	33°02'	+59'	147°	32°12'	+59'	147°	14
15	38°09'	+58'	145°	37°20'	+58'	145°	36°31'	+58'	146°	35°41'	+58'	146°	34°51'	+58'	146°	34°01'	+59'	147°	33°11'	+59'	147°	15
16	39°07'	+58'	144°	38°18'	+58'	145°	37°29'	+58'	145°	36°39'	+58'	146°	35°50'	+58'	146°	35°00'	+59'	147°	34°10'	+59'	147°	16
17	40°05'	+58'	144°	39°16'	+58'	145°	38°27'	+58'	145°	37°38'	+58'	145°	36°48'	+58'	146°	35°58'	+59'	146°	35°08'	+59'	147°	17
18	41°02'	+58'	144°	40°14'	+58'	144°	39°25'	+58'	145°	38°36'	+58'	145°	37°46'	+58'	146°	36°57'	+59'	146°	36°07'	+59'	146°	18
19	42°00'	+57'	143°	41°12'	+58'	144°	40°23'	+58'	144°	39°34'	+58'	145°	38°45'	+58'	145°	37°55'	+58'	146°	37°06'	+59'	146°	19
20	42°57'	+57'	143°	42°09'	+58'	143°	41°21'	+58'	144°	40°32'	+58'	145°	39°43'	+58'	145°	38°54'	+58'	145°	38°04'	+59'	146°	20
21	43°55'	+57'	143°	43°07'	+58'	143°	42°19'	+58'	144°	41°30'	+58'	144°	40°41'	+58'	145°	39°52'	+58'	145°	39°03'	+59'	146°	21
22	44°52'	+57'	142°	44°04'	+57'	143°	43°16'	+58'	143°	42°28'	+58'	144°	41°40'	+58'	144°	40°51'	+58'	145°	40°01'	+59'	145°	22
23	45°49'	+57'	142°	45°02'	+57'	142°	44°14'	+58'	143°	43°26'	+58'	143°	42°38'	+58'	144°	41°49'	+58'	145°	41°00'	+58'	145°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

28° 332° LHA — Latitude SAME as Declination — 28° 332° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

29° 331° LHA — Latitude SAME as Declination — 29° 331° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	23°24'	+58'	148°	22°33'	+58'	148°	21°42'	+59'	149°	20°50'	+59'	149°	19°59'	+59'	149°	19°08'	+59'	149°	18°16'	+59'	149°	0
1	24°22'	+58'	148°	23°31'	+58'	148°	22°40'	+58'	148°	21°49'	+59'	149°	20°58'	+59'	149°	20°06'	+59'	149°	19°15'	+59'	149°	1
2	25°20'	+58'	148°	24°29'	+58'	148°	23°39'	+58'	148°	22°48'	+59'	148°	21°56'	+59'	149°	21°05'	+59'	149°	20°14'	+59'	149°	2
3	26°18'	+58'	147°	25°28'	+58'	148°	24°37'	+58'	148°	23°46'	+59'	148°	22°55'	+59'	148°	22°04'	+59'	149°	21°13'	+59'	149°	3
4	27°16'	+58'	147°	26°26'	+58'	147°	25°35'	+58'	148°	24°45'	+59'	148°	23°54'	+59'	148°	23°03'	+59'	148°	22°12'	+59'	149°	4
5	28°15'	+58'	147°	27°24'	+58'	147°	26°34'	+58'	147°	25°43'	+59'	148°	24°53'	+59'	148°	24°02'	+59'	148°	23°11'	+59'	148°	5
6	29°13'	+58'	146°	28°23'	+58'	147°	27°32'	+58'	147°	26°42'	+59'	147°	25°51'	+59'	148°	25°01'	+59'	148°	24°10'	+59'	148°	6
7	30°11'	+58'	146°	29°21'	+58'	146°	28°31'	+58'	147°	27°40'	+58'	147°	26°50'	+59'	147°	25°59'	+59'	148°	25°09'	+59'	148°	7
8	31°09'	+58'	146°	30°19'	+58'	146°	29°29'	+58'	147°	28°39'	+58'	147°	27°49'	+59'	147°	26°58'	+59'	147°	26°07'	+59'	148°	8
9	32°07'	+58'	146°	31°17'	+58'	146°	30°27'	+58'	146°	29°37'	+58'	147°	28°47'	+59'	147°	27°57'	+59'	147°	27°06'	+59'	147°	9
10	33°05'	+58'	145°	32°15'	+58'	146°	31°26'	+58'	146°	30°36'	+58'	146°	29°46'	+59'	147°	28°56'	+59'	147°	28°05'	+59'	147°	10
11	34°02'	+58'	145°	33°13'	+58'	145°	32°24'	+58'	146°	31°34'	+58'	146°	30°44'	+59'	146°	29°54'	+59'	147°	29°04'	+59'	147°	11
12	35°00'	+58'	145°	34°11'	+58'	145°	33°22'	+58'	145°	32°32'	+58'	146°	31°43'	+58'	146°	30°53'	+59'	146°	30°03'	+59'	147°	12
13	35°58'	+58'	144°	35°09'	+58'	145°	34°20'	+58'	145°	33°31'	+58'	145°	32°41'	+58'	146°	31°51'	+59'	146°	31°02'	+59'	147°	13
14	36°56'	+58'	144°	36°07'	+58'	144°	35°18'	+58'	145°	34°29'	+58'	145°	33°40'	+58'	146°	32°50'	+59'	146°	32°00'	+59'	146°	14
15	37°53'	+58'	144°	37°05'	+58'	144°	36°16'	+58'	144°	35°27'	+58'	145°	34°38'	+58'	145°	33°49'	+59'	146°	32°59'	+59'	146°	15
16	38°51'	+58'	143°	38°03'	+58'	144°	37°14'	+58'	144°	36°25'	+58'	145°	35°36'	+58'	145°	34°47'	+58'	145°	33°58'	+59'	146°	16
17	39°49'	+57'	143°	39°01'	+58'	143°	38°12'	+58'	144°	37°24'	+58'	144°	36°35'	+58'	145°	35°46'	+58'	145°	34°56'	+59'	146°	17
18	40°46'	+57'	142°	39°58'	+58'	143°	39°10'	+58'	144°	38°22'	+58'	144°	37°33'	+58'	144°	36°44'	+58'	145°	35°55'	+59'	145°	18
19	41°43'	+57'	142°	40°56'	+58'	143°	40°08'	+58'	143°	39°20'	+58'	144°	38°31'	+58'	144°	37°43'	+58'	145°	36°53'	+59'	145°	19
20	42°41'	+57'	142°	41°53'	+57'	142°	41°06'	+58'	143°	40°18'	+58'	143°	39°29'	+58'	144°	38°41'	+58'	144°	37°52'	+59'	145°	20
21	43°38'	+57'	141°	42°51'	+57'	142°	42°03'	+58'	142°	41°16'	+58'	143°	40°28'	+58'	143°	39°39'	+58'	144°	38°51'	+58'	144°	21
22	44°35'	+57'	141°	43°48'	+57'	141°	43°01'	+58'	142°	42°14'	+58'	143°	41°26'	+58'	143°	40°38'	+58'	144°	39°49'	+58'	144°	22
23	45°32'	+57'	140°	44°45'	+57'	141°	43°59'	+57'	142°	43°11'	+58'	142°	42°24'	+58'	143°	41°36'	+58'	143°	40°47'	+58'	144°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

29° 331° LHA — Latitude SAME as Declination — 29° 331° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

30° 330° LHA — Latitude SAME as Declination — 30° 330° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	23°09'	+58'	147°	22°19'	+58'	147°	21°28'	+58'	148°	20°37'	+59'	148°	19°47'	+59'	148°	18°56'	+59'	148°	18°05'	+59'	148°	0
1	24°07'	+58'	147°	23°17'	+58'	147°	22°27'	+58'	147°	21°36'	+59'	147°	20°45'	+59'	148°	19°55'	+59'	148°	19°04'	+59'	148°	1
2	25°05'	+58'	147°	24°15'	+58'	147°	23°25'	+58'	147°	22°35'	+59'	147°	21°44'	+59'	147°	20°53'	+59'	148°	20°03'	+59'	148°	2
3	26°03'	+58'	146°	25°13'	+58'	146°	24°23'	+58'	147°	23°33'	+58'	147°	22°43'	+59'	147°	21°52'	+59'	147°	21°02'	+59'	148°	3
4	27°01'	+58'	146°	26°12'	+58'	146°	25°22'	+58'	146°	24°32'	+58'	147°	23°41'	+59'	147°	22°51'	+59'	147°	22°00'	+59'	147°	4
5	27°59'	+58'	146°	27°10'	+58'	146°	26°20'	+58'	146°	25°30'	+58'	147°	24°40'	+59'	147°	23°50'	+59'	147°	22°59'	+59'	147°	5
6	28°57'	+58'	145°	28°08'	+58'	146°	27°18'	+58'	146°	26°28'	+58'	146°	25°39'	+59'	147°	24°48'	+59'	147°	23°58'	+59'	147°	6
7	29°55'	+58'	145°	29°06'	+58'	145°	28°17'	+58'	146°	27°27'	+58'	146°	26°37'	+59'	146°	25°47'	+59'	147°	24°57'	+59'	147°	7
8	30°53'	+58'	145°	30°04'	+58'	145°	29°15'	+58'	145°	28°25'	+58'	146°	27°36'	+59'	146°	26°46'	+59'	146°	25°56'	+59'	147°	8
9	31°51'	+58'	144°	31°02'	+58'	145°	30°13'	+58'	145°	29°24'	+58'	145°	28°34'	+58'	146°	27°44'	+59'	146°	26°55'	+59'	146°	9
10	32°49'	+58'	144°	32°00'	+58'	145°	31°11'	+58'	145°	30°22'	+58'	145°	29°33'	+58'	146°	28°43'	+59'	146°	27°53'	+59'	146°	10
11	33°47'	+58'	144°	32°58'	+58'	144°	32°09'	+58'	145°	31°20'	+58'	145°	30°31'	+58'	145°	29°42'	+59'	146°	28°52'	+59'	146°	11
12	34°44'	+58'	143°	33°56'	+58'	144°	33°07'	+58'	144°	32°19'	+58'	145°	31°29'	+58'	145°	30°40'	+59'	145°	29°51'	+59'	146°	12
13	35°42'	+58'	143°	34°54'	+58'	144°	34°05'	+58'	144°	33°17'	+58'	144°	32°28'	+58'	145°	31°39'	+59'	145°	30°49'	+59'	145°	13
14	36°40'	+58'	143°	35°52'	+58'	143°	35°03'	+58'	144°	34°15'	+58'	144°	33°26'	+58'	144°	32°37'	+58'	145°	31°48'	+59'	145°	14
15	37°37'	+57'	142°	36°49'	+58'	143°	36°01'	+58'	143°	35°13'	+58'	144°	34°25'	+58'	144°	33°36'	+58'	145°	32°47'	+59'	145°	15
16	38°34'	+57'	142°	37°47'	+58'	143°	36°59'	+58'	143°	36°11'	+58'	143°	35°23'	+58'	144°	34°34'	+58'	144°	33°45'	+59'	145°	16
17	39°32'	+57'	142°	38°45'	+58'	142°	37°57'	+58'	143°	37°09'	+58'	143°	36°21'	+58'	144°	35°33'	+58'	144°	34°44'	+59'	144°	17
18	40°29'	+57'	141°	39°42'	+57'	142°	38°55'	+58'	142°	38°07'	+58'	143°	37°19'	+58'	143°	36°31'	+58'	144°	35°42'	+59'	144°	18
19	41°26'	+57'	141°	40°40'	+57'	141°	39°53'	+58'	142°	39°05'	+58'	142°	38°17'	+58'	143°	37°29'	+58'	143°	36°41'	+58'	144°	19
20	42°24'	+57'	140°	41°37'	+57'	141°	40°50'	+58'	142°	40°03'	+58'	142°	39°15'	+58'	143°	38°28'	+58'	143°	37°39'	+58'	144°	20
21	43°21'	+57'	140°	42°34'	+57'	141°	41°48'	+58'	141°	41°01'	+58'	142°	40°13'	+58'	142°	39°26'	+58'	143°	38°38'	+58'	143°	21
22	44°18'	+57'	140°	43°32'	+57'	140°	42°45'	+57'	141°	41°59'	+58'	141°	41°11'	+58'	142°	40°24'	+58'	143°	39°36'	+58'	143°	22
23	45°14'	+57'	139°	44°29'	+57'	140°	43°43'	+57'	140°	42°56'	+58'	141°	42°09'	+58'	142°	41°22'	+58'	142°	40°35'	+58'	143°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

30° 330° LHA — Latitude SAME as Declination — 30° 330° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

31° 329° LHA — Latitude SAME as Declination — 31° 329° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	22°54'	+58'	146°	22°04'	+58'	146°	21°14'	+58'	146°	20°24'	+58'	147°	19°34'	+59'	147°	18°44'	+59'	147°	17°53'	+59'	147°	0
1	23°52'	+58'	146°	23°02'	+58'	146°	22°13'	+58'	146°	21°23'	+58'	146°	20°33'	+59'	147°	19°43'	+59'	147°	18°52'	+59'	147°	1
2	24°50'	+58'	145°	24°01'	+58'	146°	23°11'	+58'	146°	22°21'	+58'	146°	21°31'	+59'	146°	20°41'	+59'	147°	19°51'	+59'	147°	2
3	25°48'	+58'	145°	24°59'	+58'	145°	24°09'	+58'	146°	23°20'	+58'	146°	22°30'	+59'	146°	21°40'	+59'	146°	20°50'	+59'	147°	3
4	26°46'	+58'	145°	25°57'	+58'	145°	25°07'	+58'	145°	24°18'	+58'	146°	23°28'	+59'	146°	22°39'	+59'	146°	21°49'	+59'	146°	4
5	27°44'	+58'	145°	26°55'	+58'	145°	26°06'	+58'	145°	25°16'	+58'	145°	24°27'	+59'	146°	23°37'	+59'	146°	22°47'	+59'	146°	5
6	28°42'	+58'	144°	27°53'	+58'	145°	27°04'	+58'	145°	26°15'	+58'	145°	25°25'	+58'	145°	24°36'	+59'	146°	23°46'	+59'	146°	6
7	29°40'	+58'	144°	28°51'	+58'	144°	28°02'	+58'	145°	27°13'	+58'	145°	26°24'	+58'	145°	25°35'	+59'	145°	24°45'	+59'	146°	7
8	30°37'	+58'	144°	29°49'	+58'	144°	29°00'	+58'	144°	28°11'	+58'	145°	27°22'	+58'	145°	26°33'	+59'	145°	25°44'	+59'	146°	8
9	31°35'	+58'	143°	30°47'	+58'	144°	29°58'	+58'	144°	29°10'	+58'	144°	28°21'	+58'	145°	27°32'	+59'	145°	26°42'	+59'	145°	9
10	32°33'	+58'	143°	31°45'	+58'	143°	30°56'	+58'	144°	30°08'	+58'	144°	29°19'	+58'	144°	28°30'	+59'	145°	27°41'	+59'	145°	10
11	33°30'	+58'	143°	32°42'	+58'	143°	31°54'	+58'	143°	31°06'	+58'	144°	30°18'	+58'	144°	29°29'	+58'	144°	28°40'	+59'	145°	11
12	34°28'	+58'	142°	33°40'	+58'	143°	32°52'	+58'	143°	32°04'	+58'	144°	31°16'	+58'	144°	30°27'	+58'	144°	29°38'	+59'	145°	12
13	35°25'	+57'	142°	34°38'	+58'	142°	33°50'	+58'	143°	33°02'	+58'	143°	32°14'	+58'	144°	31°26'	+58'	144°	30°37'	+59'	144°	13
14	36°23'	+57'	142°	35°36'	+58'	142°	34°48'	+58'	143°	34°00'	+58'	143°	33°12'	+58'	143°	32°24'	+58'	144°	31°36'	+59'	144°	14
15	37°20'	+57'	141°	36°33'	+58'	142°	35°46'	+58'	142°	34°58'	+58'	143°	34°11'	+58'	143°	33°23'	+58'	143°	32°34'	+59'	144°	15
16	38°18'	+57'	141°	37°31'	+57'	141°	36°44'	+58'	142°	35°56'	+58'	142°	35°09'	+58'	143°	34°21'	+58'	143°	33°33'	+58'	144°	16
17	39°15'	+57'	141°	38°28'	+57'	141°	37°41'	+58'	142°	36°54'	+58'	142°	36°07'	+58'	142°	35°19'	+58'	143°	34°31'	+58'	143°	17
18	40°12'	+57'	140°	39°26'	+57'	141°	38°39'	+58'	141°	37°52'	+58'	142°	37°05'	+58'	142°	36°18'	+58'	143°	35°30'	+58'	143°	18
19	41°09'	+57'	140°	40°23'	+57'	140°	39°37'	+58'	141°	38°50'	+58'	141°	38°03'	+58'	142°	37°16'	+58'	142°	36°28'	+58'	143°	19
20	42°06'	+57'	139°	41°20'	+57'	140°	40°34'	+57'	140°	39°48'	+58'	141°	39°01'	+58'	141°	38°14'	+58'	142°	37°27'	+58'	142°	20
21	43°03'	+57'	139°	42°17'	+57'	139°	41°32'	+57'	140°	40°46'	+58'	141°	39°59'	+58'	141°	39°12'	+58'	142°	38°25'	+58'	142°	21
22	44°00'	+57'	138°	43°15'	+57'	139°	42°29'	+57'	140°	41°43'	+58'	140°	40°57'	+58'	141°	40°10'	+58'	141°	39°23'	+58'	142°	22
23	44°56'	+57'	138°	44°12'	+57'	139°	43°26'	+57'	139°	42°41'	+57'	140°	41°55'	+58'	140°	41°08'	+58'	141°	40°21'	+58'	142°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

31° 329° LHA — Latitude SAME as Declination — 31° 329° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

32° 328° LHA — Latitude SAME as Declination — 32° 328° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	22°39'	+58'	145°	21°49'	+58'	145°	21°00'	+58'	145°	20°11'	+58'	146°	19°21'	+59'	146°	18°31'	+59'	146°	17°42'	+59'	146°	0
1	23°37'	+58'	145°	22°48'	+58'	145°	21°58'	+58'	145°	21°09'	+58'	145°	20°20'	+59'	146°	19°30'	+59'	146°	18°40'	+59'	146°	1
2	24°34'	+58'	144°	23°46'	+58'	145°	22°57'	+58'	145°	22°07'	+58'	145°	21°18'	+58'	145°	20°29'	+59'	146°	19°39'	+59'	146°	2
3	25°32'	+58'	144°	24°44'	+58'	144°	23°55'	+58'	145°	23°06'	+58'	145°	22°17'	+58'	145°	21°27'	+59'	145°	20°38'	+59'	146°	3
4	26°30'	+58'	144°	25°42'	+58'	144°	24°53'	+58'	144°	24°04'	+58'	145°	23°15'	+58'	145°	22°26'	+59'	145°	21°37'	+59'	145°	4
5	27°28'	+58'	143°	26°40'	+58'	144°	25°51'	+58'	144°	25°02'	+58'	144°	24°14'	+58'	145°	23°25'	+59'	145°	22°35'	+59'	145°	5
6	28°26'	+58'	143°	27°37'	+58'	144°	26°49'	+58'	144°	26°01'	+58'	144°	25°12'	+58'	144°	24°23'	+59'	145°	23°34'	+59'	145°	6
7	29°23'	+58'	143°	28°35'	+58'	143°	27°47'	+58'	144°	26°59'	+58'	144°	26°10'	+58'	144°	25°22'	+59'	144°	24°33'	+59'	145°	7
8	30°21'	+58'	143°	29°33'	+58'	143°	28°45'	+58'	143°	27°57'	+58'	144°	27°09'	+58'	144°	26°20'	+58'	144°	25°31'	+59'	144°	8
9	31°19'	+58'	142°	30°31'	+58'	143°	29°43'	+58'	143°	28°55'	+58'	143°	28°07'	+58'	144°	27°19'	+58'	144°	26°30'	+59'	144°	9
10	32°16'	+57'	142°	31°29'	+58'	142°	30°41'	+58'	143°	29°53'	+58'	143°	29°05'	+58'	143°	28°17'	+58'	144°	27°29'	+59'	144°	10
11	33°14'	+57'	142°	32°26'	+58'	142°	31°39'	+58'	142°	30°51'	+58'	143°	30°04'	+58'	143°	29°16'	+58'	143°	28°27'	+59'	144°	11
12	34°11'	+57'	141°	33°24'	+58'	142°	32°37'	+58'	142°	31°50'	+58'	142°	31°02'	+58'	143°	30°14'	+58'	143°	29°26'	+59'	143°	12
13	35°08'	+57'	141°	34°22'	+58'	141°	33°35'	+58'	142°	32°48'	+58'	142°	32°00'	+58'	142°	31°12'	+58'	143°	30°24'	+59'	143°	13
14	36°06'	+57'	140°	35°19'	+57'	141°	34°33'	+58'	141°	33°46'	+58'	142°	32°58'	+58'	142°	32°11'	+58'	143°	31°23'	+58'	143°	14
15	37°03'	+57'	140°	36°17'	+57'	141°	35°30'	+58'	141°	34°43'	+58'	141°	33°56'	+58'	142°	33°09'	+58'	142°	32°21'	+58'	143°	15
16	38°00'	+57'	140°	37°14'	+57'	140°	36°28'	+58'	141°	35°41'	+58'	141°	34°54'	+58'	142°	34°07'	+58'	142°	33°20'	+58'	142°	16
17	38°57'	+57'	139°	38°12'	+57'	140°	37°25'	+58'	140°	36°39'	+58'	141°	35°52'	+58'	141°	35°05'	+58'	142°	34°18'	+58'	142°	17
18	39°54'	+57'	139°	39°09'	+57'	139°	38°23'	+57'	140°	37°37'	+58'	140°	36°50'	+58'	141°	36°04'	+58'	141°	35°17'	+58'	142°	18
19	40°51'	+57'	139°	40°06'	+57'	139°	39°20'	+57'	140°	38°35'	+58'	140°	37°48'	+58'	141°	37°02'	+58'	141°	36°15'	+58'	142°	19
20	41°48'	+57'	138°	41°03'	+57'	139°	40°18'	+57'	139°	39°32'	+58'	140°	38°46'	+58'	140°	38°00'	+58'	141°	37°13'	+58'	141°	20
21	42°45'	+57'	138°	42°00'	+57'	138°	41°15'	+57'	139°	40°30'	+58'	139°	39°44'	+58'	140°	38°58'	+58'	140°	38°11'	+58'	141°	21
22	43°41'	+57'	137°	42°57'	+57'	138°	42°12'	+57'	138°	41°27'	+57'	139°	40°42'	+58'	140°	39°56'	+58'	140°	39°10'	+58'	141°	22
23	44°38'	+56'	137°	43°54'	+57'	137°	43°10'	+57'	138°	42°25'	+57'	139°	41°40'	+58'	139°	40°54'	+58'	140°	40°08'	+58'	140°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

32° 328° LHA — Latitude SAME as Declination — 32° 328° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

33° 327° LHA — Latitude SAME as Declination — 33° 327° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	22°23'	+58'	144°	21°34'	+58'	144°	20°46'	+58'	144°	19°57'	+58'	145°	19°08'	+58'	145°	18°19'	+59'	145°	17°29'	+59'	145°	0
1	23°21'	+58'	144°	22°32'	+58'	144°	21°44'	+58'	144°	20°55'	+58'	144°	20°06'	+58'	145°	19°17'	+59'	145°	18°28'	+59'	145°	1
2	24°18'	+58'	143°	23°30'	+58'	144°	22°42'	+58'	144°	21°53'	+58'	144°	21°05'	+58'	144°	20°16'	+59'	145°	19°27'	+59'	145°	2
3	25°16'	+58'	143°	24°28'	+58'	143°	23°40'	+58'	144°	22°52'	+58'	144°	22°03'	+58'	144°	21°14'	+59'	144°	20°26'	+59'	145°	3
4	26°14'	+58'	143°	25°26'	+58'	143°	24°38'	+58'	143°	23°50'	+58'	144°	23°01'	+58'	144°	22°13'	+59'	144°	21°24'	+59'	144°	4
5	27°11'	+58'	142°	26°24'	+58'	143°	25°36'	+58'	143°	24°48'	+58'	143°	24°00'	+58'	144°	23°11'	+58'	144°	22°23'	+59'	144°	5
6	28°09'	+58'	142°	27°22'	+58'	142°	26°34'	+58'	143°	25°46'	+58'	143°	24°58'	+58'	143°	24°10'	+58'	144°	23°22'	+59'	144°	6
7	29°07'	+58'	142°	28°19'	+58'	142°	27°32'	+58'	142°	26°44'	+58'	143°	25°56'	+58'	143°	25°08'	+58'	143°	24°20'	+59'	144°	7
8	30°04'	+57'	141°	29°17'	+58'	142°	28°30'	+58'	142°	27°42'	+58'	142°	26°55'	+58'	143°	26°07'	+58'	143°	25°19'	+59'	143°	8
9	31°02'	+57'	141°	30°15'	+58'	141°	29°28'	+58'	142°	28°40'	+58'	142°	27°53'	+58'	143°	27°05'	+58'	143°	26°17'	+59'	143°	9
10	31°59'	+57'	141°	31°12'	+58'	141°	30°26'	+58'	142°	29°38'	+58'	142°	28°51'	+58'	142°	28°04'	+58'	143°	27°16'	+59'	143°	10
11	32°56'	+57'	140°	32°10'	+58'	141°	31°23'	+58'	141°	30°36'	+58'	142°	29°49'	+58'	142°	29°02'	+58'	142°	28°14'	+58'	143°	11
12	33°54'	+57'	140°	33°08'	+57'	140°	32°21'	+58'	141°	31°34'	+58'	141°	30°47'	+58'	142°	30°00'	+58'	142°	29°13'	+58'	142°	12
13	34°51'	+57'	140°	34°05'	+57'	140°	33°19'	+58'	141°	32°32'	+58'	141°	31°46'	+58'	141°	30°59'	+58'	142°	30°11'	+58'	142°	13
14	35°48'	+57'	139°	35°02'	+57'	140°	34°16'	+58'	140°	33°30'	+58'	141°	32°44'	+58'	141°	31°57'	+58'	141°	31°10'	+58'	142°	14
15	36°45'	+57'	139°	36°00'	+57'	139°	35°14'	+58'	140°	34°28'	+58'	140°	33°42'	+58'	141°	32°55'	+58'	141°	32°08'	+58'	142°	15
16	37°42'	+57'	139°	36°57'	+57'	139°	36°12'	+57'	140°	35°26'	+58'	140°	34°40'	+58'	140°	33°53'	+58'	141°	33°07'	+58'	141°	16
17	38°39'	+57'	138°	37°54'	+57'	139°	37°09'	+57'	139°	36°24'	+58'	140°	35°38'	+58'	140°	34°51'	+58'	141°	34°05'	+58'	141°	17
18	39°36'	+57'	138°	38°52'	+57'	138°	38°07'	+57'	139°	37°21'	+58'	139°	36°35'	+58'	140°	35°49'	+58'	140°	35°03'	+58'	141°	18
19	40°33'	+57'	137°	39°49'	+57'	138°	39°04'	+57'	138°	38°19'	+58'	139°	37°33'	+58'	139°	36°48'	+58'	140°	36°01'	+58'	140°	19
20	41°30'	+57'	137°	40°46'	+57'	137°	40°01'	+57'	138°	39°16'	+57'	139°	38°31'	+58'	139°	37°46'	+58'	140°	37°00'	+58'	140°	20
21	42°26'	+56'	136°	41°42'	+57'	137°	40°58'	+57'	138°	40°14'	+57'	138°	39°29'	+58'	139°	38°43'	+58'	139°	37°58'	+58'	140°	21
22	43°23'	+56'	136°	42°39'	+57'	137°	41°55'	+57'	137°	41°11'	+57'	138°	40°26'	+58'	138°	39°41'	+58'	139°	38°56'	+58'	140°	22
23	44°19'	+56'	136°	43°36'	+57'	136°	42°52'	+57'	137°	42°08'	+57'	137°	41°24'	+57'	138°	40°39'	+58'	139°	39°54'	+58'	139°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

33° 327° LHA — Latitude SAME as Declination — 33° 327° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

34° 326° LHA — Latitude SAME as Declination — 34° 326° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	22°07'	+58'	143°	21°19'	+58'	143°	20°31'	+58'	143°	19°42'	+58'	144°	18°54'	+58'	144°	18°06'	+59'	144°	17°17'	+59'	144°	0
1	23°04'	+58'	143°	22°17'	+58'	143°	21°29'	+58'	143°	20°41'	+58'	143°	19°52'	+58'	144°	19°04'	+58'	144°	18°16'	+59'	144°	1
2	24°02'	+58'	142°	23°14'	+58'	143°	22°27'	+58'	143°	21°39'	+58'	143°	20°51'	+58'	143°	20°03'	+58'	143°	19°14'	+59'	144°	2
3	25°00'	+58'	142°	24°12'	+58'	142°	23°25'	+58'	143°	22°37'	+58'	143°	21°49'	+58'	143°	21°01'	+58'	143°	20°13'	+59'	143°	3
4	25°57'	+58'	142°	25°10'	+58'	142°	24°23'	+58'	142°	23°35'	+58'	143°	22°47'	+58'	143°	22°00'	+58'	143°	21°12'	+59'	143°	4
5	26°55'	+57'	141°	26°08'	+58'	142°	25°21'	+58'	142°	24°33'	+58'	142°	23°46'	+58'	143°	22°58'	+58'	143°	22°10'	+59'	143°	5
6	27°52'	+57'	141°	27°05'	+58'	141°	26°18'	+58'	142°	25°31'	+58'	142°	24°44'	+58'	142°	23°56'	+58'	143°	23°09'	+59'	143°	6
7	28°50'	+57'	141°	28°03'	+58'	141°	27°16'	+58'	141°	26°29'	+58'	142°	25°42'	+58'	142°	24°55'	+58'	142°	24°07'	+59'	143°	7
8	29°47'	+57'	140°	29°01'	+58'	141°	28°14'	+58'	141°	27°27'	+58'	141°	26°40'	+58'	142°	25°53'	+58'	142°	25°06'	+59'	142°	8
9	30°44'	+57'	140°	29°58'	+58'	140°	29°12'	+58'	141°	28°25'	+58'	141°	27°39'	+58'	141°	26°51'	+58'	142°	26°04'	+58'	142°	9
10	31°42'	+57'	140°	30°56'	+57'	140°	30°10'	+58'	140°	29°23'	+58'	141°	28°37'	+58'	141°	27°50'	+58'	141°	27°03'	+58'	142°	10
11	32°39'	+57'	139°	31°53'	+57'	140°	31°07'	+58'	140°	30°21'	+58'	140°	29°35'	+58'	141°	28°48'	+58'	141°	28°01'	+58'	142°	11
12	33°36'	+57'	139°	32°51'	+57'	139°	32°05'	+58'	140°	31°19'	+58'	140°	30°33'	+58'	141°	29°46'	+58'	141°	29°00'	+58'	141°	12
13	34°33'	+57'	139°	33°48'	+57'	139°	33°03'	+58'	139°	32°17'	+58'	140°	31°31'	+58'	140°	30°45'	+58'	141°	29°58'	+58'	141°	13
14	35°30'	+57'	138°	34°45'	+57'	139°	34°00'	+57'	139°	33°15'	+58'	140°	32°29'	+58'	140°	31°43'	+58'	140°	30°56'	+58'	141°	14
15	36°27'	+57'	138°	35°43'	+57'	138°	34°58'	+57'	139°	34°12'	+58'	139°	33°27'	+58'	140°	32°41'	+58'	140°	31°55'	+58'	140°	15
16	37°24'	+57'	137°	36°40'	+57'	138°	35°55'	+57'	138°	35°10'	+58'	139°	34°25'	+58'	139°	33°39'	+58'	140°	32°53'	+58'	140°	16
17	38°21'	+57'	137°	37°37'	+57'	138°	36°52'	+57'	138°	36°08'	+58'	139°	35°22'	+58'	139°	34°37'	+58'	139°	33°51'	+58'	140°	17
18	39°18'	+57'	137°	38°34'	+57'	137°	37°50'	+57'	138°	37°05'	+57'	138°	36°20'	+58'	139°	35°35'	+58'	139°	34°49'	+58'	140°	18
19	40°14'	+57'	136°	39°31'	+57'	137°	38°47'	+57'	137°	38°03'	+57'	138°	37°18'	+58'	138°	36°33'	+58'	139°	35°48'	+58'	139°	19
20	41°11'	+56'	136°	40°28'	+57'	136°	39°44'	+57'	137°	39°00'	+57'	137°	38°16'	+58'	138°	37°31'	+58'	139°	36°46'	+58'	139°	20
21	42°07'	+56'	135°	41°24'	+57'	136°	40°41'	+57'	136°	39°57'	+57'	137°	39°13'	+58'	138°	38°29'	+58'	138°	37°44'	+58'	139°	21
22	43°04'	+56'	135°	42°21'	+57'	135°	41°38'	+57'	136°	40°55'	+57'	137°	40°11'	+57'	137°	39°26'	+58'	138°	38°42'	+58'	138°	22
23	44°00'	+56'	134°	43°18'	+56'	135°	42°35'	+57'	136°	41°52'	+57'	136°	41°08'	+57'	137°	40°24'	+58'	137°	39°40'	+58'	138°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

34° 326° LHA — Latitude SAME as Declination — 34° 326° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

35° 325° LHA — Latitude SAME as Declination — 35° 325° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	21°50'	+58'	142°	21°03'	+58'	142°	20°15'	+58'	142°	19°28'	+58'	143°	18°40'	+58'	143°	17°52'	+58'	143°	17°04'	+59'	143°	0
1	22°47'	+58'	142°	22°00'	+58'	142°	21°13'	+58'	142°	20°26'	+58'	142°	19°38'	+58'	142°	18°51'	+58'	143°	18°03'	+59'	143°	1
2	23°45'	+58'	141°	22°58'	+58'	141°	22°11'	+58'	142°	21°24'	+58'	142°	20°37'	+58'	142°	19°49'	+58'	142°	19°01'	+59'	143°	2
3	24°43'	+57'	141°	23°56'	+58'	141°	23°09'	+58'	141°	22°22'	+58'	142°	21°35'	+58'	142°	20°47'	+58'	142°	20°00'	+59'	142°	3
4	25°40'	+57'	141°	24°54'	+58'	141°	24°07'	+58'	141°	23°20'	+58'	141°	22°33'	+58'	142°	21°46'	+58'	142°	20°59'	+59'	142°	4
5	26°37'	+57'	140°	25°51'	+58'	141°	25°05'	+58'	141°	24°18'	+58'	141°	23°31'	+58'	141°	22°44'	+58'	142°	21°57'	+58'	142°	5
6	27°35'	+57'	140°	26°49'	+58'	140°	26°03'	+58'	141°	25°16'	+58'	141°	24°29'	+58'	141°	23°43'	+58'	141°	22°56'	+58'	142°	6
7	28°32'	+57'	140°	27°46'	+58'	140°	27°00'	+58'	140°	26°14'	+58'	141°	25°28'	+58'	141°	24°41'	+58'	141°	23°54'	+58'	141°	7
8	29°29'	+57'	139°	28°44'	+57'	140°	27°58'	+58'	140°	27°12'	+58'	140°	26°26'	+58'	141°	25°39'	+58'	141°	24°52'	+58'	141°	8
9	30°27'	+57'	139°	29°41'	+57'	139°	28°56'	+58'	140°	28°10'	+58'	140°	27°24'	+58'	140°	26°37'	+58'	141°	25°51'	+58'	141°	9
10	31°24'	+57'	139°	30°39'	+57'	139°	29°53'	+58'	139°	29°08'	+58'	140°	28°22'	+58'	140°	27°36'	+58'	140°	26°49'	+58'	141°	10
11	32°21'	+57'	138°	31°36'	+57'	139°	30°51'	+58'	139°	30°05'	+58'	139°	29°20'	+58'	140°	28°34'	+58'	140°	27°48'	+58'	140°	11
12	33°18'	+57'	138°	32°33'	+57'	138°	31°48'	+57'	139°	31°03'	+58'	139°	30°18'	+58'	139°	29°32'	+58'	140°	28°46'	+58'	140°	12
13	34°15'	+57'	137°	33°31'	+57'	138°	32°46'	+57'	138°	32°01'	+58'	139°	31°16'	+58'	139°	30°30'	+58'	140°	29°44'	+58'	140°	13
14	35°12'	+57'	137°	34°28'	+57'	138°	33°43'	+57'	138°	32°59'	+58'	138°	32°14'	+58'	139°	31°28'	+58'	139°	30°43'	+58'	140°	14
15	36°09'	+57'	137°	35°25'	+57'	137°	34°41'	+57'	138°	33°56'	+58'	138°	33°11'	+58'	139°	32°26'	+58'	139°	31°41'	+58'	139°	15
16	37°05'	+57'	136°	36°22'	+57'	137°	35°38'	+57'	137°	34°54'	+57'	138°	34°09'	+58'	138°	33°24'	+58'	139°	32°39'	+58'	139°	16
17	38°02'	+57'	136°	37°19'	+57'	136°	36°35'	+57'	137°	35°51'	+57'	137°	35°07'	+58'	138°	34°22'	+58'	138°	33°37'	+58'	139°	17
18	38°59'	+56'	135°	38°16'	+57'	136°	37°32'	+57'	137°	36°49'	+57'	137°	36°05'	+58'	138°	35°20'	+58'	138°	34°35'	+58'	138°	18
19	39°55'	+56'	135°	39°13'	+57'	136°	38°29'	+57'	136°	37°46'	+57'	137°	37°02'	+58'	137°	36°18'	+58'	138°	35°33'	+58'	138°	19
20	40°52'	+56'	135°	40°09'	+57'	135°	39°26'	+57'	136°	38°43'	+57'	136°	38°00'	+57'	137°	37°16'	+58'	137°	36°31'	+58'	138°	20
21	41°48'	+56'	134°	41°06'	+57'	135°	40°23'	+57'	135°	39°41'	+57'	136°	38°57'	+57'	136°	38°14'	+58'	137°	37°29'	+58'	138°	21
22	42°44'	+56'	134°	42°02'	+56'	134°	41°20'	+57'	135°	40°38'	+57'	136°	39°55'	+57'	136°	39°11'	+58'	137°	38°27'	+58'	137°	22
23	43°40'	+56'	133°	42°59'	+56'	134°	42°17'	+57'	134°	41°35'	+57'	135°	40°52'	+57'	136°	40°09'	+58'	136°	39°25'	+58'	137°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

35° 325° LHA — Latitude SAME as Declination — 35° 325° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

36° 324° LHA — Latitude SAME as Declination — 36° 324° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	21°33'	+57'	141°	20°46'	+58'	141°	20°00'	+58'	141°	19°13'	+58'	142°	18°26'	+58'	142°	17°39'	+58'	142°	16°51'	+59'	142°	0
1	22°30'	+57'	140°	21°44'	+58'	141°	20°57'	+58'	141°	20°11'	+58'	141°	19°24'	+58'	141°	18°37'	+58'	142°	17°50'	+59'	142°	1
2	23°28'	+57'	140°	22°42'	+58'	140°	21°55'	+58'	141°	21°09'	+58'	141°	20°22'	+58'	141°	19°35'	+58'	141°	18°48'	+58'	142°	2
3	24°25'	+57'	140°	23°39'	+58'	140°	22°53'	+58'	140°	22°07'	+58'	141°	21°20'	+58'	141°	20°34'	+58'	141°	19°47'	+58'	141°	3
4	25°23'	+57'	140°	24°37'	+58'	140°	23°51'	+58'	140°	23°05'	+58'	140°	22°18'	+58'	141°	21°32'	+58'	141°	20°45'	+58'	141°	4
5	26°20'	+57'	139°	25°34'	+57'	140°	24°49'	+58'	140°	24°03'	+58'	140°	23°16'	+58'	140°	22°30'	+58'	141°	21°44'	+58'	141°	5
6	27°17'	+57'	139°	26°32'	+57'	139°	25°46'	+58'	140°	25°00'	+58'	140°	24°15'	+58'	140°	23°28'	+58'	140°	22°42'	+58'	141°	6
7	28°14'	+57'	139°	27°29'	+57'	139°	26°44'	+58'	139°	25°58'	+58'	140°	25°13'	+58'	140°	24°27'	+58'	140°	23°40'	+58'	140°	7
8	29°11'	+57'	138°	28°27'	+57'	139°	27°41'	+58'	139°	26°56'	+58'	139°	26°11'	+58'	140°	25°25'	+58'	140°	24°39'	+58'	140°	8
9	30°09'	+57'	138°	29°24'	+57'	138°	28°39'	+58'	139°	27°54'	+58'	139°	27°09'	+58'	139°	26°23'	+58'	140°	25°37'	+58'	140°	9
10	31°06'	+57'	137°	30°21'	+57'	138°	29°37'	+57'	138°	28°52'	+58'	139°	28°07'	+58'	139°	27°21'	+58'	139°	26°36'	+58'	140°	10
11	32°03'	+57'	137°	31°18'	+57'	138°	30°34'	+57'	138°	29°49'	+58'	138°	29°04'	+58'	139°	28°19'	+58'	139°	27°34'	+58'	139°	11
12	32°59'	+57'	137°	32°16'	+57'	137°	31°31'	+57'	138°	30°47'	+58'	138°	30°02'	+58'	138°	29°17'	+58'	139°	28°32'	+58'	139°	12
13	33°56'	+57'	136°	33°13'	+57'	137°	32°29'	+57'	137°	31°45'	+58'	138°	31°00'	+58'	138°	30°15'	+58'	138°	29°30'	+58'	139°	13
14	34°53'	+57'	136°	34°10'	+57'	136°	33°26'	+57'	137°	32°42'	+57'	137°	31°58'	+58'	138°	31°13'	+58'	138°	30°29'	+58'	139°	14
15	35°50'	+57'	136°	35°07'	+57'	136°	34°23'	+57'	137°	33°40'	+57'	137°	32°56'	+58'	137°	32°11'	+58'	138°	31°27'	+58'	138°	15
16	36°46'	+57'	135°	36°04'	+57'	136°	35°21'	+57'	136°	34°37'	+57'	137°	33°53'	+58'	137°	33°09'	+58'	138°	32°25'	+58'	138°	16
17	37°43'	+56'	135°	37°01'	+57'	135°	36°18'	+57'	136°	35°35'	+57'	136°	34°51'	+58'	137°	34°07'	+58'	137°	33°23'	+58'	138°	17
18	38°39'	+56'	134°	37°57'	+57'	135°	37°15'	+57'	135°	36°32'	+57'	136°	35°49'	+58'	136°	35°05'	+58'	137°	34°21'	+58'	137°	18
19	39°36'	+56'	134°	38°54'	+57'	134°	38°12'	+57'	135°	37°29'	+57'	136°	36°46'	+57'	136°	36°03'	+58'	137°	35°19'	+58'	137°	19
20	40°32'	+56'	133°	39°50'	+56'	134°	39°09'	+57'	135°	38°26'	+57'	135°	37°44'	+57'	136°	37°00'	+58'	136°	36°17'	+58'	137°	20
21	41°28'	+56'	133°	40°47'	+56'	134°	40°05'	+57'	134°	39°23'	+57'	135°	38°41'	+57'	135°	37°58'	+58'	136°	37°15'	+58'	136°	21
22	42°24'	+56'	132°	41°43'	+56'	133°	41°02'	+57'	134°	40°20'	+57'	134°	39°38'	+57'	135°	38°56'	+58'	136°	38°13'	+58'	136°	22
23	43°20'	+56'	132°	42°40'	+56'	133°	41°59'	+56'	133°	41°17'	+57'	134°	40°35'	+57'	135°	39°53'	+57'	135°	39°10'	+58'	136°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

36° 324° LHA — Latitude SAME as Declination — 36° 324° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

37° 323° LHA — Latitude SAME as Declination — 37° 323° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	21°15'	+57'	140°	20°30'	+58'	140°	19°44'	+58'	140°	18°57'	+58'	140°	18°11'	+58'	141°	17°24'	+58'	141°	16°38'	+58'	141°	0
1	22°13'	+57'	139°	21°27'	+58'	140°	20°41'	+58'	140°	19°55'	+58'	140°	19°09'	+58'	140°	18°23'	+58'	141°	17°36'	+58'	141°	1
2	23°10'	+57'	139°	22°25'	+57'	139°	21°39'	+58'	140°	20°53'	+58'	140°	20°07'	+58'	140°	19°21'	+58'	140°	18°35'	+58'	141°	2
3	24°07'	+57'	139°	23°22'	+57'	139°	22°37'	+58'	139°	21°51'	+58'	140°	21°05'	+58'	140°	20°19'	+58'	140°	19°33'	+58'	140°	3
4	25°05'	+57'	138°	24°20'	+57'	139°	23°34'	+58'	139°	22°49'	+58'	139°	22°03'	+58'	140°	21°18'	+58'	140°	20°32'	+58'	140°	4
5	26°02'	+57'	138°	25°17'	+57'	138°	24°32'	+58'	139°	23°47'	+58'	139°	23°01'	+58'	139°	22°16'	+58'	140°	21°30'	+58'	140°	5
6	26°59'	+57'	138°	26°14'	+57'	138°	25°30'	+58'	138°	24°45'	+58'	139°	23°59'	+58'	139°	23°14'	+58'	139°	22°28'	+58'	140°	6
7	27°56'	+57'	137°	27°12'	+57'	138°	26°27'	+58'	138°	25°42'	+58'	138°	24°57'	+58'	139°	24°12'	+58'	139°	23°27'	+58'	139°	7
8	28°53'	+57'	137°	28°09'	+57'	137°	27°25'	+57'	138°	26°40'	+58'	138°	25°55'	+58'	139°	25°10'	+58'	139°	24°25'	+58'	139°	8
9	29°50'	+57'	137°	29°06'	+57'	137°	28°22'	+57'	138°	27°38'	+58'	138°	26°53'	+58'	138°	26°08'	+58'	139°	25°23'	+58'	139°	9
10	30°47'	+57'	136°	30°03'	+57'	137°	29°20'	+57'	137°	28°35'	+58'	138°	27°51'	+58'	138°	27°06'	+58'	138°	26°21'	+58'	139°	10
11	31°44'	+57'	136°	31°01'	+57'	136°	30°17'	+57'	137°	29°33'	+58'	137°	28°49'	+58'	138°	28°04'	+58'	138°	27°20'	+58'	138°	11
12	32°41'	+57'	136°	31°58'	+57'	136°	31°14'	+57'	136°	30°31'	+58'	137°	29°47'	+58'	137°	29°02'	+58'	138°	28°18'	+58'	138°	12
13	33°37'	+57'	135°	32°55'	+57'	136°	32°11'	+57'	136°	31°28'	+57'	137°	30°44'	+58'	137°	30°00'	+58'	137°	29°16'	+58'	138°	13
14	34°34'	+57'	135°	33°51'	+57'	135°	33°09'	+57'	136°	32°25'	+57'	136°	31°42'	+58'	137°	30°58'	+58'	137°	30°14'	+58'	137°	14
15	35°31'	+56'	134°	34°48'	+57'	135°	34°06'	+57'	135°	33°23'	+57'	136°	32°40'	+58'	136°	31°56'	+58'	137°	31°12'	+58'	137°	15
16	36°27'	+56'	134°	35°45'	+57'	135°	35°03'	+57'	135°	34°20'	+57'	136°	33°37'	+58'	136°	32°54'	+58'	136°	32°10'	+58'	137°	16
17	37°23'	+56'	134°	36°42'	+57'	134°	36°00'	+57'	135°	35°17'	+57'	135°	34°35'	+57'	136°	33°52'	+58'	136°	33°08'	+58'	137°	17
18	38°20'	+56'	133°	37°38'	+57'	134°	36°57'	+57'	134°	36°15'	+57'	135°	35°32'	+57'	135°	34°49'	+58'	136°	34°06'	+58'	136°	18
19	39°16'	+56'	133°	38°35'	+56'	133°	37°54'	+57'	134°	37°12'	+57'	134°	36°30'	+57'	135°	35°47'	+58'	135°	35°04'	+58'	136°	19
20	40°12'	+56'	132°	39°31'	+56'	133°	38°50'	+57'	133°	38°09'	+57'	134°	37°27'	+57'	135°	36°45'	+58'	135°	36°02'	+58'	136°	20
21	41°08'	+56'	132°	40°28'	+56'	132°	39°47'	+57'	133°	39°06'	+57'	134°	38°24'	+57'	134°	37°42'	+57'	135°	37°00'	+58'	135°	21
22	42°04'	+56'	131°	41°24'	+56'	132°	40°44'	+56'	133°	40°03'	+57'	133°	39°21'	+57'	134°	38°40'	+57'	134°	37°58'	+58'	135°	22
23	43°00'	+56'	131°	42°20'	+56'	131°	41°40'	+56'	132°	41°00'	+57'	133°	40°19'	+57'	133°	39°37'	+57'	134°	38°55'	+58'	135°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

37° 323° LHA — Latitude SAME as Declination — 37° 323° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

38° 322° LHA — Latitude SAME as Declination — 38° 322° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	20°58'	+57'	139°	20°13'	+57'	139°	19°27'	+58'	139°	18°42'	+58'	139°	17°56'	+58'	140°	17°10'	+58'	140°	16°24'	+58'	140°	0
1	21°55'	+57'	138°	21°10'	+57'	139°	20°25'	+58'	139°	19°39'	+58'	139°	18°54'	+58'	139°	18°08'	+58'	140°	17°23'	+58'	140°	1
2	22°52'	+57'	138°	22°07'	+57'	138°	21°22'	+58'	139°	20°37'	+58'	139°	19°52'	+58'	139°	19°07'	+58'	139°	18°21'	+58'	140°	2
3	23°49'	+57'	138°	23°05'	+57'	138°	22°20'	+58'	138°	21°35'	+58'	139°	20°50'	+58'	139°	20°05'	+58'	139°	19°19'	+58'	139°	3
4	24°46'	+57'	137°	24°02'	+57'	138°	23°18'	+58'	138°	22°33'	+58'	138°	21°48'	+58'	139°	21°03'	+58'	139°	20°18'	+58'	139°	4
5	25°43'	+57'	137°	24°59'	+57'	137°	24°15'	+57'	138°	23°31'	+58'	138°	22°46'	+58'	138°	22°01'	+58'	139°	21°16'	+58'	139°	5
6	26°40'	+57'	137°	25°57'	+57'	137°	25°13'	+57'	137°	24°28'	+58'	138°	23°44'	+58'	138°	22°59'	+58'	138°	22°14'	+58'	139°	6
7	27°37'	+57'	136°	26°54'	+57'	137°	26°10'	+57'	137°	25°26'	+58'	137°	24°42'	+58'	138°	23°57'	+58'	138°	23°12'	+58'	138°	7
8	28°34'	+57'	136°	27°51'	+57'	136°	27°07'	+57'	137°	26°24'	+58'	137°	25°40'	+58'	137°	24°55'	+58'	138°	24°11'	+58'	138°	8
9	29°31'	+57'	136°	28°48'	+57'	136°	28°05'	+57'	136°	27°21'	+58'	137°	26°37'	+58'	137°	25°53'	+58'	137°	25°09'	+58'	138°	9
10	30°28'	+57'	135°	29°45'	+57'	136°	29°02'	+57'	136°	28°19'	+57'	136°	27°35'	+58'	137°	26°51'	+58'	137°	26°07'	+58'	138°	10
11	31°25'	+57'	135°	30°42'	+57'	135°	29°59'	+57'	136°	29°16'	+57'	136°	28°33'	+58'	137°	27°49'	+58'	137°	27°05'	+58'	137°	11
12	32°21'	+57'	135°	31°39'	+57'	135°	30°57'	+57'	135°	30°14'	+57'	136°	29°31'	+58'	136°	28°47'	+58'	137°	28°03'	+58'	137°	12
13	33°18'	+57'	134°	32°36'	+57'	135°	31°54'	+57'	135°	31°11'	+57'	135°	30°28'	+58'	136°	29°45'	+58'	136°	29°01'	+58'	137°	13
14	34°14'	+56'	134°	33°33'	+57'	134°	32°51'	+57'	135°	32°08'	+57'	135°	31°26'	+58'	136°	30°43'	+58'	136°	29°59'	+58'	136°	14
15	35°11'	+56'	133°	34°30'	+57'	134°	33°48'	+57'	134°	33°06'	+57'	135°	32°23'	+57'	135°	31°41'	+58'	136°	30°57'	+58'	136°	15
16	36°07'	+56'	133°	35°26'	+57'	133°	34°45'	+57'	134°	34°03'	+57'	134°	33°21'	+57'	135°	32°38'	+58'	135°	31°55'	+58'	136°	16
17	37°03'	+56'	132°	36°23'	+56'	133°	35°42'	+57'	134°	35°00'	+57'	134°	34°18'	+57'	135°	33°36'	+58'	135°	32°53'	+58'	135°	17
18	38°00'	+56'	132°	37°19'	+56'	133°	36°38'	+57'	133°	35°57'	+57'	134°	35°16'	+57'	134°	34°34'	+58'	135°	33°51'	+58'	135°	18
19	38°56'	+56'	132°	38°16'	+56'	132°	37°35'	+57'	133°	36°54'	+57'	133°	36°13'	+57'	134°	35°31'	+58'	134°	34°49'	+58'	135°	19
20	39°52'	+56'	131°	39°12'	+56'	132°	38°32'	+57'	132°	37°51'	+57'	133°	37°10'	+57'	133°	36°29'	+57'	134°	35°47'	+58'	135°	20
21	40°47'	+56'	131°	40°08'	+56'	131°	39°28'	+56'	132°	38°48'	+57'	132°	38°07'	+57'	133°	37°26'	+57'	134°	36°44'	+58'	134°	21
22	41°43'	+56'	130°	41°04'	+56'	131°	40°25'	+56'	131°	39°45'	+57'	132°	39°04'	+57'	133°	38°23'	+57'	133°	37°42'	+58'	134°	22
23	42°39'	+55'	130°	42°00'	+56'	130°	41°21'	+56'	131°	40°41'	+57'	132°	40°01'	+57'	132°	39°21'	+57'	133°	38°40'	+58'	133°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

38° 322° LHA — Latitude SAME as Declination — 38° 322° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

39° 321° LHA — Latitude SAME as Declination — 39° 321° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	20°40'	+57'	138°	19°55'	+57'	138°	19°10'	+58'	138°	18°26'	+58'	138°	17°41'	+58'	139°	16°56'	+58'	139°	16°10'	+58'	139°	0
1	21°37'	+57'	137°	20°52'	+57'	138°	20°08'	+58'	138°	19°23'	+58'	138°	18°39'	+58'	138°	17°54'	+58'	139°	17°09'	+58'	139°	1
2	22°34'	+57'	137°	21°50'	+57'	137°	21°06'	+57'	138°	20°21'	+58'	138°	19°37'	+58'	138°	18°52'	+58'	138°	18°07'	+58'	139°	2
3	23°31'	+57'	137°	22°47'	+57'	137°	22°03'	+57'	137°	21°19'	+58'	138°	20°34'	+58'	138°	19°50'	+58'	138°	19°05'	+58'	138°	3
4	24°28'	+57'	136°	23°44'	+57'	137°	23°00'	+57'	137°	22°16'	+58'	137°	21°32'	+58'	138°	20°48'	+58'	138°	20°03'	+58'	138°	4
5	25°25'	+57'	136°	24°41'	+57'	136°	23°58'	+57'	137°	23°14'	+58'	137°	22°30'	+58'	137°	21°46'	+58'	138°	21°02'	+58'	138°	5
6	26°22'	+57'	136°	25°39'	+57'	136°	24°55'	+57'	136°	24°12'	+58'	137°	23°28'	+58'	137°	22°44'	+58'	137°	22°00'	+58'	138°	6
7	27°18'	+57'	135°	26°36'	+57'	136°	25°53'	+57'	136°	25°09'	+58'	136°	24°26'	+58'	137°	23°42'	+58'	137°	22°58'	+58'	137°	7
8	28°15'	+57'	135°	27°33'	+57'	135°	26°50'	+57'	136°	26°07'	+57'	136°	25°24'	+58'	136°	24°40'	+58'	137°	23°56'	+58'	137°	8
9	29°12'	+57'	135°	28°30'	+57'	135°	27°47'	+57'	135°	27°04'	+57'	136°	26°21'	+58'	136°	25°38'	+58'	136°	24°54'	+58'	137°	9
10	30°09'	+57'	134°	29°27'	+57'	135°	28°44'	+57'	135°	28°02'	+57'	135°	27°19'	+58'	136°	26°36'	+58'	136°	25°52'	+58'	136°	10
11	31°05'	+57'	134°	30°24'	+57'	134°	29°42'	+57'	135°	28°59'	+57'	135°	28°17'	+58'	135°	27°34'	+58'	136°	26°50'	+58'	136°	11
12	32°02'	+56'	133°	31°20'	+57'	134°	30°39'	+57'	134°	29°57'	+57'	135°	29°14'	+58'	135°	28°31'	+58'	136°	27°49'	+58'	136°	12
13	32°58'	+56'	133°	32°17'	+57'	134°	31°36'	+57'	134°	30°54'	+57'	134°	30°12'	+57'	135°	29°29'	+58'	135°	28°47'	+58'	136°	13
14	33°55'	+56'	133°	33°14'	+57'	133°	32°33'	+57'	134°	31°51'	+57'	134°	31°09'	+57'	134°	30°27'	+58'	135°	29°44'	+58'	135°	14
15	34°51'	+56'	132°	34°10'	+57'	133°	33°29'	+57'	133°	32°48'	+57'	134°	32°07'	+57'	134°	31°25'	+58'	135°	30°42'	+58'	135°	15
16	35°47'	+56'	132°	35°07'	+56'	132°	34°26'	+57'	133°	33°45'	+57'	133°	33°04'	+57'	134°	32°22'	+58'	134°	31°40'	+58'	135°	16
17	36°43'	+56'	131°	36°03'	+56'	132°	35°23'	+57'	132°	34°42'	+57'	133°	34°01'	+57'	133°	33°20'	+58'	134°	32°38'	+58'	134°	17
18	37°39'	+56'	131°	37°00'	+56'	131°	36°20'	+57'	132°	35°39'	+57'	133°	34°59'	+57'	133°	34°17'	+57'	134°	33°36'	+58'	134°	18
19	38°35'	+56'	130°	37°56'	+56'	131°	37°16'	+57'	132°	36°36'	+57'	132°	35°56'	+57'	133°	35°15'	+57'	133°	34°34'	+58'	134°	19
20	39°31'	+56'	130°	38°52'	+56'	131°	38°13'	+56'	131°	37°33'	+57'	132°	36°53'	+57'	132°	36°12'	+57'	133°	35°31'	+58'	133°	20
21	40°27'	+56'	129°	39°48'	+56'	130°	39°09'	+56'	131°	38°30'	+57'	131°	37°50'	+57'	132°	37°10'	+57'	133°	36°29'	+58'	133°	21
22	41°22'	+55'	129°	40°44'	+56'	130°	40°06'	+56'	130°	39°27'	+57'	131°	38°47'	+57'	132°	38°07'	+57'	132°	37°26'	+57'	133°	22
23	42°18'	+55'	128°	41°40'	+56'	129°	41°02'	+56'	130°	40°23'	+56'	130°	39°44'	+57'	131°	39°04'	+57'	132°	38°24'	+57'	132°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

39° 321° LHA — Latitude SAME as Declination — 39° 321° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

40° 320° LHA — Latitude SAME as Declination — 40° 320° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	20°21'	+57'	137°	19°37'	+57'	137°	18°53'	+57'	137°	18°09'	+58'	137°	17°25'	+58'	138°	16°41'	+58'	138°	15°56'	+58'	138°	0
1	21°18'	+57'	136°	20°35'	+57'	137°	19°51'	+57'	137°	19°07'	+58'	137°	18°23'	+58'	137°	17°39'	+58'	138°	16°54'	+58'	138°	1
2	22°15'	+57'	136°	21°32'	+57'	136°	20°48'	+57'	137°	20°05'	+58'	137°	19°21'	+58'	137°	18°37'	+58'	137°	17°52'	+58'	138°	2
3	23°12'	+57'	136°	22°29'	+57'	136°	21°46'	+57'	136°	21°02'	+58'	137°	20°19'	+58'	137°	19°35'	+58'	137°	18°51'	+58'	137°	3
4	24°09'	+57'	135°	23°26'	+57'	136°	22°43'	+57'	136°	22°00'	+58'	136°	21°16'	+58'	137°	20°33'	+58'	137°	19°49'	+58'	137°	4
5	25°06'	+57'	135°	24°23'	+57'	135°	23°40'	+57'	136°	22°57'	+58'	136°	22°14'	+58'	136°	21°31'	+58'	137°	20°47'	+58'	137°	5
6	26°02'	+57'	135°	25°20'	+57'	135°	24°38'	+57'	135°	23°55'	+57'	136°	23°12'	+58'	136°	22°29'	+58'	136°	21°45'	+58'	137°	6
7	26°59'	+57'	134°	26°17'	+57'	135°	25°35'	+57'	135°	24°52'	+57'	135°	24°10'	+58'	136°	23°27'	+58'	136°	22°43'	+58'	136°	7
8	27°56'	+57'	134°	27°14'	+57'	134°	26°32'	+57'	135°	25°50'	+57'	135°	25°07'	+58'	135°	24°24'	+58'	136°	23°41'	+58'	136°	8
9	28°52'	+57'	134°	28°11'	+57'	134°	27°29'	+57'	134°	26°47'	+57'	135°	26°05'	+58'	135°	25°22'	+58'	135°	24°39'	+58'	136°	9
10	29°49'	+56'	133°	29°08'	+57'	134°	28°26'	+57'	134°	27°44'	+57'	134°	27°02'	+58'	135°	26°20'	+58'	135°	25°37'	+58'	135°	10
11	30°45'	+56'	133°	30°05'	+57'	133°	29°23'	+57'	134°	28°42'	+57'	134°	28°00'	+57'	134°	27°18'	+58'	135°	26°35'	+58'	135°	11
12	31°42'	+56'	132°	31°01'	+57'	133°	30°20'	+57'	133°	29°39'	+57'	134°	28°57'	+57'	134°	28°16'	+58'	134°	27°33'	+58'	135°	12
13	32°38'	+56'	132°	31°58'	+57'	132°	31°17'	+57'	133°	30°36'	+57'	133°	29°55'	+57'	134°	29°13'	+58'	134°	28°31'	+58'	135°	13
14	33°34'	+56'	132°	32°54'	+56'	132°	32°14'	+57'	132°	31°33'	+57'	133°	30°52'	+57'	133°	30°11'	+58'	134°	29°29'	+58'	134°	14
15	34°31'	+56'	131°	33°51'	+56'	132°	33°11'	+57'	132°	32°30'	+57'	133°	31°50'	+57'	133°	31°09'	+58'	133°	30°27'	+58'	134°	15
16	35°27'	+56'	131°	34°47'	+56'	131°	34°08'	+57'	132°	33°27'	+57'	132°	32°47'	+57'	133°	32°06'	+57'	133°	31°25'	+58'	134°	16
17	36°23'	+56'	130°	35°44'	+56'	131°	35°04'	+57'	131°	34°24'	+57'	132°	33°44'	+57'	132°	33°04'	+57'	133°	32°23'	+58'	133°	17
18	37°18'	+56'	130°	36°40'	+56'	130°	36°01'	+56'	131°	35°21'	+57'	131°	34°41'	+57'	132°	34°01'	+57'	132°	33°20'	+58'	133°	18
19	38°14'	+56'	129°	37°36'	+56'	130°	36°57'	+56'	130°	36°18'	+57'	131°	35°38'	+57'	132°	34°58'	+57'	132°	34°18'	+58'	133°	19
20	39°10'	+56'	129°	38°32'	+56'	129°	37°54'	+56'	130°	37°15'	+57'	131°	36°35'	+57'	131°	35°56'	+57'	132°	35°16'	+58'	132°	20
21	40°05'	+55'	128°	39°28'	+56'	129°	38°50'	+56'	130°	38°11'	+57'	130°	37°32'	+57'	131°	36°53'	+57'	131°	36°13'	+57'	132°	21
22	41°01'	+55'	128°	40°24'	+56'	129°	39°46'	+56'	129°	39°08'	+56'	130°	38°29'	+57'	130°	37°50'	+57'	131°	37°11'	+57'	132°	22
23	41°56'	+55'	127°	41°19'	+56'	128°	40°42'	+56'	129°	40°04'	+56'	129°	39°26'	+57'	130°	38°47'	+57'	131°	38°08'	+57'	131°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

40° 320° LHA — Latitude SAME as Declination — 40° 320° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

41° 319° LHA — Latitude SAME as Declination — 41° 319° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	20°02'	+57'	136°	19°19'	+57'	136°	18°36'	+57'	136°	17°53'	+58'	136°	17°09'	+58'	137°	16°25'	+58'	137°	15°42'	+58'	137°	0
1	20°59'	+57'	135°	20°16'	+57'	136°	19°33'	+57'	136°	18°50'	+58'	136°	18°07'	+58'	136°	17°23'	+58'	137°	16°40'	+58'	137°	1
2	21°56'	+57'	135°	21°13'	+57'	135°	20°31'	+57'	136°	19°48'	+58'	136°	19°05'	+58'	136°	18°21'	+58'	136°	17°38'	+58'	137°	2
3	22°53'	+57'	135°	22°10'	+57'	135°	21°28'	+57'	135°	20°45'	+57'	136°	20°02'	+58'	136°	19°19'	+58'	136°	18°36'	+58'	136°	3
4	23°50'	+57'	134°	23°07'	+57'	135°	22°25'	+57'	135°	21°43'	+57'	135°	21°00'	+58'	135°	20°17'	+58'	136°	19°34'	+58'	136°	4
5	24°46'	+57'	134°	24°04'	+57'	134°	23°22'	+57'	135°	22°40'	+57'	135°	21°58'	+58'	135°	21°15'	+58'	135°	20°32'	+58'	136°	5
6	25°43'	+57'	134°	25°01'	+57'	134°	24°20'	+57'	134°	23°38'	+57'	135°	22°55'	+58'	135°	22°13'	+58'	135°	21°30'	+58'	135°	6
7	26°39'	+57'	133°	25°58'	+57'	134°	25°17'	+57'	134°	24°35'	+57'	134°	23°53'	+58'	135°	23°11'	+58'	135°	22°28'	+58'	135°	7
8	27°36'	+56'	133°	26°55'	+57'	133°	26°14'	+57'	134°	25°32'	+57'	134°	24°51'	+58'	134°	24°09'	+58'	135°	23°26'	+58'	135°	8
9	28°32'	+56'	132°	27°52'	+57'	133°	27°11'	+57'	133°	26°30'	+57'	134°	25°48'	+57'	134°	25°06'	+58'	134°	24°24'	+58'	135°	9
10	29°29'	+56'	132°	28°49'	+57'	132°	28°08'	+57'	133°	27°27'	+57'	133°	26°46'	+57'	134°	26°04'	+58'	134°	25°22'	+58'	134°	10
11	30°25'	+56'	132°	29°45'	+57'	132°	29°05'	+57'	133°	28°24'	+57'	133°	27°43'	+57'	133°	27°02'	+58'	134°	26°20'	+58'	134°	11
12	31°22'	+56'	131°	30°42'	+57'	132°	30°02'	+57'	132°	29°21'	+57'	133°	28°40'	+57'	133°	27°59'	+58'	133°	27°18'	+58'	134°	12
13	32°18'	+56'	131°	31°38'	+56'	131°	30°58'	+57'	132°	30°18'	+57'	132°	29°38'	+57'	133°	28°57'	+58'	133°	28°16'	+58'	133°	13
14	33°14'	+56'	130°	32°35'	+56'	131°	31°55'	+57'	131°	31°15'	+57'	132°	30°35'	+57'	132°	29°55'	+58'	133°	29°14'	+58'	133°	14
15	34°10'	+56'	130°	33°31'	+56'	131°	32°52'	+57'	131°	32°12'	+57'	132°	31°32'	+57'	132°	30°52'	+57'	132°	30°11'	+58'	133°	15
16	35°06'	+56'	130°	34°27'	+56'	130°	33°48'	+57'	131°	33°09'	+57'	131°	32°30'	+57'	132°	31°50'	+57'	132°	31°09'	+58'	133°	16
17	36°02'	+56'	129°	35°24'	+56'	130°	34°45'	+56'	130°	34°06'	+57'	131°	33°27'	+57'	131°	32°47'	+57'	132°	32°07'	+58'	132°	17
18	36°57'	+56'	129°	36°20'	+56'	129°	35°41'	+56'	130°	35°03'	+57'	130°	34°24'	+57'	131°	33°44'	+57'	131°	33°04'	+58'	132°	18
19	37°53'	+56'	128°	37°16'	+56'	129°	36°38'	+56'	129°	35°59'	+57'	130°	35°21'	+57'	130°	34°42'	+57'	131°	34°02'	+58'	132°	19
20	38°48'	+55'	128°	38°12'	+56'	128°	37°34'	+56'	129°	36°56'	+57'	130°	36°18'	+57'	130°	35°39'	+57'	131°	34°59'	+57'	131°	20
21	39°44'	+55'	127°	39°07'	+56'	128°	38°30'	+56'	128°	37°53'	+56'	129°	37°15'	+57'	130°	36°36'	+57'	130°	35°57'	+57'	131°	21
22	40°39'	+55'	127°	40°03'	+56'	127°	39°26'	+56'	128°	38°49'	+56'	129°	38°11'	+57'	129°	37°33'	+57'	130°	36°54'	+57'	130°	22
23	41°34'	+55'	126°	40°58'	+55'	127°	40°22'	+56'	128°	39°45'	+56'	128°	39°08'	+57'	129°	38°30'	+57'	129°	37°52'	+57'	130°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

41° 319° LHA — Latitude SAME as Declination — 41° 319° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

42° 318° LHA — Latitude SAME as Declination — 42° 318° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	19°43'	+57'	135°	19°01'	+57'	135°	18°18'	+57'	135°	17°36'	+57'	135°	16°53'	+58'	136°	16°10'	+58'	136°	15°27'	+58'	136°	0
1	20°40'	+57'	134°	19°58'	+57'	135°	19°16'	+57'	135°	18°33'	+57'	135°	17°51'	+58'	135°	17°08'	+58'	136°	16°25'	+58'	136°	1
2	21°37'	+57'	134°	20°55'	+57'	134°	20°13'	+57'	135°	19°31'	+57'	135°	18°48'	+58'	135°	18°06'	+58'	135°	17°23'	+58'	136°	2
3	22°33'	+57'	134°	21°52'	+57'	134°	21°10'	+57'	134°	20°28'	+57'	135°	19°46'	+58'	135°	19°03'	+58'	135°	18°21'	+58'	135°	3
4	23°30'	+57'	133°	22°49'	+57'	134°	22°07'	+57'	134°	21°25'	+57'	134°	20°43'	+58'	134°	20°01'	+58'	135°	19°19'	+58'	135°	4
5	24°26'	+57'	133°	23°45'	+57'	133°	23°04'	+57'	134°	22°23'	+57'	134°	21°41'	+58'	134°	20°59'	+58'	134°	20°17'	+58'	135°	5
6	25°23'	+56'	133°	24°42'	+57'	133°	24°01'	+57'	133°	23°20'	+57'	134°	22°39'	+58'	134°	21°57'	+58'	134°	21°15'	+58'	134°	6
7	26°19'	+56'	132°	25°39'	+57'	133°	24°58'	+57'	133°	24°17'	+57'	133°	23°36'	+57'	134°	22°55'	+58'	134°	22°13'	+58'	134°	7
8	27°16'	+56'	132°	26°36'	+57'	132°	25°55'	+57'	133°	25°15'	+57'	133°	24°34'	+57'	133°	23°52'	+58'	134°	23°11'	+58'	134°	8
9	28°12'	+56'	131°	27°32'	+57'	132°	26°52'	+57'	132°	26°12'	+57'	133°	25°31'	+57'	133°	24°50'	+58'	133°	24°09'	+58'	134°	9
10	29°09'	+56'	131°	28°29'	+57'	131°	27°49'	+57'	132°	27°09'	+57'	132°	26°28'	+57'	133°	25°48'	+58'	133°	25°07'	+58'	133°	10
11	30°05'	+56'	131°	29°26'	+56'	131°	28°46'	+57'	131°	28°06'	+57'	132°	27°26'	+57'	132°	26°45'	+58'	133°	26°05'	+58'	133°	11
12	31°01'	+56'	130°	30°22'	+56'	131°	29°43'	+57'	131°	29°03'	+57'	132°	28°23'	+57'	132°	27°43'	+58'	132°	27°02'	+58'	133°	12
13	31°57'	+56'	130°	31°18'	+56'	130°	30°39'	+57'	131°	30°00'	+57'	131°	29°20'	+57'	132°	28°40'	+57'	132°	28°00'	+58'	132°	13
14	32°53'	+56'	129°	32°15'	+56'	130°	31°36'	+57'	130°	30°57'	+57'	131°	30°18'	+57'	131°	29°38'	+57'	132°	28°58'	+58'	132°	14
15	33°49'	+56'	129°	33°11'	+56'	129°	32°33'	+56'	130°	31°54'	+57'	130°	31°15'	+57'	131°	30°35'	+57'	131°	29°56'	+58'	132°	15
16	34°45'	+56'	128°	34°07'	+56'	129°	33°29'	+56'	130°	32°51'	+57'	130°	32°12'	+57'	131°	31°33'	+57'	131°	30°53'	+58'	131°	16
17	35°40'	+56'	128°	35°03'	+56'	129°	34°25'	+56'	129°	33°47'	+57'	130°	33°09'	+57'	130°	32°30'	+57'	131°	31°51'	+58'	131°	17
18	36°36'	+55'	128°	35°59'	+56'	128°	35°22'	+56'	129°	34°44'	+57'	129°	34°06'	+57'	130°	33°27'	+57'	130°	32°48'	+57'	131°	18
19	37°31'	+55'	127°	36°55'	+56'	128°	36°18'	+56'	128°	35°41'	+56'	129°	35°03'	+57'	129°	34°24'	+57'	130°	33°46'	+57'	130°	19
20	38°27'	+55'	127°	37°51'	+56'	127°	37°14'	+56'	128°	36°37'	+56'	128°	36°00'	+57'	129°	35°22'	+57'	130°	34°43'	+57'	130°	20
21	39°22'	+55'	126°	38°46'	+56'	127°	38°10'	+56'	127°	37°34'	+56'	128°	36°56'	+57'	129°	36°19'	+57'	129°	35°41'	+57'	130°	21
22	40°17'	+55'	126°	39°42'	+55'	126°	39°06'	+56'	127°	38°30'	+56'	128°	37°53'	+57'	128°	37°16'	+57'	129°	36°38'	+57'	129°	22
23	41°12'	+55'	125°	40°37'	+55'	126°	40°02'	+56'	126°	39°26'	+56'	127°	38°50'	+56'	128°	38°13'	+57'	128°	37°35'	+57'	129°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

42° 318° LHA — Latitude SAME as Declination — 42° 318° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

43° 317° LHA — Latitude SAME as Declination — 43° 317° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	19°24'	+57'	134°	18°42'	+57'	134°	18°00'	+57'	134°	17°18'	+57'	134°	16°36'	+58'	135°	15°54'	+58'	135°	15°12'	+58'	135°	0
1	20°20'	+57'	133°	19°39'	+57'	134°	18°57'	+57'	134°	18°16'	+57'	134°	17°34'	+58'	134°	16°52'	+58'	135°	16°10'	+58'	135°	1
2	21°17'	+57'	133°	20°36'	+57'	133°	19°55'	+57'	134°	19°13'	+57'	134°	18°31'	+58'	134°	17°50'	+58'	134°	17°08'	+58'	135°	2
3	22°13'	+57'	133°	21°33'	+57'	133°	20°52'	+57'	133°	20°10'	+57'	133°	19°29'	+58'	134°	18°47'	+58'	134°	18°06'	+58'	134°	3
4	23°10'	+56'	132°	22°29'	+57'	133°	21°49'	+57'	133°	21°08'	+57'	133°	20°27'	+58'	133°	19°45'	+58'	134°	19°04'	+58'	134°	4
5	24°06'	+56'	132°	23°26'	+57'	132°	22°46'	+57'	133°	22°05'	+57'	133°	21°24'	+57'	133°	20°43'	+58'	133°	20°02'	+58'	134°	5
6	25°03'	+56'	132°	24°23'	+57'	132°	23°43'	+57'	132°	23°02'	+57'	133°	22°22'	+57'	133°	21°41'	+58'	133°	21°00'	+58'	133°	6
7	25°59'	+56'	131°	25°19'	+57'	132°	24°40'	+57'	132°	23°59'	+57'	132°	23°19'	+57'	133°	22°38'	+58'	133°	21°57'	+58'	133°	7
8	26°55'	+56'	131°	26°16'	+57'	131°	25°36'	+57'	132°	24°57'	+57'	132°	24°16'	+57'	132°	23°36'	+58'	133°	22°55'	+58'	133°	8
9	27°52'	+56'	130°	27°13'	+56'	131°	26°33'	+57'	131°	25°54'	+57'	132°	25°14'	+57'	132°	24°34'	+58'	132°	23°53'	+58'	133°	9
10	28°48'	+56'	130°	28°09'	+56'	130°	27°30'	+57'	131°	26°51'	+57'	131°	26°11'	+57'	132°	25°31'	+58'	132°	24°51'	+58'	132°	10
11	29°44'	+56'	130°	29°06'	+56'	130°	28°27'	+57'	130°	27°48'	+57'	131°	27°08'	+57'	131°	26°29'	+57'	132°	25°49'	+58'	132°	11
12	30°40'	+56'	129°	30°02'	+56'	130°	29°23'	+57'	130°	28°45'	+57'	130°	28°06'	+57'	131°	27°26'	+57'	131°	26°46'	+58'	132°	12
13	31°36'	+56'	129°	30°58'	+56'	129°	30°20'	+57'	130°	29°42'	+57'	130°	29°03'	+57'	131°	28°24'	+57'	131°	27°44'	+58'	131°	13
14	32°32'	+56'	128°	31°54'	+56'	129°	31°17'	+56'	129°	30°38'	+57'	130°	30°00'	+57'	130°	29°21'	+57'	131°	28°42'	+58'	131°	14
15	33°27'	+56'	128°	32°50'	+56'	128°	32°13'	+56'	129°	31°35'	+57'	129°	30°57'	+57'	130°	30°18'	+57'	130°	29°39'	+58'	131°	15
16	34°23'	+56'	127°	33°46'	+56'	128°	33°09'	+56'	128°	32°32'	+57'	129°	31°54'	+57'	129°	31°16'	+57'	130°	30°37'	+58'	130°	16
17	35°19'	+55'	127°	34°42'	+56'	127°	34°06'	+56'	128°	33°28'	+57'	129°	32°51'	+57'	129°	32°13'	+57'	130°	31°34'	+57'	130°	17
18	36°14'	+55'	126°	35°38'	+56'	127°	35°02'	+56'	128°	34°25'	+56'	128°	33°48'	+57'	129°	33°10'	+57'	129°	32°32'	+57'	130°	18
19	37°10'	+55'	126°	36°34'	+56'	127°	35°58'	+56'	127°	35°21'	+56'	128°	34°45'	+57'	128°	34°07'	+57'	129°	33°29'	+57'	129°	19
20	38°05'	+55'	125°	37°30'	+56'	126°	36°54'	+56'	127°	36°18'	+56'	127°	35°41'	+57'	128°	35°04'	+57'	128°	34°27'	+57'	129°	20
21	39°00'	+55'	125°	38°25'	+55'	126°	37°50'	+56'	126°	37°14'	+56'	127°	36°38'	+57'	127°	36°01'	+57'	128°	35°24'	+57'	129°	21
22	39°55'	+55'	124°	39°21'	+55'	125°	38°46'	+56'	126°	38°10'	+56'	126°	37°34'	+56'	127°	36°58'	+57'	128°	36°21'	+57'	128°	22
23	40°50'	+55'	124°	40°16'	+55'	125°	39°41'	+56'	125°	39°06'	+56'	126°	38°31'	+56'	127°	37°55'	+57'	127°	37°18'	+57'	128°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

43° 317° LHA — Latitude SAME as Declination — 43° 317° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

44° 316° LHA — Latitude SAME as Declination — 44° 316° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	19°04'	+57'	133°	18°23'	+57'	133°	17°42'	+57'	133°	17°01'	+57'	133°	16°19'	+58'	134°	15°38'	+58'	134°	14°56'	+58'	134°	0
1	20°00'	+56'	132°	19°20'	+57'	133°	18°39'	+57'	133°	17°58'	+57'	133°	17°17'	+58'	133°	16°36'	+58'	134°	15°54'	+58'	134°	1
2	20°57'	+56'	132°	20°16'	+57'	132°	19°36'	+57'	133°	18°55'	+57'	133°	18°14'	+57'	133°	17°33'	+58'	133°	16°52'	+58'	133°	2
3	21°53'	+56'	132°	21°13'	+57'	132°	20°33'	+57'	132°	19°53'	+57'	132°	19°12'	+57'	133°	18°31'	+58'	133°	17°50'	+58'	133°	3
4	22°50'	+56'	131°	22°10'	+57'	132°	21°30'	+57'	132°	20°50'	+57'	132°	20°09'	+57'	132°	19°29'	+58'	133°	18°48'	+58'	133°	4
5	23°46'	+56'	131°	23°07'	+57'	131°	22°27'	+57'	132°	21°47'	+57'	132°	21°07'	+57'	132°	20°26'	+58'	132°	19°46'	+58'	133°	5
6	24°42'	+56'	130°	24°03'	+57'	131°	23°24'	+57'	131°	22°44'	+57'	131°	22°04'	+57'	132°	21°24'	+58'	132°	20°44'	+58'	132°	6
7	25°38'	+56'	130°	25°00'	+56'	130°	24°21'	+57'	131°	23°41'	+57'	131°	23°02'	+57'	131°	22°22'	+58'	132°	21°42'	+58'	132°	7
8	26°35'	+56'	130°	25°56'	+56'	130°	25°17'	+57'	130°	24°38'	+57'	131°	23°59'	+57'	131°	23°19'	+58'	131°	22°39'	+58'	132°	8
9	27°31'	+56'	129°	26°53'	+56'	130°	26°14'	+57'	130°	25°35'	+57'	130°	24°56'	+57'	131°	24°17'	+57'	131°	23°37'	+58'	132°	9
10	28°27'	+56'	129°	27°49'	+56'	129°	27°11'	+57'	130°	26°32'	+57'	130°	25°53'	+57'	130°	25°14'	+57'	131°	24°35'	+58'	131°	10
11	29°23'	+56'	129°	28°45'	+56'	129°	28°07'	+57'	129°	27°29'	+57'	130°	26°51'	+57'	130°	26°12'	+57'	131°	25°33'	+58'	131°	11
12	30°19'	+56'	128°	29°41'	+56'	129°	29°04'	+56'	129°	28°26'	+57'	129°	27°48'	+57'	130°	27°09'	+57'	130°	26°30'	+58'	131°	12
13	31°14'	+56'	128°	30°38'	+56'	128°	30°00'	+56'	129°	29°23'	+57'	129°	28°45'	+57'	129°	28°06'	+57'	130°	27°28'	+58'	130°	13
14	32°10'	+56'	127°	31°34'	+56'	128°	30°57'	+56'	128°	30°19'	+57'	129°	29°42'	+57'	129°	29°04'	+57'	130°	28°25'	+58'	130°	14
15	33°06'	+56'	127°	32°30'	+56'	127°	31°53'	+56'	128°	31°16'	+57'	128°	30°39'	+57'	129°	30°01'	+57'	129°	29°23'	+57'	130°	15
16	34°01'	+55'	126°	33°26'	+56'	127°	32°49'	+56'	127°	32°13'	+57'	128°	31°36'	+57'	128°	30°58'	+57'	129°	30°20'	+57'	129°	16
17	34°57'	+55'	126°	34°21'	+56'	126°	33°46'	+56'	127°	33°09'	+56'	127°	32°33'	+57'	128°	31°55'	+57'	128°	31°18'	+57'	129°	17
18	35°52'	+55'	125°	35°17'	+56'	126°	34°42'	+56'	127°	34°06'	+56'	127°	33°29'	+57'	128°	32°52'	+57'	128°	32°15'	+57'	129°	18
19	36°47'	+55'	125°	36°13'	+56'	126°	35°38'	+56'	126°	35°02'	+56'	127°	34°26'	+57'	127°	33°49'	+57'	128°	33°13'	+57'	128°	19
20	37°42'	+55'	124°	37°08'	+55'	125°	36°34'	+56'	126°	35°58'	+56'	126°	35°23'	+57'	127°	34°46'	+57'	127°	34°10'	+57'	128°	20
21	38°37'	+55'	124°	38°04'	+55'	125°	37°29'	+56'	125°	36°54'	+56'	126°	36°19'	+56'	126°	35°43'	+57'	127°	35°07'	+57'	128°	21
22	39°32'	+55'	123°	38°59'	+55'	124°	38°25'	+56'	125°	37°51'	+56'	125°	37°16'	+56'	126°	36°40'	+57'	127°	36°04'	+57'	127°	22
23	40°27'	+55'	123°	39°54'	+55'	124°	39°21'	+55'	124°	38°47'	+56'	125°	38°12'	+56'	126°	37°37'	+57'	126°	37°01'	+57'	127°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

44° 316° LHA — Latitude SAME as Declination — 44° 316° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

45° 315° LHA — Latitude SAME as Declination — 45° 315° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	18°43'	+56'	132°	18°03'	+57'	132°	17°23'	+57'	132°	16°43'	+57'	132°	16°02'	+57'	133°	15°22'	+58'	133°	14°41'	+58'	133°	0
1	19°40'	+56'	131°	19°00'	+57'	132°	18°20'	+57'	132°	17°40'	+57'	132°	17°00'	+57'	132°	16°19'	+58'	133°	15°39'	+58'	133°	1
2	20°36'	+56'	131°	19°57'	+57'	131°	19°17'	+57'	132°	18°37'	+57'	132°	17°57'	+57'	132°	17°17'	+58'	132°	16°37'	+58'	132°	2
3	21°33'	+56'	131°	20°53'	+57'	131°	20°14'	+57'	131°	19°34'	+57'	131°	18°55'	+57'	132°	18°15'	+58'	132°	17°34'	+58'	132°	3
4	22°29'	+56'	130°	21°50'	+57'	131°	21°11'	+57'	131°	20°32'	+57'	131°	19°52'	+57'	131°	19°12'	+58'	132°	18°32'	+58'	132°	4
5	23°25'	+56'	130°	22°47'	+56'	130°	22°08'	+57'	130°	21°29'	+57'	131°	20°49'	+57'	131°	20°10'	+58'	131°	19°30'	+58'	132°	5
6	24°21'	+56'	129°	23°43'	+56'	130°	23°04'	+57'	130°	22°26'	+57'	130°	21°47'	+57'	131°	21°07'	+58'	131°	20°28'	+58'	131°	6
7	25°17'	+56'	129°	24°39'	+56'	129°	24°01'	+57'	130°	23°23'	+57'	130°	22°44'	+57'	130°	22°05'	+57'	131°	21°26'	+58'	131°	7
8	26°14'	+56'	129°	25°36'	+56'	129°	24°58'	+57'	129°	24°20'	+57'	130°	23°41'	+57'	130°	23°02'	+57'	130°	22°23'	+58'	131°	8
9	27°10'	+56'	128°	26°32'	+56'	129°	25°55'	+57'	129°	25°17'	+57'	129°	24°38'	+57'	130°	24°00'	+57'	130°	23°21'	+58'	130°	9
10	28°05'	+56'	128°	27°28'	+56'	128°	26°51'	+57'	129°	26°13'	+57'	129°	25°35'	+57'	129°	24°57'	+57'	130°	24°19'	+58'	130°	10
11	29°01'	+56'	127°	28°25'	+56'	128°	27°48'	+56'	128°	27°10'	+57'	129°	26°33'	+57'	129°	25°55'	+57'	129°	25°16'	+58'	130°	11
12	29°57'	+56'	127°	29°21'	+56'	127°	28°44'	+56'	128°	28°07'	+57'	128°	27°30'	+57'	129°	26°52'	+57'	129°	26°14'	+58'	130°	12
13	30°53'	+56'	127°	30°17'	+56'	127°	29°40'	+56'	128°	29°04'	+57'	128°	28°27'	+57'	128°	27°49'	+57'	129°	27°11'	+57'	129°	13
14	31°48'	+56'	126°	31°13'	+56'	127°	30°37'	+56'	127°	30°00'	+57'	128°	29°23'	+57'	128°	28°46'	+57'	128°	28°09'	+57'	129°	14
15	32°44'	+55'	126°	32°09'	+56'	126°	31°33'	+56'	127°	30°57'	+56'	127°	30°20'	+57'	128°	29°43'	+57'	128°	29°06'	+57'	129°	15
16	33°39'	+55'	125°	33°04'	+56'	126°	32°29'	+56'	126°	31°53'	+56'	127°	31°17'	+57'	127°	30°41'	+57'	128°	30°04'	+57'	128°	16
17	34°35'	+55'	125°	34°00'	+56'	125°	33°25'	+56'	126°	32°50'	+56'	126°	32°14'	+57'	127°	31°38'	+57'	127°	31°01'	+57'	128°	17
18	35°30'	+55'	124°	34°56'	+55'	125°	34°21'	+56'	125°	33°46'	+56'	126°	33°11'	+57'	127°	32°35'	+57'	127°	31°58'	+57'	128°	18
19	36°25'	+55'	124°	35°51'	+55'	124°	35°17'	+56'	125°	34°42'	+56'	126°	34°07'	+57'	126°	33°32'	+57'	127°	32°56'	+57'	127°	19
20	37°20'	+55'	123°	36°47'	+55'	124°	36°13'	+56'	125°	35°38'	+56'	125°	35°04'	+56'	126°	34°28'	+57'	126°	33°53'	+57'	127°	20
21	38°15'	+55'	123°	37°42'	+55'	123°	37°08'	+56'	124°	36°35'	+56'	125°	36°00'	+56'	125°	35°25'	+57'	126°	34°50'	+57'	126°	21
22	39°09'	+55'	122°	38°37'	+55'	123°	38°04'	+55'	124°	37°31'	+56'	124°	36°56'	+56'	125°	36°22'	+57'	125°	35°47'	+57'	126°	22
23	40°04'	+54'	122°	39°32'	+55'	122°	38°59'	+55'	123°	38°26'	+56'	124°	37°53'	+56'	124°	37°19'	+57'	125°	36°44'	+57'	126°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

45° 315° LHA — Latitude SAME as Declination — 45° 315° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

46° 314° LHA — Latitude SAME as Declination — 46° 314° LHA

Dec°	63 Hc°	63 d'	63 Z°	64 Hc°	64 d'	64 Z°	65 Hc°	65 d'	65 Z°	66 Hc°	66 d'	66 Z°	67 Hc°	67 d'	67 Z°	68 Hc°	68 d'	68 Z°	69 Hc°	69 d'	69 Z°	Dec°
0	18°23'	+56'	131°	17°44'	+57'	131°	17°04'	+57'	131°	16°25'	+57'	131°	15°45'	+57'	132°	15°05'	+58'	132°	14°25'	+58'	132°	0
1	19°19'	+56'	130°	18°40'	+57'	131°	18°01'	+57'	131°	17°22'	+57'	131°	16°42'	+57'	131°	16°03'	+58'	132°	15°23'	+58'	132°	1
2	20°16'	+56'	130°	19°37'	+57'	130°	18°58'	+57'	131°	18°19'	+57'	131°	17°40'	+57'	131°	17°00'	+58'	131°	16°21'	+58'	131°	2
3	21°12'	+56'	130°	20°33'	+56'	130°	19°55'	+57'	130°	19°16'	+57'	130°	18°37'	+57'	131°	17°58'	+58'	131°	17°18'	+58'	131°	3
4	22°08'	+56'	129°	21°30'	+56'	130°	20°52'	+57'	130°	20°13'	+57'	130°	19°34'	+57'	130°	18°55'	+57'	131°	18°16'	+58'	131°	4
5	23°04'	+56'	129°	22°26'	+56'	129°	21°48'	+57'	129°	21°10'	+57'	130°	20°32'	+57'	130°	19°53'	+57'	130°	19°14'	+58'	131°	5
6	24°00'	+56'	128°	23°23'	+56'	129°	22°45'	+57'	129°	22°07'	+57'	129°	21°29'	+57'	130°	20°50'	+57'	130°	20°12'	+58'	130°	6
7	24°56'	+56'	128°	24°19'	+56'	128°	23°42'	+57'	129°	23°04'	+57'	129°	22°26'	+57'	129°	21°48'	+57'	130°	21°09'	+58'	130°	7
8	25°52'	+56'	128°	25°15'	+56'	128°	24°38'	+57'	128°	24°01'	+57'	129°	23°23'	+57'	129°	22°45'	+57'	129°	22°07'	+58'	130°	8
9	26°48'	+56'	127°	26°11'	+56'	128°	25°35'	+56'	128°	24°58'	+57'	128°	24°20'	+57'	129°	23°42'	+57'	129°	23°04'	+58'	129°	9
10	27°44'	+56'	127°	27°08'	+56'	127°	26°31'	+56'	128°	25°54'	+57'	128°	25°17'	+57'	128°	24°40'	+57'	129°	24°02'	+58'	129°	10
11	28°40'	+56'	126°	28°04'	+56'	127°	27°28'	+56'	127°	26°51'	+57'	128°	26°14'	+57'	128°	25°37'	+57'	128°	25°00'	+58'	129°	11
12	29°35'	+56'	126°	29°00'	+56'	126°	28°24'	+56'	127°	27°48'	+57'	127°	27°11'	+57'	128°	26°34'	+57'	128°	25°57'	+57'	129°	12
13	30°31'	+55'	126°	29°56'	+56'	126°	29°20'	+56'	126°	28°44'	+57'	127°	28°08'	+57'	127°	27°31'	+57'	128°	26°55'	+57'	128°	13
14	31°26'	+55'	125°	30°51'	+56'	126°	30°16'	+56'	126°	29°41'	+56'	127°	29°05'	+57'	127°	28°29'	+57'	127°	27°52'	+57'	128°	14
15	32°22'	+55'	125°	31°47'	+56'	125°	31°12'	+56'	126°	30°37'	+56'	126°	30°02'	+57'	127°	29°26'	+57'	127°	28°49'	+57'	128°	15
16	33°17'	+55'	124°	32°43'	+56'	125°	32°09'	+56'	125°	31°34'	+56'	126°	30°58'	+57'	126°	30°23'	+57'	127°	29°47'	+57'	127°	16
17	34°12'	+55'	124°	33°38'	+55'	124°	33°04'	+56'	125°	32°30'	+56'	125°	31°55'	+57'	126°	31°20'	+57'	126°	30°44'	+57'	127°	17
18	35°07'	+55'	123°	34°34'	+55'	124°	34°00'	+56'	124°	33°26'	+56'	125°	32°52'	+57'	125°	32°17'	+57'	126°	31°41'	+57'	126°	18
19	36°02'	+55'	123°	35°29'	+55'	123°	34°56'	+56'	124°	34°22'	+56'	125°	33°48'	+56'	125°	33°13'	+57'	126°	32°38'	+57'	126°	19
20	36°57'	+55'	122°	36°25'	+55'	123°	35°52'	+56'	123°	35°18'	+56'	124°	34°45'	+56'	125°	34°10'	+57'	125°	33°35'	+57'	126°	20
21	37°52'	+55'	122°	37°20'	+55'	122°	36°47'	+55'	123°	36°14'	+56'	124°	35°41'	+56'	124°	35°07'	+57'	125°	34°32'	+57'	125°	21
22	38°46'	+54'	121°	38°15'	+55'	122°	37°43'	+55'	123°	37°10'	+56'	123°	36°37'	+56'	124°	36°03'	+57'	124°	35°29'	+57'	125°	22
23	39°41'	+54'	121°	39°10'	+55'	121°	38°38'	+55'	122°	38°06'	+56'	123°	37°33'	+56'	123°	37°00'	+56'	124°	36°26'	+57'	125°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

46° 314° LHA — Latitude SAME as Declination — 46° 314° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

47° 313° LHA — Latitude SAME as Declination — 47° 313° LHA

Dec°	63 Hc°	63 d'	63 Z°	64 Hc°	64 d'	64 Z°	65 Hc°	65 d'	65 Z°	66 Hc°	66 d'	66 Z°	67 Hc°	67 d'	67 Z°	68 Hc°	68 d'	68 Z°	69 Hc°	69 d'	69 Z°	Dec°
0	18°02'	+56'	130°	17°24'	+56'	130°	16°45'	+57'	130°	16°06'	+57'	130°	15°27'	+57'	131°	14°48'	+58'	131°	14°09'	+58'	131°	0
1	18°58'	+56'	129°	18°20'	+56'	130°	17°42'	+57'	130°	17°03'	+57'	130°	16°25'	+57'	130°	15°46'	+58'	131°	15°07'	+58'	131°	1
2	19°55'	+56'	129°	19°17'	+56'	129°	18°39'	+57'	130°	18°00'	+57'	130°	17°22'	+57'	130°	16°43'	+57'	130°	16°04'	+58'	130°	2
3	20°51'	+56'	129°	20°13'	+56'	129°	19°35'	+57'	129°	18°57'	+57'	129°	18°19'	+57'	130°	17°41'	+57'	130°	17°02'	+58'	130°	3
4	21°47'	+56'	128°	21°09'	+56'	129°	20°32'	+57'	129°	19°54'	+57'	129°	19°16'	+57'	129°	18°38'	+57'	130°	18°00'	+58'	130°	4
5	22°43'	+56'	128°	22°06'	+56'	128°	21°29'	+57'	128°	20°51'	+57'	129°	20°13'	+57'	129°	19°36'	+57'	129°	18°57'	+58'	130°	5
6	23°39'	+56'	127°	23°02'	+56'	128°	22°25'	+57'	128°	21°48'	+57'	128°	21°11'	+57'	129°	20°33'	+57'	129°	19°55'	+58'	129°	6
7	24°35'	+56'	127°	23°58'	+56'	127°	23°22'	+56'	128°	22°45'	+57'	128°	22°08'	+57'	128°	21°30'	+57'	129°	20°53'	+58'	129°	7
8	25°30'	+56'	127°	24°54'	+56'	127°	24°18'	+56'	127°	23°42'	+57'	128°	23°05'	+57'	128°	22°28'	+57'	128°	21°50'	+58'	129°	8
9	26°26'	+56'	126°	25°51'	+56'	127°	25°15'	+56'	127°	24°38'	+57'	127°	24°02'	+57'	128°	23°25'	+57'	128°	22°48'	+58'	128°	9
10	27°22'	+56'	126°	26°47'	+56'	126°	26°11'	+56'	127°	25°35'	+57'	127°	24°59'	+57'	127°	24°22'	+57'	128°	23°45'	+57'	128°	10
11	28°17'	+56'	125°	27°43'	+56'	126°	27°07'	+56'	126°	26°32'	+57'	127°	25°56'	+57'	127°	25°19'	+57'	127°	24°43'	+57'	128°	11
12	29°13'	+55'	125°	28°38'	+56'	125°	28°03'	+56'	126°	27°28'	+56'	126°	26°52'	+57'	127°	26°16'	+57'	127°	25°40'	+57'	127°	12
13	30°08'	+55'	125°	29°34'	+56'	125°	29°00'	+56'	125°	28°25'	+56'	126°	27°49'	+57'	126°	27°14'	+57'	127°	26°38'	+57'	127°	13
14	31°04'	+55'	124°	30°30'	+56'	125°	29°56'	+56'	125°	29°21'	+56'	125°	28°46'	+57'	126°	28°11'	+57'	126°	27°35'	+57'	127°	14
15	31°59'	+55'	124°	31°26'	+56'	124°	30°52'	+56'	125°	30°17'	+56'	125°	29°43'	+57'	126°	29°08'	+57'	126°	28°32'	+57'	126°	15
16	32°54'	+55'	123°	32°21'	+55'	124°	31°48'	+56'	124°	31°14'	+56'	125°	30°39'	+57'	125°	30°05'	+57'	126°	29°29'	+57'	126°	16
17	33°49'	+55'	123°	33°17'	+55'	123°	32°44'	+56'	124°	32°10'	+56'	124°	31°36'	+56'	125°	31°01'	+57'	125°	30°27'	+57'	126°	17
18	34°44'	+55'	122°	34°12'	+55'	123°	33°39'	+56'	123°	33°06'	+56'	124°	32°32'	+56'	124°	31°58'	+57'	125°	31°24'	+57'	125°	18
19	35°39'	+55'	122°	35°07'	+55'	122°	34°35'	+56'	123°	34°02'	+56'	123°	33°29'	+56'	124°	32°55'	+57'	125°	32°21'	+57'	125°	19
20	36°34'	+55'	121°	36°02'	+55'	122°	35°30'	+55'	122°	34°58'	+56'	123°	34°25'	+56'	124°	33°52'	+57'	124°	33°18'	+57'	125°	20
21	37°28'	+54'	121°	36°57'	+55'	121°	36°26'	+55'	122°	35°54'	+56'	123°	35°21'	+56'	123°	34°48'	+57'	124°	34°15'	+57'	124°	21
22	38°23'	+54'	120°	37°52'	+55'	121°	37°21'	+55'	121°	36°50'	+56'	122°	36°18'	+56'	123°	35°45'	+56'	123°	35°12'	+57'	124°	22
23	39°17'	+54'	120°	38°47'	+55'	120°	38°16'	+55'	121°	37°45'	+56'	122°	37°14'	+56'	122°	36°41'	+56'	123°	36°08'	+57'	124°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

47° 313° LHA — Latitude SAME as Declination — 47° 313° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

48° 312° LHA — Latitude SAME as Declination — 48° 312° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	17°41'	+56'	129°	17°03'	+56'	129°	16°26'	+57'	129°	15°48'	+57'	129°	15°09'	+57'	130°	14°31'	+57'	130°	13°52'	+58'	130°	0
1	18°37'	+56'	128°	18°00'	+56'	129°	17°22'	+57'	129°	16°45'	+57'	129°	16°07'	+57'	129°	15°28'	+57'	130°	14°50'	+58'	130°	1
2	19°33'	+56'	128°	18°56'	+56'	128°	18°19'	+57'	129°	17°41'	+57'	129°	17°04'	+57'	129°	16°26'	+57'	129°	15°48'	+58'	129°	2
3	20°29'	+56'	128°	19°52'	+56'	128°	19°16'	+57'	128°	18°38'	+57'	128°	18°01'	+57'	129°	17°23'	+57'	129°	16°45'	+58'	129°	3
4	21°25'	+56'	127°	20°49'	+56'	128°	20°12'	+57'	128°	19°35'	+57'	128°	18°58'	+57'	128°	18°21'	+57'	129°	17°43'	+58'	129°	4
5	22°21'	+56'	127°	21°45'	+56'	127°	21°09'	+56'	127°	20°32'	+57'	128°	19°55'	+57'	128°	19°18'	+57'	128°	18°41'	+58'	129°	5
6	23°17'	+56'	126°	22°41'	+56'	127°	22°05'	+56'	127°	21°29'	+57'	127°	20°52'	+57'	128°	20°15'	+57'	128°	19°38'	+58'	128°	6
7	24°13'	+56'	126°	23°37'	+56'	126°	23°01'	+56'	127°	22°25'	+57'	127°	21°49'	+57'	127°	21°13'	+57'	128°	20°36'	+58'	128°	7
8	25°08'	+56'	126°	24°33'	+56'	126°	23°58'	+56'	126°	23°22'	+57'	127°	22°46'	+57'	127°	22°10'	+57'	127°	21°33'	+57'	128°	8
9	26°04'	+56'	125°	25°29'	+56'	126°	24°54'	+56'	126°	24°19'	+57'	126°	23°43'	+57'	127°	23°07'	+57'	127°	22°31'	+57'	127°	9
10	27°00'	+55'	125°	26°25'	+56'	125°	25°50'	+56'	126°	25°15'	+57'	126°	24°40'	+57'	126°	24°04'	+57'	127°	23°28'	+57'	127°	10
11	27°55'	+55'	124°	27°21'	+56'	125°	26°47'	+56'	125°	26°12'	+56'	126°	25°37'	+57'	126°	25°01'	+57'	126°	24°26'	+57'	127°	11
12	28°51'	+55'	124°	28°17'	+56'	124°	27°43'	+56'	125°	27°08'	+56'	125°	26°34'	+57'	126°	25°58'	+57'	126°	25°23'	+57'	126°	12
13	29°46'	+55'	123°	29°13'	+56'	124°	28°39'	+56'	124°	28°05'	+56'	125°	27°30'	+57'	125°	26°55'	+57'	126°	26°20'	+57'	126°	13
14	30°41'	+55'	123°	30°08'	+56'	124°	29°35'	+56'	124°	29°01'	+56'	124°	28°27'	+57'	125°	27°52'	+57'	125°	27°18'	+57'	126°	14
15	31°36'	+55'	123°	31°04'	+55'	123°	30°31'	+56'	124°	29°57'	+56'	124°	29°24'	+57'	125°	28°49'	+57'	125°	28°15'	+57'	125°	15
16	32°31'	+55'	122°	31°59'	+55'	123°	31°27'	+56'	123°	30°54'	+56'	124°	30°20'	+56'	124°	29°46'	+57'	125°	29°12'	+57'	125°	16
17	33°26'	+55'	122°	32°54'	+55'	122°	32°22'	+56'	123°	31°50'	+56'	123°	31°17'	+56'	124°	30°43'	+57'	124°	30°09'	+57'	125°	17
18	34°21'	+55'	121°	33°50'	+55'	122°	33°18'	+56'	122°	32°46'	+56'	123°	32°13'	+56'	123°	31°40'	+57'	124°	31°06'	+57'	124°	18
19	35°16'	+55'	121°	34°45'	+55'	121°	34°14'	+55'	122°	33°42'	+56'	122°	33°09'	+56'	123°	32°36'	+57'	123°	32°03'	+57'	124°	19
20	36°10'	+54'	120°	35°40'	+55'	121°	35°09'	+55'	121°	34°37'	+56'	122°	34°05'	+56'	123°	33°33'	+57'	123°	33°00'	+57'	124°	20
21	37°05'	+54'	120°	36°35'	+55'	120°	36°04'	+55'	121°	35°33'	+56'	121°	35°02'	+56'	122°	34°29'	+56'	123°	33°57'	+57'	123°	21
22	37°59'	+54'	119°	37°30'	+55'	120°	37°00'	+55'	120°	36°29'	+56'	121°	35°58'	+56'	122°	35°26'	+56'	122°	34°54'	+57'	123°	22
23	38°53'	+54'	118°	38°24'	+54'	119°	37°55'	+55'	120°	37°24'	+55'	121°	36°54'	+56'	121°	36°22'	+56'	122°	35°50'	+57'	122°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

48° 312° LHA — Latitude SAME as Declination — 48° 312° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

49° 311° LHA — Latitude SAME as Declination — 49° 311° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	17°20'	+56'	128°	16°43'	+56'	128°	16°06'	+57'	128°	15°29'	+57'	128°	14°51'	+57'	129°	14°14'	+57'	129°	13°36'	+58'	129°	0
1	18°16'	+56'	127°	17°39'	+56'	128°	17°02'	+57'	128°	16°25'	+57'	128°	15°48'	+57'	128°	15°11'	+57'	129°	14°34'	+58'	129°	1
2	19°12'	+56'	127°	18°35'	+56'	127°	17°59'	+57'	128°	17°22'	+57'	128°	16°45'	+57'	128°	16°08'	+57'	128°	15°31'	+58'	128°	2
3	20°07'	+56'	127°	19°32'	+56'	127°	18°55'	+56'	127°	18°19'	+57'	127°	17°42'	+57'	128°	17°06'	+57'	128°	16°29'	+58'	128°	3
4	21°03'	+56'	126°	20°28'	+56'	127°	19°52'	+56'	127°	19°16'	+57'	127°	18°40'	+57'	127°	18°03'	+57'	128°	17°26'	+58'	128°	4
5	21°59'	+56'	126°	21°24'	+56'	126°	20°48'	+56'	126°	20°13'	+57'	127°	19°37'	+57'	127°	19°00'	+57'	127°	18°24'	+57'	128°	5
6	22°55'	+56'	125°	22°20'	+56'	126°	21°45'	+56'	126°	21°09'	+57'	126°	20°33'	+57'	127°	19°57'	+57'	127°	19°21'	+57'	127°	6
7	23°51'	+56'	125°	23°16'	+56'	125°	22°41'	+56'	126°	22°06'	+57'	126°	21°30'	+57'	126°	20°55'	+57'	127°	20°19'	+57'	127°	7
8	24°46'	+56'	125°	24°12'	+56'	125°	23°37'	+56'	125°	23°02'	+57'	126°	22°27'	+57'	126°	21°52'	+57'	126°	21°16'	+57'	127°	8
9	25°42'	+55'	124°	25°08'	+56'	125°	24°34'	+56'	125°	23°59'	+56'	125°	23°24'	+57'	126°	22°49'	+57'	126°	22°14'	+57'	126°	9
10	26°37'	+55'	124°	26°04'	+56'	124°	25°30'	+56'	125°	24°55'	+56'	125°	24°21'	+57'	125°	23°46'	+57'	126°	23°11'	+57'	126°	10
11	27°32'	+55'	123°	26°59'	+56'	124°	26°26'	+56'	124°	25°52'	+56'	125°	25°18'	+57'	125°	24°43'	+57'	125°	24°08'	+57'	126°	11
12	28°28'	+55'	123°	27°55'	+56'	123°	27°22'	+56'	124°	26°48'	+56'	124°	26°14'	+57'	125°	25°40'	+57'	125°	25°06'	+57'	125°	12
13	29°23'	+55'	122°	28°51'	+56'	123°	28°18'	+56'	123°	27°45'	+56'	124°	27°11'	+57'	124°	26°37'	+57'	125°	26°03'	+57'	125°	13
14	30°18'	+55'	122°	29°46'	+55'	122°	29°14'	+56'	123°	28°41'	+56'	123°	28°08'	+57'	124°	27°34'	+57'	124°	27°00'	+57'	125°	14
15	31°13'	+55'	122°	30°42'	+55'	122°	30°09'	+56'	123°	29°37'	+56'	123°	29°04'	+56'	123°	28°31'	+57'	124°	27°57'	+57'	124°	15
16	32°08'	+55'	121°	31°37'	+55'	122°	31°05'	+56'	122°	30°33'	+56'	123°	30°01'	+56'	123°	29°28'	+57'	124°	28°54'	+57'	124°	16
17	33°03'	+55'	121°	32°32'	+55'	121°	32°01'	+56'	122°	31°29'	+56'	122°	30°57'	+56'	123°	30°24'	+57'	123°	29°51'	+57'	124°	17
18	33°58'	+55'	120°	33°27'	+55'	121°	32°56'	+55'	121°	32°25'	+56'	122°	31°53'	+56'	122°	31°21'	+57'	123°	30°48'	+57'	123°	18
19	34°52'	+54'	120°	34°22'	+55'	120°	33°52'	+55'	121°	33°21'	+56'	121°	32°49'	+56'	122°	32°18'	+57'	122°	31°45'	+57'	123°	19
20	35°47'	+54'	119°	35°17'	+55'	120°	34°47'	+55'	120°	34°17'	+56'	121°	33°46'	+56'	121°	33°14'	+56'	122°	32°42'	+57'	123°	20
21	36°41'	+54'	119°	36°12'	+55'	119°	35°42'	+55'	120°	35°12'	+56'	120°	34°42'	+56'	121°	34°10'	+56'	122°	33°39'	+57'	122°	21
22	37°35'	+54'	118°	37°07'	+55'	119°	36°38'	+55'	119°	36°08'	+55'	120°	35°38'	+56'	121°	35°07'	+56'	121°	34°35'	+57'	122°	22
23	38°29'	+54'	117°	38°01'	+54'	118°	37°33'	+55'	119°	37°03'	+55'	119°	36°33'	+56'	120°	36°03'	+56'	121°	35°32'	+57'	121°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

49° 311° LHA — Latitude SAME as Declination — 49° 311° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

50° 310° LHA — Latitude SAME as Declination — 50° 310° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	16°58'	+56'	127°	16°22'	+56'	127°	15°46'	+56'	127°	15°09'	+57'	127°	14°33'	+57'	128°	13°56'	+57'	128°	13°19'	+58'	128°	0
1	17°54'	+56'	126°	17°18'	+56'	127°	16°42'	+56'	127°	16°06'	+57'	127°	15°30'	+57'	127°	14°53'	+57'	128°	14°17'	+58'	128°	1
2	18°50'	+56'	126°	18°14'	+56'	126°	17°39'	+56'	127°	17°03'	+57'	127°	16°27'	+57'	127°	15°51'	+57'	127°	15°14'	+58'	127°	2
3	19°45'	+56'	126°	19°10'	+56'	126°	18°35'	+56'	126°	18°00'	+57'	126°	17°24'	+57'	127°	16°48'	+57'	127°	16°12'	+57'	127°	3
4	20°41'	+56'	125°	20°06'	+56'	126°	19°31'	+56'	126°	18°56'	+57'	126°	18°21'	+57'	126°	17°45'	+57'	127°	17°09'	+57'	127°	4
5	21°37'	+56'	125°	21°02'	+56'	125°	20°28'	+56'	125°	19°53'	+57'	126°	19°18'	+57'	126°	18°42'	+57'	126°	18°07'	+57'	127°	5
6	22°33'	+56'	124°	21°58'	+56'	125°	21°24'	+56'	125°	20°49'	+57'	125°	20°15'	+57'	126°	19°39'	+57'	126°	19°04'	+57'	126°	6
7	23°28'	+55'	124°	22°54'	+56'	124°	22°20'	+56'	125°	21°46'	+56'	125°	21°11'	+57'	125°	20°37'	+57'	126°	20°01'	+57'	126°	7
8	24°24'	+55'	124°	23°50'	+56'	124°	23°16'	+56'	124°	22°43'	+56'	125°	22°08'	+57'	125°	21°34'	+57'	125°	20°59'	+57'	126°	8
9	25°19'	+55'	123°	24°46'	+56'	124°	24°13'	+56'	124°	23°39'	+56'	124°	23°05'	+57'	125°	22°31'	+57'	125°	21°56'	+57'	125°	9
10	26°14'	+55'	123°	25°42'	+56'	123°	25°09'	+56'	124°	24°35'	+56'	124°	24°02'	+57'	124°	23°28'	+57'	125°	22°53'	+57'	125°	10
11	27°10'	+55'	122°	26°37'	+56'	123°	26°05'	+56'	123°	25°32'	+56'	124°	24°58'	+57'	124°	24°25'	+57'	124°	23°51'	+57'	125°	11
12	28°05'	+55'	122°	27°33'	+55'	122°	27°01'	+56'	123°	26°28'	+56'	123°	25°55'	+57'	124°	25°22'	+57'	124°	24°48'	+57'	124°	12
13	29°00'	+55'	121°	28°28'	+55'	122°	27°56'	+56'	122°	27°24'	+56'	123°	26°52'	+56'	123°	26°18'	+57'	124°	25°45'	+57'	124°	13
14	29°55'	+55'	121°	29°24'	+55'	121°	28°52'	+56'	122°	28°20'	+56'	122°	27°48'	+56'	123°	27°15'	+57'	123°	26°42'	+57'	124°	14
15	30°50'	+55'	120°	30°19'	+55'	121°	29°48'	+56'	121°	29°16'	+56'	122°	28°44'	+56'	122°	28°12'	+57'	123°	27°39'	+57'	123°	15
16	31°45'	+55'	120°	31°14'	+55'	121°	30°44'	+56'	121°	30°12'	+56'	122°	29°41'	+56'	122°	29°09'	+57'	123°	28°36'	+57'	123°	16
17	32°39'	+55'	120°	32°09'	+55'	120°	31°39'	+55'	121°	31°08'	+56'	121°	30°37'	+56'	122°	30°05'	+57'	122°	29°33'	+57'	123°	17
18	33°34'	+54'	119°	33°04'	+55'	120°	32°35'	+55'	120°	32°04'	+56'	121°	31°33'	+56'	121°	31°02'	+56'	122°	30°30'	+57'	122°	18
19	34°28'	+54'	119°	33°59'	+55'	119°	33°30'	+55'	120°	33°00'	+56'	120°	32°29'	+56'	121°	31°58'	+56'	121°	31°27'	+57'	122°	19
20	35°23'	+54'	118°	34°54'	+55'	119°	34°25'	+55'	119°	33°56'	+56'	120°	33°25'	+56'	120°	32°55'	+56'	121°	32°24'	+57'	122°	20
21	36°17'	+54'	117°	35°49'	+55'	118°	35°20'	+55'	119°	34°51'	+55'	119°	34°21'	+56'	120°	33°51'	+56'	121°	33°20'	+57'	121°	21
22	37°11'	+54'	117°	36°43'	+54'	118°	36°15'	+55'	118°	35°47'	+55'	119°	35°17'	+56'	120°	34°47'	+56'	120°	34°17'	+57'	121°	22
23	38°05'	+54'	116°	37°38'	+54'	117°	37°10'	+55'	118°	36°42'	+55'	118°	36°13'	+56'	119°	35°44'	+56'	120°	35°14'	+56'	120°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

50° 310° LHA — Latitude SAME as Declination — 50° 310° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

51° 309° LHA — Latitude SAME as Declination — 51° 309° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	16°36'	+56'	126°	16°01'	+56'	126°	15°25'	+56'	126°	14°50'	+57'	126°	14°14'	+57'	127°	13°38'	+57'	127°	13°02'	+57'	127°	0
1	17°32'	+56'	125°	16°57'	+56'	126°	16°22'	+56'	126°	15°47'	+57'	126°	15°11'	+57'	126°	14°35'	+57'	127°	14°00'	+57'	127°	1
2	18°28'	+56'	125°	17°53'	+56'	125°	17°18'	+56'	126°	16°43'	+57'	126°	16°08'	+57'	126°	15°33'	+57'	126°	14°57'	+57'	126°	2
3	19°23'	+56'	125°	18°49'	+56'	125°	18°15'	+56'	125°	17°40'	+57'	125°	17°05'	+57'	126°	16°30'	+57'	126°	15°54'	+57'	126°	3
4	20°19'	+56'	124°	19°45'	+56'	125°	19°11'	+56'	125°	18°36'	+57'	125°	18°02'	+57'	125°	17°27'	+57'	126°	16°52'	+57'	126°	4
5	21°14'	+56'	124°	20°41'	+56'	124°	20°07'	+56'	124°	19°33'	+57'	125°	18°59'	+57'	125°	18°24'	+57'	125°	17°49'	+57'	126°	5
6	22°10'	+55'	123°	21°37'	+56'	124°	21°03'	+56'	124°	20°29'	+56'	124°	19°55'	+57'	125°	19°21'	+57'	125°	18°47'	+57'	125°	6
7	23°05'	+55'	123°	22°32'	+56'	123°	21°59'	+56'	124°	21°26'	+56'	124°	20°52'	+57'	124°	20°18'	+57'	125°	19°44'	+57'	125°	7
8	24°01'	+55'	123°	23°28'	+56'	123°	22°55'	+56'	123°	22°22'	+56'	124°	21°49'	+57'	124°	21°15'	+57'	124°	20°41'	+57'	125°	8
9	24°56'	+55'	122°	24°24'	+56'	123°	23°51'	+56'	123°	23°19'	+56'	123°	22°46'	+57'	124°	22°12'	+57'	124°	21°38'	+57'	124°	9
10	25°51'	+55'	122°	25°20'	+56'	122°	24°47'	+56'	123°	24°15'	+56'	123°	23°42'	+57'	123°	23°09'	+57'	124°	22°36'	+57'	124°	10
11	26°46'	+55'	121°	26°15'	+55'	122°	25°43'	+56'	122°	25°11'	+56'	123°	24°39'	+57'	123°	24°06'	+57'	123°	23°33'	+57'	124°	11
12	27°41'	+55'	121°	27°11'	+55'	121°	26°39'	+56'	122°	26°07'	+56'	122°	25°35'	+56'	123°	25°03'	+57'	123°	24°30'	+57'	123°	12
13	28°36'	+55'	120°	28°06'	+55'	121°	27°35'	+56'	121°	27°04'	+56'	122°	26°32'	+56'	122°	26°00'	+57'	123°	25°27'	+57'	123°	13
14	29°31'	+55'	120°	29°01'	+55'	120°	28°31'	+56'	121°	28°00'	+56'	121°	27°28'	+56'	122°	26°56'	+57'	122°	26°24'	+57'	123°	14
15	30°26'	+55'	119°	29°56'	+55'	120°	29°26'	+56'	120°	28°56'	+56'	121°	28°25'	+56'	121°	27°53'	+57'	122°	27°21'	+57'	122°	15
16	31°21'	+55'	119°	30°52'	+55'	120°	30°22'	+55'	120°	29°52'	+56'	121°	29°21'	+56'	121°	28°50'	+57'	121°	28°18'	+57'	122°	16
17	32°15'	+54'	118°	31°47'	+55'	119°	31°17'	+55'	120°	30°47'	+56'	120°	30°17'	+56'	121°	29°46'	+56'	121°	29°15'	+57'	122°	17
18	33°10'	+54'	118°	32°41'	+55'	119°	32°13'	+55'	119°	31°43'	+56'	120°	31°13'	+56'	120°	30°43'	+56'	121°	30°12'	+57'	121°	18
19	34°04'	+54'	117°	33°36'	+55'	118°	33°08'	+55'	119°	32°39'	+56'	119°	32°09'	+56'	120°	31°39'	+56'	120°	31°09'	+57'	121°	19
20	34°58'	+54'	117°	34°31'	+55'	118°	34°03'	+55'	118°	33°34'	+55'	119°	33°05'	+56'	119°	32°35'	+56'	120°	32°05'	+57'	120°	20
21	35°53'	+54'	116°	35°26'	+54'	117°	34°58'	+55'	118°	34°30'	+55'	118°	34°01'	+56'	119°	33°32'	+56'	120°	33°02'	+57'	120°	21
22	36°47'	+54'	116°	36°20'	+54'	117°	35°53'	+55'	117°	35°25'	+55'	118°	34°57'	+56'	118°	34°28'	+56'	119°	33°59'	+56'	120°	22
23	37°40'	+54'	115°	37°14'	+54'	116°	36°48'	+55'	117°	36°20'	+55'	117°	35°52'	+56'	118°	35°24'	+56'	119°	34°55'	+56'	119°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

51° 309° LHA — Latitude SAME as Declination — 51° 309° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

52° 308° LHA — Latitude SAME as Declination — 52° 308° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	16°14'	+56'	125°	15°39'	+56'	125°	15°05'	+56'	125°	14°30'	+57'	126°	13°55'	+57'	126°	13°20'	+57'	126°	12°45'	+57'	126°	0
1	17°09'	+56'	124°	16°35'	+56'	125°	16°01'	+56'	125°	15°27'	+57'	125°	14°52'	+57'	125°	14°17'	+57'	126°	13°42'	+57'	126°	1
2	18°05'	+56'	124°	17°31'	+56'	124°	16°57'	+56'	125°	16°23'	+57'	125°	15°49'	+57'	125°	15°14'	+57'	125°	14°40'	+57'	126°	2
3	19°01'	+56'	124°	18°27'	+56'	124°	17°54'	+56'	124°	17°20'	+56'	124°	16°46'	+57'	125°	16°11'	+57'	125°	15°37'	+57'	125°	3
4	19°56'	+55'	123°	19°23'	+56'	124°	18°50'	+56'	124°	18°16'	+56'	124°	17°43'	+57'	124°	17°09'	+57'	125°	16°34'	+57'	125°	4
5	20°52'	+55'	123°	20°19'	+56'	123°	19°46'	+56'	123°	19°13'	+56'	124°	18°39'	+57'	124°	18°06'	+57'	124°	17°32'	+57'	125°	5
6	21°47'	+55'	122°	21°15'	+56'	123°	20°42'	+56'	123°	20°09'	+56'	123°	19°36'	+57'	124°	19°03'	+57'	124°	18°29'	+57'	124°	6
7	22°42'	+55'	122°	22°10'	+56'	122°	21°38'	+56'	123°	21°06'	+56'	123°	20°33'	+57'	123°	20°00'	+57'	124°	19°26'	+57'	124°	7
8	23°38'	+55'	122°	23°06'	+56'	122°	22°34'	+56'	122°	22°02'	+56'	123°	21°29'	+57'	123°	20°57'	+57'	123°	20°23'	+57'	124°	8
9	24°33'	+55'	121°	24°02'	+56'	122°	23°30'	+56'	122°	22°58'	+56'	122°	22°26'	+57'	123°	21°53'	+57'	123°	21°21'	+57'	123°	9
10	25°28'	+55'	121°	24°57'	+55'	121°	24°26'	+56'	122°	23°54'	+56'	122°	23°23'	+56'	122°	22°50'	+57'	123°	22°18'	+57'	123°	10
11	26°23'	+55'	120°	25°53'	+55'	121°	25°22'	+56'	121°	24°51'	+56'	122°	24°19'	+56'	122°	23°47'	+57'	122°	23°15'	+57'	123°	11
12	27°18'	+55'	120°	26°48'	+55'	120°	26°17'	+56'	121°	25°47'	+56'	121°	25°15'	+56'	122°	24°44'	+57'	122°	24°12'	+57'	122°	12
13	28°13'	+55'	119°	27°43'	+55'	120°	27°13'	+56'	120°	26°43'	+56'	121°	26°12'	+56'	121°	25°41'	+57'	122°	25°09'	+57'	122°	13
14	29°08'	+55'	119°	28°38'	+55'	119°	28°09'	+56'	120°	27°39'	+56'	120°	27°08'	+56'	121°	26°37'	+57'	121°	26°06'	+57'	122°	14
15	30°02'	+55'	118°	29°34'	+55'	119°	29°04'	+55'	119°	28°35'	+56'	120°	28°04'	+56'	120°	27°34'	+57'	121°	27°03'	+57'	121°	15
16	30°57'	+54'	118°	30°29'	+55'	118°	30°00'	+55'	119°	29°30'	+56'	119°	29°01'	+56'	120°	28°30'	+56'	120°	28°00'	+57'	121°	16
17	31°51'	+54'	117°	31°23'	+55'	118°	30°55'	+55'	119°	30°26'	+56'	119°	29°57'	+56'	120°	29°27'	+56'	120°	28°57'	+57'	121°	17
18	32°46'	+54'	117°	32°18'	+55'	118°	31°50'	+55'	118°	31°22'	+56'	119°	30°53'	+56'	119°	30°23'	+56'	120°	29°53'	+57'	120°	18
19	33°40'	+54'	116°	33°13'	+55'	117°	32°45'	+55'	118°	32°17'	+55'	118°	31°49'	+56'	119°	31°20'	+56'	119°	30°50'	+57'	120°	19
20	34°34'	+54'	116°	34°08'	+54'	117°	33°40'	+55'	117°	33°13'	+55'	118°	32°45'	+56'	118°	32°16'	+56'	119°	31°47'	+57'	119°	20
21	35°28'	+54'	115°	35°02'	+54'	116°	34°35'	+55'	117°	34°08'	+55'	117°	33°40'	+56'	118°	33°12'	+56'	118°	32°43'	+56'	119°	21
22	36°22'	+54'	115°	35°56'	+54'	116°	35°30'	+55'	116°	35°03'	+55'	117°	34°36'	+56'	117°	34°08'	+56'	118°	33°40'	+56'	119°	22
23	37°16'	+54'	114°	36°51'	+54'	115°	36°25'	+55'	116°	35°59'	+55'	116°	35°32'	+55'	117°	35°04'	+56'	118°	34°36'	+56'	118°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

52° 308° LHA — Latitude SAME as Declination — 52° 308° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

53° 307° LHA — Latitude SAME as Declination — 53° 307° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	15°51'	+56'	124°	15°18'	+56'	124°	14°44'	+56'	124°	14°10'	+57'	125°	13°36'	+57'	125°	13°02'	+57'	125°	12°27'	+57'	125°	0
1	16°47'	+56'	123°	16°14'	+56'	124°	15°40'	+56'	124°	15°07'	+56'	124°	14°33'	+57'	124°	13°59'	+57'	125°	13°25'	+57'	125°	1
2	17°42'	+55'	123°	17°10'	+56'	123°	16°36'	+56'	124°	16°03'	+56'	124°	15°30'	+57'	124°	14°56'	+57'	124°	14°22'	+57'	125°	2
3	18°38'	+55'	123°	18°05'	+56'	123°	17°33'	+56'	123°	17°00'	+56'	123°	16°26'	+57'	124°	15°53'	+57'	124°	15°19'	+57'	124°	3
4	19°33'	+55'	122°	19°01'	+56'	123°	18°29'	+56'	123°	17°56'	+56'	123°	17°23'	+57'	123°	16°50'	+57'	124°	16°17'	+57'	124°	4
5	20°29'	+55'	122°	19°57'	+56'	122°	19°25'	+56'	122°	18°52'	+56'	123°	18°20'	+57'	123°	17°47'	+57'	123°	17°14'	+57'	124°	5
6	21°24'	+55'	121°	20°52'	+56'	122°	20°21'	+56'	122°	19°49'	+56'	122°	19°16'	+57'	123°	18°44'	+57'	123°	18°11'	+57'	123°	6
7	22°19'	+55'	121°	21°48'	+56'	121°	21°17'	+56'	122°	20°45'	+56'	122°	20°13'	+57'	122°	19°41'	+57'	123°	19°08'	+57'	123°	7
8	23°14'	+55'	121°	22°44'	+55'	121°	22°13'	+56'	121°	21°41'	+56'	122°	21°10'	+57'	122°	20°38'	+57'	122°	20°05'	+57'	123°	8
9	24°09'	+55'	120°	23°39'	+55'	121°	23°08'	+56'	121°	22°37'	+56'	121°	22°06'	+56'	122°	21°34'	+57'	122°	21°03'	+57'	122°	9
10	25°04'	+55'	120°	24°35'	+55'	120°	24°04'	+56'	121°	23°34'	+56'	121°	23°03'	+56'	121°	22°31'	+57'	122°	22°00'	+57'	122°	10
11	25°59'	+55'	119°	25°30'	+55'	120°	25°00'	+56'	120°	24°30'	+56'	121°	23°59'	+56'	121°	23°28'	+57'	121°	22°57'	+57'	122°	11
12	26°54'	+55'	119°	26°25'	+55'	119°	25°56'	+56'	120°	25°26'	+56'	120°	24°55'	+56'	121°	24°25'	+57'	121°	23°54'	+57'	121°	12
13	27°49'	+55'	118°	27°20'	+55'	119°	26°51'	+56'	119°	26°22'	+56'	120°	25°52'	+56'	120°	25°21'	+57'	121°	24°51'	+57'	121°	13
14	28°44'	+55'	118°	28°15'	+55'	118°	27°47'	+55'	119°	27°17'	+56'	119°	26°48'	+56'	120°	26°18'	+57'	120°	25°48'	+57'	121°	14
15	29°38'	+54'	117°	29°10'	+55'	118°	28°42'	+55'	118°	28°13'	+56'	119°	27°44'	+56'	119°	27°14'	+56'	120°	26°44'	+57'	120°	15
16	30°33'	+54'	117°	30°05'	+55'	117°	29°37'	+55'	118°	29°09'	+56'	118°	28°40'	+56'	119°	28°11'	+56'	119°	27°41'	+57'	120°	16
17	31°27'	+54'	116°	31°00'	+55'	117°	30°33'	+55'	118°	30°05'	+56'	118°	29°36'	+56'	119°	29°07'	+56'	119°	28°38'	+57'	120°	17
18	32°21'	+54'	116°	31°55'	+55'	117°	31°28'	+55'	117°	31°00'	+55'	118°	30°32'	+56'	118°	30°04'	+56'	119°	29°35'	+57'	119°	18
19	33°16'	+54'	115°	32°49'	+54'	116°	32°23'	+55'	117°	31°56'	+55'	117°	31°28'	+56'	118°	31°00'	+56'	118°	30°31'	+57'	119°	19
20	34°10'	+54'	115°	33°44'	+54'	116°	33°18'	+55'	116°	32°51'	+55'	117°	32°24'	+56'	117°	31°56'	+56'	118°	31°28'	+56'	118°	20
21	35°03'	+54'	114°	34°38'	+54'	115°	34°13'	+55'	116°	33°46'	+55'	116°	33°20'	+56'	117°	32°52'	+56'	117°	32°24'	+56'	118°	21
22	35°57'	+54'	114°	35°33'	+54'	114°	35°07'	+55'	115°	34°42'	+55'	116°	34°15'	+56'	116°	33°48'	+56'	117°	33°21'	+56'	118°	22
23	36°51'	+53'	113°	36°27'	+54'	114°	36°02'	+54'	115°	35°37'	+55'	115°	35°11'	+55'	116°	34°44'	+56'	117°	34°17'	+56'	117°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

53° 307° LHA — Latitude SAME as Declination — 53° 307° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

54° 306° LHA **Latitude SAME as Declination** **54° 306° LHA**

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	15°29'	+55'	123°	14°56'	+56'	123°	14°23'	+56'	123°	13°50'	+56'	124°	13°17'	+57'	124°	12°43'	+57'	124°	12°10'	+57'	124°	0
1	16°24'	+55'	123°	15°52'	+56'	123°	15°19'	+56'	123°	14°46'	+56'	123°	14°13'	+57'	123°	13°40'	+57'	124°	13°07'	+57'	124°	1
2	17°19'	+55'	122°	16°47'	+56'	122°	16°15'	+56'	123°	15°43'	+56'	123°	15°10'	+57'	123°	14°37'	+57'	123°	14°04'	+57'	124°	2
3	18°15'	+55'	122°	17°43'	+56'	122°	17°11'	+56'	122°	16°39'	+56'	123°	16°07'	+57'	123°	15°34'	+57'	123°	15°01'	+57'	123°	3
4	19°10'	+55'	121°	18°39'	+56'	122°	18°07'	+56'	122°	17°35'	+56'	122°	17°03'	+57'	122°	16°31'	+57'	123°	15°59'	+57'	123°	4
5	20°05'	+55'	121°	19°34'	+56'	121°	19°03'	+56'	121°	18°32'	+56'	122°	18°00'	+57'	122°	17°28'	+57'	122°	16°56'	+57'	123°	5
6	21°01'	+55'	120°	20°30'	+56'	121°	19°59'	+56'	121°	19°28'	+56'	121°	18°57'	+57'	122°	18°25'	+57'	122°	17°53'	+57'	122°	6
7	21°56'	+55'	120°	21°25'	+55'	120°	20°55'	+56'	121°	20°24'	+56'	121°	19°53'	+56'	121°	19°22'	+57'	122°	18°50'	+57'	122°	7
8	22°51'	+55'	120°	22°21'	+55'	120°	21°51'	+56'	120°	21°20'	+56'	121°	20°50'	+56'	121°	20°19'	+57'	121°	19°47'	+57'	122°	8
9	23°46'	+55'	119°	23°16'	+55'	120°	22°47'	+56'	120°	22°16'	+56'	120°	21°46'	+56'	121°	21°15'	+57'	121°	20°44'	+57'	121°	9
10	24°41'	+55'	119°	24°12'	+55'	119°	23°42'	+56'	120°	23°13'	+56'	120°	22°42'	+56'	120°	22°12'	+57'	121°	21°41'	+57'	121°	10
11	25°36'	+55'	118°	25°07'	+55'	119°	24°38'	+56'	119°	24°08'	+56'	120°	23°39'	+56'	120°	23°09'	+57'	120°	22°38'	+57'	121°	11
12	26°30'	+55'	118°	26°02'	+55'	118°	25°33'	+55'	119°	25°04'	+56'	119°	24°35'	+56'	120°	24°05'	+57'	120°	23°35'	+57'	120°	12
13	27°25'	+55'	117°	26°57'	+55'	118°	26°29'	+55'	118°	26°00'	+56'	119°	25°31'	+56'	119°	25°02'	+57'	120°	24°32'	+57'	120°	13
14	28°20'	+54'	117°	27°52'	+55'	117°	27°24'	+55'	118°	26°56'	+56'	118°	26°27'	+56'	119°	25°58'	+56'	119°	25°29'	+57'	120°	14
15	29°14'	+54'	116°	28°47'	+55'	117°	28°20'	+55'	117°	27°52'	+56'	118°	27°24'	+56'	118°	26°55'	+56'	119°	26°26'	+57'	119°	15
16	30°08'	+54'	116°	29°42'	+55'	116°	29°15'	+55'	117°	28°47'	+56'	117°	28°20'	+56'	118°	27°51'	+56'	118°	27°23'	+57'	119°	16
17	31°03'	+54'	115°	30°37'	+55'	116°	30°10'	+55'	117°	29°43'	+55'	117°	29°16'	+56'	118°	28°48'	+56'	118°	28°19'	+57'	118°	17
18	31°57'	+54'	115°	31°31'	+55'	115°	31°05'	+55'	116°	30°39'	+55'	117°	30°11'	+56'	117°	29°44'	+56'	118°	29°16'	+57'	118°	18
19	32°51'	+54'	114°	32°26'	+54'	115°	32°00'	+55'	116°	31°34'	+55'	116°	31°07'	+56'	117°	30°40'	+56'	117°	30°12'	+56'	118°	19
20	33°45'	+54'	114°	33°20'	+54'	115°	32°55'	+55'	115°	32°29'	+55'	116°	32°03'	+56'	116°	31°36'	+56'	117°	31°09'	+56'	117°	20
21	34°38'	+54'	113°	34°14'	+54'	114°	33°50'	+55'	115°	33°24'	+55'	115°	32°59'	+56'	116°	32°32'	+56'	116°	32°05'	+56'	117°	21
22	35°32'	+53'	113°	35°08'	+54'	113°	34°44'	+54'	114°	34°19'	+55'	115°	33°54'	+55'	115°	33°28'	+56'	116°	33°02'	+56'	117°	22
23	36°26'	+53'	112°	36°02'	+54'	113°	35°39'	+54'	114°	35°14'	+55'	114°	34°50'	+55'	115°	34°24'	+56'	116°	33°58'	+56'	116°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

54° 306° LHA **Latitude SAME as Declination** **54° 306° LHA**

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

55° 305° LHA **Latitude SAME as Declination** **55° 305° LHA**

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	15°06'	+55'	122°	14°34'	+56'	122°	14°02'	+56'	122°	13°29'	+56'	123°	12°57'	+57'	123°	12°24'	+57'	123°	11°52'	+57'	123°	0
1	16°01'	+55'	122°	15°29'	+56'	122°	14°58'	+56'	122°	14°26'	+56'	122°	13°54'	+57'	122°	13°21'	+57'	123°	12°49'	+57'	123°	1
2	16°56'	+55'	121°	16°25'	+56'	121°	15°54'	+56'	122°	15°22'	+56'	122°	14°50'	+57'	122°	14°18'	+57'	122°	13°46'	+57'	123°	2
3	17°52'	+55'	121°	17°21'	+56'	121°	16°50'	+56'	121°	16°18'	+56'	122°	15°47'	+57'	122°	15°15'	+57'	122°	14°43'	+57'	122°	3
4	18°47'	+55'	120°	18°16'	+56'	121°	17°46'	+56'	121°	17°15'	+56'	121°	16°44'	+57'	121°	16°12'	+57'	122°	15°40'	+57'	122°	4
5	19°42'	+55'	120°	19°12'	+55'	120°	18°41'	+56'	121°	18°11'	+56'	121°	17°40'	+56'	121°	17°09'	+57'	121°	16°38'	+57'	122°	5
6	20°37'	+55'	119°	20°07'	+55'	120°	19°37'	+56'	120°	19°07'	+56'	120°	18°37'	+56'	121°	18°06'	+57'	121°	17°35'	+57'	121°	6
7	21°32'	+55'	119°	21°03'	+55'	119°	20°33'	+56'	120°	20°03'	+56'	120°	19°33'	+56'	120°	19°03'	+57'	121°	18°32'	+57'	121°	7
8	22°27'	+55'	119°	21°58'	+55'	119°	21°29'	+56'	119°	20°59'	+56'	120°	20°29'	+56'	120°	19°59'	+57'	120°	19°29'	+57'	121°	8
9	23°22'	+55'	118°	22°53'	+55'	119°	22°24'	+56'	119°	21°55'	+56'	119°	21°26'	+56'	120°	20°56'	+57'	120°	20°26'	+57'	120°	9
10	24°17'	+55'	118°	23°49'	+55'	118°	23°20'	+56'	119°	22°51'	+56'	119°	22°22'	+56'	119°	21°53'	+57'	120°	21°23'	+57'	120°	10
11	25°11'	+55'	117°	24°44'	+55'	118°	24°16'	+55'	118°	23°47'	+56'	119°	23°18'	+56'	119°	22°49'	+57'	119°	22°20'	+57'	120°	11
12	26°06'	+55'	117°	25°39'	+55'	117°	25°11'	+55'	118°	24°43'	+56'	118°	24°15'	+56'	119°	23°46'	+57'	119°	23°17'	+57'	119°	12
13	27°01'	+54'	116°	26°34'	+55'	117°	26°06'	+55'	117°	25°39'	+56'	118°	25°11'	+56'	118°	24°42'	+56'	119°	24°13'	+57'	119°	13
14	27°55'	+54'	116°	27°29'	+55'	116°	27°02'	+55'	117°	26°35'	+56'	117°	26°07'	+56'	118°	25°39'	+56'	118°	25°10'	+57'	119°	14
15	28°49'	+54'	115°	28°24'	+55'	116°	27°57'	+55'	116°	27°30'	+56'	117°	27°03'	+56'	117°	26°35'	+56'	118°	26°07'	+57'	118°	15
16	29°44'	+54'	115°	29°18'	+55'	115°	28°52'	+55'	116°	28°26'	+55'	116°	27°59'	+56'	117°	27°31'	+56'	117°	27°04'	+57'	118°	16
17	30°38'	+54'	114°	30°13'	+55'	115°	29°47'	+55'	115°	29°21'	+55'	116°	28°55'	+56'	117°	28°28'	+56'	117°	28°00'	+57'	117°	17
18	31°32'	+54'	114°	31°07'	+54'	114°	30°42'	+55'	115°	30°17'	+55'	116°	29°50'	+56'	116°	29°24'	+56'	117°	28°57'	+56'	117°	18
19	32°26'	+54'	113°	32°02'	+54'	114°	31°37'	+55'	115°	31°12'	+55'	115°	30°46'	+56'	116°	30°20'	+56'	116°	29°53'	+56'	117°	19
20	33°20'	+54'	113°	32°56'	+54'	113°	32°32'	+55'	114°	32°07'	+55'	115°	31°42'	+56'	115°	31°16'	+56'	116°	30°50'	+56'	116°	20
21	34°13'	+54'	112°	33°50'	+54'	113°	33°27'	+55'	114°	33°02'	+55'	114°	32°37'	+55'	115°	32°12'	+56'	115°	31°46'	+56'	116°	21
22	35°07'	+53'	112°	34°44'	+54'	112°	34°21'	+54'	113°	33°57'	+55'	114°	33°33'	+55'	114°	33°08'	+56'	115°	32°42'	+56'	115°	22
23	36°00'	+53'	111°	35°38'	+54'	112°	35°15'	+54'	113°	34°52'	+55'	113°	34°28'	+55'	114°	34°04'	+56'	114°	33°38'	+56'	115°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

55° 305° LHA **Latitude SAME as Declination** **55° 305° LHA**

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

56° 304° LHA — Latitude SAME as Declination — 56° 304° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	14°42'	+55'	121°	14°11'	+56'	121°	13°40'	+56'	121°	13°09'	+56'	122°	12°37'	+57'	122°	12°06'	+57'	122°	11°34'	+57'	122°	0
1	15°38'	+55'	121°	15°07'	+56'	121°	14°36'	+56'	121°	14°05'	+56'	121°	13°34'	+57'	121°	13°02'	+57'	122°	12°31'	+57'	122°	1
2	16°33'	+55'	120°	16°03'	+56'	120°	15°32'	+56'	121°	15°01'	+56'	121°	14°30'	+57'	121°	13°59'	+57'	121°	13°28'	+57'	122°	2
3	17°28'	+55'	120°	16°58'	+55'	120°	16°28'	+56'	120°	15°58'	+56'	121°	15°27'	+56'	121°	14°56'	+57'	121°	14°25'	+57'	121°	3
4	18°23'	+55'	119°	17°54'	+55'	120°	17°24'	+56'	120°	16°54'	+56'	120°	16°23'	+56'	120°	15°53'	+57'	121°	15°22'	+57'	121°	4
5	19°18'	+55'	119°	18°49'	+55'	119°	18°20'	+56'	120°	17°50'	+56'	120°	17°20'	+56'	120°	16°50'	+57'	120°	16°19'	+57'	121°	5
6	20°13'	+55'	119°	19°44'	+55'	119°	19°15'	+56'	119°	18°46'	+56'	119°	18°16'	+56'	120°	17°46'	+57'	120°	17°16'	+57'	120°	6
7	21°08'	+55'	118°	20°40'	+55'	118°	20°11'	+56'	119°	19°42'	+56'	119°	19°13'	+56'	119°	18°43'	+57'	120°	18°13'	+57'	120°	7
8	22°03'	+55'	118°	21°35'	+55'	118°	21°07'	+56'	118°	20°38'	+56'	119°	20°09'	+56'	119°	19°40'	+57'	119°	19°10'	+57'	120°	8
9	22°58'	+55'	117°	22°30'	+55'	118°	22°02'	+56'	118°	21°34'	+56'	118°	21°05'	+56'	119°	20°36'	+57'	119°	20°07'	+57'	119°	9
10	23°52'	+55'	117°	23°25'	+55'	117°	22°58'	+55'	118°	22°30'	+56'	118°	22°02'	+56'	118°	21°33'	+57'	119°	21°04'	+57'	119°	10
11	24°47'	+55'	116°	24°20'	+55'	117°	23°53'	+55'	117°	23°26'	+56'	118°	22°58'	+56'	118°	22°29'	+56'	118°	22°01'	+57'	119°	11
12	25°42'	+54'	116°	25°15'	+55'	116°	24°49'	+55'	117°	24°21'	+56'	117°	23°54'	+56'	118°	23°26'	+56'	118°	22°58'	+57'	118°	12
13	26°36'	+54'	115°	26°10'	+55'	116°	25°44'	+55'	116°	25°17'	+56'	117°	24°50'	+56'	117°	24°22'	+56'	118°	23°54'	+57'	118°	13
14	27°31'	+54'	115°	27°05'	+55'	115°	26°39'	+55'	116°	26°13'	+56'	116°	25°46'	+56'	117°	25°19'	+56'	117°	24°51'	+57'	118°	14
15	28°25'	+54'	114°	28°00'	+55'	115°	27°34'	+55'	115°	27°08'	+55'	116°	26°42'	+56'	116°	26°15'	+56'	117°	25°48'	+57'	117°	15
16	29°19'	+54'	114°	28°54'	+55'	114°	28°29'	+55'	115°	28°04'	+55'	115°	27°38'	+56'	116°	27°11'	+56'	116°	26°44'	+57'	117°	16
17	30°13'	+54'	113°	29°49'	+54'	114°	29°24'	+55'	114°	28°59'	+55'	115°	28°34'	+56'	115°	28°08'	+56'	116°	27°41'	+56'	116°	17
18	31°07'	+54'	113°	30°43'	+54'	113°	30°19'	+55'	114°	29°54'	+55'	115°	29°29'	+56'	115°	29°04'	+56'	116°	28°38'	+56'	116°	18
19	32°01'	+54'	112°	31°38'	+54'	113°	31°14'	+55'	114°	30°50'	+55'	114°	30°25'	+56'	115°	30°00'	+56'	115°	29°34'	+56'	116°	19
20	32°55'	+54'	112°	32°32'	+54'	112°	32°09'	+55'	113°	31°45'	+55'	114°	31°21'	+55'	114°	30°56'	+56'	115°	30°30'	+56'	115°	20
21	33°48'	+53'	111°	33°26'	+54'	112°	33°03'	+54'	113°	32°40'	+55'	113°	32°16'	+55'	114°	31°52'	+56'	114°	31°27'	+56'	115°	21
22	34°41'	+53'	111°	34°20'	+54'	111°	33°58'	+54'	112°	33°35'	+55'	113°	33°11'	+55'	113°	32°47'	+56'	114°	32°23'	+56'	114°	22
23	35°35'	+53'	110°	35°14'	+54'	111°	34°52'	+54'	112°	34°30'	+55'	112°	34°07'	+55'	113°	33°43'	+56'	113°	33°19'	+56'	114°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

56° 304° LHA — Latitude SAME as Declination — 56° 304° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

57° 303° LHA — Latitude SAME as Declination — 57° 303° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	14°19'	+55'	120°	13°49'	+56'	120°	13°18'	+56'	120°	12°48'	+56'	121°	12°17'	+57'	121°	11°46'	+57'	121°	11°15'	+57'	121°	0
1	15°14'	+55'	120°	14°44'	+55'	120°	14°14'	+56'	120°	13°44'	+56'	120°	13°14'	+56'	121°	12°43'	+57'	121°	12°12'	+57'	121°	1
2	16°09'	+55'	119°	15°40'	+55'	119°	15°10'	+56'	120°	14°40'	+56'	120°	14°10'	+56'	120°	13°40'	+57'	120°	13°10'	+57'	121°	2
3	17°04'	+55'	119°	16°35'	+55'	119°	16°06'	+56'	119°	15°36'	+56'	120°	15°07'	+56'	120°	14°37'	+57'	120°	14°07'	+57'	120°	3
4	17°59'	+55'	118°	17°31'	+55'	119°	17°02'	+56'	119°	16°32'	+56'	119°	16°03'	+56'	119°	15°33'	+57'	120°	15°04'	+57'	120°	4
5	18°54'	+55'	118°	18°26'	+55'	118°	17°57'	+56'	119°	17°29'	+56'	119°	16°59'	+56'	119°	16°30'	+57'	119°	16°01'	+57'	120°	5
6	19°49'	+55'	118°	19°21'	+55'	118°	18°53'	+56'	118°	18°25'	+56'	118°	17°56'	+56'	119°	17°27'	+57'	119°	16°58'	+57'	119°	6
7	20°44'	+55'	117°	20°16'	+55'	117°	19°49'	+56'	118°	19°21'	+56'	118°	18°52'	+56'	118°	18°23'	+57'	119°	17°55'	+57'	119°	7
8	21°39'	+55'	117°	21°12'	+55'	117°	20°44'	+55'	117°	20°16'	+56'	118°	19°48'	+56'	118°	19°20'	+57'	118°	18°51'	+57'	119°	8
9	22°33'	+55'	116°	22°07'	+55'	117°	21°40'	+55'	117°	21°12'	+56'	117°	20°45'	+56'	118°	20°17'	+57'	118°	19°48'	+57'	118°	9
10	23°28'	+55'	116°	23°02'	+55'	116°	22°35'	+55'	117°	22°08'	+56'	117°	21°41'	+56'	117°	21°13'	+56'	118°	20°45'	+57'	118°	10
11	24°23'	+54'	115°	23°57'	+55'	116°	23°30'	+55'	116°	23°04'	+56'	117°	22°37'	+56'	117°	22°10'	+56'	117°	21°42'	+57'	118°	11
12	25°17'	+54'	115°	24°52'	+55'	115°	24°26'	+55'	116°	24°00'	+56'	116°	23°33'	+56'	117°	23°06'	+56'	117°	22°39'	+57'	117°	12
13	26°11'	+54'	114°	25°46'	+55'	115°	25°21'	+55'	115°	24°55'	+56'	116°	24°29'	+56'	116°	24°02'	+56'	117°	23°35'	+57'	117°	13
14	27°06'	+54'	114°	26°41'	+55'	114°	26°16'	+55'	115°	25°51'	+55'	115°	25°25'	+56'	116°	24°59'	+56'	116°	24°32'	+57'	117°	14
15	28°00'	+54'	113°	27°36'	+55'	114°	27°11'	+55'	114°	26°46'	+55'	115°	26°21'	+56'	115°	25°55'	+56'	116°	25°29'	+57'	116°	15
16	28°54'	+54'	113°	28°30'	+54'	113°	28°06'	+55'	114°	27°42'	+55'	114°	27°17'	+56'	115°	26°51'	+56'	115°	26°25'	+56'	116°	16
17	29°48'	+54'	112°	29°25'	+54'	113°	29°01'	+55'	113°	28°37'	+55'	114°	28°12'	+56'	114°	27°47'	+56'	115°	27°22'	+56'	115°	17
18	30°42'	+54'	112°	30°19'	+54'	112°	29°56'	+55'	113°	29°32'	+55'	114°	29°08'	+56'	114°	28°43'	+56'	115°	28°18'	+56'	115°	18
19	31°36'	+54'	111°	31°13'	+54'	112°	30°51'	+55'	113°	30°27'	+55'	113°	30°04'	+55'	114°	29°39'	+56'	114°	29°14'	+56'	115°	19
20	32°29'	+53'	111°	32°07'	+54'	111°	31°45'	+54'	112°	31°22'	+55'	113°	30°59'	+55'	113°	30°35'	+56'	114°	30°11'	+56'	114°	20
21	33°23'	+53'	110°	33°01'	+54'	111°	32°40'	+54'	112°	32°17'	+55'	112°	31°54'	+55'	113°	31°31'	+56'	113°	31°07'	+56'	114°	21
22	34°16'	+53'	110°	33°55'	+54'	110°	33°34'	+54'	111°	33°12'	+55'	112°	32°50'	+55'	112°	32°27'	+56'	113°	32°03'	+56'	113°	22
23	35°09'	+53'	109°	34°49'	+54'	110°	34°28'	+54'	111°	34°07'	+55'	111°	33°45'	+55'	112°	33°22'	+56'	112°	32°59'	+56'	113°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

57° 303° LHA — Latitude SAME as Declination — 57° 303° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

58° 302° LHA — Latitude SAME as Declination — 58° 302° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	13°55'	+55'	119°	13°26'	+55'	119°	12°56'	+56'	120°	12°27'	+56'	120°	11°57'	+56'	120°	11°27'	+57'	120°	10°57'	+57'	120°	0
1	14°50'	+55'	119°	14°21'	+55'	119°	13°52'	+56'	119°	13°23'	+56'	119°	12°53'	+56'	120°	12°24'	+57'	120°	11°54'	+57'	120°	1
2	15°45'	+55'	118°	15°17'	+55'	119°	14°48'	+56'	119°	14°19'	+56'	119°	13°50'	+56'	119°	13°20'	+57'	119°	12°51'	+57'	120°	2
3	16°40'	+55'	118°	16°12'	+55'	118°	15°44'	+56'	118°	15°15'	+56'	119°	14°46'	+56'	119°	14°17'	+57'	119°	13°48'	+57'	119°	3
4	17°35'	+55'	117°	17°07'	+55'	118°	16°39'	+56'	118°	16°11'	+56'	118°	15°43'	+56'	119°	15°14'	+57'	119°	14°45'	+57'	119°	4
5	18°30'	+55'	117°	18°03'	+55'	117°	17°35'	+56'	118°	17°07'	+56'	118°	16°39'	+56'	118°	16°10'	+57'	118°	15°42'	+57'	119°	5
6	19°25'	+55'	117°	18°58'	+55'	117°	18°31'	+56'	117°	18°03'	+56'	117°	17°35'	+56'	118°	17°07'	+57'	118°	16°39'	+57'	118°	6
7	20°20'	+55'	116°	19°53'	+55'	116°	19°26'	+55'	117°	18°59'	+56'	117°	18°31'	+56'	117°	18°04'	+57'	118°	17°36'	+57'	118°	7
8	21°14'	+55'	116°	20°48'	+55'	116°	20°22'	+55'	116°	19°55'	+56'	117°	19°28'	+56'	117°	19°00'	+56'	117°	18°32'	+57'	118°	8
9	22°09'	+55'	115°	21°43'	+55'	116°	21°17'	+55'	116°	20°51'	+56'	116°	20°24'	+56'	117°	19°57'	+56'	117°	19°29'	+57'	117°	9
10	23°03'	+54'	115°	22°38'	+55'	115°	22°12'	+55'	116°	21°46'	+56'	116°	21°20'	+56'	116°	20°53'	+56'	117°	20°26'	+57'	117°	10
11	23°58'	+54'	114°	23°33'	+55'	115°	23°08'	+55'	115°	22°42'	+56'	116°	22°16'	+56'	116°	21°50'	+56'	116°	21°23'	+57'	117°	11
12	24°52'	+54'	114°	24°28'	+55'	114°	24°03'	+55'	115°	23°38'	+56'	115°	23°12'	+56'	116°	22°46'	+56'	116°	22°19'	+57'	116°	12
13	25°47'	+54'	113°	25°22'	+55'	114°	24°58'	+55'	114°	24°33'	+55'	115°	24°08'	+56'	115°	23°42'	+56'	116°	23°16'	+57'	116°	13
14	26°41'	+54'	113°	26°17'	+55'	113°	25°53'	+55'	114°	25°29'	+55'	114°	25°04'	+56'	115°	24°38'	+56'	115°	24°13'	+57'	116°	14
15	27°35'	+54'	112°	27°12'	+54'	113°	26°48'	+55'	113°	26°24'	+55'	114°	26°00'	+56'	114°	25°35'	+56'	115°	25°09'	+56'	115°	15
16	28°29'	+54'	112°	28°06'	+54'	112°	27°43'	+55'	113°	27°19'	+55'	113°	26°55'	+56'	114°	26°31'	+56'	114°	26°06'	+56'	115°	16
17	29°23'	+54'	111°	29°00'	+54'	112°	28°38'	+55'	112°	28°15'	+55'	113°	27°51'	+56'	113°	27°27'	+56'	114°	27°02'	+56'	114°	17
18	30°16'	+54'	111°	29°55'	+54'	111°	29°33'	+55'	112°	29°10'	+55'	113°	28°47'	+56'	113°	28°23'	+56'	114°	27°59'	+56'	114°	18
19	31°10'	+54'	110°	30°49'	+54'	111°	30°27'	+55'	112°	30°05'	+55'	112°	29°42'	+55'	113°	29°19'	+56'	113°	28°55'	+56'	114°	19
20	32°04'	+53'	110°	31°43'	+54'	110°	31°22'	+54'	111°	31°00'	+55'	112°	30°37'	+55'	112°	30°15'	+56'	113°	29°51'	+56'	113°	20
21	32°57'	+53'	109°	32°37'	+54'	110°	32°16'	+54'	111°	31°55'	+55'	111°	31°33'	+55'	112°	31°10'	+56'	112°	30°47'	+56'	113°	21
22	33°50'	+53'	109°	33°31'	+54'	109°	33°10'	+54'	110°	32°49'	+55'	111°	32°28'	+55'	111°	32°06'	+56'	112°	31°43'	+56'	112°	22
23	34°43'	+53'	108°	34°24'	+53'	109°	34°04'	+54'	110°	33°44'	+55'	110°	33°23'	+55'	111°	33°02'	+55'	111°	32°39'	+56'	112°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

58° 302° LHA — Latitude SAME as Declination — 58° 302° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

59° 301° LHA — Latitude SAME as Declination — 59° 301° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	13°31'	+55'	118°	13°03'	+55'	118°	12°34'	+56'	119°	12°06'	+56'	119°	11°37'	+56'	119°	11°07'	+57'	119°	10°38'	+57'	119°	0
1	14°26'	+55'	118°	13°58'	+55'	118°	13°30'	+56'	118°	13°02'	+56'	118°	12°33'	+56'	119°	12°04'	+57'	119°	11°35'	+57'	119°	1
2	15°21'	+55'	117°	14°54'	+55'	118°	14°26'	+56'	118°	13°58'	+56'	118°	13°29'	+56'	118°	13°01'	+57'	118°	12°32'	+57'	119°	2
3	16°16'	+55'	117°	15°49'	+55'	117°	15°21'	+56'	117°	14°54'	+56'	118°	14°26'	+56'	118°	13°57'	+57'	118°	13°29'	+57'	118°	3
4	17°11'	+55'	116°	16°44'	+55'	117°	16°17'	+56'	117°	15°50'	+56'	117°	15°22'	+56'	118°	14°54'	+57'	118°	14°26'	+57'	118°	4
5	18°06'	+55'	116°	17°39'	+55'	116°	17°12'	+55'	117°	16°45'	+56'	117°	16°18'	+56'	117°	15°51'	+57'	117°	15°23'	+57'	118°	5
6	19°00'	+55'	116°	18°34'	+55'	116°	18°08'	+55'	116°	17°41'	+56'	117°	17°14'	+56'	117°	16°47'	+57'	117°	16°20'	+57'	117°	6
7	19°55'	+55'	115°	19°29'	+55'	116°	19°03'	+55'	116°	18°37'	+56'	116°	18°11'	+56'	116°	17°44'	+56'	117°	17°17'	+57'	117°	7
8	20°50'	+55'	115°	20°24'	+55'	115°	19°59'	+55'	115°	19°33'	+56'	116°	19°07'	+56'	116°	18°40'	+56'	116°	18°13'	+57'	117°	8
9	21°44'	+54'	114°	21°19'	+55'	115°	20°54'	+55'	115°	20°29'	+56'	115°	20°03'	+56'	116°	19°37'	+56'	116°	19°10'	+57'	116°	9
10	22°39'	+54'	114°	22°14'	+55'	114°	21°49'	+55'	115°	21°24'	+56'	115°	20°59'	+56'	115°	20°33'	+56'	116°	20°07'	+57'	116°	10
11	23°33'	+54'	113°	23°09'	+55'	114°	22°45'	+55'	114°	22°20'	+56'	115°	21°55'	+56'	115°	21°29'	+56'	115°	21°03'	+57'	116°	11
12	24°27'	+54'	113°	24°04'	+55'	113°	23°40'	+55'	114°	23°15'	+55'	114°	22°51'	+56'	115°	22°26'	+56'	115°	22°00'	+57'	115°	12
13	25°21'	+54'	112°	24°58'	+55'	113°	24°35'	+55'	113°	24°11'	+55'	114°	23°47'	+56'	114°	23°22'	+56'	115°	22°57'	+57'	115°	13
14	26°16'	+54'	112°	25°53'	+54'	112°	25°30'	+55'	113°	25°06'	+55'	113°	24°42'	+56'	114°	24°18'	+56'	114°	23°53'	+56'	115°	14
15	27°10'	+54'	111°	26°47'	+54'	112°	26°25'	+55'	112°	26°02'	+55'	113°	25°38'	+56'	113°	25°14'	+56'	114°	24°50'	+56'	114°	15
16	28°03'	+54'	111°	27°42'	+54'	111°	27°20'	+55'	112°	26°57'	+55'	112°	26°34'	+56'	113°	26°10'	+56'	113°	25°46'	+56'	114°	16
17	28°57'	+54'	110°	28°36'	+54'	111°	28°14'	+55'	111°	27°52'	+55'	112°	27°29'	+56'	112°	27°06'	+56'	113°	26°43'	+56'	113°	17
18	29°51'	+54'	110°	29°30'	+54'	110°	29°09'	+55'	111°	28°47'	+55'	112°	28°25'	+55'	112°	28°02'	+56'	113°	27°39'	+56'	113°	18
19	30°44'	+53'	109°	30°24'	+54'	110°	30°03'	+54'	111°	29°42'	+55'	111°	29°20'	+55'	112°	28°58'	+56'	112°	28°35'	+56'	113°	19
20	31°38'	+53'	109°	31°18'	+54'	109°	30°58'	+54'	110°	30°37'	+55'	111°	30°16'	+55'	111°	29°54'	+56'	112°	29°31'	+56'	112°	20
21	32°31'	+53'	108°	32°12'	+54'	109°	31°52'	+54'	110°	31°32'	+55'	110°	31°11'	+55'	111°	30°49'	+56'	111°	30°27'	+56'	112°	21
22	33°24'	+53'	108°	33°06'	+54'	108°	32°46'	+54'	109°	32°27'	+55'	110°	32°06'	+55'	110°	31°45'	+56'	111°	31°23'	+56'	111°	22
23	34°17'	+53'	107°	33°59'	+53'	108°	33°41'	+54'	109°	33°21'	+54'	109°	33°01'	+55'	110°	32°41'	+55'	110°	32°19'	+56'	111°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

59° 301° LHA — Latitude SAME as Declination — 59° 301° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

60° 300° LHA — Latitude SAME as Declination — 60° 300° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	13°07'	+55'	117°	12°40'	+55'	117°	12°12'	+56'	118°	11°44'	+56'	118°	11°16'	+56'	118°	10°48'	+57'	118°	10°19'	+57'	118°	0
1	14°02'	+55'	117°	13°35'	+55'	117°	13°08'	+56'	117°	12°40'	+56'	117°	12°12'	+56'	118°	11°44'	+57'	118°	11°16'	+57'	118°	1
2	14°57'	+55'	116°	14°30'	+55'	117°	14°03'	+56'	117°	13°36'	+56'	117°	13°09'	+56'	117°	12°41'	+57'	117°	12°13'	+57'	118°	2
3	15°52'	+55'	116°	15°25'	+55'	116°	14°59'	+56'	116°	14°32'	+56'	117°	14°05'	+56'	117°	13°38'	+57'	117°	13°10'	+57'	117°	3
4	16°46'	+55'	116°	16°20'	+55'	116°	15°54'	+55'	116°	15°28'	+56'	116°	15°01'	+56'	117°	14°34'	+57'	117°	14°07'	+57'	117°	4
5	17°41'	+55'	115°	17°16'	+55'	115°	16°50'	+55'	116°	16°24'	+56'	116°	15°57'	+56'	116°	15°31'	+56'	116°	15°04'	+57'	117°	5
6	18°36'	+55'	115°	18°11'	+55'	115°	17°45'	+55'	115°	17°19'	+56'	116°	16°53'	+56'	116°	16°27'	+56'	116°	16°01'	+57'	116°	6
7	19°30'	+54'	114°	19°06'	+55'	115°	18°40'	+55'	115°	18°15'	+56'	115°	17°49'	+56'	115°	17°24'	+56'	116°	16°57'	+57'	116°	7
8	20°25'	+54'	114°	20°00'	+55'	114°	19°36'	+55'	114°	19°11'	+56'	115°	18°45'	+56'	115°	18°20'	+56'	115°	17°54'	+57'	116°	8
9	21°19'	+54'	113°	20°55'	+55'	114°	20°31'	+55'	114°	20°06'	+56'	114°	19°42'	+56'	115°	19°16'	+56'	115°	18°51'	+57'	115°	9
10	22°14'	+54'	113°	21°50'	+55'	113°	21°26'	+55'	114°	21°02'	+56'	114°	20°37'	+56'	114°	20°13'	+56'	115°	19°47'	+57'	115°	10
11	23°08'	+54'	112°	22°45'	+55'	113°	22°21'	+55'	113°	21°58'	+55'	114°	21°33'	+56'	114°	21°09'	+56'	114°	20°44'	+57'	115°	11
12	24°02'	+54'	112°	23°39'	+55'	112°	23°16'	+55'	113°	22°53'	+55'	113°	22°29'	+56'	114°	22°05'	+56'	114°	21°41'	+57'	114°	12
13	24°56'	+54'	111°	24°34'	+54'	112°	24°11'	+55'	112°	23°48'	+55'	113°	23°25'	+56'	113°	23°01'	+56'	114°	22°37'	+56'	114°	13
14	25°50'	+54'	111°	25°28'	+54'	111°	25°06'	+55'	112°	24°44'	+55'	112°	24°21'	+56'	113°	23°57'	+56'	113°	23°34'	+56'	114°	14
15	26°44'	+54'	111°	26°23'	+54'	111°	26°01'	+55'	111°	25°39'	+55'	112°	25°16'	+56'	112°	24°53'	+56'	113°	24°30'	+56'	113°	15
16	27°38'	+54'	110°	27°17'	+54'	110°	26°56'	+55'	111°	26°34'	+55'	111°	26°12'	+56'	112°	25°49'	+56'	112°	25°26'	+56'	113°	16
17	28°32'	+54'	110°	28°11'	+54'	110°	27°51'	+55'	111°	27°29'	+55'	111°	27°08'	+55'	111°	26°45'	+56'	112°	26°23'	+56'	112°	17
18	29°25'	+53'	109°	29°05'	+54'	110°	28°45'	+54'	110°	28°24'	+55'	111°	28°03'	+55'	111°	27°41'	+56'	112°	27°19'	+56'	112°	18
19	30°19'	+53'	108°	29°59'	+54'	109°	29°40'	+54'	110°	29°19'	+55'	110°	28°58'	+55'	111°	28°37'	+56'	111°	28°15'	+56'	112°	19
20	31°12'	+53'	108°	30°53'	+54'	109°	30°34'	+54'	109°	30°14'	+55'	110°	29°54'	+55'	110°	29°33'	+56'	111°	29°11'	+56'	111°	20
21	32°05'	+53'	107°	31°47'	+54'	108°	31°28'	+54'	109°	31°09'	+55'	109°	30°49'	+55'	110°	30°28'	+56'	110°	30°07'	+56'	111°	21
22	32°58'	+53'	107°	32°41'	+53'	107°	32°22'	+54'	108°	32°03'	+55'	109°	31°44'	+55'	109°	31°24'	+55'	110°	31°03'	+56'	110°	22
23	33°51'	+53'	106°	33°34'	+53'	107°	33°16'	+54'	108°	32°58'	+54'	108°	32°39'	+55'	109°	32°19'	+55'	109°	31°59'	+56'	110°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

60° 300° LHA — Latitude SAME as Declination — 60° 300° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

61° 299° LHA — Latitude SAME as Declination — 61° 299° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	12°43'	+55'	116°	12°16'	+55'	116°	11°49'	+56'	117°	11°22'	+56'	117°	10°55'	+56'	117°	10°28'	+57'	117°	10°00'	+57'	117°	0
1	13°38'	+55'	116°	13°11'	+55'	116°	12°45'	+56'	116°	12°18'	+56'	116°	11°51'	+56'	117°	11°24'	+57'	117°	10°57'	+57'	117°	1
2	14°32'	+55'	115°	14°07'	+55'	116°	13°40'	+55'	116°	13°14'	+56'	116°	12°48'	+56'	116°	12°21'	+57'	117°	11°54'	+57'	117°	2
3	15°27'	+55'	115°	15°02'	+55'	115°	14°36'	+55'	116°	14°10'	+56'	116°	13°44'	+56'	116°	13°17'	+56'	116°	12°51'	+57'	116°	3
4	16°22'	+55'	115°	15°57'	+55'	115°	15°31'	+55'	115°	15°06'	+56'	115°	14°40'	+56'	116°	14°14'	+56'	116°	13°48'	+57'	116°	4
5	17°16'	+55'	114°	16°52'	+55'	114°	16°27'	+55'	115°	16°02'	+56'	115°	15°36'	+56'	115°	15°10'	+56'	115°	14°44'	+57'	116°	5
6	18°11'	+54'	114°	17°47'	+55'	114°	17°22'	+55'	114°	16°57'	+56'	115°	16°32'	+56'	115°	16°07'	+56'	115°	15°41'	+57'	115°	6
7	19°05'	+54'	113°	18°42'	+55'	114°	18°17'	+55'	114°	17°53'	+56'	114°	17°28'	+56'	114°	17°03'	+56'	115°	16°38'	+57'	115°	7
8	20°00'	+54'	113°	19°36'	+55'	113°	19°13'	+55'	113°	18°49'	+56'	114°	18°24'	+56'	114°	18°00'	+56'	114°	17°35'	+57'	115°	8
9	20°54'	+54'	112°	20°31'	+55'	113°	20°08'	+55'	113°	19°44'	+56'	113°	19°20'	+56'	114°	18°56'	+56'	114°	18°31'	+57'	114°	9
10	21°48'	+54'	112°	21°26'	+55'	112°	21°03'	+55'	113°	20°40'	+55'	113°	20°16'	+56'	113°	19°52'	+56'	114°	19°28'	+57'	114°	10
11	22°43'	+54'	111°	22°20'	+55'	112°	21°58'	+55'	112°	21°35'	+55'	113°	21°12'	+56'	113°	20°48'	+56'	113°	20°24'	+57'	114°	11
12	23°37'	+54'	111°	23°15'	+54'	111°	22°53'	+55'	112°	22°30'	+55'	112°	22°08'	+56'	113°	21°44'	+56'	113°	21°21'	+56'	113°	12
13	24°31'	+54'	111°	24°10'	+54'	111°	23°48'	+55'	111°	23°26'	+55'	112°	23°03'	+56'	112°	22°41'	+56'	113°	22°17'	+56'	113°	13
14	25°25'	+54'	110°	25°04'	+54'	110°	24°43'	+55'	111°	24°21'	+55'	111°	23°59'	+56'	112°	23°37'	+56'	112°	23°14'	+56'	113°	14
15	26°19'	+54'	110°	25°58'	+54'	110°	25°37'	+55'	110°	25°16'	+55'	111°	24°55'	+56'	111°	24°33'	+56'	112°	24°10'	+56'	112°	15
16	27°12'	+54'	109°	26°52'	+54'	110°	26°32'	+55'	110°	26°11'	+55'	110°	25°50'	+55'	111°	25°29'	+56'	111°	25°07'	+56'	112°	16
17	28°06'	+54'	109°	27°47'	+54'	109°	27°27'	+54'	110°	27°06'	+55'	110°	26°46'	+55'	110°	26°24'	+56'	111°	26°03'	+56'	111°	17
18	28°59'	+53'	108°	28°41'	+54'	109°	28°21'	+54'	109°	28°01'	+55'	110°	27°41'	+55'	110°	27°20'	+56'	111°	26°59'	+56'	111°	18
19	29°53'	+53'	107°	29°35'	+54'	108°	29°16'	+54'	109°	28°56'	+55'	109°	28°36'	+55'	110°	28°16'	+56'	110°	27°55'	+56'	111°	19
20	30°46'	+53'	107°	30°28'	+54'	108°	30°10'	+54'	108°	29°51'	+55'	109°	29°32'	+55'	109°	29°12'	+56'	110°	28°51'	+56'	110°	20
21	31°39'	+53'	106°	31°22'	+54'	107°	31°04'	+54'	108°	30°46'	+55'	108°	30°27'	+55'	109°	30°07'	+55'	109°	29°47'	+56'	110°	21
22	32°32'	+53'	106°	32°16'	+53'	106°	31°58'	+54'	107°	31°40'	+54'	108°	31°22'	+55'	108°	31°03'	+55'	109°	30°43'	+56'	109°	22
23	33°25'	+53'	105°	33°09'	+53'	106°	32°52'	+54'	107°	32°35'	+54'	107°	32°17'	+55'	108°	31°58'	+55'	108°	31°39'	+56'	109°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

61° 299° LHA — Latitude SAME as Declination — 61° 299° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

62° 298° LHA — Latitude SAME as Declination — 62° 298° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	12°18'	+55'	115°	11°53'	+55'	116°	11°27'	+55'	116°	11°00'	+56'	116°	10°34'	+56'	116°	10°08'	+57'	116°	9°41'	+57'	116°	0
1	13°13'	+55'	115°	12°48'	+55'	115°	12°22'	+55'	115°	11°56'	+56'	116°	11°30'	+56'	116°	11°04'	+56'	116°	10°38'	+57'	116°	1
2	14°08'	+55'	115°	13°43'	+55'	115°	13°18'	+55'	115°	12°52'	+56'	115°	12°27'	+56'	115°	12°01'	+56'	116°	11°35'	+57'	116°	2
3	15°02'	+55'	114°	14°38'	+55'	114°	14°13'	+55'	115°	13°48'	+56'	115°	13°23'	+56'	115°	12°57'	+56'	115°	12°32'	+57'	115°	3
4	15°57'	+55'	114°	15°33'	+55'	114°	15°08'	+55'	114°	14°44'	+56'	114°	14°19'	+56'	115°	13°54'	+56'	115°	13°28'	+57'	115°	4
5	16°51'	+54'	113°	16°28'	+55'	113°	16°04'	+55'	114°	15°39'	+56'	114°	15°15'	+56'	114°	14°50'	+56'	115°	14°25'	+57'	115°	5
6	17°46'	+54'	113°	17°23'	+55'	113°	16°59'	+55'	113°	16°35'	+56'	114°	16°11'	+56'	114°	15°46'	+56'	114°	15°22'	+57'	114°	6
7	18°40'	+54'	112°	18°17'	+55'	113°	17°54'	+55'	113°	17°31'	+56'	113°	17°07'	+56'	114°	16°43'	+56'	114°	16°18'	+57'	114°	7
8	19°35'	+54'	112°	19°12'	+55'	112°	18°49'	+55'	113°	18°26'	+56'	113°	18°03'	+56'	113°	17°39'	+56'	113°	17°15'	+57'	114°	8
9	20°29'	+54'	111°	20°07'	+55'	112°	19°44'	+55'	112°	19°22'	+55'	112°	18°59'	+56'	113°	18°35'	+56'	113°	18°12'	+57'	113°	9
10	21°23'	+54'	111°	21°01'	+55'	111°	20°39'	+55'	112°	20°17'	+55'	112°	19°54'	+56'	112°	19°31'	+56'	113°	19°08'	+57'	113°	10
11	22°17'	+54'	110°	21°56'	+54'	111°	21°34'	+55'	111°	21°12'	+55'	112°	20°50'	+56'	112°	20°28'	+56'	112°	20°05'	+56'	113°	11
12	23°11'	+54'	110°	22°50'	+54'	110°	22°29'	+55'	111°	22°08'	+55'	111°	21°46'	+56'	112°	21°24'	+56'	112°	21°01'	+56'	112°	12
13	24°05'	+54'	110°	23°45'	+54'	110°	23°24'	+55'	110°	23°03'	+55'	111°	22°42'	+56'	111°	22°20'	+56'	112°	21°58'	+56'	112°	13
14	24°59'	+54'	109°	24°39'	+54'	109°	24°19'	+55'	110°	23°58'	+55'	110°	23°37'	+56'	111°	23°16'	+56'	111°	22°54'	+56'	112°	14
15	25°53'	+54'	109°	25°33'	+54'	109°	25°14'	+55'	109°	24°53'	+55'	110°	24°33'	+55'	110°	24°12'	+56'	111°	23°50'	+56'	111°	15
16	26°46'	+54'	108°	26°28'	+54'	109°	26°08'	+55'	109°	25°48'	+55'	109°	25°28'	+55'	110°	25°08'	+56'	110°	24°46'	+56'	111°	16
17	27°40'	+53'	108°	27°22'	+54'	108°	27°03'	+54'	109°	26°43'	+55'	109°	26°24'	+55'	110°	26°03'	+56'	110°	25°43'	+56'	110°	17
18	28°33'	+53'	107°	28°16'	+54'	108°	27°57'	+54'	108°	27°38'	+55'	109°	27°19'	+55'	109°	26°59'	+56'	110°	26°39'	+56'	110°	18
19	29°27'	+53'	107°	29°09'	+54'	107°	28°52'	+54'	108°	28°33'	+55'	108°	28°14'	+55'	109°	27°55'	+56'	109°	27°35'	+56'	110°	19
20	30°20'	+53'	106°	30°03'	+54'	107°	29°46'	+54'	107°	29°28'	+55'	108°	29°09'	+55'	108°	28°50'	+56'	109°	28°31'	+56'	109°	20
21	31°13'	+53'	105°	30°57'	+53'	106°	30°40'	+54'	107°	30°22'	+55'	107°	30°04'	+55'	108°	29°46'	+55'	108°	29°27'	+56'	109°	21
22	32°06'	+53'	105°	31°50'	+53'	105°	31°34'	+54'	106°	31°17'	+54'	107°	30°59'	+55'	107°	30°41'	+55'	108°	30°23'	+56'	108°	22
23	32°59'	+53'	104°	32°44'	+53'	105°	32°28'	+54'	106°	32°11'	+54'	106°	31°54'	+55'	107°	31°37'	+55'	107°	31°19'	+56'	108°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

62° 298° LHA — Latitude SAME as Declination — 62° 298° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

63° 297° LHA — Latitude SAME as Declination — 63° 297° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	11°54'	+55'	114°	11°29'	+55'	115°	11°04'	+55'	115°	10°38'	+56'	115°	10°13'	+56'	115°	9°48'	+56'	115°	9°22'	+57'	115°	0
1	12°48'	+55'	114°	12°24'	+55'	114°	11°59'	+55'	114°	11°34'	+56'	115°	11°09'	+56'	115°	10°44'	+56'	115°	10°19'	+57'	115°	1
2	13°43'	+55'	114°	13°19'	+55'	114°	12°54'	+55'	114°	12°30'	+56'	114°	12°05'	+56'	114°	11°40'	+56'	115°	11°15'	+57'	115°	2
3	14°37'	+54'	113°	14°14'	+55'	113°	13°50'	+55'	114°	13°26'	+56'	114°	13°01'	+56'	114°	12°37'	+56'	114°	12°12'	+57'	114°	3
4	15°32'	+54'	113°	15°09'	+55'	113°	14°45'	+55'	113°	14°21'	+56'	113°	13°57'	+56'	114°	13°33'	+56'	114°	13°09'	+57'	114°	4
5	16°26'	+54'	112°	16°03'	+55'	113°	15°40'	+55'	113°	15°17'	+56'	113°	14°53'	+56'	113°	14°29'	+56'	114°	14°05'	+57'	114°	5
6	17°21'	+54'	112°	16°58'	+55'	112°	16°35'	+55'	112°	16°13'	+56'	113°	15°49'	+56'	113°	15°26'	+56'	113°	15°02'	+57'	113°	6
7	18°15'	+54'	111°	17°53'	+55'	112°	17°31'	+55'	112°	17°08'	+55'	112°	16°45'	+56'	113°	16°22'	+56'	113°	15°59'	+57'	113°	7
8	19°09'	+54'	111°	18°48'	+55'	111°	18°26'	+55'	112°	18°04'	+55'	112°	17°41'	+56'	112°	17°18'	+56'	112°	16°55'	+57'	113°	8
9	20°03'	+54'	110°	19°42'	+55'	111°	19°21'	+55'	111°	18°59'	+55'	111°	18°37'	+56'	112°	18°14'	+56'	112°	17°52'	+57'	112°	9
10	20°58'	+54'	110°	20°37'	+54'	110°	20°16'	+55'	111°	19°54'	+55'	111°	19°33'	+56'	111°	19°11'	+56'	112°	18°48'	+56'	112°	10
11	21°52'	+54'	110°	21°31'	+54'	110°	21°11'	+55'	110°	20°50'	+55'	111°	20°28'	+56'	111°	20°07'	+56'	111°	19°45'	+56'	112°	11
12	22°46'	+54'	109°	22°26'	+54'	109°	22°06'	+55'	110°	21°45'	+55'	110°	21°24'	+56'	111°	21°03'	+56'	111°	20°41'	+56'	111°	12
13	23°39'	+54'	109°	23°20'	+54'	109°	23°00'	+55'	109°	22°40'	+55'	110°	22°20'	+56'	110°	21°59'	+56'	111°	21°38'	+56'	111°	13
14	24°33'	+54'	108°	24°14'	+54'	109°	23°55'	+55'	109°	23°35'	+55'	109°	23°15'	+55'	110°	22°55'	+56'	110°	22°34'	+56'	111°	14
15	25°27'	+54'	108°	25°09'	+54'	108°	24°50'	+55'	109°	24°30'	+55'	109°	24°11'	+55'	109°	23°51'	+56'	110°	23°30'	+56'	110°	15
16	26°20'	+53'	107°	26°03'	+54'	108°	25°44'	+54'	108°	25°25'	+55'	108°	25°06'	+55'	109°	24°46'	+56'	109°	24°26'	+56'	110°	16
17	27°14'	+53'	107°	26°57'	+54'	107°	26°39'	+54'	108°	26°20'	+55'	108°	26°02'	+55'	109°	25°42'	+56'	109°	25°22'	+56'	109°	17
18	28°07'	+53'	106°	27°50'	+54'	107°	27°33'	+54'	107°	27°15'	+55'	108°	26°57'	+55'	108°	26°38'	+56'	109°	26°19'	+56'	109°	18
19	29°01'	+53'	106°	28°44'	+54'	106°	28°27'	+54'	107°	28°10'	+55'	107°	27°52'	+55'	108°	27°34'	+56'	108°	27°15'	+56'	109°	19
20	29°54'	+53'	105°	29°38'	+54'	106°	29°21'	+54'	106°	29°05'	+55'	107°	28°47'	+55'	107°	28°29'	+55'	108°	28°11'	+56'	108°	20
21	30°47'	+53'	104°	30°31'	+53'	105°	30°16'	+54'	106°	29°59'	+54'	106°	29°42'	+55'	107°	29°25'	+55'	107°	29°06'	+56'	108°	21
22	31°40'	+53'	104°	31°25'	+53'	105°	31°09'	+54'	105°	30°54'	+54'	106°	30°37'	+55'	106°	30°20'	+55'	107°	30°02'	+56'	107°	22
23	32°32'	+53'	103°	32°18'	+53'	104°	32°03'	+54'	105°	31°48'	+54'	105°	31°32'	+55'	106°	31°15'	+55'	106°	30°58'	+56'	107°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

63° 297° LHA — Latitude SAME as Declination — 63° 297° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

64° 296° LHA — Latitude SAME as Declination — 64° 296° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	11°29'	+55'	113°	11°05'	+55'	114°	10°41'	+55'	114°	10°16'	+56'	114°	9°52'	+56'	114°	9°27'	+56'	114°	9°02'	+57'	114°	0
1	12°23'	+54'	113°	12°00'	+55'	113°	11°36'	+55'	113°	11°12'	+56'	114°	10°48'	+56'	114°	10°23'	+56'	114°	9°59'	+57'	114°	1
2	13°18'	+54'	113°	12°55'	+55'	113°	12°31'	+55'	113°	12°08'	+56'	113°	11°44'	+56'	113°	11°20'	+56'	114°	10°56'	+57'	114°	2
3	14°12'	+54'	112°	13°49'	+55'	112°	13°26'	+55'	113°	13°03'	+56'	113°	12°40'	+56'	113°	12°16'	+56'	113°	11°52'	+57'	113°	3
4	15°07'	+54'	112°	14°44'	+55'	112°	14°22'	+55'	112°	13°59'	+56'	112°	13°36'	+56'	113°	13°13'	+56'	113°	12°49'	+57'	113°	4
5	16°01'	+54'	111°	15°39'	+55'	112°	15°17'	+55'	112°	14°54'	+56'	112°	14°32'	+56'	112°	14°09'	+56'	113°	13°46'	+57'	113°	5
6	16°55'	+54'	111°	16°34'	+55'	111°	16°12'	+55'	111°	15°50'	+55'	112°	15°28'	+56'	112°	15°05'	+56'	112°	14°42'	+57'	112°	6
7	17°50'	+54'	110°	17°28'	+55'	111°	17°07'	+55'	111°	16°45'	+55'	111°	16°23'	+56'	112°	16°01'	+56'	112°	15°39'	+57'	112°	7
8	18°44'	+54'	110°	18°23'	+55'	110°	18°02'	+55'	111°	17°41'	+55'	111°	17°19'	+56'	111°	16°57'	+56'	111°	16°35'	+56'	112°	8
9	19°38'	+54'	110°	19°18'	+54'	110°	18°57'	+55'	110°	18°36'	+55'	111°	18°15'	+56'	111°	17°54'	+56'	111°	17°32'	+56'	111°	9
10	20°32'	+54'	109°	20°12'	+54'	109°	19°52'	+55'	110°	19°32'	+55'	110°	19°11'	+56'	110°	18°50'	+56'	111°	18°28'	+56'	111°	10
11	21°26'	+54'	109°	21°07'	+54'	109°	20°47'	+55'	109°	20°27'	+55'	110°	20°06'	+56'	110°	19°46'	+56'	110°	19°25'	+56'	111°	11
12	22°20'	+54'	108°	22°01'	+54'	109°	21°42'	+55'	109°	21°22'	+55'	109°	21°02'	+56'	110°	20°42'	+56'	110°	20°21'	+56'	110°	12
13	23°14'	+54'	108°	22°55'	+54'	108°	22°36'	+55'	108°	22°17'	+55'	109°	21°58'	+56'	109°	21°38'	+56'	110°	21°17'	+56'	110°	13
14	24°07'	+54'	107°	23°49'	+54'	108°	23°31'	+55'	108°	23°12'	+55'	108°	22°53'	+55'	109°	22°34'	+56'	109°	22°14'	+56'	110°	14
15	25°01'	+54'	107°	24°43'	+54'	107°	24°26'	+54'	108°	24°07'	+55'	108°	23°49'	+55'	108°	23°29'	+56'	109°	23°10'	+56'	109°	15
16	25°54'	+53'	106°	25°37'	+54'	107°	25°20'	+54'	107°	25°02'	+55'	108°	24°44'	+55'	108°	24°25'	+56'	108°	24°06'	+56'	109°	16
17	26°48'	+53'	106°	26°31'	+54'	106°	26°14'	+54'	107°	25°57'	+55'	107°	25°39'	+55'	108°	25°21'	+56'	108°	25°02'	+56'	108°	17
18	27°41'	+53'	105°	27°25'	+54'	106°	27°09'	+54'	106°	26°52'	+55'	107°	26°34'	+55'	107°	26°17'	+56'	108°	25°58'	+56'	108°	18
19	28°34'	+53'	105°	28°19'	+54'	105°	28°03'	+54'	106°	27°47'	+55'	106°	27°30'	+55'	107°	27°12'	+55'	107°	26°54'	+56'	108°	19
20	29°27'	+53'	104°	29°12'	+53'	105°	28°57'	+54'	105°	28°41'	+54'	106°	28°25'	+55'	106°	28°08'	+55'	107°	27°50'	+56'	107°	20
21	30°20'	+53'	104°	30°06'	+53'	104°	29°51'	+54'	105°	29°36'	+54'	105°	29°20'	+55'	106°	29°03'	+55'	106°	28°46'	+56'	107°	21
22	31°13'	+53'	103°	30°59'	+53'	104°	30°45'	+54'	104°	30°30'	+54'	105°	30°14'	+55'	105°	29°58'	+55'	106°	29°42'	+56'	106°	22
23	32°06'	+53'	102°	31°53'	+53'	103°	31°39'	+54'	104°	31°24'	+54'	104°	31°09'	+55'	105°	30°54'	+55'	105°	30°37'	+56'	106°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

64° 296° LHA — Latitude SAME as Declination — 64° 296° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

65° 295° LHA — Latitude SAME as Declination — 65° 295° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	11°04'	+54'	113°	10°41'	+55'	113°	10°17'	+55'	113°	9°54'	+56'	113°	9°30'	+56'	113°	9°07'	+56'	113°	8°43'	+57'	114°	0
1	11°58'	+54'	112°	11°35'	+55'	112°	11°13'	+55'	113°	10°50'	+56'	113°	10°26'	+56'	113°	10°03'	+56'	113°	9°39'	+57'	113°	1
2	12°53'	+54'	112°	12°30'	+55'	112°	12°08'	+55'	112°	11°45'	+56'	112°	11°22'	+56'	112°	10°59'	+56'	113°	10°36'	+57'	113°	2
3	13°47'	+54'	111°	13°25'	+55'	111°	13°03'	+55'	112°	12°41'	+56'	112°	12°18'	+56'	112°	11°55'	+56'	112°	11°33'	+57'	113°	3
4	14°41'	+54'	111°	14°20'	+55'	111°	13°58'	+55'	111°	13°36'	+55'	112°	13°14'	+56'	112°	12°52'	+56'	112°	12°29'	+57'	112°	4
5	15°36'	+54'	110°	15°15'	+55'	111°	14°53'	+55'	111°	14°32'	+55'	111°	14°10'	+56'	111°	13°48'	+56'	112°	13°26'	+57'	112°	5
6	16°30'	+54'	110°	16°09'	+55'	110°	15°48'	+55'	110°	15°27'	+55'	111°	15°06'	+56'	111°	14°44'	+56'	111°	14°22'	+57'	111°	6
7	17°24'	+54'	109°	17°04'	+55'	110°	16°43'	+55'	110°	16°23'	+55'	110°	16°02'	+56'	111°	15°40'	+56'	111°	15°19'	+56'	111°	7
8	18°18'	+54'	109°	17°58'	+54'	109°	17°38'	+55'	110°	17°18'	+55'	110°	16°57'	+56'	110°	16°36'	+56'	111°	16°15'	+56'	111°	8
9	19°12'	+54'	109°	18°53'	+54'	109°	18°33'	+55'	109°	18°13'	+55'	110°	17°53'	+56'	110°	17°33'	+56'	110°	17°12'	+56'	110°	9
10	20°06'	+54'	108°	19°47'	+54'	108°	19°28'	+55'	109°	19°09'	+55'	109°	18°49'	+56'	109°	18°29'	+56'	110°	18°08'	+56'	110°	10
11	21°00'	+54'	108°	20°42'	+54'	108°	20°23'	+55'	108°	20°04'	+55'	109°	19°44'	+56'	109°	19°25'	+56'	109°	19°05'	+56'	110°	11
12	21°54'	+54'	107°	21°36'	+54'	108°	21°18'	+55'	108°	20°59'	+55'	108°	20°40'	+56'	109°	20°21'	+56'	109°	20°01'	+56'	109°	12
13	22°47'	+54'	107°	22°30'	+54'	107°	22°12'	+55'	107°	21°54'	+55'	108°	21°35'	+55'	108°	21°16'	+56'	109°	20°57'	+56'	109°	13
14	23°41'	+54'	106°	23°24'	+54'	107°	23°07'	+55'	107°	22°49'	+55'	107°	22°31'	+55'	108°	22°12'	+56'	108°	21°53'	+56'	109°	14
15	24°35'	+53'	106°	24°18'	+54'	106°	24°01'	+54'	107°	23°44'	+55'	107°	23°26'	+55'	107°	23°08'	+56'	108°	22°50'	+56'	108°	15
16	25°28'	+53'	105°	25°12'	+54'	106°	24°56'	+54'	106°	24°39'	+55'	107°	24°22'	+55'	107°	24°04'	+56'	107°	23°46'	+56'	108°	16
17	26°22'	+53'	105°	26°06'	+54'	105°	25°50'	+54'	106°	25°34'	+55'	106°	25°17'	+55'	107°	24°59'	+56'	107°	24°42'	+56'	107°	17
18	27°15'	+53'	104°	27°00'	+54'	105°	26°44'	+54'	105°	26°28'	+55'	106°	26°12'	+55'	106°	25°55'	+56'	107°	25°38'	+56'	107°	18
19	28°08'	+53'	104°	27°53'	+54'	104°	27°39'	+54'	105°	27°23'	+55'	105°	27°07'	+55'	106°	26°51'	+55'	106°	26°34'	+56'	107°	19
20	29°01'	+53'	103°	28°47'	+53'	104°	28°33'	+54'	104°	28°18'	+54'	105°	28°02'	+55'	105°	27°46'	+55'	106°	27°30'	+56'	106°	20
21	29°54'	+53'	103°	29°40'	+53'	103°	29°26'	+54'	104°	29°12'	+54'	104°	28°57'	+55'	105°	28°41'	+55'	105°	28°25'	+56'	106°	21
22	30°47'	+53'	102°	30°34'	+53'	103°	30°20'	+54'	103°	30°06'	+54'	104°	29°52'	+55'	104°	29°37'	+55'	105°	29°21'	+56'	105°	22
23	31°39'	+52'	101°	31°27'	+53'	102°	31°14'	+54'	103°	31°01'	+54'	103°	30°47'	+55'	104°	30°32'	+55'	104°	30°17'	+56'	105°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

65° 295° LHA — Latitude SAME as Declination — 65° 295° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

66° 294° LHA — Latitude SAME as Declination — 66° 294° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	10°38'	+54'	112°	10°16'	+55'	112°	9°54'	+55'	112°	9°31'	+56'	112°	9°09'	+56'	112°	8°46'	+56'	112°	8°23'	+57'	113°	0
1	11°33'	+54'	111°	11°11'	+55'	111°	10°49'	+55'	112°	10°27'	+56'	112°	10°05'	+56'	112°	9°42'	+56'	112°	9°19'	+57'	112°	1
2	12°27'	+54'	111°	12°06'	+55'	111°	11°44'	+55'	111°	11°22'	+56'	111°	11°01'	+56'	112°	10°38'	+56'	112°	10°16'	+57'	112°	2
3	13°21'	+54'	110°	13°01'	+55'	111°	12°39'	+55'	111°	12°18'	+55'	111°	11°56'	+56'	111°	11°35'	+56'	111°	11°13'	+57'	112°	3
4	14°16'	+54'	110°	13°55'	+55'	110°	13°34'	+55'	110°	13°13'	+55'	111°	12°52'	+56'	111°	12°31'	+56'	111°	12°09'	+57'	111°	4
5	15°10'	+54'	109°	14°50'	+55'	110°	14°29'	+55'	110°	14°09'	+55'	110°	13°48'	+56'	110°	13°27'	+56'	111°	13°06'	+56'	111°	5
6	16°04'	+54'	109°	15°44'	+55'	109°	15°24'	+55'	110°	15°04'	+55'	110°	14°44'	+56'	110°	14°23'	+56'	110°	14°02'	+56'	111°	6
7	16°58'	+54'	109°	16°39'	+54'	109°	16°19'	+55'	109°	16°00'	+55'	109°	15°40'	+56'	110°	15°19'	+56'	110°	14°59'	+56'	110°	7
8	17°52'	+54'	108°	17°33'	+54'	108°	17°14'	+55'	109°	16°55'	+55'	109°	16°35'	+56'	109°	16°15'	+56'	110°	15°55'	+56'	110°	8
9	18°46'	+54'	108°	18°28'	+54'	108°	18°09'	+55'	108°	17°50'	+55'	109°	17°31'	+56'	109°	17°11'	+56'	109°	16°52'	+56'	109°	9
10	19°40'	+54'	107°	19°22'	+54'	108°	19°04'	+55'	108°	18°45'	+55'	108°	18°27'	+56'	108°	18°07'	+56'	109°	17°48'	+56'	109°	10
11	20°34'	+54'	107°	20°16'	+54'	107°	19°59'	+55'	107°	19°41'	+55'	108°	19°22'	+56'	108°	19°03'	+56'	108°	18°44'	+56'	109°	11
12	21°28'	+54'	106°	21°11'	+54'	107°	20°53'	+55'	107°	20°36'	+55'	107°	20°18'	+55'	108°	19°59'	+56'	108°	19°40'	+56'	108°	12
13	22°21'	+54'	106°	22°05'	+54'	106°	21°48'	+55'	107°	21°31'	+55'	107°	21°13'	+55'	107°	20°55'	+56'	108°	20°37'	+56'	108°	13
14	23°15'	+53'	105°	22°59'	+54'	106°	22°43'	+54'	106°	22°26'	+55'	106°	22°08'	+55'	107°	21°51'	+56'	107°	21°33'	+56'	108°	14
15	24°08'	+53'	105°	23°53'	+54'	105°	23°37'	+54'	106°	23°21'	+55'	106°	23°04'	+55'	106°	22°47'	+56'	107°	22°29'	+56'	107°	15
16	25°02'	+53'	104°	24°47'	+54'	105°	24°31'	+54'	105°	24°15'	+55'	106°	23°59'	+55'	106°	23°42'	+56'	106°	23°25'	+56'	107°	16
17	25°55'	+53'	104°	25°41'	+54'	104°	25°26'	+54'	105°	25°10'	+55'	105°	24°54'	+55'	106°	24°38'	+56'	106°	24°21'	+56'	106°	17
18	26°48'	+53'	103°	26°34'	+54'	104°	26°20'	+54'	104°	26°05'	+55'	105°	25°49'	+55'	105°	25°33'	+55'	106°	25°17'	+56'	106°	18
19	27°41'	+53'	103°	27°28'	+53'	103°	27°14'	+54'	104°	26°59'	+54'	104°	26°44'	+55'	105°	26°29'	+55'	105°	26°13'	+56'	106°	19
20	28°34'	+53'	102°	28°21'	+53'	103°	28°08'	+54'	103°	27°54'	+54'	104°	27°39'	+55'	104°	27°24'	+55'	105°	27°09'	+56'	105°	20
21	29°27'	+53'	102°	29°15'	+53'	102°	29°02'	+54'	103°	28°48'	+54'	103°	28°34'	+55'	104°	28°20'	+55'	104°	28°05'	+56'	105°	21
22	30°20'	+53'	101°	30°08'	+53'	102°	29°56'	+54'	102°	29°43'	+54'	103°	29°29'	+55'	103°	29°15'	+55'	104°	29°00'	+56'	104°	22
23	31°12'	+52'	101°	31°01'	+53'	101°	30°49'	+54'	102°	30°37'	+54'	102°	30°24'	+55'	103°	30°10'	+55'	103°	29°56'	+56'	104°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

66° 294° LHA — Latitude SAME as Declination — 66° 294° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

67° 293° LHA — Latitude SAME as Declination — 67° 293° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	10°13'	+54'	111°	9°52'	+55'	111°	9°30'	+55'	111°	9°09'	+56'	111°	8°47'	+56'	111°	8°25'	+56'	111°	8°03'	+57'	112°	0
1	11°07'	+54'	110°	10°46'	+55'	110°	10°25'	+55'	111°	10°04'	+55'	111°	9°43'	+56'	111°	9°21'	+56'	111°	9°00'	+57'	111°	1
2	12°02'	+54'	110°	11°41'	+55'	110°	11°20'	+55'	110°	11°00'	+55'	110°	10°39'	+56'	111°	10°17'	+56'	111°	9°56'	+57'	111°	2
3	12°56'	+54'	109°	12°36'	+55'	110°	12°16'	+55'	110°	11°55'	+55'	110°	11°34'	+56'	110°	11°14'	+56'	110°	10°53'	+57'	111°	3
4	13°50'	+54'	109°	13°30'	+55'	109°	13°11'	+55'	109°	12°51'	+55'	110°	12°30'	+56'	110°	12°10'	+56'	110°	11°49'	+56'	110°	4
5	14°44'	+54'	109°	14°25'	+55'	109°	14°06'	+55'	109°	13°46'	+55'	109°	13°26'	+56'	109°	13°06'	+56'	110°	12°46'	+56'	110°	5
6	15°38'	+54'	108°	15°20'	+54'	108°	15°01'	+55'	109°	14°41'	+55'	109°	14°22'	+56'	109°	14°02'	+56'	109°	13°42'	+56'	110°	6
7	16°32'	+54'	108°	16°14'	+54'	108°	15°55'	+55'	108°	15°37'	+55'	108°	15°17'	+56'	109°	14°58'	+56'	109°	14°38'	+56'	109°	7
8	17°26'	+54'	107°	17°08'	+54'	107°	16°50'	+55'	108°	16°32'	+55'	108°	16°13'	+56'	108°	15°54'	+56'	109°	15°35'	+56'	109°	8
9	18°20'	+54'	107°	18°03'	+54'	107°	17°45'	+55'	107°	17°27'	+55'	108°	17°09'	+56'	108°	16°50'	+56'	108°	16°31'	+56'	109°	9
10	19°14'	+54'	106°	18°57'	+54'	107°	18°40'	+55'	107°	18°22'	+55'	107°	18°04'	+56'	108°	17°46'	+56'	108°	17°28'	+56'	108°	10
11	20°08'	+54'	106°	19°51'	+54'	106°	19°34'	+55'	106°	19°17'	+55'	107°	19°00'	+55'	107°	18°42'	+56'	107°	18°24'	+56'	108°	11
12	21°01'	+54'	105°	20°45'	+54'	106°	20°29'	+55'	106°	20°12'	+55'	106°	19°55'	+55'	107°	19°38'	+56'	107°	19°20'	+56'	107°	12
13	21°55'	+54'	105°	21°40'	+54'	105°	21°24'	+54'	106°	21°07'	+55'	106°	20°51'	+55'	106°	20°34'	+56'	107°	20°16'	+56'	107°	13
14	22°49'	+53'	104°	22°34'	+54'	105°	22°18'	+54'	105°	22°02'	+55'	106°	21°46'	+55'	106°	21°29'	+56'	106°	21°12'	+56'	107°	14
15	23°42'	+53'	104°	23°27'	+54'	104°	23°12'	+54'	105°	22°57'	+55'	105°	22°41'	+55'	105°	22°25'	+56'	106°	22°08'	+56'	106°	15
16	24°35'	+53'	103°	24°21'	+54'	104°	24°07'	+54'	104°	23°52'	+55'	105°	23°36'	+55'	105°	23°21'	+56'	105°	23°04'	+56'	106°	16
17	25°29'	+53'	103°	25°15'	+54'	103°	25°01'	+54'	104°	24°47'	+55'	104°	24°32'	+55'	105°	24°16'	+56'	105°	24°00'	+56'	105°	17
18	26°22'	+53'	102°	26°09'	+54'	103°	25°55'	+54'	103°	25°41'	+55'	104°	25°27'	+55'	104°	25°12'	+55'	105°	24°56'	+56'	105°	18
19	27°15'	+53'	102°	27°02'	+53'	102°	26°49'	+54'	103°	26°36'	+54'	103°	26°22'	+55'	104°	26°07'	+55'	104°	25°52'	+56'	105°	19
20	28°08'	+53'	101°	27°56'	+53'	102°	27°43'	+54'	102°	27°30'	+54'	103°	27°17'	+55'	103°	27°03'	+55'	104°	26°48'	+56'	104°	20
21	29°00'	+53'	101°	28°49'	+53'	101°	28°37'	+54'	102°	28°25'	+54'	102°	28°11'	+55'	103°	27°58'	+55'	103°	27°44'	+56'	104°	21
22	29°53'	+52'	100°	29°42'	+53'	101°	29°31'	+54'	101°	29°19'	+54'	102°	29°06'	+55'	102°	28°53'	+55'	103°	28°39'	+56'	103°	22
23	30°46'	+52'	100°	30°35'	+53'	100°	30°24'	+53'	101°	30°13'	+54'	101°	30°01'	+55'	102°	29°48'	+55'	102°	29°35'	+55'	103°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

67° 293° LHA — Latitude SAME as Declination — 67° 293° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

68° 292° LHA — Latitude SAME as Declination — 68° 292° LHA

Dec°	63 Hc°	63 d'	63 Z°	64 Hc°	64 d'	64 Z°	65 Hc°	65 d'	65 Z°	66 Hc°	66 d'	66 Z°	67 Hc°	67 d'	67 Z°	68 Hc°	68 d'	68 Z°	69 Hc°	69 d'	69 Z°	Dec°
0	9°48'	+54'	110°	9°27'	+55'	110°	9°07'	+55'	110°	8°46'	+55'	110°	8°25'	+56'	110°	8°04'	+56'	111°	7°43'	+57'	111°	0
1	10°42'	+54'	109°	10°22'	+55'	110°	10°02'	+55'	110°	9°41'	+55'	110°	9°21'	+56'	110°	9°00'	+56'	110°	8°39'	+57'	110°	1
2	11°36'	+54'	109°	11°16'	+55'	109°	10°57'	+55'	109°	10°37'	+55'	109°	10°17'	+56'	110°	9°56'	+56'	110°	9°36'	+56'	110°	2
3	12°30'	+54'	108°	12°11'	+55'	109°	11°52'	+55'	109°	11°32'	+55'	109°	11°12'	+56'	109°	10°52'	+56'	109°	10°32'	+56'	110°	3
4	13°24'	+54'	108°	13°06'	+55'	108°	12°47'	+55'	108°	12°27'	+55'	109°	12°08'	+56'	109°	11°49'	+56'	109°	11°29'	+56'	109°	4
5	14°18'	+54'	108°	14°00'	+54'	108°	13°42'	+55'	108°	13°23'	+55'	108°	13°04'	+56'	109°	12°45'	+56'	109°	12°25'	+56'	109°	5
6	15°12'	+54'	107°	14°54'	+54'	107°	14°36'	+55'	108°	14°18'	+55'	108°	14°00'	+56'	108°	13°41'	+56'	108°	13°22'	+56'	109°	6
7	16°06'	+54'	107°	15°49'	+54'	107°	15°31'	+55'	107°	15°13'	+55'	107°	14°55'	+56'	108°	14°37'	+56'	108°	14°18'	+56'	108°	7
8	17°00'	+54'	106°	16°43'	+54'	107°	16°26'	+55'	107°	16°09'	+55'	107°	15°51'	+56'	107°	15°33'	+56'	108°	15°14'	+56'	108°	8
9	17°54'	+54'	106°	17°38'	+54'	106°	17°21'	+55'	106°	17°04'	+55'	107°	16°46'	+56'	107°	16°29'	+56'	107°	16°11'	+56'	108°	9
10	18°48'	+54'	105°	18°32'	+54'	106°	18°15'	+55'	106°	17°59'	+55'	106°	17°42'	+55'	107°	17°25'	+56'	107°	17°07'	+56'	107°	10
11	19°41'	+54'	105°	19°26'	+54'	105°	19°10'	+55'	106°	18°54'	+55'	106°	18°37'	+55'	106°	18°20'	+56'	106°	18°03'	+56'	107°	11
12	20°35'	+54'	104°	20°20'	+54'	105°	20°05'	+54'	105°	19°49'	+55'	105°	19°33'	+55'	106°	19°16'	+56'	106°	18°59'	+56'	106°	12
13	21°29'	+53'	104°	21°14'	+54'	104°	20°59'	+54'	105°	20°44'	+55'	105°	20°28'	+55'	105°	20°12'	+56'	106°	19°56'	+56'	106°	13
14	22°22'	+53'	103°	22°08'	+54'	104°	21°54'	+54'	104°	21°39'	+55'	105°	21°23'	+55'	105°	21°08'	+56'	105°	20°52'	+56'	106°	14
15	23°16'	+53'	103°	23°02'	+54'	103°	22°48'	+54'	104°	22°33'	+55'	104°	22°19'	+55'	105°	22°03'	+56'	105°	21°48'	+56'	105°	15
16	24°09'	+53'	102°	23°56'	+54'	103°	23°42'	+54'	103°	23°28'	+55'	104°	23°14'	+55'	104°	22°59'	+56'	105°	22°44'	+56'	105°	16
17	25°02'	+53'	102°	24°49'	+54'	102°	24°36'	+54'	103°	24°23'	+55'	103°	24°09'	+55'	104°	23°55'	+55'	104°	23°40'	+56'	105°	17
18	25°55'	+53'	101°	25°43'	+53'	102°	25°30'	+54'	102°	25°17'	+54'	103°	25°04'	+55'	103°	24°50'	+55'	104°	24°36'	+56'	104°	18
19	26°48'	+53'	101°	26°36'	+53'	101°	26°24'	+54'	102°	26°12'	+54'	102°	25°59'	+55'	103°	25°45'	+55'	103°	25°31'	+56'	104°	19
20	27°41'	+53'	100°	27°30'	+53'	101°	27°18'	+54'	101°	27°06'	+54'	102°	26°54'	+55'	102°	26°41'	+55'	103°	26°27'	+56'	103°	20
21	28°34'	+53'	100°	28°23'	+53'	100°	28°12'	+54'	101°	28°01'	+54'	101°	27°49'	+55'	102°	27°36'	+55'	102°	27°23'	+56'	103°	21
22	29°26'	+52'	99°	29°16'	+53'	100°	29°06'	+54'	100°	28°55'	+54'	101°	28°43'	+55'	101°	28°31'	+55'	102°	28°18'	+56'	102°	22
23	30°19'	+52'	99°	30°09'	+53'	99°	29°59'	+53'	100°	29°49'	+54'	100°	29°38'	+54'	101°	29°26'	+55'	101°	29°14'	+55'	102°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

68° 292° LHA — Latitude SAME as Declination — 68° 292° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

69° 291° LHA — Latitude SAME as Declination — 69° 291° LHA

Dec°	63 Hc°	63 d'	63 Z°	64 Hc°	64 d'	64 Z°	65 Hc°	65 d'	65 Z°	66 Hc°	66 d'	66 Z°	67 Hc°	67 d'	67 Z°	68 Hc°	68 d'	68 Z°	69 Hc°	69 d'	69 Z°	Dec°
0	9°22'	+54'	109°	9°02'	+55'	109°	8°43'	+55'	109°	8°23'	+55'	109°	8°03'	+56'	109°	7°43'	+56'	110°	7°23'	+56'	110°	0
1	10°16'	+54'	108°	9°57'	+55'	109°	9°38'	+55'	109°	9°18'	+55'	109°	8°59'	+56'	109°	8°39'	+56'	109°	8°19'	+56'	109°	1
2	11°10'	+54'	108°	10°51'	+55'	108°	10°33'	+55'	108°	10°14'	+55'	109°	9°54'	+56'	109°	9°35'	+56'	109°	9°16'	+56'	109°	2
3	12°04'	+54'	108°	11°46'	+54'	108°	11°28'	+55'	108°	11°09'	+55'	108°	10°50'	+56'	108°	10°31'	+56'	109°	10°12'	+56'	109°	3
4	12°58'	+54'	107°	12°40'	+54'	107°	12°22'	+55'	108°	12°04'	+55'	108°	11°46'	+56'	108°	11°27'	+56'	108°	11°09'	+56'	108°	4
5	13°52'	+54'	107°	13°35'	+54'	107°	13°17'	+55'	107°	13°00'	+55'	107°	12°42'	+56'	108°	12°23'	+56'	108°	12°05'	+56'	108°	5
6	14°46'	+54'	106°	14°29'	+54'	106°	14°12'	+55'	107°	13°55'	+55'	107°	13°37'	+56'	107°	13°19'	+56'	107°	13°01'	+56'	108°	6
7	15°40'	+54'	106°	15°24'	+54'	106°	15°07'	+55'	106°	14°50'	+55'	107°	14°33'	+56'	107°	14°15'	+56'	107°	13°58'	+56'	107°	7
8	16°34'	+54'	105°	16°18'	+54'	106°	16°02'	+55'	106°	15°45'	+55'	106°	15°28'	+56'	106°	15°11'	+56'	107°	14°54'	+56'	107°	8
9	17°28'	+54'	105°	17°12'	+54'	105°	16°56'	+55'	105°	16°40'	+55'	106°	16°24'	+55'	106°	16°07'	+56'	106°	15°50'	+56'	107°	9
10	18°21'	+54'	104°	18°06'	+54'	105°	17°51'	+55'	105°	17°35'	+55'	105°	17°19'	+55'	106°	17°03'	+56'	106°	16°46'	+56'	106°	10
11	19°15'	+54'	104°	19°01'	+54'	104°	18°46'	+55'	105°	18°30'	+55'	105°	18°15'	+55'	105°	17°59'	+56'	106°	17°43'	+56'	106°	11
12	20°09'	+53'	103°	19°55'	+54'	104°	19°40'	+54'	104°	19°25'	+55'	104°	19°10'	+55'	105°	18°55'	+56'	105°	18°39'	+56'	105°	12
13	21°02'	+53'	103°	20°49'	+54'	103°	20°35'	+54'	104°	20°20'	+55'	104°	20°05'	+55'	104°	19°50'	+56'	105°	19°35'	+56'	105°	13
14	21°56'	+53'	102°	21°42'	+54'	103°	21°29'	+54'	103°	21°15'	+55'	104°	21°01'	+55'	104°	20°46'	+56'	104°	20°31'	+56'	105°	14
15	22°49'	+53'	102°	22°36'	+54'	102°	22°23'	+54'	103°	22°10'	+55'	103°	21°56'	+55'	104°	21°42'	+56'	104°	21°27'	+56'	104°	15
16	23°42'	+53'	101°	23°30'	+54'	102°	23°17'	+54'	102°	23°04'	+55'	103°	22°51'	+55'	103°	22°37'	+55'	104°	22°23'	+56'	104°	16
17	24°35'	+53'	101°	24°24'	+54'	101°	24°12'	+54'	102°	23°59'	+55'	102°	23°46'	+55'	103°	23°33'	+55'	103°	23°19'	+56'	104°	17
18	25°28'	+53'	100°	25°17'	+53'	101°	25°06'	+54'	101°	24°54'	+54'	102°	24°41'	+55'	102°	24°28'	+55'	103°	24°15'	+56'	103°	18
19	26°21'	+53'	100°	26°11'	+53'	100°	26°00'	+54'	101°	25°48'	+54'	101°	25°36'	+55'	102°	25°23'	+55'	102°	25°10'	+56'	103°	19
20	27°14'	+53'	99°	27°04'	+53'	100°	26°53'	+54'	100°	26°42'	+54'	101°	26°31'	+55'	101°	26°19'	+55'	102°	26°06'	+56'	102°	20
21	28°07'	+53'	99°	27°57'	+53'	99°	27°47'	+54'	100°	27°37'	+54'	100°	27°26'	+55'	101°	27°14'	+55'	101°	27°02'	+56'	102°	21
22	28°59'	+52'	98°	28°50'	+53'	99°	28°41'	+54'	99°	28°31'	+54'	100°	28°20'	+55'	100°	28°09'	+55'	101°	27°57'	+55'	101°	22
23	29°52'	+52'	98°	29°43'	+53'	98°	29°34'	+53'	99°	29°25'	+54'	99°	29°15'	+54'	100°	29°04'	+55'	101°	28°53'	+55'	101°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

69° 291° LHA — Latitude SAME as Declination — 69° 291° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

70° 290° LHA — Latitude SAME as Declination — 70° 290° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	8°56'	+54'	108°	8°37'	+55'	108°	8°19'	+55'	108°	8°00'	+55'	108°	7°41'	+56'	109°	7°22'	+56'	109°	7°02'	+56'	109°	0
1	9°50'	+54'	108°	9°32'	+54'	108°	9°14'	+55'	108°	8°55'	+55'	108°	8°37'	+56'	108°	8°18'	+56'	108°	7°59'	+56'	108°	1
2	10°44'	+54'	107°	10°26'	+54'	107°	10°09'	+55'	107°	9°50'	+55'	108°	9°32'	+56'	108°	9°14'	+56'	108°	8°55'	+56'	108°	2
3	11°38'	+54'	107°	11°21'	+54'	107°	11°03'	+55'	107°	10°46'	+55'	107°	10°28'	+56'	107°	10°10'	+56'	108°	9°52'	+56'	108°	3
4	12°32'	+54'	106°	12°15'	+54'	106°	11°58'	+55'	107°	11°41'	+55'	107°	11°24'	+56'	107°	11°06'	+56'	107°	10°48'	+56'	107°	4
5	13°26'	+54'	106°	13°10'	+54'	106°	12°53'	+55'	106°	12°36'	+55'	106°	12°19'	+56'	107°	12°02'	+56'	107°	11°44'	+56'	107°	5
6	14°20'	+54'	105°	14°04'	+54'	106°	13°48'	+55'	106°	13°31'	+55'	106°	13°15'	+56'	106°	12°58'	+56'	106°	12°41'	+56'	107°	6
7	15°14'	+54'	105°	14°58'	+54'	105°	14°43'	+55'	105°	14°27'	+55'	106°	14°10'	+56'	106°	13°54'	+56'	106°	13°37'	+56'	106°	7
8	16°08'	+54'	104°	15°53'	+54'	105°	15°37'	+55'	105°	15°22'	+55'	105°	15°06'	+55'	105°	14°50'	+56'	106°	14°33'	+56'	106°	8
9	17°01'	+54'	104°	16°47'	+54'	104°	16°32'	+55'	105°	16°17'	+55'	105°	16°01'	+55'	105°	15°46'	+56'	105°	15°30'	+56'	106°	9
10	17°55'	+54'	103°	17°41'	+54'	104°	17°26'	+55'	104°	17°12'	+55'	104°	16°57'	+55'	105°	16°41'	+56'	105°	16°26'	+56'	105°	10
11	18°49'	+54'	103°	18°35'	+54'	103°	18°21'	+54'	104°	18°07'	+55'	104°	17°52'	+55'	104°	17°37'	+56'	105°	17°22'	+56'	105°	11
12	19°42'	+53'	102°	19°29'	+54'	103°	19°15'	+54'	103°	19°02'	+55'	104°	18°47'	+55'	104°	18°33'	+56'	104°	18°18'	+56'	105°	12
13	20°36'	+53'	102°	20°23'	+54'	102°	20°10'	+54'	103°	19°56'	+55'	103°	19°43'	+55'	103°	19°29'	+56'	104°	19°14'	+56'	104°	13
14	21°29'	+53'	102°	21°17'	+54'	102°	21°04'	+54'	102°	20°51'	+55'	103°	20°38'	+55'	103°	20°24'	+56'	103°	20°10'	+56'	104°	14
15	22°22'	+53'	101°	22°11'	+54'	101°	21°58'	+54'	102°	21°46'	+55'	102°	21°33'	+55'	103°	21°20'	+56'	103°	21°06'	+56'	103°	15
16	23°15'	+53'	101°	23°04'	+54'	101°	22°53'	+54'	101°	22°41'	+55'	102°	22°28'	+55'	102°	22°15'	+55'	103°	22°02'	+56'	103°	16
17	24°09'	+53'	100°	23°58'	+54'	100°	23°47'	+54'	101°	23°35'	+54'	101°	23°23'	+55'	102°	23°11'	+55'	102°	22°58'	+56'	103°	17
18	25°01'	+53'	99°	24°51'	+53'	100°	24°41'	+54'	100°	24°30'	+54'	101°	24°18'	+55'	101°	24°06'	+55'	102°	23°54'	+56'	102°	18
19	25°54'	+53'	99°	25°45'	+53'	99°	25°35'	+54'	100°	25°24'	+54'	100°	25°13'	+55'	101°	25°01'	+55'	101°	24°49'	+56'	102°	19
20	26°47'	+53'	98°	26°38'	+53'	99°	26°28'	+54'	99°	26°18'	+54'	100°	26°08'	+55'	100°	25°57'	+55'	101°	25°45'	+56'	101°	20
21	27°40'	+53'	98°	27°31'	+53'	98°	27°22'	+54'	99°	27°13'	+54'	99°	27°03'	+55'	100°	26°52'	+55'	100°	26°41'	+56'	101°	21
22	28°32'	+52'	97°	28°24'	+53'	98°	28°16'	+53'	98°	28°07'	+54'	99°	27°57'	+55'	99°	27°47'	+55'	100°	27°36'	+55'	101°	22
23	29°25'	+52'	97°	29°17'	+53'	97°	29°09'	+53'	98°	29°01'	+54'	98°	28°52'	+54'	99°	28°42'	+55'	100°	28°32'	+55'	100°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

70° 290° LHA — Latitude SAME as Declination — 70° 290° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

71° 289° LHA — Latitude SAME as Declination — 71° 289° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	8°30'	+54'	107°	8°12'	+54'	107°	7°55'	+55'	107°	7°37'	+55'	107°	7°19'	+56'	108°	7°00'	+56'	108°	6°42'	+56'	108°	0
1	9°24'	+54'	107°	9°07'	+54'	107°	8°49'	+55'	107°	8°32'	+55'	107°	8°14'	+56'	107°	7°56'	+56'	107°	7°38'	+56'	107°	1
2	10°18'	+54'	106°	10°01'	+54'	106°	9°44'	+55'	107°	9°27'	+55'	107°	9°10'	+56'	107°	8°52'	+56'	107°	8°35'	+56'	107°	2
3	11°12'	+54'	106°	10°56'	+54'	106°	10°39'	+55'	106°	10°22'	+55'	106°	10°05'	+56'	106°	9°48'	+56'	107°	9°31'	+56'	107°	3
4	12°06'	+54'	105°	11°50'	+54'	105°	11°34'	+55'	106°	11°18'	+55'	106°	11°01'	+56'	106°	10°44'	+56'	106°	10°27'	+56'	106°	4
5	13°00'	+54'	105°	12°44'	+54'	105°	12°29'	+55'	105°	12°13'	+55'	105°	11°57'	+56'	106°	11°40'	+56'	106°	11°24'	+56'	106°	5
6	13°54'	+54'	104°	13°39'	+54'	105°	13°23'	+55'	105°	13°08'	+55'	105°	12°52'	+56'	105°	12°36'	+56'	106°	12°20'	+56'	106°	6
7	14°47'	+54'	104°	14°33'	+54'	104°	14°18'	+55'	104°	14°03'	+55'	105°	13°48'	+55'	105°	13°32'	+56'	105°	13°16'	+56'	105°	7
8	15°41'	+54'	103°	15°27'	+54'	104°	15°13'	+55'	104°	14°58'	+55'	104°	14°43'	+55'	105°	14°28'	+56'	105°	14°13'	+56'	105°	8
9	16°35'	+54'	103°	16°21'	+54'	103°	16°07'	+55'	104°	15°53'	+55'	104°	15°39'	+55'	104°	15°24'	+56'	104°	15°09'	+56'	105°	9
10	17°28'	+54'	103°	17°15'	+54'	103°	17°02'	+54'	103°	16°48'	+55'	103°	16°34'	+55'	104°	16°20'	+56'	104°	16°05'	+56'	104°	10
11	18°22'	+53'	102°	18°09'	+54'	102°	17°56'	+54'	103°	17°43'	+55'	103°	17°29'	+55'	103°	17°15'	+56'	104°	17°01'	+56'	104°	11
12	19°15'	+53'	102°	19°03'	+54'	102°	18°51'	+54'	102°	18°38'	+55'	103°	18°25'	+55'	103°	18°11'	+56'	103°	17°57'	+56'	104°	12
13	20°09'	+53'	101°	19°57'	+54'	101°	19°45'	+54'	102°	19°33'	+55'	102°	19°20'	+55'	102°	19°07'	+56'	103°	18°53'	+56'	103°	13
14	21°02'	+53'	101°	20°51'	+54'	101°	20°39'	+54'	101°	20°27'	+55'	102°	20°15'	+55'	102°	20°02'	+56'	102°	19°49'	+56'	103°	14
15	21°55'	+53'	100°	21°45'	+54'	100°	21°34'	+54'	101°	21°22'	+55'	101°	21°10'	+55'	102°	20°58'	+55'	102°	20°45'	+56'	102°	15
16	22°49'	+53'	100°	22°38'	+54'	100°	22°28'	+54'	100°	22°17'	+55'	101°	22°05'	+55'	101°	21°53'	+55'	102°	21°41'	+56'	102°	16
17	23°42'	+53'	99°	23°32'	+53'	100°	23°22'	+54'	100°	23°11'	+54'	100°	23°00'	+55'	101°	22°49'	+55'	101°	22°37'	+56'	102°	17
18	24°35'	+53'	99°	24°25'	+53'	99°	24°16'	+54'	99°	24°06'	+54'	100°	23°55'	+55'	100°	23°44'	+55'	101°	23°33'	+56'	101°	18
19	25°27'	+53'	98°	25°19'	+53'	99°	25°10'	+54'	99°	25°00'	+54'	99°	24°50'	+55'	100°	24°39'	+55'	100°	24°28'	+56'	101°	19
20	26°20'	+53'	98°	26°12'	+53'	98°	26°03'	+54'	98°	25°54'	+54'	99°	25°45'	+55'	99°	25°35'	+55'	100°	25°24'	+56'	100°	20
21	27°13'	+52'	97°	27°05'	+53'	97°	26°57'	+54'	98°	26°49'	+54'	98°	26°39'	+55'	99°	26°30'	+55'	99°	26°20'	+56'	100°	21
22	28°05'	+52'	96°	27°58'	+53'	97°	27°51'	+53'	97°	27°43'	+54'	98°	27°34'	+54'	99°	27°25'	+55'	99°	27°15'	+55'	100°	22
23	28°58'	+52'	96°	28°51'	+53'	96°	28°44'	+53'	97°	28°37'	+54'	98°	28°28'	+54'	98°	28°20'	+55'	99°	28°11'	+55'	99°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

71° 289° LHA — Latitude SAME as Declination — 71° 289° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

72° 288° LHA — Latitude SAME as Declination — 72° 288° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	8°04'	+54'	106°	7°47'	+54'	106°	7°30'	+55'	106°	7°13'	+55'	107°	6°56'	+56'	107°	6°39'	+56'	107°	6°21'	+56'	107°	0
1	8°58'	+54'	106°	8°42'	+54'	106°	8°25'	+55'	106°	8°08'	+55'	106°	7°52'	+56'	106°	7°35'	+56'	106°	7°18'	+56'	107°	1
2	9°52'	+54'	105°	9°36'	+54'	105°	9°20'	+55'	106°	9°04'	+55'	106°	8°47'	+56'	106°	8°31'	+56'	106°	8°14'	+56'	106°	2
3	10°46'	+54'	105°	10°30'	+54'	105°	10°15'	+55'	105°	9°59'	+55'	105°	9°43'	+56'	106°	9°27'	+56'	106°	9°10'	+56'	106°	3
4	11°40'	+54'	104°	11°25'	+54'	105°	11°09'	+55'	105°	10°54'	+55'	105°	10°38'	+56'	105°	10°23'	+56'	105°	10°07'	+56'	105°	4
5	12°33'	+54'	104°	12°19'	+54'	104°	12°04'	+55'	104°	11°49'	+55'	105°	11°34'	+56'	105°	11°19'	+56'	105°	11°03'	+56'	105°	5
6	13°27'	+54'	103°	13°13'	+54'	104°	12°59'	+55'	104°	12°44'	+55'	104°	12°30'	+55'	104°	12°15'	+56'	105°	11°59'	+56'	105°	6
7	14°21'	+54'	103°	14°07'	+54'	103°	13°53'	+55'	103°	13°39'	+55'	104°	13°25'	+55'	104°	13°10'	+56'	104°	12°56'	+56'	104°	7
8	15°15'	+54'	103°	15°01'	+54'	103°	14°48'	+55'	103°	14°34'	+55'	103°	14°20'	+55'	104°	14°06'	+56'	104°	13°52'	+56'	104°	8
9	16°08'	+54'	102°	15°56'	+54'	102°	15°43'	+54'	103°	15°29'	+55'	103°	15°16'	+55'	103°	15°02'	+56'	103°	14°48'	+56'	104°	9
10	17°02'	+54'	102°	16°50'	+54'	102°	16°37'	+54'	102°	16°24'	+55'	102°	16°11'	+55'	103°	15°58'	+56'	103°	15°44'	+56'	103°	10
11	17°55'	+53'	101°	17°44'	+54'	101°	17°32'	+54'	102°	17°19'	+55'	102°	17°06'	+55'	102°	16°53'	+56'	103°	16°40'	+56'	103°	11
12	18°49'	+53'	101°	18°38'	+54'	101°	18°26'	+54'	101°	18°14'	+55'	102°	18°02'	+55'	102°	17°49'	+56'	102°	17°36'	+56'	103°	12
13	19°42'	+53'	100°	19°31'	+54'	101°	19°20'	+54'	101°	19°09'	+55'	101°	18°57'	+55'	102°	18°45'	+56'	102°	18°32'	+56'	102°	13
14	20°35'	+53'	100°	20°25'	+54'	100°	20°14'	+54'	100°	20°03'	+55'	101°	19°52'	+55'	101°	19°40'	+56'	101°	19°28'	+56'	102°	14
15	21°29'	+53'	99°	21°19'	+54'	100°	21°09'	+54'	100°	20°58'	+55'	100°	20°47'	+55'	101°	20°36'	+55'	101°	20°24'	+56'	101°	15
16	22°22'	+53'	99°	22°12'	+54'	99°	22°03'	+54'	99°	21°53'	+55'	100°	21°42'	+55'	100°	21°31'	+55'	101°	21°20'	+56'	101°	16
17	23°15'	+53'	98°	23°06'	+53'	99°	22°57'	+54'	99°	22°47'	+54'	99°	22°37'	+55'	100°	22°27'	+55'	100°	22°16'	+56'	101°	17
18	24°08'	+53'	98°	23°59'	+53'	98°	23°51'	+54'	99°	23°42'	+54'	99°	23°32'	+55'	99°	23°22'	+55'	100°	23°12'	+56'	100°	18
19	25°00'	+53'	97°	24°53'	+53'	98°	24°45'	+54'	98°	24°36'	+54'	99°	24°27'	+55'	99°	24°17'	+55'	99°	24°07'	+56'	100°	19
20	25°53'	+53'	97°	25°46'	+53'	97°	25°38'	+54'	98°	25°30'	+54'	98°	25°22'	+55'	99°	25°12'	+55'	99°	25°03'	+56'	99°	20
21	26°46'	+52'	96°	26°39'	+53'	97°	26°32'	+54'	97°	26°24'	+54'	98°	26°16'	+55'	98°	26°08'	+55'	99°	25°58'	+55'	99°	21
22	27°38'	+52'	96°	27°32'	+53'	96°	27°26'	+53'	97°	27°18'	+54'	97°	27°11'	+54'	98°	27°03'	+55'	98°	26°54'	+55'	99°	22
23	28°30'	+52'	95°	28°25'	+53'	96°	28°19'	+53'	96°	28°12'	+54'	97°	28°05'	+54'	97°	27°58'	+55'	98°	27°49'	+55'	98°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

72° 288° LHA — Latitude SAME as Declination — 72° 288° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

73° 287° LHA — Latitude SAME as Declination — 73° 287° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	7°38'	+54'	105°	7°22'	+54'	105°	7°06'	+55'	105°	6°50'	+55'	106°	6°34'	+56'	106°	6°17'	+56'	106°	6°01'	+56'	106°	0
1	8°32'	+54'	105°	8°16'	+54'	105°	8°01'	+55'	105°	7°45'	+55'	105°	7°29'	+56'	105°	7°13'	+56'	105°	6°57'	+56'	106°	1
2	9°25'	+54'	104°	9°11'	+54'	105°	8°55'	+55'	105°	8°40'	+55'	105°	8°25'	+56'	105°	8°09'	+56'	105°	7°53'	+56'	105°	2
3	10°19'	+54'	104°	10°05'	+54'	104°	9°50'	+55'	104°	9°35'	+55'	104°	9°20'	+56'	105°	9°05'	+56'	105°	8°50'	+56'	105°	3
4	11°13'	+54'	103°	10°59'	+54'	104°	10°45'	+55'	104°	10°30'	+55'	104°	10°16'	+55'	104°	10°01'	+56'	104°	9°46'	+56'	105°	4
5	12°07'	+54'	103°	11°53'	+54'	103°	11°40'	+55'	103°	11°26'	+55'	104°	11°11'	+55'	104°	10°57'	+56'	104°	10°42'	+56'	104°	5
6	13°01'	+54'	103°	12°48'	+54'	103°	12°34'	+55'	103°	12°21'	+55'	103°	12°07'	+55'	103°	11°53'	+56'	104°	11°38'	+56'	104°	6
7	13°54'	+54'	102°	13°42'	+54'	102°	13°29'	+55'	103°	13°16'	+55'	103°	13°02'	+55'	103°	12°49'	+56'	103°	12°35'	+56'	103°	7
8	14°48'	+54'	102°	14°36'	+54'	102°	14°23'	+55'	102°	14°11'	+55'	102°	13°58'	+55'	103°	13°44'	+56'	103°	13°31'	+56'	103°	8
9	15°42'	+54'	101°	15°30'	+54'	101°	15°18'	+54'	102°	15°06'	+55'	102°	14°53'	+55'	102°	14°40'	+56'	102°	14°27'	+56'	103°	9
10	16°35'	+53'	101°	16°24'	+54'	101°	16°12'	+54'	101°	16°00'	+55'	102°	15°48'	+55'	102°	15°36'	+56'	102°	15°23'	+56'	102°	10
11	17°29'	+53'	100°	17°18'	+54'	101°	17°07'	+54'	101°	16°55'	+55'	101°	16°44'	+55'	101°	16°31'	+56'	102°	16°19'	+56'	102°	11
12	18°22'	+53'	100°	18°12'	+54'	100°	18°01'	+54'	100°	17°50'	+55'	101°	17°39'	+55'	101°	17°27'	+56'	101°	17°15'	+56'	102°	12
13	19°15'	+53'	99°	19°05'	+54'	100°	18°55'	+54'	100°	18°45'	+55'	100°	18°34'	+55'	101°	18°23'	+56'	101°	18°11'	+56'	101°	13
14	20°09'	+53'	99°	19°59'	+54'	99°	19°49'	+54'	99°	19°39'	+55'	100°	19°29'	+55'	100°	19°18'	+55'	101°	19°07'	+56'	101°	14
15	21°02'	+53'	98°	20°53'	+54'	99°	20°44'	+54'	99°	20°34'	+55'	99°	20°24'	+55'	100°	20°14'	+55'	100°	20°03'	+56'	100°	15
16	21°55'	+53'	98°	21°46'	+53'	98°	21°38'	+54'	99°	21°29'	+54'	99°	21°19'	+55'	99°	21°09'	+55'	100°	20°59'	+56'	100°	16
17	22°48'	+53'	97°	22°40'	+53'	98°	22°32'	+54'	98°	22°23'	+54'	98°	22°14'	+55'	99°	22°05'	+55'	99°	21°55'	+56'	100°	17
18	23°41'	+53'	97°	23°33'	+53'	97°	23°26'	+54'	98°	23°17'	+54'	98°	23°09'	+55'	98°	23°00'	+55'	99°	22°50'	+56'	99°	18
19	24°33'	+53'	96°	24°27'	+53'	97°	24°19'	+54'	97°	24°12'	+54'	98°	24°04'	+55'	98°	23°55'	+55'	98°	23°46'	+56'	99°	19
20	25°26'	+53'	96°	25°20'	+53'	96°	25°13'	+54'	97°	25°06'	+54'	97°	24°58'	+55'	98°	24°50'	+55'	98°	24°42'	+56'	98°	20
21	26°19'	+52'	95°	26°13'	+53'	96°	26°07'	+54'	96°	26°00'	+54'	97°	25°53'	+55'	97°	25°45'	+55'	98°	25°37'	+55'	98°	21
22	27°11'	+52'	95°	27°06'	+53'	95°	27°00'	+53'	96°	26°54'	+54'	96°	26°47'	+54'	97°	26°40'	+55'	97°	26°33'	+55'	98°	22
23	28°03'	+52'	94°	27°59'	+53'	95°	27°54'	+53'	95°	27°48'	+54'	96°	27°42'	+54'	96°	27°35'	+55'	97°	27°28'	+55'	97°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

73° 287° LHA — Latitude SAME as Declination — 73° 287° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

74° 286° LHA — Latitude SAME as Declination — 74° 286° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	7°11'	+54'	104°	6°56'	+54'	104°	6°41'	+55'	105°	6°26'	+55'	105°	6°11'	+56'	105°	5°56'	+56'	105°	5°40'	+56'	105°	0
1	8°05'	+54'	104°	7°51'	+54'	104°	7°36'	+55'	104°	7°21'	+55'	104°	7°07'	+56'	104°	6°52'	+56'	105°	6°36'	+56'	105°	1
2	8°59'	+54'	103°	8°45'	+54'	104°	8°31'	+55'	104°	8°17'	+55'	104°	8°02'	+56'	104°	7°47'	+56'	104°	7°33'	+56'	104°	2
3	9°53'	+54'	103°	9°39'	+54'	103°	9°26'	+55'	103°	9°12'	+55'	103°	8°58'	+55'	104°	8°43'	+56'	104°	8°29'	+56'	104°	3
4	10°47'	+54'	103°	10°33'	+54'	103°	10°20'	+55'	103°	10°07'	+55'	103°	9°53'	+55'	103°	9°39'	+56'	103°	9°25'	+56'	104°	4
5	11°40'	+54'	102°	11°28'	+54'	102°	11°15'	+55'	102°	11°02'	+55'	103°	10°48'	+55'	103°	10°35'	+56'	103°	10°21'	+56'	103°	5
6	12°34'	+54'	102°	12°22'	+54'	102°	12°09'	+55'	102°	11°57'	+55'	102°	11°44'	+55'	102°	11°31'	+56'	103°	11°18'	+56'	103°	6
7	13°28'	+54'	101°	13°16'	+54'	101°	13°04'	+55'	102°	12°52'	+55'	102°	12°39'	+55'	102°	12°27'	+56'	102°	12°14'	+56'	103°	7
8	14°21'	+54'	101°	14°10'	+54'	101°	13°58'	+54'	101°	13°47'	+55'	101°	13°35'	+55'	102°	13°22'	+56'	102°	13°10'	+56'	102°	8
9	15°15'	+53'	100°	15°04'	+54'	101°	14°53'	+54'	101°	14°42'	+55'	101°	14°30'	+55'	101°	14°18'	+56'	102°	14°06'	+56'	102°	9
10	16°08'	+53'	100°	15°58'	+54'	100°	15°47'	+54'	100°	15°36'	+55'	101°	15°25'	+55'	101°	15°14'	+56'	101°	15°02'	+56'	101°	10
11	17°02'	+53'	99°	16°52'	+54'	100°	16°42'	+54'	100°	16°31'	+55'	100°	16°20'	+55'	100°	16°09'	+56'	101°	15°58'	+56'	101°	11
12	17°55'	+53'	99°	17°46'	+54'	99°	17°36'	+54'	99°	17°26'	+55'	100°	17°16'	+55'	100°	17°05'	+56'	100°	16°54'	+56'	101°	12
13	18°48'	+53'	98°	18°39'	+54'	99°	18°30'	+54'	99°	18°21'	+55'	99°	18°11'	+55'	100°	18°01'	+56'	100°	17°50'	+56'	100°	13
14	19°42'	+53'	98°	19°33'	+54'	98°	19°24'	+54'	99°	19°15'	+55'	99°	19°06'	+55'	99°	18°56'	+55'	100°	18°46'	+56'	100°	14
15	20°35'	+53'	97°	20°27'	+54'	98°	20°19'	+54'	98°	20°10'	+55'	98°	20°01'	+55'	99°	19°52'	+55'	99°	19°42'	+56'	100°	15
16	21°28'	+53'	97°	21°20'	+53'	97°	21°13'	+54'	98°	21°04'	+54'	98°	20°56'	+55'	98°	20°47'	+55'	99°	20°38'	+56'	99°	16
17	22°21'	+53'	96°	22°14'	+53'	97°	22°07'	+54'	97°	21°59'	+54'	98°	21°51'	+55'	98°	21°42'	+55'	98°	21°33'	+56'	99°	17
18	23°14'	+53'	96°	23°07'	+53'	96°	23°00'	+54'	97°	22°53'	+54'	97°	22°46'	+55'	98°	22°38'	+55'	98°	22°29'	+56'	98°	18
19	24°06'	+53'	95°	24°00'	+53'	96°	23°54'	+54'	96°	23°48'	+54'	97°	23°40'	+55'	97°	23°33'	+55'	98°	23°25'	+56'	98°	19
20	24°59'	+53'	95°	24°54'	+53'	95°	24°48'	+54'	96°	24°42'	+54'	96°	24°35'	+55'	97°	24°28'	+55'	97°	24°20'	+56'	98°	20
21	25°51'	+52'	94°	25°47'	+53'	95°	25°42'	+54'	95°	25°36'	+54'	96°	25°30'	+55'	96°	25°23'	+55'	97°	25°16'	+55'	97°	21
22	26°44'	+52'	94°	26°40'	+53'	94°	26°35'	+53'	95°	26°30'	+54'	95°	26°24'	+54'	96°	26°18'	+55'	96°	26°11'	+55'	97°	22
23	27°36'	+52'	93°	27°33'	+53'	94°	27°28'	+53'	94°	27°24'	+54'	95°	27°19'	+54'	95°	27°13'	+55'	96°	27°07'	+55'	96°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

74° 286° LHA — Latitude SAME as Declination — 74° 286° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

75° 285° LHA — Latitude SAME as Declination — 75° 285° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	6°45'	+54'	103°	6°31'	+54'	104°	6°17'	+55'	104°	6°03'	+55'	104°	5°48'	+56'	104°	5°34'	+56'	104°	5°19'	+56'	104°	0
1	7°39'	+54'	103°	7°25'	+54'	103°	7°11'	+55'	103°	6°58'	+55'	103°	6°44'	+55'	103°	6°30'	+56'	104°	6°16'	+56'	104°	1
2	8°32'	+54'	103°	8°19'	+54'	103°	8°06'	+55'	103°	7°53'	+55'	103°	7°39'	+55'	103°	7°26'	+56'	103°	7°12'	+56'	103°	2
3	9°26'	+54'	102°	9°14'	+54'	102°	9°01'	+55'	102°	8°48'	+55'	103°	8°35'	+55'	103°	8°21'	+56'	103°	8°08'	+56'	103°	3
4	10°20'	+54'	102°	10°08'	+54'	102°	9°55'	+55'	102°	9°43'	+55'	102°	9°30'	+55'	102°	9°17'	+56'	102°	9°04'	+56'	103°	4
5	11°14'	+54'	101°	11°02'	+54'	101°	10°50'	+55'	102°	10°38'	+55'	102°	10°26'	+55'	102°	10°13'	+56'	102°	10°00'	+56'	102°	5
6	12°07'	+54'	101°	11°56'	+54'	101°	11°45'	+55'	101°	11°33'	+55'	101°	11°21'	+55'	102°	11°09'	+56'	102°	10°57'	+56'	102°	6
7	13°01'	+54'	100°	12°50'	+54'	100°	12°39'	+54'	101°	12°28'	+55'	101°	12°16'	+55'	101°	12°05'	+56'	101°	11°53'	+56'	102°	7
8	13°54'	+54'	100°	13°44'	+54'	100°	13°34'	+54'	100°	13°23'	+55'	101°	13°12'	+55'	101°	13°00'	+56'	101°	12°49'	+56'	101°	8
9	14°48'	+53'	99°	14°38'	+54'	100°	14°28'	+54'	100°	14°18'	+55'	100°	14°07'	+55'	100°	13°56'	+56'	101°	13°45'	+56'	101°	9
10	15°41'	+53'	99°	15°32'	+54'	99°	15°22'	+54'	99°	15°12'	+55'	100°	15°02'	+55'	100°	14°52'	+56'	100°	14°41'	+56'	100°	10
11	16°35'	+53'	98°	16°26'	+54'	99°	16°17'	+54'	99°	16°07'	+55'	99°	15°57'	+55'	100°	15°47'	+56'	100°	15°37'	+56'	100°	11
12	17°28'	+53'	98°	17°20'	+54'	98°	17°11'	+54'	99°	17°02'	+55'	99°	16°53'	+55'	99°	16°43'	+56'	99°	16°33'	+56'	100°	12
13	18°21'	+53'	97°	18°13'	+54'	98°	18°05'	+54'	98°	17°57'	+55'	98°	17°48'	+55'	99°	17°38'	+55'	99°	17°29'	+56'	99°	13
14	19°15'	+53'	97°	19°07'	+54'	97°	18°59'	+54'	98°	18°51'	+55'	98°	18°43'	+55'	98°	18°34'	+55'	99°	18°25'	+56'	99°	14
15	20°08'	+53'	96°	20°01'	+54'	97°	19°53'	+54'	97°	19°46'	+54'	98°	19°38'	+55'	98°	19°29'	+55'	98°	19°21'	+56'	99°	15
16	21°01'	+53'	96°	20°54'	+53'	96°	20°47'	+54'	97°	20°40'	+54'	97°	20°33'	+55'	97°	20°25'	+55'	98°	20°16'	+56'	98°	16
17	21°54'	+53'	95°	21°48'	+53'	96°	21°41'	+54'	96°	21°35'	+54'	97°	21°28'	+55'	97°	21°20'	+55'	97°	21°12'	+56'	98°	17
18	22°46'	+53'	95°	22°41'	+53'	95°	22°35'	+54'	96°	22°29'	+54'	96°	22°22'	+55'	97°	22°15'	+55'	97°	22°08'	+56'	97°	18
19	23°39'	+53'	94°	23°34'	+53'	95°	23°29'	+54'	95°	23°23'	+54'	96°	23°17'	+55'	96°	23°10'	+55'	97°	23°03'	+56'	97°	19
20	24°32'	+53'	94°	24°27'	+53'	94°	24°23'	+54'	95°	24°17'	+54'	95°	24°12'	+55'	96°	24°06'	+55'	96°	23°59'	+55'	97°	20
21	25°24'	+52'	93°	25°21'	+53'	94°	25°16'	+53'	94°	25°12'	+54'	95°	25°06'	+54'	95°	25°01'	+55'	96°	24°54'	+55'	96°	21
22	26°17'	+52'	93°	26°13'	+53'	93°	26°10'	+53'	94°	26°06'	+54'	94°	26°01'	+54'	95°	25°56'	+55'	95°	25°50'	+55'	96°	22
23	27°09'	+52'	92°	27°06'	+53'	93°	27°03'	+53'	93°	26°59'	+54'	94°	26°55'	+54'	94°	26°51'	+55'	95°	26°45'	+55'	95°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

75° 285° LHA — Latitude SAME as Declination — 75° 285° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

76° 284° LHA — Latitude SAME as Declination — 76° 284° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	6°18'	+54'	103°	6°05'	+54'	103°	5°52'	+55'	103°	5°39'	+55'	103°	5°25'	+55'	103°	5°12'	+56'	103°	4°58'	+56'	103°	0
1	7°12'	+54'	102°	6°59'	+54'	102°	6°47'	+55'	102°	6°34'	+55'	102°	6°21'	+55'	103°	6°08'	+56'	103°	5°55'	+56'	103°	1
2	8°06'	+54'	102°	7°54'	+54'	102°	7°41'	+55'	102°	7°29'	+55'	102°	7°16'	+55'	102°	7°04'	+56'	102°	6°51'	+56'	102°	2
3	9°00'	+54'	101°	8°48'	+54'	101°	8°36'	+55'	101°	8°24'	+55'	102°	8°12'	+55'	102°	7°59'	+56'	102°	7°47'	+56'	102°	3
4	9°53'	+54'	101°	9°42'	+54'	101°	9°31'	+55'	101°	9°19'	+55'	101°	9°07'	+55'	101°	8°55'	+56'	102°	8°43'	+56'	102°	4
5	10°47'	+54'	100°	10°36'	+54'	100°	10°25'	+55'	101°	10°14'	+55'	101°	10°03'	+55'	101°	9°51'	+56'	101°	9°39'	+56'	101°	5
6	11°41'	+54'	100°	11°30'	+54'	100°	11°20'	+54'	100°	11°09'	+55'	100°	10°58'	+55'	101°	10°47'	+56'	101°	10°35'	+56'	101°	6
7	12°34'	+54'	99°	12°24'	+54'	100°	12°14'	+54'	100°	12°04'	+55'	100°	11°53'	+55'	100°	11°43'	+56'	100°	11°32'	+56'	101°	7
8	13°28'	+53'	99°	13°18'	+54'	99°	13°09'	+54'	99°	12°59'	+55'	100°	12°49'	+55'	100°	12°38'	+56'	100°	12°28'	+56'	100°	8
9	14°21'	+53'	98°	14°12'	+54'	99°	14°03'	+54'	99°	13°54'	+55'	99°	13°44'	+55'	99°	13°34'	+56'	100°	13°24'	+56'	100°	9
10	15°14'	+53'	98°	15°06'	+54'	98°	14°57'	+54'	98°	14°48'	+55'	99°	14°39'	+55'	99°	14°30'	+56'	99°	14°20'	+56'	100°	10
11	16°08'	+53'	97°	16°00'	+54'	98°	15°52'	+54'	98°	15°43'	+55'	98°	15°34'	+55'	99°	15°25'	+56'	99°	15°16'	+56'	99°	11
12	17°01'	+53'	97°	16°54'	+54'	97°	16°46'	+54'	98°	16°38'	+55'	98°	16°29'	+55'	98°	16°21'	+56'	98°	16°12'	+56'	99°	12
13	17°54'	+53'	97°	17°47'	+54'	97°	17°40'	+54'	97°	17°32'	+55'	97°	17°24'	+55'	98°	17°16'	+55'	98°	17°08'	+56'	98°	13
14	18°47'	+53'	96°	18°41'	+54'	96°	18°34'	+54'	97°	18°27'	+55'	97°	18°20'	+55'	97°	18°12'	+55'	98°	18°03'	+56'	98°	14
15	19°41'	+53'	96°	19°35'	+53'	96°	19°28'	+54'	96°	19°22'	+54'	97°	19°14'	+55'	97°	19°07'	+55'	97°	18°59'	+56'	98°	15
16	20°34'	+53'	95°	20°28'	+53'	95°	20°22'	+54'	96°	20°16'	+54'	96°	20°09'	+55'	97°	20°02'	+55'	97°	19°55'	+56'	97°	16
17	21°26'	+53'	95°	21°21'	+53'	95°	21°16'	+54'	95°	21°10'	+54'	96°	21°04'	+55'	96°	20°58'	+55'	96°	20°51'	+56'	97°	17
18	22°19'	+53'	94°	22°15'	+53'	94°	22°10'	+54'	95°	22°05'	+54'	95°	21°59'	+55'	96°	21°53'	+55'	96°	21°46'	+56'	96°	18
19	23°12'	+53'	93°	23°08'	+53'	94°	23°04'	+54'	94°	22°59'	+54'	95°	22°54'	+55'	95°	22°48'	+55'	96°	22°42'	+56'	96°	19
20	24°05'	+52'	93°	24°01'	+53'	93°	23°57'	+54'	94°	23°53'	+54'	94°	23°48'	+55'	95°	23°43'	+55'	95°	23°38'	+55'	96°	20
21	24°57'	+52'	92°	24°54'	+53'	93°	24°51'	+53'	93°	24°47'	+54'	94°	24°43'	+54'	94°	24°38'	+55'	95°	24°33'	+55'	95°	21
22	25°49'	+52'	92°	25°47'	+53'	92°	25°44'	+53'	93°	25°41'	+54'	93°	25°37'	+54'	94°	25°33'	+55'	94°	25°28'	+55'	95°	22
23	26°42'	+52'	91°	26°40'	+53'	92°	26°38'	+53'	92°	26°35'	+54'	93°	26°32'	+54'	93°	26°28'	+55'	94°	26°24'	+55'	94°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

76° 284° LHA — Latitude SAME as Declination — 76° 284° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

77° 283° LHA — Latitude SAME as Declination — 77° 283° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°52'	+54'	102°	5°40'	+54'	102°	5°27'	+55'	102°	5°15'	+55'	102°	5°03'	+55'	102°	4°50'	+56'	102°	4°37'	+56'	102°	0
1	6°45'	+54'	101°	6°34'	+54'	101°	6°22'	+55'	101°	6°10'	+55'	102°	5°58'	+55'	102°	5°46'	+56'	102°	5°34'	+56'	102°	1
2	7°39'	+54'	101°	7°28'	+54'	101°	7°17'	+55'	101°	7°05'	+55'	101°	6°53'	+55'	101°	6°42'	+56'	101°	6°30'	+56'	101°	2
3	8°33'	+54'	100°	8°22'	+54'	100°	8°11'	+55'	101°	8°00'	+55'	101°	7°49'	+55'	101°	7°37'	+56'	101°	7°26'	+56'	101°	3
4	9°26'	+54'	100°	9°16'	+54'	100°	9°06'	+55'	100°	8°55'	+55'	100°	8°44'	+55'	100°	8°33'	+56'	101°	8°22'	+56'	101°	4
5	10°20'	+54'	99°	10°10'	+54'	100°	10°00'	+54'	100°	9°50'	+55'	100°	9°40'	+55'	100°	9°29'	+56'	100°	9°18'	+56'	100°	5
6	11°14'	+54'	99°	11°04'	+54'	99°	10°55'	+54'	99°	10°45'	+55'	99°	10°35'	+55'	100°	10°25'	+56'	100°	10°14'	+56'	100°	6
7	12°07'	+53'	98°	11°58'	+54'	99°	11°49'	+54'	99°	11°40'	+55'	99°	11°30'	+55'	99°	11°20'	+56'	99°	11°10'	+56'	100°	7
8	13°01'	+53'	98°	12°52'	+54'	98°	12°44'	+54'	98°	12°35'	+55'	99°	12°25'	+55'	99°	12°16'	+56'	99°	12°06'	+56'	99°	8
9	13°54'	+53'	98°	13°46'	+54'	98°	13°38'	+54'	98°	13°29'	+55'	98°	13°21'	+55'	98°	13°12'	+56'	99°	13°03'	+56'	99°	9
10	14°47'	+53'	97°	14°40'	+54'	97°	14°32'	+54'	98°	14°24'	+55'	98°	14°16'	+55'	98°	14°07'	+56'	98°	13°59'	+56'	99°	10
11	15°41'	+53'	97°	15°34'	+54'	97°	15°26'	+54'	97°	15°19'	+55'	97°	15°11'	+55'	98°	15°03'	+56'	98°	14°54'	+56'	98°	11
12	16°34'	+53'	96°	16°28'	+54'	96°	16°21'	+54'	97°	16°14'	+55'	97°	16°06'	+55'	97°	15°58'	+55'	98°	15°50'	+56'	98°	12
13	17°27'	+53'	96°	17°21'	+54'	96°	17°15'	+54'	96°	17°08'	+55'	97°	17°01'	+55'	97°	16°54'	+55'	97°	16°46'	+56'	97°	13
14	18°20'	+53'	95°	18°15'	+54'	95°	18°09'	+54'	96°	18°03'	+55'	96°	17°56'	+55'	96°	17°49'	+55'	97°	17°42'	+56'	97°	14
15	19°13'	+53'	95°	19°08'	+53'	95°	19°03'	+54'	95°	18°57'	+54'	96°	18°51'	+55'	96°	18°45'	+55'	96°	18°38'	+56'	97°	15
16	20°06'	+53'	94°	20°02'	+53'	94°	19°57'	+54'	95°	19°52'	+54'	95°	19°46'	+55'	96°	19°40'	+55'	96°	19°34'	+56'	96°	16
17	20°59'	+53'	94°	20°55'	+53'	94°	20°51'	+54'	94°	20°46'	+54'	95°	20°41'	+55'	95°	20°35'	+55'	96°	20°29'	+56'	96°	17
18	21°52'	+53'	93°	21°49'	+53'	94°	21°45'	+54'	94°	21°40'	+54'	94°	21°36'	+55'	95°	21°31'	+55'	95°	21°25'	+56'	95°	18
19	22°45'	+53'	93°	22°42'	+53'	93°	22°38'	+54'	93°	22°35'	+54'	94°	22°30'	+55'	94°	22°26'	+55'	95°	22°21'	+56'	95°	19
20	23°37'	+52'	92°	23°35'	+53'	93°	23°32'	+54'	93°	23°29'	+54'	93°	23°25'	+55'	94°	23°21'	+55'	94°	23°16'	+55'	95°	20
21	24°30'	+52'	92°	24°28'	+53'	92°	24°26'	+53'	92°	24°23'	+54'	93°	24°20'	+54'	93°	24°16'	+55'	94°	24°12'	+55'	94°	21
22	25°22'	+52'	91°	25°21'	+53'	91°	25°19'	+53'	92°	25°17'	+54'	92°	25°14'	+54'	93°	25°11'	+55'	93°	25°07'	+55'	94°	22
23	26°14'	+52'	90°	26°14'	+53'	91°	26°12'	+53'	91°	26°11'	+54'	92°	26°08'	+54'	92°	26°06'	+55'	93°	26°02'	+55'	93°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

77° 283° LHA — Latitude SAME as Declination — 77° 283° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

78° 282° LHA — Latitude SAME as Declination — 78° 282° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°25'	+54'	101°	5°14'	+54'	101°	5°02'	+55'	101°	4°51'	+55'	101°	4°40'	+55'	101°	4°28'	+56'	101°	4°16'	+56'	101°	0
1	6°19'	+54'	100°	6°08'	+54'	100°	5°57'	+55'	100°	5°46'	+55'	101°	5°35'	+55'	101°	5°24'	+56'	101°	5°13'	+56'	101°	1
2	7°12'	+54'	100°	7°02'	+54'	100°	6°52'	+55'	100°	6°41'	+55'	100°	6°30'	+55'	100°	6°20'	+56'	100°	6°09'	+56'	101°	2
3	8°06'	+54'	99°	7°56'	+54'	100°	7°46'	+55'	100°	7°36'	+55'	100°	7°26'	+55'	100°	7°15'	+56'	100°	7°05'	+56'	100°	3
4	9°00'	+54'	99°	8°50'	+54'	99°	8°41'	+54'	99°	8°31'	+55'	99°	8°21'	+55'	100°	8°11'	+56'	100°	8°01'	+56'	100°	4
5	9°53'	+54'	98°	9°44'	+54'	99°	9°35'	+54'	99°	9°26'	+55'	99°	9°16'	+55'	99°	9°07'	+56'	99°	8°57'	+56'	99°	5
6	10°47'	+53'	98°	10°38'	+54'	98°	10°30'	+54'	98°	10°21'	+55'	99°	10°12'	+55'	99°	10°03'	+56'	99°	9°53'	+56'	99°	6
7	11°40'	+53'	98°	11°32'	+54'	98°	11°24'	+54'	98°	11°16'	+55'	98°	11°07'	+55'	98°	10°58'	+56'	99°	10°49'	+56'	99°	7
8	12°34'	+53'	97°	12°26'	+54'	97°	12°18'	+54'	98°	12°10'	+55'	98°	12°02'	+55'	98°	11°54'	+56'	98°	11°45'	+56'	98°	8
9	13°27'	+53'	97°	13°20'	+54'	97°	13°13'	+54'	97°	13°05'	+55'	97°	12°57'	+55'	98°	12°49'	+56'	98°	12°41'	+56'	98°	9
10	14°20'	+53'	96°	14°14'	+54'	96°	14°07'	+54'	97°	14°00'	+55'	97°	13°53'	+55'	97°	13°45'	+56'	97°	13°37'	+56'	98°	10
11	15°14'	+53'	96°	15°08'	+54'	96°	15°01'	+54'	96°	14°55'	+55'	96°	14°48'	+55'	97°	14°41'	+56'	97°	14°33'	+56'	97°	11
12	16°07'	+53'	95°	16°01'	+54'	95°	15°56'	+54'	96°	15°49'	+55'	96°	15°43'	+55'	96°	15°36'	+55'	97°	15°29'	+56'	97°	12
13	17°00'	+53'	95°	16°55'	+54'	95°	16°50'	+54'	95°	16°44'	+55'	96°	16°38'	+55'	96°	16°32'	+55'	96°	16°25'	+56'	96°	13
14	17°53'	+53'	94°	17°49'	+54'	95°	17°44'	+54'	95°	17°38'	+54'	95°	17°33'	+55'	95°	17°27'	+55'	96°	17°21'	+56'	96°	14
15	18°46'	+53'	94°	18°42'	+53'	94°	18°38'	+54'	94°	18°33'	+54'	95°	18°28'	+55'	95°	18°22'	+55'	95°	18°17'	+56'	96°	15
16	19°39'	+53'	93°	19°36'	+53'	94°	19°32'	+54'	94°	19°27'	+54'	94°	19°23'	+55'	95°	19°18'	+55'	95°	19°12'	+56'	95°	16
17	20°32'	+53'	93°	20°29'	+53'	93°	20°26'	+54'	93°	20°22'	+54'	94°	20°18'	+55'	94°	20°13'	+55'	95°	20°08'	+56'	95°	17
18	21°25'	+53'	92°	21°22'	+53'	93°	21°19'	+54'	93°	21°16'	+54'	93°	21°12'	+55'	94°	21°08'	+55'	94°	21°04'	+56'	95°	18
19	22°18'	+53'	92°	22°16'	+53'	92°	22°13'	+54'	93°	22°10'	+54'	93°	22°07'	+55'	93°	22°03'	+55'	94°	21°59'	+56'	94°	19
20	23°10'	+52'	91°	23°09'	+53'	92°	23°07'	+54'	92°	23°04'	+54'	92°	23°02'	+55'	93°	22°58'	+55'	93°	22°55'	+55'	94°	20
21	24°03'	+52'	91°	24°02'	+53'	91°	24°00'	+53'	92°	23°58'	+54'	92°	23°56'	+54'	92°	23°53'	+55'	93°	23°50'	+55'	93°	21
22	24°55'	+52'	90°	24°55'	+53'	91°	24°54'	+53'	91°	24°52'	+54'	91°	24°51'	+54'	92°	24°48'	+55'	92°	24°46'	+55'	93°	22
23	25°47'	+52'	90°	25°47'	+53'	90°	25°47'	+53'	91°	25°46'	+54'	91°	25°45'	+54'	91°	25°43'	+55'	92°	25°41'	+55'	92°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

78° 282° LHA — Latitude SAME as Declination — 78° 282° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

79° 281° LHA — Latitude SAME as Declination — 79° 281° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°58'	+54'	100°	4°48'	+54'	100°	4°38'	+55'	100°	4°27'	+55'	100°	4°17'	+55'	100°	4°06'	+56'	100°	3°55'	+56'	100°	0
1	5°52'	+54'	99°	5°42'	+54'	99°	5°32'	+55'	100°	5°22'	+55'	100°	5°12'	+55'	100°	5°02'	+56'	100°	4°51'	+56'	100°	1
2	6°45'	+54'	99°	6°36'	+54'	99°	6°27'	+55'	99°	6°17'	+55'	99°	6°07'	+55'	99°	5°57'	+56'	99°	5°48'	+56'	100°	2
3	7°39'	+54'	98°	7°30'	+54'	99°	7°21'	+54'	99°	7°12'	+55'	99°	7°03'	+55'	99°	6°53'	+56'	99°	6°44'	+56'	99°	3
4	8°33'	+54'	98°	8°24'	+54'	98°	8°16'	+54'	98°	8°07'	+55'	98°	7°58'	+55'	99°	7°49'	+56'	99°	7°40'	+56'	99°	4
5	9°26'	+54'	98°	9°18'	+54'	98°	9°10'	+54'	98°	9°02'	+55'	98°	8°53'	+55'	98°	8°45'	+56'	98°	8°36'	+56'	99°	5
6	10°20'	+53'	97°	10°12'	+54'	97°	10°04'	+54'	97°	9°57'	+55'	98°	9°49'	+55'	98°	9°40'	+56'	98°	9°32'	+56'	98°	6
7	11°13'	+53'	97°	11°06'	+54'	97°	10°59'	+54'	97°	10°51'	+55'	97°	10°44'	+55'	97°	10°36'	+56'	98°	10°28'	+56'	98°	7
8	12°07'	+53'	96°	12°00'	+54'	96°	11°53'	+54'	97°	11°46'	+55'	97°	11°39'	+55'	97°	11°32'	+56'	97°	11°24'	+56'	97°	8
9	13°00'	+53'	96°	12°54'	+54'	96°	12°48'	+54'	96°	12°41'	+55'	96°	12°34'	+55'	97°	12°27'	+56'	97°	12°20'	+56'	97°	9
10	13°53'	+53'	95°	13°48'	+54'	95°	13°42'	+54'	96°	13°36'	+55'	96°	13°29'	+55'	96°	13°23'	+56'	96°	13°16'	+56'	97°	10
11	14°47'	+53'	95°	14°41'	+54'	95°	14°36'	+54'	95°	14°30'	+55'	96°	14°24'	+55'	96°	14°18'	+55'	96°	14°12'	+56'	96°	11
12	15°40'	+53'	94°	15°35'	+54'	95°	15°30'	+54'	95°	15°25'	+55'	95°	15°20'	+55'	95°	15°14'	+55'	96°	15°08'	+56'	96°	12
13	16°33'	+53'	94°	16°29'	+54'	94°	16°24'	+54'	94°	16°20'	+55'	95°	16°15'	+55'	95°	16°09'	+55'	95°	16°04'	+56'	96°	13
14	17°26'	+53'	93°	17°22'	+54'	94°	17°18'	+54'	94°	17°14'	+54'	94°	17°10'	+55'	95°	17°05'	+55'	95°	16°59'	+56'	95°	14
15	18°19'	+53'	93°	18°16'	+53'	93°	18°12'	+54'	93°	18°09'	+54'	94°	18°04'	+55'	94°	18°00'	+55'	94°	17°55'	+56'	95°	15
16	19°12'	+53'	92°	19°09'	+53'	93°	19°06'	+54'	93°	19°03'	+54'	93°	18°59'	+55'	94°	18°55'	+55'	94°	18°51'	+56'	94°	16
17	20°05'	+53'	92°	20°03'	+53'	92°	20°00'	+54'	93°	19°57'	+54'	93°	19°54'	+55'	93°	19°51'	+55'	94°	19°47'	+56'	94°	17
18	20°58'	+53'	91°	20°56'	+53'	92°	20°54'	+54'	92°	20°52'	+54'	92°	20°49'	+55'	93°	20°46'	+55'	93°	20°42'	+56'	94°	18
19	21°50'	+53'	91°	21°49'	+53'	91°	21°48'	+54'	92°	21°46'	+54'	92°	21°44'	+55'	92°	21°41'	+55'	93°	21°38'	+56'	93°	19
20	22°43'	+52'	90°	22°42'	+53'	91°	22°41'	+54'	91°	22°40'	+54'	92°	22°38'	+55'	92°	22°36'	+55'	92°	22°33'	+55'	93°	20
21	23°35'	+52'	90°	23°35'	+53'	90°	23°35'	+53'	91°	23°34'	+54'	91°	23°33'	+54'	91°	23°31'	+55'	92°	23°29'	+55'	92°	21
22	24°28'	+52'	89°	24°28'	+53'	90°	24°28'	+53'	90°	24°28'	+54'	91°	24°27'	+54'	91°	24°26'	+55'	91°	24°24'	+55'	92°	22
23	25°20'	+52'	89°	25°21'	+53'	89°	25°22'	+53'	90°	25°22'	+54'	90°	25°22'	+54'	91°	25°21'	+55'	91°	25°19'	+55'	92°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

79° 281° LHA — Latitude SAME as Declination — 79° 281° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

80° 280° LHA — Latitude SAME as Declination — 80° 280° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°31'	+54'	99°	4°22'	+54'	99°	4°13'	+55'	99°	4°03'	+55'	99°	3°53'	+55'	99°	3°44'	+56'	99°	3°34'	+56'	99°	0
1	5°25'	+54'	98°	5°16'	+54'	99°	5°07'	+55'	99°	4°58'	+55'	99°	4°49'	+55'	99°	4°40'	+56'	99°	4°30'	+56'	99°	1
2	6°19'	+54'	98°	6°10'	+54'	98°	6°02'	+54'	98°	5°53'	+55'	98°	5°44'	+55'	98°	5°35'	+56'	99°	5°26'	+56'	99°	2
3	7°12'	+54'	98°	7°04'	+54'	98°	6°56'	+54'	98°	6°48'	+55'	98°	6°39'	+55'	98°	6°31'	+56'	98°	6°22'	+56'	98°	3
4	8°06'	+54'	97°	7°58'	+54'	97°	7°50'	+54'	97°	7°43'	+55'	98°	7°35'	+55'	98°	7°27'	+56'	98°	7°18'	+56'	98°	4
5	8°59'	+53'	97°	8°52'	+54'	97°	8°45'	+54'	97°	8°38'	+55'	97°	8°30'	+55'	97°	8°22'	+56'	97°	8°15'	+56'	98°	5
6	9°53'	+53'	96°	9°46'	+54'	96°	9°39'	+54'	97°	9°32'	+55'	97°	9°25'	+55'	97°	9°18'	+56'	97°	9°11'	+56'	97°	6
7	10°46'	+53'	96°	10°40'	+54'	96°	10°34'	+54'	96°	10°27'	+55'	96°	10°21'	+55'	96°	10°14'	+56'	97°	10°07'	+56'	97°	7
8	11°39'	+53'	95°	11°34'	+54'	95°	11°28'	+54'	96°	11°22'	+55'	96°	11°16'	+55'	96°	11°09'	+56'	96°	11°03'	+56'	96°	8
9	12°33'	+53'	95°	12°28'	+54'	95°	12°22'	+54'	95°	12°17'	+55'	95°	12°11'	+55'	96°	12°05'	+56'	96°	11°59'	+56'	96°	9
10	13°26'	+53'	94°	13°21'	+54'	95°	13°17'	+54'	95°	13°11'	+55'	95°	13°06'	+55'	95°	13°00'	+56'	96°	12°55'	+56'	96°	10
11	14°19'	+53'	94°	14°15'	+54'	94°	14°11'	+54'	94°	14°06'	+55'	95°	14°01'	+55'	95°	13°56'	+55'	95°	13°50'	+56'	95°	11
12	15°13'	+53'	93°	15°09'	+54'	94°	15°05'	+54'	94°	15°01'	+55'	94°	14°56'	+55'	94°	14°51'	+55'	95°	14°46'	+56'	95°	12
13	16°06'	+53'	93°	16°03'	+54'	93°	15°59'	+54'	93°	15°55'	+55'	94°	15°51'	+55'	94°	15°47'	+55'	94°	15°42'	+56'	95°	13
14	16°59'	+53'	92°	16°56'	+54'	93°	16°53'	+54'	93°	16°50'	+54'	93°	16°46'	+55'	94°	16°42'	+55'	94°	16°38'	+56'	94°	14
15	17°52'	+53'	92°	17°50'	+53'	92°	17°47'	+54'	93°	17°44'	+54'	93°	17°41'	+55'	93°	17°38'	+55'	94°	17°34'	+56'	94°	15
16	18°45'	+53'	91°	18°43'	+53'	92°	18°41'	+54'	92°	18°39'	+54'	92°	18°36'	+55'	93°	18°33'	+55'	93°	18°29'	+56'	93°	16
17	19°38'	+53'	91°	19°36'	+53'	91°	19°35'	+54'	92°	19°33'	+54'	92°	19°31'	+55'	92°	19°28'	+55'	93°	19°25'	+56'	93°	17
18	20°30'	+53'	90°	20°30'	+53'	91°	20°29'	+54'	91°	20°27'	+54'	92°	20°25'	+55'	92°	20°23'	+55'	92°	20°21'	+56'	93°	18
19	21°23'	+53'	90°	21°23'	+53'	90°	21°22'	+54'	91°	21°22'	+54'	91°	21°20'	+55'	91°	21°18'	+55'	92°	21°16'	+56'	92°	19
20	22°16'	+52'	89°	22°16'	+53'	90°	22°16'	+54'	90°	22°16'	+54'	91°	22°15'	+55'	91°	22°13'	+55'	91°	22°12'	+55'	92°	20
21	23°08'	+52'	89°	23°09'	+53'	89°	23°10'	+53'	90°	23°10'	+54'	90°	23°09'	+54'	91°	23°08'	+55'	91°	23°07'	+55'	91°	21
22	24°01'	+52'	88°	24°02'	+53'	89°	24°03'	+53'	89°	24°04'	+54'	90°	24°04'	+54'	90°	24°03'	+55'	91°	24°03'	+55'	91°	22
23	24°53'	+52'	88°	24°55'	+53'	88°	24°56'	+53'	89°	24°58'	+54'	89°	24°58'	+54'	90°	24°58'	+55'	90°	24°58'	+55'	91°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

80° 280° LHA — Latitude SAME as Declination — 80° 280° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

81° 279° LHA — Latitude SAME as Declination — 81° 279° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°04'	+54'	98°	3°56'	+54'	98°	3°47'	+54'	98°	3°39'	+55'	98°	3°30'	+55'	98°	3°22'	+56'	98°	3°13'	+56'	98°	0
1	4°58'	+54'	98°	4°50'	+54'	98°	4°42'	+54'	98°	4°34'	+55'	98°	4°26'	+55'	98°	4°17'	+56'	98°	4°09'	+56'	98°	1
2	5°52'	+54'	97°	5°44'	+54'	97°	5°36'	+54'	97°	5°29'	+55'	97°	5°21'	+55'	98°	5°13'	+56'	98°	5°05'	+56'	98°	2
3	6°45'	+54'	97°	6°38'	+54'	97°	6°31'	+54'	97°	6°24'	+55'	97°	6°16'	+55'	97°	6°09'	+56'	97°	6°01'	+56'	97°	3
4	7°39'	+53'	96°	7°32'	+54'	96°	7°25'	+54'	96°	7°18'	+55'	97°	7°11'	+55'	97°	7°04'	+56'	97°	6°57'	+56'	97°	4
5	8°32'	+53'	96°	8°26'	+54'	96°	8°20'	+54'	96°	8°13'	+55'	96°	8°07'	+55'	96°	8°00'	+56'	96°	7°53'	+56'	97°	5
6	9°26'	+53'	95°	9°20'	+54'	95°	9°14'	+54'	96°	9°08'	+55'	96°	9°02'	+55'	96°	8°56'	+56'	96°	8°49'	+56'	96°	6
7	10°19'	+53'	95°	10°14'	+54'	95°	10°08'	+54'	95°	10°03'	+55'	95°	9°57'	+55'	96°	9°51'	+56'	96°	9°45'	+56'	96°	7
8	11°12'	+53'	94°	11°08'	+54'	95°	11°03'	+54'	95°	10°58'	+55'	95°	10°52'	+55'	95°	10°47'	+56'	95°	10°41'	+56'	96°	8
9	12°06'	+53'	94°	12°01'	+54'	94°	11°57'	+54'	94°	11°52'	+55'	95°	11°48'	+55'	95°	11°42'	+56'	95°	11°37'	+56'	95°	9
10	12°59'	+53'	93°	12°55'	+54'	94°	12°51'	+54'	94°	12°47'	+55'	94°	12°43'	+55'	94°	12°38'	+56'	95°	12°33'	+56'	95°	10
11	13°52'	+53'	93°	13°49'	+54'	93°	13°46'	+54'	93°	13°42'	+55'	94°	13°38'	+55'	94°	13°34'	+55'	94°	13°29'	+56'	94°	11
12	14°45'	+53'	92°	14°43'	+54'	93°	14°40'	+54'	93°	14°36'	+55'	93°	14°33'	+55'	94°	14°29'	+55'	94°	14°25'	+56'	94°	12
13	15°39'	+53'	92°	15°36'	+54'	92°	15°34'	+54'	93°	15°31'	+55'	93°	15°28'	+55'	93°	15°24'	+55'	93°	15°21'	+56'	94°	13
14	16°32'	+53'	92°	16°30'	+54'	92°	16°28'	+54'	92°	16°25'	+54'	92°	16°23'	+55'	93°	16°20'	+55'	93°	16°17'	+56'	93°	14
15	17°25'	+53'	91°	17°23'	+53'	91°	17°22'	+54'	92°	17°20'	+54'	92°	17°18'	+55'	92°	17°15'	+55'	93°	17°12'	+56'	93°	15
16	18°18'	+53'	91°	18°17'	+53'	91°	18°16'	+54'	91°	18°14'	+54'	92°	18°13'	+55'	92°	18°10'	+55'	92°	18°08'	+56'	93°	16
17	19°10'	+53'	90°	19°10'	+53'	90°	19°10'	+54'	91°	19°09'	+54'	91°	19°07'	+55'	91°	19°06'	+55'	92°	19°04'	+56'	92°	17
18	20°03'	+53'	90°	20°03'	+53'	90°	20°03'	+54'	90°	20°03'	+54'	91°	20°02'	+55'	91°	20°01'	+55'	91°	19°59'	+56'	92°	18
19	20°56'	+53'	89°	20°57'	+53'	89°	20°57'	+54'	90°	20°57'	+54'	90°	20°57'	+55'	91°	20°56'	+55'	91°	20°55'	+55'	91°	19
20	21°48'	+52'	89°	21°50'	+53'	89°	21°51'	+54'	89°	21°51'	+54'	90°	21°51'	+55'	90°	21°51'	+55'	91°	21°50'	+55'	91°	20
21	22°41'	+52'	88°	22°43'	+53'	88°	22°44'	+53'	89°	22°45'	+54'	89°	22°46'	+54'	90°	22°46'	+55'	90°	22°46'	+55'	90°	21
22	23°33'	+52'	87°	23°36'	+53'	88°	23°38'	+53'	88°	23°39'	+54'	89°	23°40'	+54'	89°	23°41'	+55'	90°	23°41'	+55'	90°	22
23	24°26'	+52'	87°	24°29'	+53'	87°	24°31'	+53'	88°	24°33'	+54'	88°	24°35'	+54'	89°	24°36'	+55'	89°	24°36'	+55'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

81° 279° LHA — Latitude SAME as Declination — 81° 279° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

82° 278° LHA — Latitude SAME as Declination — 82° 278° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°37'	+54'	97°	3°30'	+54'	97°	3°22'	+54'	97°	3°15'	+55'	97°	3°07'	+55'	97°	2°59'	+56'	97°	2°52'	+56'	97°	0
1	4°31'	+54'	97°	4°24'	+54'	97°	4°17'	+54'	97°	4°10'	+55'	97°	4°02'	+55'	97°	3°55'	+56'	97°	3°48'	+56'	97°	1
2	5°24'	+54'	96°	5°18'	+54'	96°	5°11'	+54'	96°	5°04'	+55'	97°	4°58'	+55'	97°	4°51'	+56'	97°	4°44'	+56'	97°	2
3	6°18'	+53'	96°	6°12'	+54'	96°	6°06'	+54'	96°	5°59'	+55'	96°	5°53'	+55'	96°	5°46'	+56'	96°	5°40'	+56'	96°	3
4	7°11'	+53'	95°	7°06'	+54'	95°	7°00'	+54'	96°	6°54'	+55'	96°	6°48'	+55'	96°	6°42'	+56'	96°	6°36'	+56'	96°	4
5	8°05'	+53'	95°	8°00'	+54'	95°	7°54'	+54'	95°	7°49'	+55'	95°	7°43'	+55'	95°	7°38'	+56'	96°	7°32'	+56'	96°	5
6	8°58'	+53'	94°	8°54'	+54'	95°	8°49'	+54'	95°	8°44'	+55'	95°	8°39'	+55'	95°	8°33'	+56'	95°	8°28'	+56'	95°	6
7	9°52'	+53'	94°	9°48'	+54'	94°	9°43'	+54'	94°	9°39'	+55'	94°	9°34'	+55'	95°	9°29'	+56'	95°	9°24'	+56'	95°	7
8	10°45'	+53'	93°	10°41'	+54'	94°	10°37'	+54'	94°	10°33'	+55'	94°	10°29'	+55'	94°	10°25'	+56'	94°	10°20'	+56'	95°	8
9	11°38'	+53'	93°	11°35'	+54'	93°	11°32'	+54'	93°	11°28'	+55'	94°	11°24'	+55'	94°	11°20'	+56'	94°	11°16'	+56'	94°	9
10	12°32'	+53'	93°	12°29'	+54'	93°	12°26'	+54'	93°	12°23'	+55'	93°	12°19'	+55'	93°	12°16'	+55'	94°	12°12'	+56'	94°	10
11	13°25'	+53'	92°	13°23'	+54'	92°	13°20'	+54'	93°	13°17'	+55'	93°	13°14'	+55'	93°	13°11'	+55'	93°	13°08'	+56'	93°	11
12	14°18'	+53'	92°	14°16'	+54'	92°	14°14'	+54'	92°	14°12'	+55'	92°	14°09'	+55'	93°	14°07'	+55'	93°	14°03'	+56'	93°	12
13	15°11'	+53'	91°	15°10'	+54'	91°	15°08'	+54'	92°	15°07'	+55'	92°	15°04'	+55'	92°	15°02'	+55'	92°	14°59'	+56'	93°	13
14	16°04'	+53'	91°	16°04'	+53'	91°	16°02'	+54'	91°	16°01'	+54'	91°	15°59'	+55'	92°	15°57'	+55'	92°	15°55'	+56'	92°	14
15	16°57'	+53'	90°	16°57'	+53'	90°	16°56'	+54'	91°	16°56'	+54'	91°	16°54'	+55'	91°	16°53'	+55'	92°	16°51'	+56'	92°	15
16	17°50'	+53'	90°	17°50'	+53'	90°	17°50'	+54'	90°	17°50'	+54'	91°	17°49'	+55'	91°	17°48'	+55'	91°	17°46'	+56'	92°	16
17	18°43'	+53'	89°	18°44'	+53'	89°	18°44'	+54'	90°	18°44'	+54'	90°	18°44'	+55'	91°	18°43'	+55'	91°	18°42'	+56'	91°	17
18	19°36'	+53'	89°	19°37'	+53'	89°	19°38'	+54'	89°	19°39'	+54'	90°	19°39'	+55'	90°	19°38'	+55'	90°	19°38'	+56'	91°	18
19	20°29'	+53'	88°	20°30'	+53'	89°	20°32'	+54'	89°	20°33'	+54'	89°	20°33'	+55'	90°	20°33'	+55'	90°	20°33'	+55'	90°	19
20	21°21'	+52'	88°	21°23'	+53'	88°	21°25'	+54'	88°	21°27'	+54'	89°	21°28'	+55'	89°	21°29'	+55'	90°	21°29'	+55'	90°	20
21	22°14'	+52'	87°	22°17'	+53'	88°	22°19'	+53'	88°	22°21'	+54'	88°	22°22'	+54'	89°	22°24'	+55'	89°	22°24'	+55'	90°	21
22	23°06'	+52'	87°	23°09'	+53'	87°	23°12'	+53'	87°	23°15'	+54'	88°	23°17'	+54'	88°	23°18'	+55'	89°	23°20'	+55'	89°	22
23	23°58'	+52'	86°	24°02'	+53'	86°	24°06'	+53'	87°	24°09'	+54'	87°	24°11'	+54'	88°	24°13'	+55'	88°	24°15'	+55'	89°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

82° 278° LHA — Latitude SAME as Declination — 82° 278° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

83° 277° LHA — Latitude SAME as Declination — 83° 277° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°10'	+54'	96°	3°04'	+54'	96°	2°57'	+54'	96°	2°50'	+55'	96°	2°44'	+55'	96°	2°37'	+56'	96°	2°30'	+56'	97°	0
1	4°04'	+54'	96°	3°58'	+54'	96°	3°52'	+54'	96°	3°45'	+55'	96°	3°39'	+55'	96°	3°33'	+56'	96°	3°26'	+56'	96°	1
2	4°57'	+54'	95°	4°52'	+54'	95°	4°46'	+54'	96°	4°40'	+55'	96°	4°34'	+55'	96°	4°28'	+56'	96°	4°22'	+56'	96°	2
3	5°51'	+53'	95°	5°46'	+54'	95°	5°40'	+54'	95°	5°35'	+55'	95°	5°30'	+55'	95°	5°24'	+56'	95°	5°18'	+56'	95°	3
4	6°44'	+53'	94°	6°40'	+54'	95°	6°35'	+54'	95°	6°30'	+55'	95°	6°25'	+55'	95°	6°20'	+56'	95°	6°14'	+56'	95°	4
5	7°38'	+53'	94°	7°34'	+54'	94°	7°29'	+54'	94°	7°25'	+55'	94°	7°20'	+55'	94°	7°15'	+56'	95°	7°10'	+56'	95°	5
6	8°31'	+53'	94°	8°27'	+54'	94°	8°24'	+54'	94°	8°20'	+55'	94°	8°15'	+55'	94°	8°11'	+56'	94°	8°06'	+56'	94°	6
7	9°25'	+53'	93°	9°21'	+54'	93°	9°18'	+54'	93°	9°14'	+55'	94°	9°10'	+55'	94°	9°07'	+56'	94°	9°02'	+56'	94°	7
8	10°18'	+53'	93°	10°15'	+54'	93°	10°12'	+54'	93°	10°09'	+55'	93°	10°06'	+55'	93°	10°02'	+56'	93°	9°58'	+56'	94°	8
9	11°11'	+53'	92°	11°09'	+54'	92°	11°06'	+54'	93°	11°04'	+55'	93°	11°01'	+55'	93°	10°58'	+56'	93°	10°54'	+56'	93°	9
10	12°05'	+53'	92°	12°03'	+54'	92°	12°01'	+54'	92°	11°58'	+55'	92°	11°56'	+55'	92°	11°53'	+55'	93°	11°50'	+56'	93°	10
11	12°58'	+53'	91°	12°56'	+54'	91°	12°55'	+54'	92°	12°53'	+55'	92°	12°51'	+55'	92°	12°49'	+55'	92°	12°46'	+56'	93°	11
12	13°51'	+53'	91°	13°50'	+54'	91°	13°49'	+54'	91°	13°48'	+55'	91°	13°46'	+55'	92°	13°44'	+55'	92°	13°42'	+56'	92°	12
13	14°44'	+53'	90°	14°44'	+54'	90°	14°43'	+54'	91°	14°42'	+54'	91°	14°41'	+55'	91°	14°39'	+55'	92°	14°38'	+56'	92°	13
14	15°37'	+53'	90°	15°37'	+53'	90°	15°37'	+54'	90°	15°37'	+54'	91°	15°36'	+55'	91°	15°35'	+55'	91°	15°34'	+56'	91°	14
15	16°30'	+53'	89°	16°31'	+53'	90°	16°31'	+54'	90°	16°31'	+54'	90°	16°31'	+55'	90°	16°30'	+55'	91°	16°29'	+56'	91°	15
16	17°23'	+53'	89°	17°24'	+53'	89°	17°25'	+54'	89°	17°25'	+54'	90°	17°26'	+55'	90°	17°25'	+55'	90°	17°25'	+56'	91°	16
17	18°16'	+53'	88°	18°18'	+53'	89°	18°19'	+54'	89°	18°20'	+54'	89°	18°20'	+55'	90°	18°21'	+55'	90°	18°21'	+56'	90°	17
18	19°09'	+53'	88°	19°11'	+53'	88°	19°13'	+54'	88°	19°14'	+54'	89°	19°15'	+55'	89°	19°16'	+55'	89°	19°16'	+56'	90°	18
19	20°01'	+53'	87°	20°04'	+53'	88°	20°06'	+54'	88°	20°08'	+54'	88°	20°10'	+55'	89°	20°11'	+55'	89°	20°12'	+55'	89°	19
20	20°54'	+53'	87°	20°57'	+53'	87°	21°00'	+54'	87°	21°02'	+54'	88°	21°04'	+55'	88°	21°06'	+55'	89°	21°07'	+55'	89°	20
21	21°46'	+52'	86°	21°50'	+53'	87°	21°54'	+53'	87°	21°56'	+54'	87°	21°59'	+54'	88°	22°01'	+55'	88°	22°03'	+55'	89°	21
22	22°39'	+52'	86°	22°43'	+53'	86°	22°47'	+53'	87°	22°50'	+54'	87°	22°53'	+54'	87°	22°56'	+55'	88°	22°58'	+55'	88°	22
23	23°31'	+52'	85°	23°36'	+53'	86°	23°40'	+53'	86°	23°44'	+54'	86°	23°48'	+54'	87°	23°51'	+55'	87°	23°53'	+55'	88°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

83° 277° LHA — Latitude SAME as Declination — 83° 277° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

84° 276° LHA Latitude SAME as Declination 84° 276° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°43'	+54'	95°	2°38'	+54'	95°	2°32'	+54'	95°	2°26'	+55'	95°	2°20'	+55'	96°	2°15'	+56'	96°	2°09'	+56'	96°	0
1	3°37'	+54'	95°	3°32'	+54'	95°	3°26'	+54'	95°	3°21'	+55'	95°	3°16'	+55'	95°	3°10'	+56'	95°	3°05'	+56'	95°	1
2	4°30'	+53'	94°	4°26'	+54'	95°	4°21'	+54'	95°	4°16'	+55'	95°	4°11'	+55'	95°	4°06'	+56'	95°	4°01'	+56'	95°	2
3	5°24'	+53'	94°	5°19'	+54'	94°	5°15'	+54'	94°	5°11'	+55'	94°	5°06'	+55'	94°	5°02'	+56'	94°	4°57'	+56'	95°	3
4	6°17'	+53'	94°	6°13'	+54'	94°	6°10'	+54'	94°	6°06'	+55'	94°	6°01'	+55'	94°	5°57'	+56'	94°	5°53'	+56'	94°	4
5	7°11'	+53'	93°	7°07'	+54'	93°	7°04'	+54'	93°	7°00'	+55'	93°	6°57'	+55'	94°	6°53'	+56'	94°	6°49'	+56'	94°	5
6	8°04'	+53'	93°	8°01'	+54'	93°	7°58'	+54'	93°	7°55'	+55'	93°	7°52'	+55'	93°	7°48'	+56'	93°	7°45'	+56'	93°	6
7	8°57'	+53'	92°	8°55'	+54'	92°	8°53'	+54'	92°	8°50'	+55'	93°	8°47'	+55'	93°	8°44'	+56'	93°	8°41'	+56'	93°	7
8	9°51'	+53'	92°	9°49'	+54'	92°	9°47'	+54'	92°	9°45'	+55'	92°	9°42'	+55'	92°	9°40'	+56'	93°	9°37'	+56'	93°	8
9	10°44'	+53'	91°	10°43'	+54'	91°	10°41'	+54'	92°	10°39'	+55'	92°	10°37'	+55'	92°	10°35'	+56'	92°	10°33'	+56'	92°	9
10	11°37'	+53'	91°	11°36'	+54'	91°	11°35'	+54'	91°	11°34'	+55'	91°	11°32'	+55'	92°	11°31'	+55'	92°	11°29'	+56'	92°	10
11	12°31'	+53'	90°	12°30'	+54'	91°	12°29'	+54'	91°	12°29'	+55'	91°	12°28'	+55'	91°	12°26'	+55'	91°	12°25'	+56'	92°	11
12	13°24'	+53'	90°	13°24'	+54'	90°	13°24'	+54'	90°	13°23'	+55'	91°	13°23'	+55'	91°	13°22'	+55'	91°	13°20'	+56'	91°	12
13	14°17'	+53'	89°	14°17'	+54'	90°	14°18'	+54'	90°	14°18'	+54'	90°	14°18'	+55'	90°	14°17'	+55'	91°	14°16'	+56'	91°	13
14	15°10'	+53'	89°	15°11'	+53'	89°	15°12'	+54'	89°	15°12'	+54'	90°	15°12'	+55'	90°	15°12'	+55'	90°	15°12'	+56'	90°	14
15	16°03'	+53'	88°	16°04'	+53'	89°	16°06'	+54'	89°	16°07'	+54'	89°	16°07'	+55'	90°	16°08'	+55'	90°	16°08'	+56'	90°	15
16	16°56'	+53'	88°	16°58'	+53'	88°	17°00'	+54'	88°	17°01'	+54'	89°	17°02'	+55'	89°	17°03'	+55'	89°	17°03'	+56'	90°	16
17	17°49'	+53'	87°	17°51'	+53'	88°	17°54'	+54'	88°	17°55'	+54'	88°	17°57'	+55'	89°	17°58'	+55'	89°	17°59'	+56'	89°	17
18	18°41'	+53'	87°	18°45'	+53'	87°	18°47'	+54'	88°	18°50'	+54'	88°	18°52'	+55'	88°	18°53'	+55'	89°	18°55'	+56'	89°	18
19	19°34'	+53'	86°	19°38'	+53'	87°	19°41'	+54'	87°	19°44'	+54'	87°	19°46'	+55'	88°	19°49'	+55'	88°	19°50'	+55'	89°	19
20	20°27'	+53'	86°	20°31'	+53'	86°	20°35'	+54'	87°	20°38'	+54'	87°	20°41'	+55'	87°	20°44'	+55'	88°	20°46'	+55'	88°	20
21	21°19'	+52'	85°	21°24'	+53'	86°	21°28'	+53'	86°	21°32'	+54'	87°	21°36'	+54'	87°	21°39'	+55'	87°	21°41'	+55'	88°	21
22	22°12'	+52'	85°	22°17'	+53'	85°	22°22'	+53'	86°	22°26'	+54'	86°	22°30'	+54'	86°	22°34'	+55'	87°	22°37'	+55'	87°	22
23	23°04'	+52'	84°	23°10'	+53'	85°	23°15'	+53'	85°	23°20'	+54'	86°	23°24'	+54'	86°	23°28'	+55'	86°	23°32'	+55'	87°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

84° 276° LHA Latitude SAME as Declination 84° 276° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

85° 275° LHA Latitude SAME as Declination 85° 275° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°16'	+53'	94°	2°11'	+54'	94°	2°07'	+54'	95°	2°02'	+55'	95°	1°57'	+55'	95°	1°52'	+56'	95°	1°47'	+56'	95°	0
1	3°10'	+53'	94°	3°05'	+54'	94°	3°01'	+54'	94°	2°57'	+55'	94°	2°52'	+55'	94°	2°48'	+56'	94°	2°43'	+56'	94°	1
2	4°03'	+53'	94°	3°59'	+54'	94°	3°55'	+54'	94°	3°52'	+55'	94°	3°48'	+55'	94°	3°44'	+56'	94°	3°39'	+56'	94°	2
3	4°57'	+53'	93°	4°53'	+54'	93°	4°50'	+54'	93°	4°46'	+55'	93°	4°43'	+55'	93°	4°39'	+56'	94°	4°35'	+56'	94°	3
4	5°50'	+53'	93°	5°47'	+54'	93°	5°44'	+54'	93°	5°41'	+55'	93°	5°38'	+55'	93°	5°35'	+56'	93°	5°32'	+56'	93°	4
5	6°43'	+53'	92°	6°41'	+54'	92°	6°39'	+54'	92°	6°36'	+55'	93°	6°33'	+55'	93°	6°30'	+56'	93°	6°28'	+56'	93°	5
6	7°37'	+53'	92°	7°35'	+54'	92°	7°33'	+54'	92°	7°31'	+55'	92°	7°28'	+55'	92°	7°26'	+56'	92°	7°23'	+56'	93°	6
7	8°30'	+53'	91°	8°29'	+54'	91°	8°27'	+54'	92°	8°26'	+55'	92°	8°24'	+55'	92°	8°22'	+56'	92°	8°19'	+56'	92°	7
8	9°24'	+53'	91°	9°23'	+54'	91°	9°22'	+54'	91°	9°20'	+55'	91°	9°19'	+55'	91°	9°17'	+56'	92°	9°15'	+56'	92°	8
9	10°17'	+53'	90°	10°16'	+54'	91°	10°16'	+54'	91°	10°15'	+55'	91°	10°14'	+55'	91°	10°13'	+56'	91°	10°11'	+56'	91°	9
10	11°10'	+53'	90°	11°10'	+54'	90°	11°10'	+54'	90°	11°10'	+55'	90°	11°09'	+55'	91°	11°08'	+55'	91°	11°07'	+56'	91°	10
11	12°03'	+53'	89°	12°04'	+54'	90°	12°04'	+54'	90°	12°04'	+55'	90°	12°04'	+55'	90°	12°04'	+55'	90°	12°03'	+56'	91°	11
12	12°56'	+53'	89°	12°57'	+54'	89°	12°58'	+54'	89°	12°59'	+55'	90°	12°59'	+55'	90°	12°59'	+55'	90°	12°59'	+56'	90°	12
13	13°50'	+53'	88°	13°51'	+54'	89°	13°52'	+54'	89°	13°53'	+55'	89°	13°54'	+55'	89°	13°55'	+55'	90°	13°55'	+56'	90°	13
14	14°43'	+53'	88°	14°45'	+54'	88°	14°46'	+54'	88°	14°48'	+54'	89°	14°49'	+55'	89°	14°50'	+55'	89°	14°51'	+56'	90°	14
15	15°36'	+53'	87°	15°38'	+53'	88°	15°40'	+54'	88°	15°42'	+54'	88°	15°44'	+55'	89°	15°45'	+55'	89°	15°46'	+56'	89°	15
16	16°29'	+53'	87°	16°32'	+53'	87°	16°34'	+54'	88°	16°37'	+54'	88°	16°39'	+55'	88°	16°41'	+55'	88°	16°42'	+56'	89°	16
17	17°21'	+53'	86°	17°25'	+53'	87°	17°28'	+54'	87°	17°31'	+54'	87°	17°34'	+55'	88°	17°36'	+55'	88°	17°38'	+56'	88°	17
18	18°14'	+53'	86°	18°18'	+53'	86°	18°22'	+54'	87°	18°25'	+54'	87°	18°28'	+55'	87°	18°31'	+55'	88°	18°33'	+56'	88°	18
19	19°07'	+53'	85°	19°12'	+53'	86°	19°16'	+54'	86°	19°20'	+54'	87°	19°23'	+55'	87°	19°26'	+55'	87°	19°29'	+56'	88°	19
20	20°00'	+53'	85°	20°05'	+53'	85°	20°09'	+54'	86°	20°14'	+54'	86°	20°18'	+55'	86°	20°21'	+55'	87°	20°24'	+55'	87°	20
21	20°52'	+52'	84°	20°58'	+53'	85°	21°03'	+54'	85°	21°08'	+54'	86°	21°12'	+54'	86°	21°16'	+55'	86°	21°20'	+55'	87°	21
22	21°45'	+52'	84°	21°51'	+53'	84°	21°56'	+53'	85°	22°02'	+54'	85°	22°07'	+54'	86°	22°11'	+55'	86°	22°15'	+55'	86°	22
23	22°37'	+52'	83°	22°44'	+53'	84°	22°50'	+53'	84°	22°56'	+54'	85°	23°01'	+54'	85°	23°06'	+55'	86°	23°10'	+55'	86°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

85° 275° LHA Latitude SAME as Declination 85° 275° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

86° 274° LHA — Latitude SAME as Declination — 86° 274° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°49'	+53'	94°	1°45'	+54'	94°	1°41'	+54'	94°	1°38'	+55'	94°	1°34'	+55'	94°	1°30'	+56'	94°	1°26'	+56'	94°	0
1	2°42'	+53'	93°	2°39'	+54'	93°	2°36'	+54'	93°	2°32'	+55'	93°	2°29'	+55'	93°	2°25'	+56'	93°	2°22'	+56'	93°	1
2	3°36'	+53'	93°	3°33'	+54'	93°	3°30'	+54'	93°	3°27'	+55'	93°	3°24'	+55'	93°	3°21'	+56'	93°	3°18'	+56'	93°	2
3	4°29'	+53'	92°	4°27'	+54'	92°	4°25'	+54'	92°	4°22'	+55'	92°	4°19'	+55'	93°	4°17'	+56'	93°	4°14'	+56'	93°	3
4	5°23'	+53'	92°	5°21'	+54'	92°	5°19'	+54'	92°	5°17'	+55'	92°	5°15'	+55'	92°	5°12'	+56'	92°	5°10'	+56'	92°	4
5	6°16'	+53'	91°	6°15'	+54'	91°	6°13'	+54'	92°	6°12'	+55'	92°	6°10'	+55'	92°	6°08'	+56'	92°	6°06'	+56'	92°	5
6	7°10'	+53'	91°	7°09'	+54'	91°	7°08'	+54'	91°	7°06'	+55'	91°	7°05'	+55'	91°	7°04'	+56'	91°	7°02'	+56'	92°	6
7	8°03'	+53'	90°	8°02'	+54'	91°	8°02'	+54'	91°	8°01'	+55'	91°	8°00'	+55'	91°	7°59'	+56'	91°	7°58'	+56'	91°	7
8	8°56'	+53'	90°	8°56'	+54'	90°	8°56'	+54'	90°	8°56'	+55'	90°	8°55'	+55'	91°	8°55'	+56'	91°	8°54'	+56'	91°	8
9	9°50'	+53'	89°	9°50'	+54'	90°	9°50'	+54'	90°	9°51'	+55'	90°	9°50'	+55'	90°	9°50'	+56'	90°	9°50'	+56'	90°	9
10	10°43'	+53'	89°	10°44'	+54'	89°	10°45'	+54'	89°	10°45'	+55'	90°	10°46'	+55'	90°	10°46'	+55'	90°	10°46'	+56'	90°	10
11	11°36'	+53'	89°	11°38'	+54'	89°	11°39'	+54'	89°	11°40'	+55'	89°	11°41'	+55'	89°	11°41'	+55'	90°	11°42'	+56'	90°	11
12	12°29'	+53'	88°	12°31'	+54'	88°	12°33'	+54'	88°	12°34'	+55'	89°	12°36'	+55'	89°	12°37'	+55'	89°	12°37'	+56'	89°	12
13	13°22'	+53'	88°	13°25'	+54'	88°	13°27'	+54'	88°	13°29'	+55'	88°	13°31'	+55'	89°	13°32'	+55'	89°	13°33'	+56'	89°	13
14	14°15'	+53'	87°	14°18'	+54'	87°	14°21'	+54'	88°	14°23'	+54'	88°	14°26'	+55'	88°	14°27'	+55'	88°	14°29'	+56'	89°	14
15	15°08'	+53'	87°	15°12'	+53'	87°	15°15'	+54'	87°	15°18'	+54'	87°	15°20'	+55'	88°	15°23'	+55'	88°	15°25'	+56'	88°	15
16	16°01'	+53'	86°	16°05'	+53'	86°	16°09'	+54'	87°	16°12'	+54'	87°	16°15'	+55'	87°	16°18'	+55'	88°	16°20'	+56'	88°	16
17	16°54'	+53'	86°	16°59'	+53'	86°	17°03'	+54'	86°	17°07'	+54'	87°	17°10'	+55'	87°	17°13'	+55'	87°	17°16'	+56'	87°	17
18	17°47'	+53'	85°	17°52'	+53'	85°	17°57'	+54'	86°	18°01'	+54'	86°	18°05'	+55'	86°	18°09'	+55'	87°	18°12'	+56'	87°	18
19	18°40'	+53'	85°	18°45'	+53'	85°	18°50'	+54'	85°	18°55'	+54'	86°	19°00'	+55'	86°	19°04'	+55'	86°	19°07'	+56'	87°	19
20	19°33'	+53'	84°	19°39'	+53'	84°	19°44'	+54'	85°	19°49'	+54'	85°	19°54'	+55'	86°	19°59'	+55'	86°	20°03'	+55'	86°	20
21	20°25'	+52'	84°	20°32'	+53'	84°	20°38'	+54'	84°	20°43'	+54'	85°	20°49'	+54'	85°	20°54'	+55'	85°	20°58'	+55'	86°	21
22	21°18'	+52'	83°	21°25'	+53'	83°	21°31'	+53'	84°	21°37'	+54'	84°	21°43'	+54'	85°	21°49'	+55'	85°	21°54'	+55'	85°	22
23	22°10'	+52'	83°	22°18'	+53'	83°	22°25'	+53'	83°	22°31'	+54'	84°	22°38'	+54'	84°	22°44'	+55'	85°	22°49'	+55'	85°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

86° 274° LHA — Latitude SAME as Declination — 86° 274° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

87° 273° LHA — Latitude SAME as Declination — 87° 273° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°22'	+53'	93°	1°19'	+54'	93°	1°16'	+54'	93°	1°13'	+55'	93°	1°10'	+55'	93°	1°07'	+56'	93°	1°04'	+56'	93°	0
1	2°15'	+53'	92°	2°13'	+54'	92°	2°10'	+54'	92°	2°08'	+55'	92°	2°06'	+55'	92°	2°03'	+56'	92°	2°01'	+56'	92°	1
2	3°09'	+53'	92°	3°07'	+54'	92°	3°05'	+54'	92°	3°03'	+55'	92°	3°01'	+55'	92°	2°59'	+56'	92°	2°57'	+56'	92°	2
3	4°02'	+53'	91°	4°01'	+54'	91°	3°59'	+54'	91°	3°58'	+55'	92°	3°56'	+55'	92°	3°54'	+56'	92°	3°53'	+56'	92°	3
4	4°56'	+53'	91°	4°55'	+54'	91°	4°54'	+54'	91°	4°52'	+55'	91°	4°51'	+55'	91°	4°50'	+56'	91°	4°49'	+56'	91°	4
5	5°49'	+53'	90°	5°48'	+54'	90°	5°48'	+54'	91°	5°47'	+55'	91°	5°46'	+55'	91°	5°46'	+56'	91°	5°45'	+56'	91°	5
6	6°42'	+53'	90°	6°42'	+54'	90°	6°42'	+54'	90°	6°42'	+55'	90°	6°42'	+55'	90°	6°41'	+56'	91°	6°41'	+56'	91°	6
7	7°36'	+53'	89°	7°36'	+54'	90°	7°37'	+54'	90°	7°37'	+55'	90°	7°37'	+55'	90°	7°37'	+56'	90°	7°36'	+56'	90°	7
8	8°29'	+53'	89°	8°30'	+54'	89°	8°31'	+54'	89°	8°31'	+55'	89°	8°32'	+55'	90°	8°32'	+56'	90°	8°32'	+56'	90°	8
9	9°22'	+53'	89°	9°24'	+54'	89°	9°25'	+54'	89°	9°26'	+55'	89°	9°27'	+55'	89°	9°28'	+56'	89°	9°28'	+56'	90°	9
10	10°16'	+53'	88°	10°18'	+54'	88°	10°19'	+54'	88°	10°21'	+55'	89°	10°22'	+55'	89°	10°23'	+55'	89°	10°24'	+56'	89°	10
11	11°09'	+53'	88°	11°11'	+54'	88°	11°13'	+54'	88°	11°15'	+55'	88°	11°17'	+55'	88°	11°19'	+55'	89°	11°20'	+56'	89°	11
12	12°02'	+53'	87°	12°05'	+54'	87°	12°08'	+54'	88°	12°10'	+55'	88°	12°12'	+55'	88°	12°14'	+55'	88°	12°16'	+56'	88°	12
13	12°55'	+53'	87°	12°59'	+54'	87°	13°02'	+54'	87°	13°05'	+55'	87°	13°07'	+55'	88°	13°10'	+55'	88°	13°12'	+56'	88°	13
14	13°48'	+53'	86°	13°52'	+54'	86°	13°56'	+54'	87°	13°59'	+54'	87°	14°02'	+55'	87°	14°05'	+55'	87°	14°08'	+56'	88°	14
15	14°41'	+53'	86°	14°46'	+53'	86°	14°50'	+54'	86°	14°54'	+54'	86°	14°57'	+55'	87°	15°00'	+55'	87°	15°03'	+56'	87°	15
16	15°34'	+53'	85°	15°39'	+53'	85°	15°44'	+54'	86°	15°48'	+54'	86°	15°52'	+55'	86°	15°56'	+55'	87°	15°59'	+56'	87°	16
17	16°27'	+53'	85°	16°33'	+53'	85°	16°38'	+54'	85°	16°42'	+54'	86°	16°47'	+55'	86°	16°51'	+55'	86°	16°55'	+56'	87°	17
18	17°20'	+53'	84°	17°26'	+53'	85°	17°31'	+54'	85°	17°37'	+54'	85°	17°42'	+55'	85°	17°46'	+55'	86°	17°50'	+56'	86°	18
19	18°13'	+53'	84°	18°19'	+53'	84°	18°25'	+54'	84°	18°31'	+54'	85°	18°36'	+55'	85°	18°41'	+55'	85°	18°46'	+56'	86°	19
20	19°05'	+53'	83°	19°12'	+53'	84°	19°19'	+54'	84°	19°25'	+54'	84°	19°31'	+55'	85°	19°36'	+55'	85°	19°41'	+55'	85°	20
21	19°58'	+53'	83°	20°05'	+53'	83°	20°13'	+54'	83°	20°19'	+54'	84°	20°25'	+55'	84°	20°31'	+55'	85°	20°37'	+55'	85°	21
22	20°51'	+52'	82°	20°59'	+53'	83°	21°06'	+53'	83°	21°13'	+54'	83°	21°20'	+54'	84°	21°26'	+55'	84°	21°32'	+55'	85°	22
23	21°43'	+52'	82°	21°51'	+53'	82°	22°00'	+53'	82°	22°07'	+54'	83°	22°14'	+54'	83°	22°21'	+55'	84°	22°28'	+55'	84°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

87° 273° LHA — Latitude SAME as Declination — 87° 273° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

88° 272° LHA — Latitude SAME as Declination — 88° 272° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°54'	+53'	92°	0°53'	+54'	92°	0°51'	+54'	92°	0°49'	+55'	92°	0°47'	+55'	92°	0°45'	+56'	92°	0°43'	+56'	92°	0
1	1°48'	+53'	91°	1°47'	+54'	91°	1°45'	+54'	91°	1°44'	+55'	91°	1°42'	+55'	91°	1°41'	+56'	91°	1°39'	+56'	92°	1
2	2°41'	+53'	91°	2°40'	+54'	91°	2°39'	+54'	91°	2°38'	+55'	91°	2°37'	+55'	91°	2°36'	+56'	91°	2°35'	+56'	91°	2
3	3°35'	+53'	90°	3°34'	+54'	90°	3°34'	+54'	91°	3°33'	+55'	91°	3°33'	+55'	91°	3°32'	+56'	91°	3°31'	+56'	91°	3
4	4°28'	+53'	90°	4°28'	+54'	90°	4°28'	+54'	90°	4°28'	+55'	90°	4°28'	+55'	90°	4°27'	+56'	90°	4°27'	+56'	90°	4
5	5°22'	+53'	90°	5°22'	+54'	90°	5°23'	+54'	90°	5°23'	+55'	90°	5°23'	+55'	90°	5°23'	+56'	90°	5°23'	+56'	90°	5
6	6°15'	+53'	89°	6°16'	+54'	89°	6°17'	+54'	89°	6°18'	+55'	89°	6°18'	+55'	89°	6°19'	+56'	90°	6°19'	+56'	90°	6
7	7°08'	+53'	89°	7°10'	+54'	89°	7°11'	+54'	89°	7°12'	+55'	89°	7°13'	+55'	89°	7°14'	+56'	89°	7°15'	+56'	89°	7
8	8°02'	+53'	88°	8°04'	+54'	88°	8°05'	+54'	88°	8°07'	+55'	89°	8°08'	+55'	89°	8°10'	+56'	89°	8°11'	+56'	89°	8
9	8°55'	+53'	88°	8°57'	+54'	88°	9°00'	+54'	88°	9°02'	+55'	88°	9°04'	+55'	88°	9°05'	+56'	88°	9°07'	+56'	89°	9
10	9°48'	+53'	87°	9°51'	+54'	87°	9°54'	+54'	88°	9°56'	+55'	88°	9°59'	+55'	88°	10°01'	+55'	88°	10°03'	+56'	88°	10
11	10°42'	+53'	87°	10°45'	+54'	87°	10°48'	+54'	87°	10°51'	+55'	87°	10°54'	+55'	87°	10°56'	+55'	88°	10°59'	+56'	88°	11
12	11°35'	+53'	86°	11°39'	+54'	86°	11°42'	+54'	87°	11°46'	+55'	87°	11°49'	+55'	87°	11°52'	+55'	87°	11°54'	+56'	88°	12
13	12°28'	+53'	86°	12°32'	+54'	86°	12°36'	+54'	86°	12°40'	+55'	86°	12°44'	+55'	87°	12°47'	+55'	87°	12°50'	+56'	87°	13
14	13°21'	+53'	85°	13°26'	+54'	86°	13°30'	+54'	86°	13°35'	+54'	86°	13°39'	+55'	86°	13°43'	+55'	87°	13°46'	+56'	87°	14
15	14°14'	+53'	85°	14°19'	+53'	85°	14°24'	+54'	85°	14°29'	+54'	86°	14°34'	+55'	86°	14°38'	+55'	86°	14°42'	+56'	86°	15
16	15°07'	+53'	84°	15°13'	+53'	85°	15°18'	+54'	85°	15°24'	+54'	85°	15°29'	+55'	85°	15°33'	+55'	86°	15°38'	+56'	86°	16
17	16°00'	+53'	84°	16°06'	+53'	84°	16°12'	+54'	84°	16°18'	+54'	85°	16°23'	+55'	85°	16°28'	+55'	85°	16°33'	+56'	86°	17
18	16°53'	+53'	83°	17°00'	+53'	84°	17°06'	+54'	84°	17°12'	+54'	84°	17°18'	+55'	85°	17°24'	+55'	85°	17°29'	+56'	85°	18
19	17°46'	+53'	83°	17°53'	+53'	83°	18°00'	+54'	83°	18°07'	+54'	84°	18°13'	+55'	84°	18°19'	+55'	84°	18°24'	+56'	85°	19
20	18°38'	+53'	82°	18°46'	+53'	83°	18°54'	+54'	83°	19°01'	+54'	83°	19°08'	+55'	84°	19°14'	+55'	84°	19°20'	+55'	84°	20
21	19°31'	+53'	82°	19°39'	+53'	82°	19°47'	+54'	83°	19°55'	+54'	83°	20°02'	+55'	83°	20°09'	+55'	84°	20°15'	+55'	84°	21
22	20°24'	+52'	81°	20°32'	+53'	82°	20°41'	+53'	82°	20°49'	+54'	82°	20°57'	+54'	83°	21°04'	+55'	83°	21°11'	+55'	84°	22
23	21°16'	+52'	81°	21°25'	+53'	81°	21°34'	+53'	82°	21°43'	+54'	82°	21°51'	+54'	82°	21°59'	+55'	83°	22°06'	+55'	83°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

88° 272° LHA — Latitude SAME as Declination — 88° 272° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

89° 271° LHA — Latitude SAME as Declination — 89° 271° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°27'	+53'	91°	0°26'	+54'	91°	0°25'	+54'	91°	0°24'	+55'	91°	0°23'	+55'	91°	0°22'	+56'	91°	0°22'	+56'	91°	0
1	1°21'	+53'	90°	1°20'	+54'	90°	1°20'	+54'	90°	1°19'	+55'	91°	1°19'	+55'	91°	1°18'	+56'	91°	1°18'	+56'	91°	1
2	2°14'	+53'	90°	2°14'	+54'	90°	2°14'	+54'	90°	2°14'	+55'	90°	2°14'	+55'	90°	2°14'	+56'	90°	2°14'	+56'	90°	2
3	3°08'	+53'	90°	3°08'	+54'	90°	3°08'	+54'	90°	3°09'	+55'	90°	3°09'	+55'	90°	3°09'	+56'	90°	3°10'	+56'	90°	3
4	4°01'	+53'	89°	4°02'	+54'	89°	4°03'	+54'	89°	4°04'	+55'	89°	4°04'	+55'	89°	4°05'	+56'	89°	4°06'	+56'	89°	4
5	4°54'	+53'	89°	4°56'	+54'	89°	4°57'	+54'	89°	4°58'	+55'	89°	5°00'	+55'	89°	5°01'	+56'	89°	5°02'	+56'	89°	5
6	5°48'	+53'	88°	5°50'	+54'	88°	5°52'	+54'	88°	5°53'	+55'	88°	5°55'	+55'	89°	5°56'	+56'	89°	5°58'	+56'	89°	6
7	6°41'	+53'	88°	6°44'	+54'	88°	6°46'	+54'	88°	6°48'	+55'	88°	6°50'	+55'	88°	6°52'	+56'	88°	6°53'	+56'	88°	7
8	7°35'	+53'	87°	7°37'	+54'	87°	7°40'	+54'	88°	7°43'	+55'	88°	7°45'	+55'	88°	7°47'	+56'	88°	7°49'	+56'	88°	8
9	8°28'	+53'	87°	8°31'	+54'	87°	8°34'	+54'	87°	8°37'	+55'	87°	8°40'	+55'	87°	8°43'	+56'	88°	8°45'	+56'	88°	9
10	9°21'	+53'	86°	9°25'	+54'	86°	9°29'	+54'	87°	9°32'	+55'	87°	9°35'	+55'	87°	9°38'	+55'	87°	9°41'	+56'	87°	10
11	10°14'	+53'	86°	10°19'	+54'	86°	10°23'	+54'	86°	10°27'	+55'	86°	10°30'	+55'	87°	10°34'	+55'	87°	10°37'	+56'	87°	11
12	11°08'	+53'	85°	11°12'	+54'	86°	11°17'	+54'	86°	11°21'	+55'	86°	11°25'	+55'	86°	11°29'	+55'	86°	11°33'	+56'	87°	12
13	12°01'	+53'	85°	12°06'	+54'	85°	12°11'	+54'	85°	12°16'	+55'	86°	12°20'	+55'	86°	12°25'	+55'	86°	12°29'	+56'	86°	13
14	12°54'	+53'	84°	13°00'	+54'	85°	13°05'	+54'	85°	13°10'	+54'	85°	13°15'	+55'	85°	13°20'	+55'	86°	13°25'	+56'	86°	14
15	13°47'	+53'	84°	13°53'	+54'	84°	13°59'	+54'	84°	14°05'	+54'	85°	14°10'	+55'	85°	14°15'	+55'	85°	14°20'	+56'	85°	15
16	14°40'	+53'	83°	14°47'	+53'	84°	14°53'	+54'	84°	14°59'	+54'	84°	15°05'	+55'	85°	15°11'	+55'	85°	15°16'	+56'	85°	16
17	15°33'	+53'	83°	15°40'	+53'	83°	15°47'	+54'	84°	15°54'	+54'	84°	16°00'	+55'	84°	16°06'	+55'	84°	16°12'	+56'	85°	17
18	16°26'	+53'	82°	16°34'	+53'	83°	16°41'	+54'	83°	16°48'	+54'	83°	16°55'	+55'	84°	17°01'	+55'	84°	17°07'	+56'	84°	18
19	17°19'	+53'	82°	17°27'	+53'	82°	17°35'	+54'	83°	17°42'	+54'	83°	17°50'	+55'	83°	17°56'	+55'	84°	18°03'	+56'	84°	19
20	18°11'	+53'	81°	18°20'	+53'	82°	18°29'	+54'	82°	18°37'	+54'	82°	18°44'	+55'	83°	18°52'	+55'	83°	18°59'	+55'	83°	20
21	19°04'	+53'	81°	19°13'	+53'	81°	19°22'	+54'	82°	19°31'	+54'	82°	19°39'	+55'	82°	19°47'	+55'	83°	19°54'	+55'	83°	21
22	19°57'	+52'	80°	20°06'	+53'	81°	20°16'	+54'	81°	20°25'	+54'	82°	20°33'	+54'	82°	20°42'	+55'	82°	20°50'	+55'	83°	22
23	20°49'	+52'	80°	20°59'	+53'	80°	21°09'	+53'	81°	21°19'	+54'	81°	21°28'	+54'	81°	21°37'	+55'	82°	21°45'	+55'	82°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

89° 271° LHA — Latitude SAME as Declination — 89° 271° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

90° 270° LHA — Latitude SAME or CONTRARY as Declination — 90° 270° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	0°00'	+53'	90°	0°00'	+54'	90°	0°00'	+54'	90°	0°00'	+55'	90°	0°00'	+55'	90°	0°00'	+56'	90°	0°00'	+56'	90°	0
1	0°53'	+53'	90°	0°54'	+54'	90°	0°54'	+54'	90°	0°55'	+55'	90°	0°55'	+55'	90°	0°56'	+56'	90°	0°56'	+56'	90°	1
2	1°47'	+53'	89°	1°48'	+54'	89°	1°49'	+54'	89°	1°50'	+55'	89°	1°50'	+55'	89°	1°51'	+56'	89°	1°52'	+56'	89°	2
3	2°40'	+53'	89°	2°42'	+54'	89°	2°43'	+54'	89°	2°44'	+55'	89°	2°46'	+55'	89°	2°47'	+56'	89°	2°48'	+56'	89°	3
4	3°34'	+53'	88°	3°36'	+54'	88°	3°37'	+54'	88°	3°39'	+55'	88°	3°41'	+55'	88°	3°42'	+56'	88°	3°44'	+56'	89°	4
5	4°27'	+53'	88°	4°30'	+54'	88°	4°32'	+54'	88°	4°34'	+55'	88°	4°36'	+55'	88°	4°38'	+56'	88°	4°40'	+56'	88°	5
6	5°21'	+53'	87°	5°23'	+54'	87°	5°26'	+54'	87°	5°29'	+55'	88°	5°31'	+55'	88°	5°34'	+56'	88°	5°36'	+56'	88°	6
7	6°14'	+53'	87°	6°17'	+54'	87°	6°20'	+54'	87°	6°24'	+55'	87°	6°26'	+55'	87°	6°29'	+56'	87°	6°32'	+56'	87°	7
8	7°07'	+53'	86°	7°11'	+54'	86°	7°15'	+54'	87°	7°18'	+55'	87°	7°22'	+55'	87°	7°25'	+56'	87°	7°28'	+56'	87°	8
9	8°01'	+53'	86°	8°05'	+54'	86°	8°09'	+54'	86°	8°13'	+55'	86°	8°17'	+55'	86°	8°20'	+56'	87°	8°24'	+56'	87°	9
10	8°54'	+53'	85°	8°59'	+54'	86°	9°03'	+54'	86°	9°08'	+55'	86°	9°12'	+55'	86°	9°16'	+55'	86°	9°20'	+56'	86°	10
11	9°47'	+53'	85°	9°52'	+54'	85°	9°57'	+54'	85°	10°02'	+55'	85°	10°07'	+55'	86°	10°11'	+55'	86°	10°16'	+56'	86°	11
12	10°41'	+53'	84°	10°46'	+54'	85°	10°52'	+54'	85°	10°57'	+55'	85°	11°02'	+55'	85°	11°07'	+55'	85°	11°12'	+56'	86°	12
13	11°34'	+53'	84°	11°40'	+54'	84°	11°46'	+54'	84°	11°52'	+55'	85°	11°57'	+55'	85°	12°02'	+55'	85°	12°07'	+56'	85°	13
14	12°27'	+53'	84°	12°34'	+54'	84°	12°40'	+54'	84°	12°46'	+55'	84°	12°52'	+55'	84°	12°58'	+55'	85°	13°03'	+56'	85°	14
15	13°20'	+53'	83°	13°27'	+54'	83°	13°34'	+54'	84°	13°41'	+54'	84°	13°47'	+55'	84°	13°53'	+55'	84°	13°59'	+56'	85°	15
16	14°13'	+53'	83°	14°21'	+53'	83°	14°28'	+54'	83°	14°35'	+54'	83°	14°42'	+55'	84°	14°48'	+55'	84°	14°55'	+56'	84°	16
17	15°06'	+53'	82°	15°14'	+53'	82°	15°22'	+54'	83°	15°29'	+54'	83°	15°37'	+55'	83°	15°44'	+55'	83°	15°50'	+56'	84°	17
18	15°59'	+53'	82°	16°08'	+53'	82°	16°16'	+54'	82°	16°24'	+54'	82°	16°32'	+55'	83°	16°39'	+55'	83°	16°46'	+56'	83°	18
19	16°52'	+53'	81°	17°01'	+53'	81°	17°10'	+54'	82°	17°18'	+54'	82°	17°26'	+55'	82°	17°34'	+55'	83°	17°42'	+56'	83°	19
20	17°45'	+53'	81°	17°54'	+53'	81°	18°03'	+54'	81°	18°12'	+54'	82°	18°21'	+55'	82°	18°29'	+55'	82°	18°37'	+56'	83°	20
21	18°37'	+53'	80°	18°47'	+53'	80°	18°57'	+54'	81°	19°07'	+54'	81°	19°16'	+55'	81°	19°24'	+55'	82°	19°33'	+55'	82°	21
22	19°30'	+53'	80°	19°41'	+53'	80°	19°51'	+54'	80°	20°01'	+54'	81°	20°10'	+55'	81°	20°19'	+55'	81°	20°28'	+55'	82°	22
23	20°22'	+52'	79°	20°34'	+53'	79°	20°44'	+53'	80°	20°55'	+54'	80°	21°05'	+54'	81°	21°14'	+55'	81°	21°24'	+55'	81°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

90° 270° LHA — Latitude CONTRARY or SAME as Declination — 90° 270° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

89° 271° LHA — Latitude CONTRARY to Declination — 89° 271° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	0°27'	-53'	91°	0°26'	-54'	91°	0°25'	-54'	91°	0°24'	-55'	91°	0°23'	-55'	91°	0°22'	-56'	91°	0°22'	-56'	91°	0
1	0°26'	+53'	89°	0°28'	+54'	89°	0°29'	+54'	89°	0°30'	+55'	89°	0°32'	+55'	89°	0°33'	+56'	89°	0°35'	+56'	89°	1
2	1°20'	+53'	88°	1°22'	+54'	88°	1°23'	+54'	88°	1°25'	+55'	88°	1°27'	+55'	88°	1°29'	+56'	88°	1°31'	+56'	88°	2
3	2°13'	+53'	88°	2°15'	+54'	88°	2°18'	+54'	88°	2°20'	+55'	88°	2°22'	+55'	88°	2°24'	+56'	88°	2°27'	+56'	88°	3
4	3°07'	+53'	87°	3°09'	+54'	87°	3°12'	+54'	87°	3°15'	+55'	87°	3°17'	+55'	88°	3°20'	+56'	88°	3°23'	+56'	88°	4
5	4°00'	+53'	87°	4°03'	+54'	87°	4°06'	+54'	87°	4°10'	+55'	87°	4°13'	+55'	87°	4°16'	+56'	87°	4°19'	+56'	87°	5
6	4°53'	+53'	86°	4°57'	+54'	86°	5°01'	+54'	87°	5°04'	+55'	87°	5°08'	+55'	87°	5°11'	+56'	87°	5°15'	+56'	87°	6
7	5°47'	+53'	86°	5°51'	+54'	86°	5°55'	+54'	86°	5°59'	+55'	86°	6°03'	+55'	86°	6°07'	+56'	86°	6°11'	+56'	87°	7
8	6°40'	+53'	85°	6°45'	+54'	86°	6°49'	+54'	86°	6°54'	+55'	86°	6°58'	+55'	86°	7°02'	+56'	86°	7°06'	+56'	86°	8
9	7°34'	+53'	85°	7°39'	+54'	85°	7°44'	+54'	85°	7°49'	+55'	85°	7°53'	+55'	86°	7°58'	+56'	86°	8°02'	+56'	86°	9
10	8°27'	+53'	85°	8°33'	+54'	85°	8°38'	+54'	85°	8°43'	+55'	85°	8°48'	+55'	85°	8°53'	+56'	85°	8°58'	+56'	85°	10
11	9°20'	+53'	84°	9°26'	+54'	84°	9°32'	+54'	84°	9°38'	+55'	85°	9°44'	+55'	85°	9°49'	+55'	85°	9°54'	+56'	85°	11
12	10°13'	+53'	84°	10°20'	+54'	84°	10°26'	+54'	84°	10°33'	+55'	84°	10°39'	+55'	84°	10°44'	+55'	85°	10°50'	+56'	85°	12
13	11°07'	+53'	83°	11°14'	+54'	83°	11°21'	+54'	84°	11°27'	+55'	84°	11°34'	+55'	84°	11°40'	+55'	84°	11°46'	+56'	84°	13
14	12°00'	+53'	83°	12°07'	+54'	83°	12°15'	+54'	83°	12°22'	+55'	83°	12°29'	+55'	84°	12°35'	+55'	84°	12°42'	+56'	84°	14
15	12°53'	+53'	82°	13°01'	+54'	82°	13°09'	+54'	83°	13°16'	+54'	83°	13°24'	+55'	83°	13°31'	+55'	83°	13°38'	+56'	84°	15
16	13°46'	+53'	82°	13°55'	+54'	82°	14°03'	+54'	82°	14°11'	+54'	82°	14°19'	+55'	83°	14°26'	+55'	83°	14°33'	+56'	83°	16
17	14°39'	+53'	81°	14°48'	+53'	81°	14°57'	+54'	82°	15°05'	+54'	82°	15°13'	+55'	82°	15°21'	+55'	83°	15°29'	+56'	83°	17
18	15°32'	+53'	81°	15°42'	+53'	81°	15°51'	+54'	81°	16°00'	+54'	82°	16°08'	+55'	82°	16°17'	+55'	82°	16°25'	+56'	82°	18
19	16°25'	+53'	80°	16°35'	+53'	81°	16°45'	+54'	81°	16°54'	+54'	81°	17°03'	+55'	81°	17°12'	+55'	82°	17°20'	+56'	82°	19
20	17°18'	+53'	80°	17°28'	+53'	80°	17°38'	+54'	80°	17°48'	+54'	81°	17°58'	+55'	81°	18°07'	+55'	81°	18°16'	+56'	82°	20
21	18°10'	+53'	79°	18°21'	+53'	80°	18°32'	+54'	80°	18°43'	+54'	80°	18°53'	+55'	81°	19°02'	+55'	81°	19°11'	+55'	81°	21
22	19°03'	+53'	79°	19°15'	+53'	79°	19°26'	+54'	79°	19°37'	+54'	80°	19°47'	+55'	80°	19°57'	+55'	80°	20°07'	+55'	81°	22
23	19°56'	+52'	78°	20°08'	+53'	79°	20°19'	+54'	79°	20°31'	+54'	79°	20°42'	+54'	80°	20°52'	+55'	80°	21°02'	+55'	80°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

91° 269° LHA — Latitude SAME as DECLINATION — 91° 269° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

88° 272° LHA — Latitude CONTRARY to Declination — 88° 272° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°54'	-53'	92°	0°53'	-54'	92°	0°51'	-54'	92°	0°49'	-55'	92°	0°47'	-55'	92°	0°45'	-56'	92°	0°43'	-56'	92°	0
1	0°01'	-53'	92°	0°01'	+54'	88°	0°04'	+54'	88°	0°06'	+55'	88°	0°08'	+55'	88°	0°11'	+56'	88°	0°13'	+56'	88°	1
2	0°52'	+53'	87°	0°55'	+54'	87°	0°58'	+54'	87°	1°01'	+55'	87°	1°04'	+55'	87°	1°06'	+56'	87°	1°09'	+56'	87°	2
3	1°46'	+53'	87°	1°49'	+54'	87°	1°52'	+54'	87°	1°56'	+55'	87°	1°59'	+55'	87°	2°02'	+56'	87°	2°05'	+56'	87°	3
4	2°39'	+53'	86°	2°43'	+54'	86°	2°47'	+54'	86°	2°50'	+55'	87°	2°54'	+55'	87°	2°58'	+56'	87°	3°01'	+56'	87°	4
5	3°33'	+53'	86°	3°37'	+54'	86°	3°41'	+54'	86°	3°45'	+55'	86°	3°49'	+55'	86°	3°53'	+56'	86°	3°57'	+56'	86°	5
6	4°26'	+53'	85°	4°31'	+54'	86°	4°36'	+54'	86°	4°40'	+55'	86°	4°44'	+55'	86°	4°49'	+56'	86°	4°53'	+56'	86°	6
7	5°20'	+53'	85°	5°25'	+54'	85°	5°30'	+54'	85°	5°35'	+55'	85°	5°40'	+55'	85°	5°44'	+56'	86°	5°49'	+56'	86°	7
8	6°13'	+53'	85°	6°19'	+54'	85°	6°24'	+54'	85°	6°30'	+55'	85°	6°35'	+55'	85°	6°40'	+56'	85°	6°45'	+56'	85°	8
9	7°06'	+53'	84°	7°13'	+54'	84°	7°19'	+54'	84°	7°24'	+55'	84°	7°30'	+55'	85°	7°36'	+56'	85°	7°41'	+56'	85°	9
10	8°00'	+53'	84°	8°06'	+54'	84°	8°13'	+54'	84°	8°19'	+55'	84°	8°25'	+55'	84°	8°31'	+56'	84°	8°37'	+56'	85°	10
11	8°53'	+53'	83°	9°00'	+54'	83°	9°07'	+54'	84°	9°14'	+55'	84°	9°20'	+55'	84°	9°27'	+55'	84°	9°33'	+56'	84°	11
12	9°46'	+53'	83°	9°54'	+54'	83°	10°01'	+54'	83°	10°08'	+55'	83°	10°15'	+55'	83°	10°22'	+55'	84°	10°29'	+56'	84°	12
13	10°40'	+53'	82°	10°48'	+54'	82°	10°55'	+54'	83°	11°03'	+55'	83°	11°10'	+55'	83°	11°18'	+55'	83°	11°25'	+56'	83°	13
14	11°33'	+53'	82°	11°41'	+54'	82°	11°50'	+54'	82°	11°58'	+55'	82°	12°05'	+55'	83°	12°13'	+55'	83°	12°20'	+56'	83°	14
15	12°26'	+53'	81°	12°35'	+54'	82°	12°44'	+54'	82°	12°52'	+55'	82°	13°00'	+55'	82°	13°08'	+55'	82°	13°16'	+56'	83°	15
16	13°19'	+53'	81°	13°29'	+54'	81°	13°38'	+54'	81°	13°47'	+54'	82°	13°55'	+55'	82°	14°04'	+55'	82°	14°12'	+56'	82°	16
17	14°12'	+53'	80°	14°22'	+53'	81°	14°32'	+54'	81°	14°41'	+54'	81°	14°50'	+55'	81°	14°59'	+55'	82°	15°08'	+56'	82°	17
18	15°05'	+53'	80°	15°16'	+53'	80°	15°26'	+54'	80°	15°36'	+54'	81°	15°45'	+55'	81°	15°54'	+55'	81°	16°03'	+56'	82°	18
19	15°58'	+53'	79°	16°09'	+53'	80°	16°20'	+54'	80°	16°30'	+54'	80°	16°40'	+55'	81°	16°50'	+55'	81°	16°59'	+56'	81°	19
20	16°51'	+53'	79°	17°02'	+53'	79°	17°13'	+54'	79°	17°24'	+54'	80°	17°35'	+55'	80°	17°45'	+55'	80°	17°55'	+56'	81°	20
21	17°44'	+53'	78°	17°56'	+53'	79°	18°07'	+54'	79°	18°19'	+54'	79°	18°29'	+55'	80°	18°40'	+55'	80°	18°50'	+56'	80°	21
22	18°36'	+53'	78°	18°49'	+53'	78°	19°01'	+54'	79°	19°13'	+54'	79°	19°24'	+55'	79°	19°35'	+55'	80°	19°46'	+55'	80°	22
23	19°29'	+53'	77°	19°42'	+53'	78°	19°55'	+54'	78°	20°07'	+54'	78°	20°19'	+55'	79°	20°30'	+55'	79°	20°41'	+55'	80°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

92° 268° LHA — Latitude SAME as DECLINATION — 92° 268° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

87° 273° LHA — Latitude CONTRARY to Declination — 87° 273° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°22'	-53'	93°	1°19'	-54'	93°	1°16'	-54'	93°	1°13'	-55'	93°	1°10'	-55'	93°	1°07'	-56'	93°	1°04'	-56'	93°	0
1	0°28'	-53'	93°	0°25'	-54'	93°	0°22'	-54'	93°	0°18'	-55'	93°	0°15'	-55'	93°	0°12'	-56'	93°	0°08'	-56'	93°	1
2	0°25'	+53'	86°	0°29'	+54'	86°	0°33'	+54'	86°	0°36'	+55'	86°	0°40'	+55'	86°	0°44'	+56'	86°	0°48'	+56'	86°	2
3	1°19'	+53'	86°	1°23'	+54'	86°	1°27'	+54'	86°	1°31'	+55'	86°	1°35'	+55'	86°	1°40'	+56'	86°	1°44'	+56'	86°	3
4	2°12'	+53'	86°	2°17'	+54'	86°	2°22'	+54'	86°	2°26'	+55'	86°	2°31'	+55'	86°	2°35'	+56'	86°	2°40'	+56'	86°	4
5	3°06'	+53'	85°	3°11'	+54'	85°	3°16'	+54'	85°	3°21'	+55'	85°	3°26'	+55'	85°	3°31'	+56'	85°	3°36'	+56'	85°	5
6	3°59'	+53'	85°	4°05'	+54'	85°	4°10'	+54'	85°	4°16'	+55'	85°	4°21'	+55'	85°	4°26'	+56'	85°	4°32'	+56'	85°	6
7	4°53'	+53'	84°	4°59'	+54'	84°	5°05'	+54'	84°	5°11'	+55'	84°	5°16'	+55'	85°	5°22'	+56'	85°	5°28'	+56'	85°	7
8	5°46'	+53'	84°	5°53'	+54'	84°	5°59'	+54'	84°	6°05'	+55'	84°	6°12'	+55'	84°	6°18'	+56'	84°	6°24'	+56'	84°	8
9	6°39'	+53'	83°	6°46'	+54'	83°	6°53'	+54'	83°	7°00'	+55'	84°	7°07'	+55'	84°	7°13'	+56'	84°	7°20'	+56'	84°	9
10	7°33'	+53'	83°	7°40'	+54'	83°	7°48'	+54'	83°	7°55'	+55'	83°	8°02'	+55'	83°	8°09'	+56'	83°	8°16'	+56'	84°	10
11	8°26'	+53'	82°	8°34'	+54'	82°	8°42'	+54'	83°	8°49'	+55'	83°	8°57'	+55'	83°	9°04'	+56'	83°	9°11'	+56'	83°	11
12	9°19'	+53'	82°	9°28'	+54'	82°	9°36'	+54'	82°	9°44'	+55'	82°	9°52'	+55'	83°	10°00'	+55'	83°	10°07'	+56'	83°	12
13	10°13'	+53'	81°	10°22'	+54'	82°	10°30'	+54'	82°	10°39'	+55'	82°	10°47'	+55'	82°	10°55'	+55'	82°	11°03'	+56'	82°	13
14	11°06'	+53'	81°	11°15'	+54'	81°	11°24'	+54'	81°	11°33'	+55'	82°	11°42'	+55'	82°	11°51'	+55'	82°	11°59'	+56'	82°	14
15	11°59'	+53'	80°	12°09'	+54'	81°	12°19'	+54'	81°	12°28'	+55'	81°	12°37'	+55'	81°	12°46'	+55'	82°	12°55'	+56'	82°	15
16	12°52'	+53'	80°	13°03'	+54'	80°	13°13'	+54'	80°	13°23'	+54'	81°	13°32'	+55'	81°	13°42'	+55'	81°	13°51'	+56'	81°	16
17	13°45'	+53'	79°	13°56'	+54'	80°	14°07'	+54'	80°	14°17'	+54'	80°	14°27'	+55'	80°	14°37'	+55'	81°	14°46'	+56'	81°	17
18	14°38'	+53'	79°	14°50'	+53'	79°	15°01'	+54'	80°	15°12'	+54'	80°	15°22'	+55'	80°	15°32'	+55'	80°	15°42'	+56'	81°	18
19	15°31'	+53'	79°	15°43'	+53'	79°	15°55'	+54'	79°	16°06'	+54'	79°	16°17'	+55'	80°	16°28'	+55'	80°	16°38'	+56'	80°	19
20	16°24'	+53'	78°	16°37'	+53'	78°	16°49'	+54'	79°	17°00'	+54'	79°	17°12'	+55'	79°	17°23'	+55'	80°	17°34'	+56'	80°	20
21	17°17'	+53'	78°	17°30'	+53'	78°	17°42'	+54'	78°	17°55'	+54'	78°	18°06'	+55'	79°	18°18'	+55'	79°	18°29'	+56'	79°	21
22	18°10'	+53'	77°	18°23'	+53'	77°	18°36'	+54'	78°	18°49'	+54'	78°	19°01'	+55'	78°	19°13'	+55'	79°	19°25'	+55'	79°	22
23	19°03'	+53'	77°	19°16'	+53'	77°	19°30'	+54'	77°	19°43'	+54'	78°	19°56'	+55'	78°	20°08'	+55'	78°	20°20'	+55'	79°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

93° 267° LHA — Latitude SAME as DECLINATION — 93° 267° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

86° 274° LHA — Latitude CONTRARY to Declination — 86° 274° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°49'	-53'	94°	1°45'	-54'	94°	1°41'	-54'	94°	1°38'	-55'	94°	1°34'	-55'	94°	1°30'	-56'	94°	1°26'	-56'	94°	0
1	0°55'	-53'	94°	0°51'	-54'	94°	0°47'	-54'	94°	0°43'	-55'	94°	0°38'	-55'	94°	0°34'	-56'	94°	0°30'	-56'	94°	1
2	0°02'	-53'	94°	0°03'	+54'	86°	0°07'	+54'	86°	0°12'	+55'	86°	0°17'	+55'	86°	0°21'	+56'	86°	0°26'	+56'	86°	2
3	0°52'	+53'	85°	0°57'	+54'	85°	1°02'	+54'	85°	1°07'	+55'	85°	1°12'	+55'	85°	1°17'	+56'	85°	1°22'	+56'	85°	3
4	1°45'	+53'	85°	1°51'	+54'	85°	1°56'	+54'	85°	2°02'	+55'	85°	2°07'	+55'	85°	2°13'	+56'	85°	2°18'	+56'	85°	4
5	2°39'	+53'	84°	2°45'	+54'	84°	2°51'	+54'	84°	2°57'	+55'	84°	3°03'	+55'	84°	3°08'	+56'	84°	3°14'	+56'	84°	5
6	3°32'	+53'	84°	3°39'	+54'	84°	3°45'	+54'	84°	3°51'	+55'	84°	3°58'	+55'	84°	4°04'	+56'	84°	4°10'	+56'	84°	6
7	4°25'	+53'	83°	4°33'	+54'	83°	4°39'	+54'	83°	4°46'	+55'	83°	4°53'	+55'	84°	5°00'	+56'	84°	5°06'	+56'	84°	7
8	5°19'	+53'	83°	5°26'	+54'	83°	5°34'	+54'	83°	5°41'	+55'	83°	5°48'	+55'	83°	5°55'	+56'	83°	6°02'	+56'	83°	8
9	6°12'	+53'	82°	6°20'	+54'	82°	6°28'	+54'	83°	6°36'	+55'	83°	6°43'	+55'	83°	6°51'	+56'	83°	6°58'	+56'	83°	9
10	7°06'	+53'	82°	7°14'	+54'	82°	7°22'	+54'	82°	7°31'	+55'	82°	7°39'	+55'	82°	7°46'	+56'	83°	7°54'	+56'	83°	10
11	7°59'	+53'	81°	8°08'	+54'	82°	8°17'	+54'	82°	8°25'	+55'	82°	8°34'	+55'	82°	8°42'	+56'	82°	8°50'	+56'	82°	11
12	8°52'	+53'	81°	9°02'	+54'	81°	9°11'	+54'	81°	9°20'	+55'	81°	9°29'	+55'	82°	9°38'	+56'	82°	9°46'	+56'	82°	12
13	9°46'	+53'	80°	9°56'	+54'	81°	10°05'	+54'	81°	10°15'	+55'	81°	10°24'	+55'	81°	10°33'	+55'	81°	10°42'	+56'	82°	13
14	10°39'	+53'	80°	10°49'	+54'	80°	10°59'	+54'	80°	11°09'	+55'	81°	11°19'	+55'	81°	11°29'	+55'	81°	11°38'	+56'	81°	14
15	11°32'	+53'	80°	11°43'	+54'	80°	11°54'	+54'	80°	12°04'	+55'	80°	12°14'	+55'	80°	12°24'	+55'	81°	12°34'	+56'	81°	15
16	12°25'	+53'	79°	12°37'	+54'	79°	12°48'	+54'	80°	12°59'	+55'	80°	13°09'	+55'	80°	13°19'	+55'	80°	13°29'	+56'	80°	16
17	13°19'	+53'	79°	13°30'	+54'	79°	13°42'	+54'	79°	13°53'	+54'	79°	14°04'	+55'	80°	14°15'	+55'	80°	14°25'	+56'	80°	17
18	14°12'	+53'	78°	14°24'	+54'	78°	14°36'	+54'	79°	14°48'	+54'	79°	14°59'	+55'	79°	15°10'	+55'	79°	15°21'	+56'	80°	18
19	15°05'	+53'	78°	15°17'	+53'	78°	15°30'	+54'	78°	15°42'	+54'	78°	15°54'	+55'	79°	16°05'	+55'	79°	16°17'	+56'	79°	19
20	15°58'	+53'	77°	16°11'	+53'	77°	16°24'	+54'	78°	16°36'	+54'	78°	16°49'	+55'	78°	17°01'	+55'	79°	17°12'	+56'	79°	20
21	16°51'	+53'	77°	17°04'	+53'	77°	17°18'	+54'	77°	17°31'	+54'	78°	17°43'	+55'	78°	17°56'	+55'	78°	18°08'	+56'	79°	21
22	17°43'	+53'	76°	17°58'	+53'	76°	18°11'	+54'	77°	18°25'	+54'	77°	18°38'	+55'	77°	18°51'	+55'	78°	19°04'	+56'	78°	22
23	18°36'	+53'	76°	18°51'	+53'	76°	19°05'	+54'	76°	19°19'	+54'	77°	19°33'	+55'	77°	19°46'	+55'	77°	19°59'	+55'	78°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

94° 266° LHA — Latitude SAME as DECLINATION — 94° 266° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

85° 275° LHA — Latitude CONTRARY to Declination — 85° 275° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°16'	-54'	94°	2°11'	-54'	94°	2°07'	-54'	95°	2°02'	-55'	95°	1°57'	-55'	95°	1°52'	-56'	95°	1°47'	-56'	95°	0
1	1°23'	-54'	95°	1°17'	-54'	95°	1°12'	-54'	95°	1°07'	-55'	95°	1°02'	-55'	95°	0°57'	-56'	95°	0°51'	-56'	95°	1
2	0°29'	-54'	95°	0°23'	-54'	95°	0°18'	-54'	95°	0°12'	-55'	95°	0°07'	-55'	95°	0°01'	-56'	95°	0°05'	+56'	85°	2
3	0°24'	+54'	84°	0°31'	+54'	84°	0°37'	+54'	84°	0°43'	+55'	84°	0°49'	+55'	84°	0°55'	+56'	84°	1°01'	+56'	84°	3
4	1°18'	+54'	84°	1°25'	+54'	84°	1°31'	+54'	84°	1°38'	+55'	84°	1°44'	+55'	84°	1°50'	+56'	84°	1°57'	+56'	84°	4
5	2°11'	+53'	83°	2°18'	+54'	83°	2°25'	+54'	83°	2°32'	+55'	83°	2°39'	+55'	83°	2°46'	+56'	83°	2°53'	+56'	84°	5
6	3°05'	+53'	83°	3°12'	+54'	83°	3°20'	+54'	83°	3°27'	+55'	83°	3°34'	+55'	83°	3°42'	+56'	83°	3°49'	+56'	83°	6
7	3°58'	+53'	82°	4°06'	+54'	82°	4°14'	+54'	83°	4°22'	+55'	83°	4°30'	+55'	83°	4°37'	+56'	83°	4°45'	+56'	83°	7
8	4°52'	+53'	82°	5°00'	+54'	82°	5°09'	+54'	82°	5°17'	+55'	82°	5°25'	+55'	82°	5°33'	+56'	82°	5°41'	+56'	82°	8
9	5°45'	+53'	81°	5°54'	+54'	82°	6°03'	+54'	82°	6°12'	+55'	82°	6°20'	+55'	82°	6°29'	+56'	82°	6°37'	+56'	82°	9
10	6°39'	+53'	81°	6°48'	+54'	81°	6°57'	+54'	81°	7°06'	+55'	81°	7°15'	+55'	81°	7°24'	+56'	82°	7°33'	+56'	82°	10
11	7°32'	+53'	81°	7°42'	+54'	81°	7°52'	+54'	81°	8°01'	+55'	81°	8°11'	+55'	81°	8°20'	+56'	81°	8°29'	+56'	81°	11
12	8°26'	+53'	80°	8°36'	+54'	80°	8°46'	+54'	80°	8°56'	+55'	81°	9°06'	+55'	81°	9°15'	+56'	81°	9°25'	+56'	81°	12
13	9°19'	+53'	80°	9°30'	+54'	80°	9°40'	+54'	80°	9°51'	+55'	80°	10°01'	+55'	80°	10°11'	+56'	80°	10°21'	+56'	81°	13
14	10°12'	+53'	79°	10°23'	+54'	79°	10°34'	+54'	80°	10°45'	+55'	80°	10°56'	+55'	80°	11°06'	+55'	80°	11°17'	+56'	80°	14
15	11°06'	+53'	79°	11°17'	+54'	79°	11°29'	+54'	79°	11°40'	+55'	79°	11°51'	+55'	79°	12°02'	+55'	80°	12°12'	+56'	80°	15
16	11°59'	+53'	78°	12°11'	+54'	78°	12°23'	+54'	79°	12°35'	+55'	79°	12°46'	+55'	79°	12°57'	+55'	79°	13°08'	+56'	80°	16
17	12°52'	+53'	78°	13°05'	+54'	78°	13°17'	+54'	78°	13°29'	+55'	78°	13°41'	+55'	79°	13°53'	+55'	79°	14°04'	+56'	79°	17
18	13°45'	+53'	77°	13°58'	+54'	78°	14°11'	+54'	78°	14°24'	+54'	78°	14°36'	+55'	78°	14°48'	+55'	79°	15°00'	+56'	79°	18
19	14°38'	+53'	77°	14°52'	+53'	77°	15°05'	+54'	77°	15°18'	+54'	78°	15°31'	+55'	78°	15°43'	+55'	78°	15°56'	+56'	78°	19
20	15°31'	+53'	76°	15°45'	+53'	77°	15°59'	+54'	77°	16°13'	+54'	77°	16°26'	+55'	77°	16°39'	+55'	78°	16°51'	+56'	78°	20
21	16°24'	+53'	76°	16°39'	+53'	76°	16°53'	+54'	76°	17°07'	+54'	77°	17°21'	+55'	77°	17°34'	+55'	77°	17°47'	+56'	78°	21
22	17°17'	+53'	75°	17°32'	+53'	76°	17°47'	+54'	76°	18°01'	+54'	76°	18°15'	+55'	77°	18°29'	+55'	77°	18°43'	+56'	77°	22
23	18°10'	+53'	75°	18°25'	+53'	75°	18°41'	+54'	75°	18°55'	+54'	76°	19°10'	+55'	76°	19°24'	+55'	76°	19°38'	+55'	77°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

95° 265° LHA — Latitude SAME as DECLINATION — 95° 265° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

84° 276° LHA — Latitude CONTRARY to Declination — 84° 276° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°43'	-54'	95°	2°38'	-54'	95°	2°32'	-54'	95°	2°26'	-55'	95°	2°20'	-55'	96°	2°15'	-56'	96°	2°09'	-56'	96°	0
1	1°50'	-54'	96°	1°44'	-54'	96°	1°37'	-54'	96°	1°31'	-55'	96°	1°25'	-55'	96°	1°19'	-56'	96°	1°13'	-56'	96°	1
2	0°56'	-54'	96°	0°50'	-54'	96°	0°43'	-54'	96°	0°36'	-55'	96°	0°30'	-55'	96°	0°23'	-56'	96°	0°17'	-56'	96°	2
3	0°03'	-54'	97°	0°04'	+54'	83°	0°11'	+54'	83°	0°18'	+55'	83°	0°25'	+55'	83°	0°32'	+56'	83°	0°39'	+56'	83°	3
4	0°51'	+54'	83°	0°58'	+54'	83°	1°06'	+54'	83°	1°13'	+55'	83°	1°21'	+55'	83°	1°28'	+56'	83°	1°35'	+56'	83°	4
5	1°44'	+54'	82°	1°52'	+54'	82°	2°00'	+54'	82°	2°08'	+55'	82°	2°16'	+55'	83°	2°24'	+56'	83°	2°31'	+56'	83°	5
6	2°38'	+54'	82°	2°46'	+54'	82°	2°55'	+54'	82°	3°03'	+55'	82°	3°11'	+55'	82°	3°19'	+56'	82°	3°28'	+56'	82°	6
7	3°32'	+54'	81°	3°40'	+54'	82°	3°49'	+54'	82°	3°58'	+55'	82°	4°07'	+55'	82°	4°15'	+56'	82°	4°24'	+56'	82°	7
8	4°25'	+53'	81°	4°34'	+54'	81°	4°44'	+54'	81°	4°53'	+55'	81°	5°02'	+55'	81°	5°11'	+56'	81°	5°20'	+56'	82°	8
9	5°18'	+53'	81°	5°28'	+54'	81°	5°38'	+54'	81°	5°48'	+55'	81°	5°57'	+55'	81°	6°06'	+56'	81°	6°16'	+56'	81°	9
10	6°12'	+53'	80°	6°22'	+54'	80°	6°32'	+54'	80°	6°42'	+55'	80°	6°52'	+55'	81°	7°02'	+56'	81°	7°12'	+56'	81°	10
11	7°05'	+53'	80°	7°16'	+54'	80°	7°27'	+54'	80°	7°37'	+55'	80°	7°47'	+55'	80°	7°58'	+56'	80°	8°08'	+56'	80°	11
12	7°59'	+53'	79°	8°10'	+54'	79°	8°21'	+54'	79°	8°32'	+55'	80°	8°43'	+55'	80°	8°53'	+56'	80°	9°04'	+56'	80°	12
13	8°52'	+53'	79°	9°04'	+54'	79°	9°15'	+54'	79°	9°27'	+55'	79°	9°38'	+55'	79°	9°49'	+56'	80°	10°00'	+56'	80°	13
14	9°46'	+53'	78°	9°58'	+54'	78°	10°10'	+54'	79°	10°21'	+55'	79°	10°33'	+55'	79°	10°44'	+56'	79°	10°55'	+56'	79°	14
15	10°39'	+53'	78°	10°51'	+54'	78°	11°04'	+54'	78°	11°16'	+55'	78°	11°28'	+55'	79°	11°40'	+55'	79°	11°51'	+56'	79°	15
16	11°32'	+53'	77°	11°45'	+54'	78°	11°58'	+54'	78°	12°11'	+55'	78°	12°23'	+55'	78°	12°35'	+55'	78°	12°47'	+56'	79°	16
17	12°25'	+53'	77°	12°39'	+54'	77°	12°52'	+54'	77°	13°05'	+55'	78°	13°18'	+55'	78°	13°31'	+55'	78°	13°43'	+56'	78°	17
18	13°19'	+53'	76°	13°33'	+54'	77°	13°46'	+54'	77°	14°00'	+55'	77°	14°13'	+55'	77°	14°26'	+55'	78°	14°39'	+56'	78°	18
19	14°12'	+53'	76°	14°26'	+54'	76°	14°40'	+54'	76°	14°54'	+54'	77°	15°08'	+55'	77°	15°21'	+55'	77°	15°35'	+56'	77°	19
20	15°05'	+53'	75°	15°20'	+53'	76°	15°34'	+54'	76°	15°49'	+54'	76°	16°03'	+55'	77°	16°17'	+55'	77°	16°30'	+56'	77°	20
21	15°58'	+53'	75°	16°13'	+53'	75°	16°28'	+54'	76°	16°43'	+54'	76°	16°58'	+55'	76°	17°12'	+55'	76°	17°26'	+56'	77°	21
22	16°51'	+53'	74°	17°07'	+53'	75°	17°22'	+54'	75°	17°38'	+54'	75°	17°53'	+55'	76°	18°07'	+55'	76°	18°22'	+56'	76°	22
23	17°44'	+53'	74°	18°00'	+53'	74°	18°16'	+54'	75°	18°32'	+54'	75°	18°47'	+55'	75°	19°02'	+55'	76°	19°17'	+56'	76°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

96° 264° LHA — Latitude SAME as DECLINATION — 96° 264° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

83° 277° LHA — Latitude CONTRARY to Declination — 83° 277° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°10'	-54'	96°	3°04'	-54'	96°	2°57'	-54'	96°	2°50'	-55'	96°	2°44'	-55'	96°	2°37'	-56'	96°	2°30'	-56'	97°	0
1	2°17'	-54'	97°	2°10'	-54'	97°	2°03'	-54'	97°	1°56'	-55'	97°	1°48'	-55'	97°	1°41'	-56'	97°	1°34'	-56'	97°	1
2	1°23'	-54'	97°	1°16'	-54'	97°	1°08'	-54'	97°	1°01'	-55'	97°	0°53'	-55'	97°	0°46'	-56'	97°	0°38'	-56'	97°	2
3	0°30'	-54'	98°	0°22'	-54'	98°	0°14'	-54'	98°	0°06'	-55'	98°	0°02'	+55'	82°	0°10'	+56'	82°	0°18'	+56'	82°	3
4	0°24'	+54'	82°	0°32'	+54'	82°	0°41'	+54'	82°	0°49'	+55'	82°	0°57'	+55'	82°	1°06'	+56'	82°	1°14'	+56'	82°	4
5	1°17'	+54'	82°	1°26'	+54'	82°	1°35'	+54'	82°	1°44'	+55'	82°	1°53'	+55'	82°	2°01'	+56'	82°	2°10'	+56'	82°	5
6	2°11'	+54'	81°	2°20'	+54'	81°	2°30'	+54'	81°	2°39'	+55'	81°	2°48'	+55'	81°	2°57'	+56'	81°	3°06'	+56'	81°	6
7	3°05'	+54'	81°	3°14'	+54'	81°	3°24'	+54'	81°	3°34'	+55'	81°	3°43'	+55'	81°	3°53'	+56'	81°	4°02'	+56'	81°	7
8	3°58'	+54'	80°	4°08'	+54'	80°	4°19'	+54'	80°	4°29'	+55'	80°	4°39'	+55'	80°	4°49'	+56'	81°	4°58'	+56'	81°	8
9	4°52'	+54'	80°	5°02'	+54'	80°	5°13'	+54'	80°	5°23'	+55'	80°	5°34'	+55'	80°	5°44'	+56'	80°	5°54'	+56'	80°	9
10	5°45'	+53'	79°	5°56'	+54'	79°	6°07'	+54'	79°	6°18'	+55'	80°	6°29'	+55'	80°	6°40'	+56'	80°	6°50'	+56'	80°	10
11	6°39'	+53'	79°	6°50'	+54'	79°	7°02'	+54'	79°	7°13'	+55'	79°	7°24'	+55'	79°	7°35'	+56'	79°	7°46'	+56'	80°	11
12	7°32'	+53'	78°	7°44'	+54'	78°	7°56'	+54'	79°	8°08'	+55'	79°	8°20'	+55'	79°	8°31'	+56'	79°	8°42'	+56'	79°	12
13	8°26'	+53'	78°	8°38'	+54'	78°	8°50'	+54'	78°	9°03'	+55'	78°	9°15'	+55'	78°	9°27'	+56'	79°	9°38'	+56'	79°	13
14	9°19'	+53'	77°	9°32'	+54'	78°	9°45'	+54'	78°	9°57'	+55'	78°	10°10'	+55'	78°	10°22'	+56'	78°	10°34'	+56'	78°	14
15	10°12'	+53'	77°	10°26'	+54'	77°	10°39'	+54'	77°	10°52'	+55'	77°	11°05'	+55'	78°	11°18'	+56'	78°	11°30'	+56'	78°	15
16	11°06'	+53'	76°	11°20'	+54'	77°	11°33'	+54'	77°	11°47'	+55'	77°	12°00'	+55'	77°	12°13'	+55'	77°	12°26'	+56'	78°	16
17	11°59'	+53'	76°	12°13'	+54'	76°	12°27'	+54'	76°	12°41'	+55'	77°	12°55'	+55'	77°	13°09'	+55'	77°	13°22'	+56'	77°	17
18	12°52'	+53'	76°	13°07'	+54'	76°	13°22'	+54'	76°	13°36'	+55'	76°	13°50'	+55'	76°	14°04'	+55'	77°	14°18'	+56'	77°	18
19	13°45'	+53'	75°	14°01'	+54'	75°	14°16'	+54'	76°	14°31'	+55'	76°	14°45'	+55'	76°	15°00'	+55'	76°	15°14'	+56'	77°	19
20	14°38'	+53'	75°	14°54'	+54'	75°	15°10'	+54'	75°	15°25'	+54'	75°	15°40'	+55'	76°	15°55'	+55'	76°	16°09'	+56'	76°	20
21	15°31'	+53'	74°	15°48'	+53'	74°	16°04'	+54'	75°	16°20'	+54'	75°	16°35'	+55'	75°	16°50'	+55'	75°	17°05'	+56'	76°	21
22	16°24'	+53'	74°	16°41'	+53'	74°	16°58'	+54'	74°	17°14'	+54'	74°	17°30'	+55'	75°	17°45'	+55'	75°	18°01'	+56'	75°	22
23	17°17'	+53'	73°	17°35'	+53'	73°	17°52'	+54'	74°	18°08'	+54'	74°	18°25'	+55'	74°	18°41'	+55'	75°	18°56'	+56'	75°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

97° 263° LHA — Latitude SAME as DECLINATION — 97° 263° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

82° 278° LHA — Latitude CONTRARY to Declination — 82° 278° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°37'	-54'	97°	3°30'	-54'	97°	3°22'	-54'	97°	3°15'	-55'	97°	3°07'	-55'	97°	2°59'	-56'	97°	2°52'	-56'	97°	0
1	2°44'	-54'	98°	2°36'	-54'	98°	2°28'	-54'	98°	2°20'	-55'	98°	2°12'	-55'	98°	2°04'	-56'	98°	1°55'	-56'	98°	1
2	1°50'	-54'	98°	1°42'	-54'	98°	1°33'	-54'	98°	1°25'	-55'	98°	1°16'	-55'	98°	1°08'	-56'	98°	0°59'	-56'	98°	2
3	0°57'	-54'	98°	0°48'	-54'	99°	0°39'	-54'	99°	0°30'	-55'	99°	0°21'	-55'	99°	0°12'	-56'	99°	0°03'	-56'	99°	3
4	0°03'	-54'	99°	0°06'	+54'	81°	0°16'	+54'	81°	0°25'	+55'	81°	0°34'	+55'	81°	0°44'	+56'	81°	0°53'	+56'	81°	4
5	0°51'	+54'	81°	1°00'	+54'	81°	1°10'	+54'	81°	1°20'	+55'	81°	1°30'	+55'	81°	1°39'	+56'	81°	1°49'	+56'	81°	5
6	1°44'	+54'	80°	1°54'	+54'	80°	2°05'	+54'	80°	2°15'	+55'	80°	2°25'	+55'	80°	2°35'	+56'	80°	2°45'	+56'	80°	6
7	2°38'	+54'	80°	2°48'	+54'	80°	2°59'	+54'	80°	3°10'	+55'	80°	3°20'	+55'	80°	3°31'	+56'	80°	3°41'	+56'	80°	7
8	3°31'	+54'	79°	3°42'	+54'	79°	3°54'	+54'	79°	4°05'	+55'	79°	4°16'	+55'	80°	4°26'	+56'	80°	4°37'	+56'	80°	8
9	4°25'	+54'	79°	4°37'	+54'	79°	4°48'	+54'	79°	4°59'	+55'	79°	5°11'	+55'	79°	5°22'	+56'	79°	5°33'	+56'	79°	9
10	5°18'	+54'	78°	5°31'	+54'	78°	5°42'	+54'	79°	5°54'	+55'	79°	6°06'	+55'	79°	6°18'	+56'	79°	6°29'	+56'	79°	10
11	6°12'	+54'	78°	6°24'	+54'	78°	6°37'	+54'	78°	6°49'	+55'	78°	7°01'	+55'	78°	7°13'	+56'	78°	7°25'	+56'	79°	11
12	7°05'	+53'	77°	7°18'	+54'	78°	7°31'	+54'	78°	7°44'	+55'	78°	7°57'	+55'	78°	8°09'	+56'	78°	8°21'	+56'	78°	12
13	7°59'	+53'	77°	8°12'	+54'	77°	8°26'	+54'	77°	8°39'	+55'	77°	8°52'	+55'	78°	9°05'	+56'	78°	9°17'	+56'	78°	13
14	8°52'	+53'	77°	9°06'	+54'	77°	9°20'	+54'	77°	9°34'	+55'	77°	9°47'	+55'	77°	10°00'	+56'	77°	10°13'	+56'	78°	14
15	9°46'	+53'	76°	10°00'	+54'	76°	10°14'	+54'	76°	10°28'	+55'	77°	10°42'	+55'	77°	10°56'	+56'	77°	11°09'	+56'	77°	15
16	10°39'	+53'	76°	10°54'	+54'	76°	11°09'	+54'	76°	11°23'	+55'	76°	11°37'	+55'	76°	11°51'	+56'	77°	12°05'	+56'	77°	16
17	11°33'	+53'	75°	11°48'	+54'	75°	12°03'	+54'	76°	12°18'	+55'	76°	12°32'	+55'	76°	12°47'	+55'	76°	13°01'	+56'	76°	17
18	12°26'	+53'	75°	12°42'	+54'	75°	12°57'	+54'	75°	13°12'	+55'	75°	13°27'	+55'	76°	13°42'	+55'	76°	13°57'	+56'	76°	18
19	13°19'	+53'	74°	13°35'	+54'	74°	13°51'	+54'	75°	14°07'	+55'	75°	14°23'	+55'	75°	14°38'	+55'	75°	14°53'	+56'	76°	19
20	14°12'	+53'	74°	14°29'	+54'	74°	14°45'	+54'	74°	15°02'	+55'	74°	15°17'	+55'	75°	15°33'	+55'	75°	15°49'	+56'	75°	20
21	15°05'	+53'	73°	15°23'	+54'	73°	15°39'	+54'	74°	15°56'	+54'	74°	16°12'	+55'	74°	16°29'	+55'	75°	16°44'	+56'	75°	21
22	15°58'	+53'	73°	16°16'	+53'	73°	16°33'	+54'	73°	16°51'	+54'	74°	17°07'	+55'	74°	17°24'	+55'	74°	17°40'	+56'	74°	22
23	16°51'	+53'	72°	17°10'	+53'	73°	17°27'	+54'	73°	17°45'	+54'	73°	18°02'	+55'	73°	18°19'	+55'	74°	18°36'	+56'	74°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

98° 262° LHA — Latitude SAME as DECLINATION — 98° 262° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

81° 279° LHA — Latitude CONTRARY to Declination — 81° 279° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°04'	-54'	98°	3°56'	-54'	98°	3°47'	-55'	98°	3°39'	-55'	98°	3°30'	-55'	98°	3°22'	-56'	98°	3°13'	-56'	98°	0
1	3°11'	-54'	98°	3°02'	-54'	99°	2°53'	-55'	99°	2°44'	-55'	99°	2°35'	-55'	99°	2°26'	-56'	99°	2°17'	-56'	99°	1
2	2°17'	-54'	99°	2°08'	-54'	99°	1°58'	-55'	99°	1°49'	-55'	99°	1°40'	-55'	99°	1°30'	-56'	99°	1°21'	-56'	99°	2
3	1°24'	-54'	99°	1°14'	-54'	99°	1°04'	-55'	99°	0°54'	-55'	99°	0°44'	-55'	99°	0°34'	-56'	99°	0°24'	-56'	99°	3
4	0°30'	-54'	100°	0°20'	-54'	100°	0°09'	-55'	100°	0°01'	+55'	80°	0°11'	+55'	80°	0°21'	+56'	80°	0°32'	+56'	80°	4
5	0°24'	+54'	80°	0°34'	+54'	80°	0°45'	+55'	80°	0°56'	+55'	80°	1°06'	+55'	80°	1°17'	+56'	80°	1°28'	+56'	80°	5
6	1°17'	+54'	79°	1°29'	+54'	79°	1°40'	+55'	79°	1°51'	+55'	79°	2°02'	+55'	79°	2°13'	+56'	79°	2°24'	+56'	79°	6
7	2°11'	+54'	79°	2°23'	+54'	79°	2°34'	+55'	79°	2°46'	+55'	79°	2°57'	+55'	79°	3°09'	+56'	79°	3°20'	+56'	79°	7
8	3°05'	+54'	78°	3°17'	+54'	78°	3°29'	+54'	78°	3°41'	+55'	79°	3°53'	+55'	79°	4°04'	+56'	79°	4°16'	+56'	79°	8
9	3°58'	+54'	78°	4°11'	+54'	78°	4°23'	+54'	78°	4°36'	+55'	78°	4°48'	+55'	78°	5°00'	+56'	78°	5°12'	+56'	78°	9
10	4°52'	+54'	77°	5°05'	+54'	78°	5°18'	+54'	78°	5°30'	+55'	78°	5°43'	+55'	78°	5°56'	+56'	78°	6°08'	+56'	78°	10
11	5°45'	+54'	77°	5°59'	+54'	77°	6°12'	+54'	77°	6°25'	+55'	77°	6°38'	+55'	77°	6°51'	+56'	78°	7°04'	+56'	78°	11
12	6°39'	+54'	77°	6°53'	+54'	77°	7°07'	+54'	77°	7°20'	+55'	77°	7°34'	+55'	77°	7°47'	+56'	77°	8°00'	+56'	77°	12
13	7°32'	+53'	76°	7°47'	+54'	76°	8°01'	+54'	76°	8°15'	+55'	77°	8°29'	+55'	77°	8°43'	+56'	77°	8°56'	+56'	77°	13
14	8°26'	+53'	76°	8°41'	+54'	76°	8°55'	+54'	76°	9°10'	+55'	76°	9°24'	+55'	76°	9°38'	+56'	76°	9°52'	+56'	77°	14
15	9°19'	+53'	75°	9°35'	+54'	75°	9°50'	+54'	76°	10°05'	+55'	76°	10°19'	+55'	76°	10°34'	+56'	76°	10°48'	+56'	76°	15
16	10°13'	+53'	75°	10°29'	+54'	75°	10°44'	+54'	75°	10°59'	+55'	75°	11°15'	+55'	75°	11°30'	+56'	76°	11°44'	+56'	76°	16
17	11°06'	+53'	74°	11°22'	+54'	74°	11°38'	+54'	75°	11°54'	+55'	75°	12°10'	+55'	75°	12°25'	+56'	75°	12°40'	+56'	75°	17
18	12°00'	+53'	74°	12°16'	+54'	74°	12°33'	+54'	74°	12°49'	+55'	74°	13°05'	+55'	75°	13°21'	+55'	75°	13°36'	+56'	75°	18
19	12°53'	+53'	73°	13°10'	+54'	74°	13°27'	+54'	74°	13°43'	+55'	74°	14°00'	+55'	74°	14°16'	+55'	74°	14°32'	+56'	75°	19
20	13°46'	+53'	73°	14°04'	+54'	73°	14°21'	+54'	73°	14°38'	+55'	74°	14°55'	+55'	74°	15°11'	+55'	74°	15°28'	+56'	74°	20
21	14°39'	+53'	72°	14°57'	+54'	73°	15°15'	+54'	73°	15°33'	+55'	73°	15°50'	+55'	73°	16°07'	+55'	74°	16°24'	+56'	74°	21
22	15°32'	+53'	72°	15°51'	+54'	72°	16°09'	+54'	72°	16°27'	+54'	73°	16°45'	+55'	73°	17°02'	+55'	73°	17°19'	+56'	74°	22
23	16°26'	+53'	71°	16°45'	+53'	72°	17°03'	+54'	72°	17°22'	+54'	72°	17°40'	+55'	73°	17°58'	+55'	73°	18°15'	+56'	73°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

99° 261° LHA — Latitude SAME as DECLINATION — 99° 261° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

80° 280° LHA — Latitude CONTRARY to Declination — 80° 280° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°31'	-54'	99°	4°22'	-54'	99°	4°13'	-55'	99°	4°03'	-55'	99°	3°53'	-55'	99°	3°44'	-56'	99°	3°34'	-56'	99°	0
1	3°38'	-54'	99°	3°28'	-54'	99°	3°18'	-55'	99°	3°08'	-55'	100°	2°58'	-55'	100°	2°48'	-56'	100°	2°38'	-56'	100°	1
2	2°44'	-54'	100°	2°34'	-54'	100°	2°23'	-55'	100°	2°13'	-55'	100°	2°03'	-55'	100°	1°52'	-56'	100°	1°42'	-56'	100°	2
3	1°50'	-54'	100°	1°40'	-54'	100°	1°29'	-55'	100°	1°18'	-55'	100°	1°07'	-55'	100°	0°57'	-56'	100°	0°46'	-56'	100°	3
4	0°57'	-54'	101°	0°46'	-54'	101°	0°34'	-55'	101°	0°23'	-55'	101°	0°12'	-55'	101°	0°01'	-56'	101°	0°10'	+56'	79°	4
5	0°03'	-54'	101°	0°09'	+54'	79°	0°20'	+55'	79°	0°32'	+55'	79°	0°43'	+55'	79°	0°55'	+56'	79°	1°07'	+56'	79°	5
6	0°51'	+54'	78°	1°03'	+54'	78°	1°15'	+55'	78°	1°27'	+55'	78°	1°39'	+55'	78°	1°51'	+56'	78°	2°03'	+56'	79°	6
7	1°44'	+54'	78°	1°57'	+54'	78°	2°09'	+55'	78°	2°22'	+55'	78°	2°34'	+55'	78°	2°47'	+56'	78°	2°59'	+56'	78°	7
8	2°38'	+54'	77°	2°51'	+54'	78°	3°04'	+55'	78°	3°17'	+55'	78°	3°30'	+55'	78°	3°42'	+56'	78°	3°55'	+56'	78°	8
9	3°32'	+54'	77°	3°45'	+54'	77°	3°58'	+55'	77°	4°12'	+55'	77°	4°25'	+55'	77°	4°38'	+56'	77°	4°51'	+56'	77°	9
10	4°25'	+54'	77°	4°39'	+54'	77°	4°53'	+55'	77°	5°07'	+55'	77°	5°20'	+55'	77°	5°34'	+56'	77°	5°47'	+56'	77°	10
11	5°19'	+54'	76°	5°33'	+54'	76°	5°47'	+54'	76°	6°02'	+55'	76°	6°16'	+55'	77°	6°30'	+56'	77°	6°43'	+56'	77°	11
12	6°12'	+54'	76°	6°27'	+54'	76°	6°42'	+54'	76°	6°56'	+55'	76°	7°11'	+55'	76°	7°25'	+56'	76°	7°39'	+56'	76°	12
13	7°06'	+54'	75°	7°21'	+54'	75°	7°36'	+54'	75°	7°51'	+55'	76°	8°06'	+55'	76°	8°21'	+56'	76°	8°35'	+56'	76°	13
14	8°00'	+54'	75°	8°15'	+54'	75°	8°31'	+54'	75°	8°46'	+55'	75°	9°01'	+55'	75°	9°17'	+56'	76°	9°31'	+56'	76°	14
15	8°53'	+53'	74°	9°09'	+54'	74°	9°25'	+54'	75°	9°41'	+55'	75°	9°57'	+55'	75°	10°12'	+56'	75°	10°27'	+56'	75°	15
16	9°47'	+53'	74°	10°03'	+54'	74°	10°20'	+54'	74°	10°36'	+55'	74°	10°52'	+55'	75°	11°08'	+56'	75°	11°23'	+56'	75°	16
17	10°40'	+53'	73°	10°57'	+54'	74°	11°14'	+54'	74°	11°31'	+55'	74°	11°47'	+55'	74°	12°03'	+56'	74°	12°19'	+56'	75°	17
18	11°33'	+53'	73°	11°51'	+54'	73°	12°08'	+54'	73°	12°25'	+55'	74°	12°42'	+55'	74°	12°59'	+56'	74°	13°15'	+56'	74°	18
19	12°27'	+53'	72°	12°45'	+54'	73°	13°03'	+54'	73°	13°20'	+55'	73°	13°37'	+55'	73°	13°54'	+55'	74°	14°11'	+56'	74°	19
20	13°20'	+53'	72°	13°39'	+54'	72°	13°57'	+54'	72°	14°15'	+55'	73°	14°32'	+55'	73°	14°50'	+55'	73°	15°07'	+56'	73°	20
21	14°13'	+53'	72°	14°32'	+54'	72°	14°51'	+54'	72°	15°09'	+55'	72°	15°27'	+55'	73°	15°45'	+55'	73°	16°03'	+56'	73°	21
22	15°07'	+53'	71°	15°26'	+54'	71°	15°45'	+54'	72°	16°04'	+55'	72°	16°22'	+55'	72°	16°41'	+55'	72°	16°59'	+56'	73°	22
23	16°00'	+53'	71°	16°20'	+54'	71°	16°39'	+54'	71°	16°58'	+54'	71°	17°17'	+55'	72°	17°36'	+55'	72°	17°55'	+56'	72°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

100° 260° LHA — Latitude SAME as DECLINATION — 100° 260° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

79° 281° LHA — Latitude CONTRARY to Declination — 79° 281° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°58'	-54'	100°	4°48'	-54'	100°	4°38'	-55'	100°	4°27'	-55'	100°	4°17'	-55'	100°	4°06'	-56'	100°	3°55'	-56'	100°	0
1	4°04'	-54'	100°	3°54'	-54'	100°	3°43'	-55'	100°	3°32'	-55'	100°	3°21'	-55'	101°	3°10'	-56'	101°	2°59'	-56'	101°	1
2	3°11'	-54'	101°	3°00'	-54'	101°	2°48'	-55'	101°	2°37'	-55'	101°	2°26'	-55'	101°	2°14'	-56'	101°	2°03'	-56'	101°	2
3	2°17'	-54'	101°	2°05'	-54'	101°	1°54'	-55'	101°	1°42'	-55'	101°	1°30'	-55'	101°	1°19'	-56'	101°	1°07'	-56'	101°	3
4	1°23'	-54'	102°	1°11'	-54'	102°	0°59'	-55'	102°	0°47'	-55'	102°	0°35'	-55'	102°	0°23'	-56'	102°	0°11'	-56'	102°	4
5	0°30'	-54'	102°	0°17'	-54'	102°	0°05'	-55'	102°	0°08'	+55'	78°	0°20'	+55'	78°	0°33'	+56'	78°	0°46'	+56'	78°	5
6	0°24'	+54'	77°	0°37'	+54'	78°	0°50'	+55'	78°	1°03'	+55'	78°	1°16'	+55'	78°	1°29'	+56'	78°	1°42'	+56'	78°	6
7	1°18'	+54'	77°	1°31'	+54'	77°	1°45'	+55'	77°	1°58'	+55'	77°	2°11'	+55'	77°	2°25'	+56'	77°	2°38'	+56'	77°	7
8	2°11'	+54'	77°	2°25'	+54'	77°	2°39'	+55'	77°	2°53'	+55'	77°	3°07'	+55'	77°	3°20'	+56'	77°	3°34'	+56'	77°	8
9	3°05'	+54'	76°	3°19'	+54'	76°	3°34'	+55'	76°	3°48'	+55'	76°	4°02'	+55'	76°	4°16'	+56'	76°	4°30'	+56'	77°	9
10	3°59'	+54'	76°	4°14'	+54'	76°	4°28'	+55'	76°	4°43'	+55'	76°	4°57'	+55'	76°	5°12'	+56'	76°	5°26'	+56'	76°	10
11	4°52'	+54'	75°	5°08'	+54'	75°	5°23'	+55'	75°	5°38'	+55'	76°	5°53'	+55'	76°	6°08'	+56'	76°	6°22'	+56'	76°	11
12	5°46'	+54'	75°	6°02'	+54'	75°	6°17'	+55'	75°	6°33'	+55'	75°	6°48'	+55'	75°	7°03'	+56'	75°	7°19'	+56'	75°	12
13	6°40'	+54'	74°	6°56'	+54'	74°	7°12'	+54'	75°	7°28'	+55'	75°	7°44'	+55'	75°	7°59'	+56'	75°	8°15'	+56'	75°	13
14	7°33'	+54'	74°	7°50'	+54'	74°	8°06'	+54'	74°	8°23'	+55'	74°	8°39'	+55'	74°	8°55'	+56'	75°	9°11'	+56'	75°	14
15	8°27'	+54'	73°	8°44'	+54'	74°	9°01'	+54'	74°	9°18'	+55'	74°	9°34'	+55'	74°	9°51'	+56'	74°	10°07'	+56'	74°	15
16	9°21'	+54'	73°	9°38'	+54'	73°	9°55'	+54'	73°	10°12'	+55'	73°	10°29'	+55'	74°	10°46'	+56'	74°	11°03'	+56'	74°	16
17	10°14'	+53'	73°	10°32'	+54'	73°	10°50'	+54'	73°	11°07'	+55'	73°	11°25'	+55'	73°	11°42'	+56'	73°	11°59'	+56'	74°	17
18	11°08'	+53'	72°	11°26'	+54'	72°	11°44'	+54'	72°	12°02'	+55'	73°	12°20'	+55'	73°	12°37'	+56'	73°	12°55'	+56'	73°	18
19	12°01'	+53'	72°	12°20'	+54'	72°	12°38'	+54'	72°	12°57'	+55'	72°	13°15'	+55'	72°	13°33'	+56'	73°	13°51'	+56'	73°	19
20	12°54'	+53'	71°	13°14'	+54'	71°	13°33'	+54'	72°	13°52'	+55'	72°	14°10'	+55'	72°	14°28'	+55'	72°	14°47'	+56'	73°	20
21	13°48'	+53'	71°	14°07'	+54'	71°	14°27'	+54'	71°	14°46'	+55'	71°	15°05'	+55'	72°	15°24'	+55'	72°	15°42'	+56'	72°	21
22	14°41'	+53'	70°	15°01'	+54'	70°	15°21'	+54'	71°	15°41'	+55'	71°	16°00'	+55'	71°	16°19'	+55'	72°	16°38'	+56'	72°	22
23	15°34'	+53'	70°	15°55'	+54'	70°	16°15'	+54'	70°	16°35'	+55'	71°	16°55'	+55'	71°	17°15'	+55'	71°	17°34'	+56'	71°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

101° 259° LHA — Latitude SAME as DECLINATION — 101° 259° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

78° 282° LHA — Latitude CONTRARY to Declination — 78° 282° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°25'	-54'	101°	5°14'	-54'	101°	5°02'	-55'	101°	4°51'	-55'	101°	4°40'	-55'	101°	4°28'	-56'	101°	4°16'	-56'	101°	0
1	4°31'	-54'	101°	4°20'	-54'	101°	4°08'	-55'	101°	3°56'	-55'	101°	3°44'	-55'	101°	3°32'	-56'	102°	3°20'	-56'	102°	1
2	3°38'	-54'	102°	3°25'	-54'	102°	3°13'	-55'	102°	3°01'	-55'	102°	2°49'	-55'	102°	2°36'	-56'	102°	2°24'	-56'	102°	2
3	2°44'	-54'	102°	2°31'	-54'	102°	2°19'	-55'	102°	2°06'	-55'	102°	1°53'	-55'	102°	1°41'	-56'	102°	1°28'	-56'	102°	3
4	1°50'	-54'	103°	1°37'	-54'	103°	1°24'	-55'	103°	1°11'	-55'	103°	0°58'	-55'	103°	0°45'	-56'	103°	0°32'	-56'	103°	4
5	0°56'	-54'	103°	0°43'	-54'	103°	0°29'	-55'	103°	0°16'	-55'	103°	0°02'	-55'	103°	0°11'	+56'	77°	0°25'	+56'	77°	5
6	0°03'	-54'	103°	0°11'	+54'	77°	0°25'	+55'	77°	0°39'	+55'	77°	0°53'	+55'	77°	1°07'	+56'	77°	1°21'	+56'	77°	6
7	0°51'	+54'	76°	1°06'	+54'	76°	1°20'	+55'	76°	1°34'	+55'	76°	1°48'	+55'	76°	2°03'	+56'	76°	2°17'	+56'	76°	7
8	1°45'	+54'	76°	2°00'	+54'	76°	2°15'	+55'	76°	2°29'	+55'	76°	2°44'	+55'	76°	2°59'	+56'	76°	3°13'	+56'	76°	8
9	2°39'	+54'	75°	2°54'	+54'	75°	3°09'	+55'	75°	3°24'	+55'	75°	3°39'	+55'	75°	3°54'	+56'	76°	4°09'	+56'	76°	9
10	3°32'	+54'	75°	3°48'	+54'	75°	4°04'	+55'	75°	4°19'	+55'	75°	4°35'	+55'	75°	4°50'	+56'	75°	5°05'	+56'	75°	10
11	4°26'	+54'	74°	4°42'	+54'	74°	4°58'	+55'	75°	5°14'	+55'	75°	5°30'	+55'	75°	5°46'	+56'	75°	6°02'	+56'	75°	11
12	5°20'	+54'	74°	5°36'	+54'	74°	5°53'	+55'	74°	6°09'	+55'	74°	6°26'	+55'	74°	6°42'	+56'	74°	6°58'	+56'	75°	12
13	6°14'	+54'	73°	6°31'	+54'	74°	6°48'	+55'	74°	7°04'	+55'	74°	7°21'	+55'	74°	7°37'	+56'	74°	7°54'	+56'	74°	13
14	7°07'	+54'	73°	7°25'	+54'	73°	7°42'	+55'	73°	7°59'	+55'	73°	8°16'	+55'	74°	8°33'	+56'	74°	8°50'	+56'	74°	14
15	8°01'	+54'	73°	8°19'	+54'	73°	8°37'	+54'	73°	8°54'	+55'	73°	9°12'	+55'	73°	9°29'	+56'	73°	9°46'	+56'	73°	15
16	8°55'	+54'	72°	9°13'	+54'	72°	9°31'	+54'	72°	9°49'	+55'	73°	10°07'	+55'	73°	10°25'	+56'	73°	10°42'	+56'	73°	16
17	9°48'	+54'	72°	10°07'	+54'	72°	10°26'	+54'	72°	10°44'	+55'	72°	11°02'	+55'	72°	11°20'	+56'	73°	11°38'	+56'	73°	17
18	10°42'	+54'	71°	11°01'	+54'	71°	11°20'	+54'	72°	11°39'	+55'	72°	11°57'	+55'	72°	12°16'	+56'	72°	12°34'	+56'	72°	18
19	11°35'	+53'	71°	11°55'	+54'	71°	12°14'	+54'	71°	12°34'	+55'	71°	12°53'	+55'	72°	13°12'	+56'	72°	13°30'	+56'	72°	19
20	12°29'	+53'	70°	12°49'	+54'	70°	13°09'	+54'	71°	13°28'	+55'	71°	13°48'	+55'	71°	14°07'	+56'	71°	14°26'	+56'	72°	20
21	13°22'	+53'	70°	13°43'	+54'	70°	14°03'	+54'	70°	14°23'	+55'	71°	14°43'	+55'	71°	15°03'	+55'	71°	15°22'	+56'	71°	21
22	14°15'	+53'	69°	14°36'	+54'	70°	14°57'	+54'	70°	15°18'	+55'	70°	15°38'	+55'	70°	15°58'	+55'	71°	16°18'	+56'	71°	22
23	15°09'	+53'	69°	15°30'	+54'	69°	15°51'	+54'	69°	16°12'	+55'	70°	16°33'	+55'	70°	16°54'	+55'	70°	17°14'	+56'	71°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

102° 258° LHA — Latitude SAME as DECLINATION — 102° 258° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

77° 283° LHA — Latitude CONTRARY to Declination — 77° 283° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°52'	-54'	102°	5°40'	-54'	102°	5°27'	-55'	102°	5°15'	-55'	102°	5°03'	-55'	102°	4°50'	-56'	102°	4°37'	-56'	102°	0
1	4°58'	-54'	102°	4°45'	-54'	102°	4°33'	-55'	102°	4°20'	-55'	102°	4°07'	-55'	102°	3°54'	-56'	102°	3°41'	-56'	103°	1
2	4°04'	-54'	103°	3°51'	-54'	103°	3°38'	-55'	103°	3°25'	-55'	103°	3°12'	-55'	103°	2°58'	-56'	103°	2°45'	-56'	103°	2
3	3°10'	-54'	103°	2°57'	-54'	103°	2°43'	-55'	103°	2°30'	-55'	103°	2°16'	-55'	103°	2°03'	-56'	103°	1°49'	-56'	103°	3
4	2°17'	-54'	103°	2°03'	-54'	103°	1°49'	-55'	103°	1°35'	-55'	104°	1°21'	-55'	104°	1°07'	-56'	104°	0°53'	-56'	104°	4
5	1°23'	-54'	104°	1°08'	-54'	104°	0°54'	-55'	104°	0°40'	-55'	104°	0°25'	-55'	104°	0°11'	-56'	104°	0°04'	+56'	76°	5
6	0°29'	-54'	104°	0°14'	-54'	104°	0°01'	+55'	76°	0°15'	+55'	76°	0°30'	+55'	76°	0°45'	+56'	76°	1°00'	+56'	76°	6
7	0°25'	+54'	75°	0°40'	+54'	75°	0°55'	+55'	75°	1°11'	+55'	75°	1°26'	+55'	75°	1°41'	+56'	75°	1°56'	+56'	75°	7
8	1°19'	+54'	75°	1°34'	+54'	75°	1°50'	+55'	75°	2°06'	+55'	75°	2°21'	+55'	75°	2°37'	+56'	75°	2°52'	+56'	75°	8
9	2°12'	+54'	74°	2°29'	+54'	74°	2°45'	+55'	74°	3°01'	+55'	75°	3°17'	+55'	75°	3°33'	+56'	75°	3°49'	+56'	75°	9
10	3°06'	+54'	74°	3°23'	+54'	74°	3°39'	+55'	74°	3°56'	+55'	74°	4°12'	+55'	74°	4°28'	+56'	74°	4°45'	+56'	74°	10
11	4°00'	+54'	73°	4°17'	+54'	74°	4°34'	+55'	74°	4°51'	+55'	74°	5°08'	+55'	74°	5°24'	+56'	74°	5°41'	+56'	74°	11
12	4°54'	+54'	73°	5°11'	+54'	73°	5°29'	+55'	73°	5°46'	+55'	73°	6°03'	+55'	73°	6°20'	+56'	74°	6°37'	+56'	74°	12
13	5°48'	+54'	73°	6°05'	+54'	73°	6°23'	+55'	73°	6°41'	+55'	73°	6°58'	+55'	73°	7°16'	+56'	73°	7°33'	+56'	73°	13
14	6°41'	+54'	72°	7°00'	+54'	72°	7°18'	+55'	72°	7°36'	+55'	73°	7°54'	+55'	73°	8°12'	+56'	73°	8°29'	+56'	73°	14
15	7°35'	+54'	72°	7°54'	+54'	72°	8°12'	+55'	72°	8°31'	+55'	72°	8°49'	+55'	72°	9°07'	+56'	72°	9°26'	+56'	73°	15
16	8°29'	+54'	71°	8°48'	+54'	71°	9°07'	+55'	72°	9°26'	+55'	72°	9°45'	+55'	72°	10°03'	+56'	72°	10°22'	+56'	72°	16
17	9°22'	+54'	71°	9°42'	+54'	71°	10°01'	+54'	71°	10°21'	+55'	71°	10°40'	+55'	71°	10°59'	+56'	72°	11°18'	+56'	72°	17
18	10°16'	+54'	70°	10°36'	+54'	71°	10°56'	+54'	71°	11°16'	+55'	71°	11°35'	+55'	71°	11°55'	+56'	71°	12°14'	+56'	71°	18
19	11°10'	+54'	70°	11°30'	+54'	70°	11°50'	+54'	70°	12°11'	+55'	70°	12°30'	+55'	71°	12°50'	+56'	71°	13°10'	+56'	71°	19
20	12°03'	+53'	69°	12°24'	+54'	70°	12°45'	+54'	70°	13°05'	+55'	70°	13°26'	+55'	70°	13°46'	+56'	71°	14°06'	+56'	71°	20
21	12°57'	+53'	69°	13°18'	+54'	69°	13°39'	+54'	69°	14°00'	+55'	70°	14°21'	+55'	70°	14°41'	+56'	70°	15°02'	+56'	70°	21
22	13°50'	+53'	68°	14°12'	+54'	69°	14°33'	+54'	69°	14°55'	+55'	69°	15°16'	+55'	69°	15°37'	+56'	70°	15°58'	+56'	70°	22
23	14°43'	+53'	68°	15°06'	+54'	68°	15°28'	+54'	69°	15°50'	+55'	69°	16°11'	+55'	69°	16°32'	+55'	69°	16°54'	+56'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

103° 257° LHA — Latitude SAME as DECLINATION — 103° 257° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

76° 284° LHA — Latitude CONTRARY to Declination — 76° 284° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	6°18'	-54'	103°	6°05'	-54'	103°	5°52'	-55'	103°	5°39'	-55'	103°	5°25'	-55'	103°	5°12'	-56'	103°	4°58'	-56'	103°	0
1	5°25'	-54'	103°	5°11'	-54'	103°	4°57'	-55'	103°	4°44'	-55'	103°	4°30'	-55'	103°	4°16'	-56'	103°	4°02'	-56'	103°	1
2	4°31'	-54'	103°	4°17'	-54'	103°	4°03'	-55'	104°	3°49'	-55'	104°	3°34'	-56'	104°	3°20'	-56'	104°	3°06'	-56'	104°	2
3	3°37'	-54'	104°	3°22'	-54'	104°	3°08'	-55'	104°	2°54'	-55'	104°	2°39'	-56'	104°	2°24'	-56'	104°	2°10'	-56'	104°	3
4	2°43'	-54'	104°	2°28'	-54'	104°	2°13'	-55'	104°	1°58'	-55'	104°	1°43'	-56'	104°	1°28'	-56'	104°	1°13'	-56'	104°	4
5	1°49'	-54'	105°	1°34'	-54'	105°	1°19'	-55'	105°	1°03'	-55'	105°	0°48'	-56'	105°	0°33'	-56'	105°	0°17'	-56'	105°	5
6	0°55'	-54'	105°	0°40'	-54'	105°	0°24'	-55'	105°	0°08'	-55'	105°	0°08'	+56'	75°	0°23'	+56'	75°	0°39'	+56'	75°	6
7	0°01'	-54'	106°	0°15'	+54'	74°	0°31'	+55'	74°	0°47'	+55'	74°	1°03'	+56'	74°	1°19'	+56'	74°	1°35'	+56'	74°	7
8	0°52'	+54'	74°	1°09'	+54'	74°	1°26'	+55'	74°	1°42'	+55'	74°	1°59'	+56'	74°	2°15'	+56'	74°	2°32'	+56'	74°	8
9	1°46'	+54'	73°	2°03'	+54'	74°	2°20'	+55'	74°	2°37'	+55'	74°	2°54'	+56'	74°	3°11'	+56'	74°	3°28'	+56'	74°	9
10	2°40'	+54'	73°	2°58'	+54'	73°	3°15'	+55'	73°	3°32'	+55'	73°	3°50'	+55'	73°	4°07'	+56'	73°	4°24'	+56'	73°	10
11	3°34'	+54'	73°	3°52'	+54'	73°	4°10'	+55'	73°	4°27'	+55'	73°	4°45'	+55'	73°	5°03'	+56'	73°	5°20'	+56'	73°	11
12	4°28'	+54'	72°	4°46'	+54'	72°	5°04'	+55'	72°	5°23'	+55'	72°	5°41'	+55'	73°	5°59'	+56'	73°	6°16'	+56'	73°	12
13	5°22'	+54'	72°	5°40'	+54'	72°	5°59'	+55'	72°	6°18'	+55'	72°	6°36'	+55'	72°	6°54'	+56'	72°	7°13'	+56'	72°	13
14	6°15'	+54'	71°	6°35'	+54'	71°	6°54'	+55'	72°	7°13'	+55'	72°	7°32'	+55'	72°	7°50'	+56'	72°	8°09'	+56'	72°	14
15	7°09'	+54'	71°	7°29'	+54'	71°	7°48'	+55'	71°	8°08'	+55'	71°	8°27'	+55'	71°	8°46'	+56'	71°	9°05'	+56'	72°	15
16	8°03'	+54'	70°	8°23'	+54'	71°	8°43'	+55'	71°	9°03'	+55'	71°	9°22'	+55'	71°	9°42'	+56'	71°	10°01'	+56'	71°	16
17	8°57'	+54'	70°	9°17'	+54'	70°	9°38'	+55'	70°	9°58'	+55'	70°	10°18'	+55'	71°	10°38'	+56'	71°	10°57'	+56'	71°	17
18	9°50'	+54'	69°	10°11'	+54'	70°	10°32'	+55'	70°	10°53'	+55'	70°	11°13'	+55'	70°	11°33'	+56'	70°	11°53'	+56'	71°	18
19	10°44'	+54'	69°	11°05'	+54'	69°	11°27'	+54'	69°	11°48'	+55'	70°	12°08'	+55'	70°	12°29'	+56'	70°	12°49'	+56'	70°	19
20	11°38'	+54'	69°	11°59'	+54'	69°	12°21'	+54'	69°	12°42'	+55'	69°	13°04'	+55'	69°	13°25'	+56'	70°	13°46'	+56'	70°	20
21	12°31'	+54'	68°	12°53'	+54'	68°	13°15'	+54'	69°	13°37'	+55'	69°	13°59'	+55'	69°	14°20'	+56'	69°	14°42'	+56'	69°	21
22	13°25'	+53'	68°	13°47'	+54'	68°	14°10'	+54'	68°	14°32'	+55'	68°	14°54'	+55'	69°	15°16'	+56'	69°	15°38'	+56'	69°	22
23	14°18'	+53'	67°	14°41'	+54'	67°	15°04'	+54'	68°	15°27'	+55'	68°	15°49'	+55'	68°	16°12'	+56'	68°	16°33'	+56'	69°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

104° 256° LHA — Latitude SAME as DECLINATION — 104° 256° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

75° 285° LHA — Latitude CONTRARY to Declination — 75° 285° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	6°45'	-54'	103°	6°31'	-54'	104°	6°17'	-55'	104°	6°03'	-55'	104°	5°48'	-56'	104°	5°34'	-56'	104°	5°19'	-56'	104°	0
1	5°51'	-54'	104°	5°37'	-54'	104°	5°22'	-55'	104°	5°07'	-55'	104°	4°53'	-56'	104°	4°38'	-56'	104°	4°23'	-56'	104°	1
2	4°57'	-54'	104°	4°42'	-54'	104°	4°27'	-55'	104°	4°12'	-55'	105°	3°57'	-56'	105°	3°42'	-56'	105°	3°27'	-56'	105°	2
3	4°03'	-54'	105°	3°48'	-54'	105°	3°33'	-55'	105°	3°17'	-55'	105°	3°02'	-56'	105°	2°46'	-56'	105°	2°31'	-56'	105°	3
4	3°09'	-54'	105°	2°54'	-54'	105°	2°38'	-55'	105°	2°22'	-55'	105°	2°06'	-56'	105°	1°50'	-56'	105°	1°34'	-56'	105°	4
5	2°15'	-54'	106°	1°59'	-54'	106°	1°43'	-55'	106°	1°27'	-55'	106°	1°11'	-56'	106°	0°54'	-56'	106°	0°38'	-56'	106°	5
6	1°22'	-54'	106°	1°05'	-54'	106°	0°48'	-55'	106°	0°32'	-55'	106°	0°15'	-56'	106°	0°02'	+56'	74°	0°18'	+56'	74°	6
7	0°28'	-54'	107°	0°11'	-54'	107°	0°06'	+55'	73°	0°24'	+55'	73°	0°41'	+56'	73°	0°58'	+56'	74°	1°15'	+56'	74°	7
8	0°26'	+54'	73°	0°44'	+54'	73°	1°01'	+55'	73°	1°19'	+55'	73°	1°36'	+56'	73°	1°54'	+56'	73°	2°11'	+56'	73°	8
9	1°20'	+54'	73°	1°38'	+54'	73°	1°56'	+55'	73°	2°14'	+55'	73°	2°32'	+56'	73°	2°49'	+56'	73°	3°07'	+56'	73°	9
10	2°14'	+54'	72°	2°32'	+54'	72°	2°51'	+55'	72°	3°09'	+55'	72°	3°27'	+56'	72°	3°45'	+56'	72°	4°03'	+56'	72°	10
11	3°08'	+54'	72°	3°27'	+54'	72°	3°46'	+55'	72°	4°04'	+55'	72°	4°23'	+56'	72°	4°41'	+56'	72°	5°00'	+56'	72°	11
12	4°02'	+54'	71°	4°21'	+54'	71°	4°40'	+55'	71°	4°59'	+55'	72°	5°18'	+56'	72°	5°37'	+56'	72°	5°56'	+56'	72°	12
13	4°56'	+54'	71°	5°15'	+54'	71°	5°35'	+55'	71°	5°54'	+55'	71°	6°14'	+55'	71°	6°33'	+56'	71°	6°52'	+56'	71°	13
14	5°50'	+54'	70°	6°10'	+54'	71°	6°30'	+55'	71°	6°50'	+55'	71°	7°09'	+55'	71°	7°29'	+56'	71°	7°48'	+56'	71°	14
15	6°44'	+54'	70°	7°04'	+54'	70°	7°24'	+55'	70°	7°45'	+55'	70°	8°05'	+55'	70°	8°25'	+56'	71°	8°45'	+56'	71°	15
16	7°37'	+54'	70°	7°58'	+54'	70°	8°19'	+55'	70°	8°40'	+55'	70°	9°00'	+55'	70°	9°21'	+56'	70°	9°41'	+56'	70°	16
17	8°31'	+54'	69°	8°53'	+54'	69°	9°14'	+55'	69°	9°35'	+55'	70°	9°56'	+55'	70°	10°16'	+56'	70°	10°37'	+56'	70°	17
18	9°25'	+54'	69°	9°47'	+54'	69°	10°08'	+55'	69°	10°30'	+55'	69°	10°51'	+55'	69°	11°12'	+56'	69°	11°33'	+56'	70°	18
19	10°19'	+54'	68°	10°41'	+54'	68°	11°03'	+55'	69°	11°25'	+55'	69°	11°46'	+55'	69°	12°08'	+56'	69°	12°29'	+56'	69°	19
20	11°12'	+54'	68°	11°35'	+54'	68°	11°57'	+55'	68°	12°20'	+55'	68°	12°42'	+55'	69°	13°04'	+56'	69°	13°25'	+56'	69°	20
21	12°06'	+54'	67°	12°29'	+54'	67°	12°52'	+54'	68°	13°15'	+55'	68°	13°37'	+55'	68°	13°59'	+56'	68°	14°21'	+56'	69°	21
22	13°00'	+54'	67°	13°23'	+54'	67°	13°46'	+54'	67°	14°10'	+55'	67°	14°32'	+55'	68°	14°55'	+56'	68°	15°17'	+56'	68°	22
23	13°53'	+54'	66°	14°17'	+54'	67°	14°41'	+54'	67°	15°04'	+55'	67°	15°28'	+55'	67°	15°51'	+56'	68°	16°13'	+56'	68°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

105° 255° LHA — Latitude SAME as DECLINATION — 105° 255° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

74° 286° LHA — Latitude CONTRARY to Declination — 74° 286° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	7°11'	-54'	104°	6°56'	-54'	104°	6°41'	-55'	105°	6°26'	-55'	105°	6°11'	-56'	105°	5°56'	-56'	105°	5°40'	-56'	105°	0
1	6°17'	-54'	105°	6°02'	-54'	105°	5°47'	-55'	105°	5°31'	-55'	105°	5°15'	-56'	105°	5°00'	-56'	105°	4°44'	-56'	105°	1
2	5°24'	-54'	105°	5°08'	-54'	105°	4°52'	-55'	105°	4°36'	-55'	105°	4°20'	-56'	106°	4°04'	-56'	106°	3°48'	-56'	106°	2
3	4°30'	-54'	106°	4°13'	-54'	106°	3°57'	-55'	106°	3°41'	-55'	106°	3°24'	-56'	106°	3°08'	-56'	106°	2°51'	-56'	106°	3
4	3°36'	-54'	106°	3°19'	-54'	106°	3°02'	-55'	106°	2°45'	-55'	106°	2°29'	-56'	106°	2°12'	-56'	106°	1°55'	-56'	106°	4
5	2°42'	-54'	107°	2°25'	-54'	107°	2°07'	-55'	107°	1°50'	-55'	107°	1°33'	-56'	107°	1°16'	-56'	107°	0°59'	-56'	107°	5
6	1°48'	-54'	107°	1°30'	-54'	107°	1°13'	-55'	107°	0°55'	-55'	107°	0°37'	-56'	107°	0°20'	-56'	107°	0°02'	-56'	107°	6
7	0°54'	-54'	107°	0°36'	-54'	107°	0°18'	-55'	107°	0°00'	+55'	73°	0°18'	+56'	73°	0°36'	+56'	73°	0°54'	+56'	73°	7
8	0°00'	+54'	72°	0°19'	+54'	72°	0°37'	+55'	72°	0°55'	+55'	72°	1°14'	+56'	72°	1°32'	+56'	72°	1°50'	+56'	72°	8
9	0°54'	+54'	72°	1°13'	+54'	72°	1°32'	+55'	72°	1°51'	+55'	72°	2°09'	+56'	72°	2°28'	+56'	72°	2°47'	+56'	72°	9
10	1°48'	+54'	71°	2°07'	+54'	71°	2°27'	+55'	71°	2°46'	+55'	71°	3°05'	+56'	71°	3°24'	+56'	72°	3°43'	+56'	72°	10
11	2°42'	+54'	71°	3°02'	+54'	71°	3°22'	+55'	71°	3°41'	+55'	71°	4°01'	+56'	71°	4°20'	+56'	71°	4°39'	+56'	71°	11
12	3°36'	+54'	70°	3°56'	+54'	70°	4°16'	+55'	71°	4°36'	+55'	71°	4°56'	+56'	71°	5°16'	+56'	71°	5°36'	+56'	71°	12
13	4°30'	+54'	70°	4°51'	+54'	70°	5°11'	+55'	70°	5°31'	+55'	70°	5°52'	+56'	70°	6°12'	+56'	70°	6°32'	+56'	71°	13
14	5°24'	+54'	70°	5°45'	+54'	70°	6°06'	+55'	70°	6°27'	+55'	70°	6°47'	+56'	70°	7°08'	+56'	70°	7°28'	+56'	70°	14
15	6°18'	+54'	69°	6°39'	+54'	69°	7°01'	+55'	69°	7°22'	+55'	69°	7°43'	+56'	70°	8°04'	+56'	70°	8°24'	+56'	70°	15
16	7°12'	+54'	69°	7°34'	+54'	69°	7°55'	+55'	69°	8°17'	+55'	69°	8°38'	+55'	69°	9°00'	+56'	69°	9°21'	+56'	69°	16
17	8°06'	+54'	68°	8°28'	+54'	68°	8°50'	+55'	68°	9°12'	+55'	69°	9°34'	+55'	69°	9°55'	+56'	69°	10°17'	+56'	69°	17
18	9°00'	+54'	68°	9°22'	+54'	68°	9°45'	+55'	68°	10°07'	+55'	68°	10°29'	+55'	68°	10°51'	+56'	69°	11°13'	+56'	69°	18
19	9°53'	+54'	67°	10°16'	+54'	67°	10°39'	+55'	68°	11°02'	+55'	68°	11°25'	+55'	68°	11°47'	+56'	68°	12°09'	+56'	68°	19
20	10°47'	+54'	67°	11°11'	+54'	67°	11°34'	+55'	67°	11°57'	+55'	67°	12°20'	+55'	68°	12°43'	+56'	68°	13°05'	+56'	68°	20
21	11°41'	+54'	66°	12°05'	+54'	67°	12°29'	+55'	67°	12°52'	+55'	67°	13°15'	+55'	67°	13°39'	+56'	67°	14°02'	+56'	68°	21
22	12°35'	+54'	66°	12°59'	+54'	66°	13°23'	+54'	66°	13°47'	+55'	67°	14°11'	+55'	67°	14°34'	+56'	67°	14°58'	+56'	67°	22
23	13°28'	+54'	65°	13°53'	+54'	66°	14°18'	+54'	66°	14°42'	+55'	66°	15°06'	+55'	66°	15°30'	+56'	67°	15°54'	+56'	67°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

106° 254° LHA — Latitude SAME as DECLINATION — 106° 254° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

73° 287° LHA — Latitude CONTRARY to Declination — 73° 287° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	7°38'	-54'	105°	7°22'	-54'	105°	7°06'	-55'	105°	6°50'	-55'	106°	6°34'	-56'	106°	6°17'	-56'	106°	6°01'	-56'	106°	0
1	6°44'	-54'	106°	6°27'	-54'	106°	6°11'	-55'	106°	5°55'	-55'	106°	5°38'	-56'	106°	5°21'	-56'	106°	5°05'	-56'	106°	1
2	5°50'	-54'	106°	5°33'	-54'	106°	5°16'	-55'	106°	4°59'	-55'	106°	4°42'	-56'	106°	4°25'	-56'	107°	4°08'	-56'	107°	2
3	4°56'	-54'	107°	4°39'	-54'	107°	4°21'	-55'	107°	4°04'	-55'	107°	3°47'	-56'	107°	3°29'	-56'	107°	3°12'	-56'	107°	3
4	4°02'	-54'	107°	3°44'	-54'	107°	3°27'	-55'	107°	3°09'	-55'	107°	2°51'	-56'	107°	2°33'	-56'	107°	2°15'	-56'	107°	4
5	3°08'	-54'	107°	2°50'	-54'	107°	2°32'	-55'	108°	2°14'	-55'	108°	1°55'	-56'	108°	1°37'	-56'	108°	1°19'	-56'	108°	5
6	2°14'	-54'	108°	1°55'	-54'	108°	1°37'	-55'	108°	1°18'	-55'	108°	1°00'	-56'	108°	0°41'	-56'	108°	0°23'	-56'	108°	6
7	1°20'	-54'	108°	1°01'	-54'	108°	0°42'	-55'	108°	0°23'	-55'	108°	0°04'	-56'	108°	0°15'	+56'	72°	0°34'	+56'	72°	7
8	0°26'	-54'	109°	0°06'	-54'	109°	0°13'	+55'	71°	0°32'	+55'	71°	0°52'	+56'	71°	1°11'	+56'	71°	1°30'	+56'	71°	8
9	0°28'	+54'	71°	0°48'	+54'	71°	1°08'	+55'	71°	1°28'	+55'	71°	1°47'	+56'	71°	2°07'	+56'	71°	2°26'	+56'	71°	9
10	1°23'	+54'	70°	1°43'	+54'	70°	2°03'	+55'	70°	2°23'	+55'	70°	2°43'	+56'	71°	3°03'	+56'	71°	3°23'	+56'	71°	10
11	2°17'	+54'	70°	2°37'	+54'	70°	2°58'	+55'	70°	3°18'	+55'	70°	3°38'	+56'	70°	3°59'	+56'	70°	4°19'	+56'	70°	11
12	3°11'	+54'	70°	3°32'	+54'	70°	3°52'	+55'	70°	4°13'	+55'	70°	4°34'	+56'	70°	4°55'	+56'	70°	5°15'	+56'	70°	12
13	4°05'	+54'	69°	4°26'	+54'	69°	4°47'	+55'	69°	5°09'	+55'	69°	5°30'	+56'	69°	5°51'	+56'	69°	6°12'	+56'	70°	13
14	4°59'	+54'	69°	5°20'	+54'	69°	5°42'	+55'	69°	6°04'	+55'	69°	6°25'	+56'	69°	6°47'	+56'	69°	7°08'	+56'	69°	14
15	5°53'	+54'	68°	6°15'	+54'	68°	6°37'	+55'	68°	6°59'	+55'	69°	7°21'	+56'	69°	7°43'	+56'	69°	8°04'	+56'	69°	15
16	6°47'	+54'	68°	7°09'	+54'	68°	7°32'	+55'	68°	7°54'	+55'	68°	8°16'	+56'	68°	8°39'	+56'	68°	9°01'	+56'	69°	16
17	7°41'	+54'	67°	8°04'	+54'	67°	8°27'	+55'	68°	8°49'	+55'	68°	9°12'	+56'	68°	9°35'	+56'	68°	9°57'	+56'	68°	17
18	8°34'	+54'	67°	8°58'	+54'	67°	9°21'	+55'	67°	9°44'	+55'	67°	10°08'	+55'	68°	10°30'	+56'	68°	10°53'	+56'	68°	18
19	9°28'	+54'	66°	9°52'	+54'	67°	10°16'	+55'	67°	10°40'	+55'	67°	11°03'	+55'	67°	11°26'	+56'	67°	11°49'	+56'	67°	19
20	10°22'	+54'	66°	10°47'	+54'	66°	11°11'	+55'	66°	11°35'	+55'	67°	11°58'	+55'	67°	12°22'	+56'	67°	12°46'	+56'	67°	20
21	11°16'	+54'	66°	11°41'	+54'	66°	12°05'	+55'	66°	12°30'	+55'	66°	12°54'	+55'	66°	13°18'	+56'	67°	13°42'	+56'	67°	21
22	12°10'	+54'	65°	12°35'	+54'	65°	13°00'	+55'	66°	13°25'	+55'	66°	13°49'	+55'	66°	14°14'	+56'	66°	14°38'	+56'	66°	22
23	13°04'	+54'	65°	13°29'	+54'	65°	13°55'	+55'	65°	14°20'	+55'	65°	14°45'	+55'	66°	15°09'	+56'	66°	15°34'	+56'	66°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

107° 253° LHA — Latitude SAME as DECLINATION — 107° 253° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

72° 288° LHA — Latitude CONTRARY to Declination — 72° 288° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	8°04'	-54'	106°	7°47'	-54'	106°	7°30'	-55'	106°	7°13'	-55'	107°	6°56'	-56'	107°	6°39'	-56'	107°	6°21'	-56'	107°	0
1	7°10'	-54'	107°	6°53'	-54'	107°	6°35'	-55'	107°	6°18'	-55'	107°	6°00'	-56'	107°	5°43'	-56'	107°	5°25'	-56'	107°	1
2	6°16'	-54'	107°	5°58'	-54'	107°	5°41'	-55'	107°	5°23'	-55'	107°	5°05'	-56'	107°	4°47'	-56'	107°	4°29'	-56'	108°	2
3	5°22'	-54'	107°	5°04'	-54'	108°	4°46'	-55'	108°	4°27'	-55'	108°	4°09'	-56'	108°	3°51'	-56'	108°	3°32'	-56'	108°	3
4	4°28'	-54'	108°	4°09'	-55'	108°	3°51'	-55'	108°	3°32'	-55'	108°	3°13'	-56'	108°	2°55'	-56'	108°	2°36'	-56'	108°	4
5	3°34'	-54'	108°	3°15'	-55'	108°	2°56'	-55'	108°	2°37'	-55'	108°	2°18'	-56'	109°	1°59'	-56'	109°	1°40'	-56'	109°	5
6	2°40'	-54'	109°	2°20'	-55'	109°	2°01'	-55'	109°	1°41'	-55'	109°	1°22'	-56'	109°	1°03'	-56'	109°	0°43'	-56'	109°	6
7	1°45'	-54'	109°	1°26'	-55'	109°	1°06'	-55'	109°	0°46'	-55'	109°	0°26'	-56'	109°	0°07'	-56'	109°	0°13'	+56'	71°	7
8	0°51'	-54'	110°	0°31'	-55'	110°	0°11'	-55'	110°	0°09'	+55'	70°	0°29'	+56'	70°	0°50'	+56'	70°	1°10'	+56'	70°	8
9	0°03'	+54'	70°	0°23'	+55'	70°	0°44'	+55'	70°	1°05'	+55'	70°	1°25'	+56'	70°	1°46'	+56'	70°	2°06'	+56'	70°	9
10	0°57'	+54'	70°	1°18'	+55'	70°	1°39'	+55'	70°	2°00'	+55'	70°	2°21'	+56'	70°	2°42'	+56'	70°	3°02'	+56'	70°	10
11	1°51'	+54'	69°	2°12'	+55'	69°	2°34'	+55'	69°	2°55'	+55'	69°	3°16'	+56'	69°	3°38'	+56'	69°	3°59'	+56'	69°	11
12	2°45'	+54'	69°	3°07'	+55'	69°	3°29'	+55'	69°	3°50'	+55'	69°	4°12'	+56'	69°	4°34'	+56'	69°	4°55'	+56'	69°	12
13	3°39'	+54'	68°	4°02'	+55'	68°	4°24'	+55'	68°	4°46'	+55'	68°	5°08'	+56'	68°	5°30'	+56'	69°	5°52'	+56'	69°	13
14	4°33'	+54'	68°	4°56'	+54'	68°	5°19'	+55'	68°	5°41'	+55'	68°	6°03'	+56'	68°	6°26'	+56'	68°	6°48'	+56'	68°	14
15	5°27'	+54'	67°	5°50'	+54'	67°	6°13'	+55'	68°	6°36'	+55'	68°	6°59'	+56'	68°	7°22'	+56'	68°	7°44'	+56'	68°	15
16	6°21'	+54'	67°	6°45'	+54'	67°	7°08'	+55'	67°	7°32'	+55'	67°	7°55'	+56'	67°	8°18'	+56'	68°	8°41'	+56'	68°	16
17	7°16'	+54'	66°	7°39'	+54'	67°	8°03'	+55'	67°	8°27'	+55'	67°	8°50'	+56'	67°	9°14'	+56'	67°	9°37'	+56'	67°	17
18	8°10'	+54'	66°	8°34'	+54'	66°	8°58'	+55'	66°	9°22'	+55'	66°	9°46'	+56'	67°	10°10'	+56'	67°	10°33'	+56'	67°	18
19	9°03'	+54'	66°	9°28'	+54'	66°	9°53'	+55'	66°	10°17'	+55'	66°	10°41'	+56'	66°	11°06'	+56'	66°	11°30'	+56'	67°	19
20	9°57'	+54'	65°	10°23'	+54'	65°	10°48'	+55'	65°	11°12'	+55'	66°	11°37'	+55'	66°	12°01'	+56'	66°	12°26'	+56'	66°	20
21	10°51'	+54'	65°	11°17'	+54'	65°	11°42'	+55'	65°	12°07'	+55'	65°	12°33'	+55'	65°	12°57'	+56'	66°	13°22'	+56'	66°	21
22	11°45'	+54'	64°	12°11'	+54'	64°	12°37'	+55'	65°	13°03'	+55'	65°	13°28'	+55'	65°	13°53'	+56'	65°	14°18'	+56'	66°	22
23	12°39'	+54'	64°	13°05'	+54'	64°	13°32'	+55'	64°	13°58'	+55'	64°	14°23'	+55'	65°	14°49'	+56'	65°	15°14'	+56'	65°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

108° 252° LHA — Latitude SAME as DECLINATION — 108° 252° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

71° 289° LHA — Latitude CONTRARY to Declination — 71° 289° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	8°30'	-54'	107°	8°12'	-54'	107°	7°55'	-55'	107°	7°37'	-55'	107°	7°19'	-56'	108°	7°00'	-56'	108°	6°42'	-56'	108°	0
1	7°36'	-54'	107°	7°18'	-55'	108°	7°00'	-55'	108°	6°41'	-55'	108°	6°23'	-56'	108°	6°04'	-56'	108°	5°46'	-56'	108°	1
2	6°42'	-54'	108°	6°23'	-55'	108°	6°05'	-55'	108°	5°46'	-55'	108°	5°27'	-56'	108°	5°08'	-56'	108°	4°49'	-56'	109°	2
3	5°48'	-54'	108°	5°29'	-55'	108°	5°10'	-55'	109°	4°51'	-55'	109°	4°31'	-56'	109°	4°12'	-56'	109°	3°53'	-56'	109°	3
4	4°54'	-54'	109°	4°34'	-55'	109°	4°15'	-55'	109°	3°55'	-55'	109°	3°36'	-56'	109°	3°16'	-56'	109°	2°56'	-56'	109°	4
5	3°59'	-54'	109°	3°40'	-55'	109°	3°20'	-55'	109°	3°00'	-55'	109°	2°40'	-56'	109°	2°20'	-56'	109°	2°00'	-56'	110°	5
6	3°05'	-54'	110°	2°45'	-55'	110°	2°25'	-55'	110°	2°04'	-55'	110°	1°44'	-56'	110°	1°24'	-56'	110°	1°03'	-56'	110°	6
7	2°11'	-54'	110°	1°50'	-55'	110°	1°30'	-55'	110°	1°09'	-55'	110°	0°48'	-56'	110°	0°28'	-56'	110°	0°07'	-56'	110°	7
8	1°17'	-54'	111°	0°56'	-55'	111°	0°35'	-55'	111°	0°14'	-55'	111°	0°07'	+56'	69°	0°28'	+56'	69°	0°49'	+56'	69°	8
9	0°23'	-54'	111°	0°01'	-55'	111°	0°20'	+55'	69°	0°42'	+55'	69°	1°03'	+56'	69°	1°25'	+56'	69°	1°46'	+56'	69°	9
10	0°31'	+54'	69°	0°53'	+55'	69°	1°15'	+55'	69°	1°37'	+55'	69°	1°59'	+56'	69°	2°21'	+56'	69°	2°42'	+56'	69°	10
11	1°26'	+54'	68°	1°48'	+55'	68°	2°10'	+55'	68°	2°32'	+55'	68°	2°55'	+56'	68°	3°17'	+56'	68°	3°39'	+56'	68°	11
12	2°20'	+54'	68°	2°43'	+55'	68°	3°05'	+55'	68°	3°28'	+55'	68°	3°50'	+56'	68°	4°13'	+56'	68°	4°35'	+56'	68°	12
13	3°14'	+54'	67°	3°37'	+55'	67°	4°00'	+55'	67°	4°23'	+55'	68°	4°46'	+56'	68°	5°09'	+56'	68°	5°32'	+56'	68°	13
14	4°08'	+54'	67°	4°32'	+55'	67°	4°55'	+55'	67°	5°19'	+55'	67°	5°42'	+56'	67°	6°05'	+56'	67°	6°28'	+56'	67°	14
15	5°02'	+54'	66°	5°26'	+55'	67°	5°50'	+55'	67°	6°14'	+55'	67°	6°37'	+56'	67°	7°01'	+56'	67°	7°24'	+56'	67°	15
16	5°56'	+54'	66°	6°21'	+55'	66°	6°45'	+55'	66°	7°09'	+55'	66°	7°33'	+56'	66°	7°57'	+56'	67°	8°21'	+56'	67°	16
17	6°51'	+54'	66°	7°15'	+54'	66°	7°40'	+55'	66°	8°04'	+55'	66°	8°29'	+56'	66°	8°53'	+56'	66°	9°17'	+56'	66°	17
18	7°45'	+54'	65°	8°10'	+54'	65°	8°35'	+55'	65°	9°00'	+55'	66°	9°24'	+56'	66°	9°49'	+56'	66°	10°14'	+56'	66°	18
19	8°39'	+54'	65°	9°04'	+54'	65°	9°30'	+55'	65°	9°55'	+55'	65°	10°20'	+56'	65°	10°45'	+56'	66°	11°10'	+56'	66°	19
20	9°33'	+54'	64°	9°59'	+54'	64°	10°25'	+55'	65°	10°50'	+55'	65°	11°16'	+56'	65°	11°41'	+56'	65°	12°06'	+56'	65°	20
21	10°27'	+54'	64°	10°53'	+54'	64°	11°19'	+55'	64°	11°45'	+55'	64°	12°11'	+56'	65°	12°37'	+56'	65°	13°02'	+56'	65°	21
22	11°21'	+54'	63°	11°48'	+54'	64°	12°14'	+55'	64°	12°41'	+55'	64°	13°07'	+55'	64°	13°33'	+56'	64°	13°59'	+56'	65°	22
23	12°15'	+54'	63°	12°42'	+54'	63°	13°09'	+55'	63°	13°36'	+55'	64°	14°02'	+55'	64°	14°29'	+56'	64°	14°55'	+56'	64°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

109° 251° LHA — Latitude SAME as DECLINATION — 109° 251° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

70° 290° LHA — Latitude CONTRARY to Declination — 70° 290° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	8°56'	-54'	108°	8°37'	-55'	108°	8°19'	-55'	108°	8°00'	-55'	108°	7°41'	-56'	109°	7°22'	-56'	109°	7°02'	-56'	109°	0
1	8°02'	-54'	108°	7°43'	-55'	109°	7°24'	-55'	109°	7°04'	-55'	109°	6°45'	-56'	109°	6°26'	-56'	109°	6°06'	-56'	109°	1
2	7°08'	-54'	109°	6°48'	-55'	109°	6°29'	-55'	109°	6°09'	-55'	109°	5°49'	-56'	109°	5°29'	-56'	109°	5°10'	-56'	109°	2
3	6°13'	-54'	109°	5°54'	-55'	109°	5°34'	-55'	109°	5°14'	-55'	110°	4°54'	-56'	110°	4°33'	-56'	110°	4°13'	-56'	110°	3
4	5°19'	-54'	110°	4°59'	-55'	110°	4°39'	-55'	110°	4°18'	-55'	110°	3°58'	-56'	110°	3°37'	-56'	110°	3°17'	-56'	110°	4
5	4°25'	-54'	110°	4°04'	-55'	110°	3°44'	-55'	110°	3°23'	-55'	110°	3°02'	-56'	110°	2°41'	-56'	110°	2°20'	-56'	110°	5
6	3°31'	-54'	111°	3°10'	-55'	111°	2°49'	-55'	111°	2°27'	-55'	111°	2°06'	-56'	111°	1°45'	-56'	111°	1°24'	-56'	111°	6
7	2°37'	-54'	111°	2°15'	-55'	111°	1°54'	-55'	111°	1°32'	-55'	111°	1°10'	-56'	111°	0°49'	-56'	111°	0°27'	-56'	111°	7
8	1°42'	-54'	111°	1°20'	-55'	111°	0°58'	-55'	111°	0°37'	-55'	111°	0°15'	-56'	111°	0°07'	+56'	69°	0°29'	+56'	69°	8
9	0°48'	-54'	112°	0°26'	-55'	112°	0°03'	-55'	112°	0°19'	+55'	68°	0°41'	+56'	68°	1°04'	+56'	68°	1°26'	+56'	68°	9
10	0°06'	+54'	68°	0°29'	+55'	68°	0°52'	+55'	68°	1°14'	+55'	68°	1°37'	+56'	68°	2°00'	+56'	68°	2°22'	+56'	68°	10
11	1°00'	+54'	67°	1°24'	+55'	67°	1°47'	+55'	67°	2°10'	+55'	67°	2°33'	+56'	67°	2°56'	+56'	67°	3°19'	+56'	68°	11
12	1°55'	+54'	67°	2°18'	+55'	67°	2°42'	+55'	67°	3°05'	+55'	67°	3°29'	+56'	67°	3°52'	+56'	67°	4°15'	+56'	67°	12
13	2°49'	+54'	66°	3°13'	+55'	66°	3°37'	+55'	67°	4°01'	+55'	67°	4°24'	+56'	67°	4°48'	+56'	67°	5°12'	+56'	67°	13
14	3°43'	+54'	66°	4°08'	+55'	66°	4°32'	+55'	66°	4°56'	+55'	66°	5°20'	+56'	66°	5°44'	+56'	66°	6°08'	+56'	66°	14
15	4°37'	+54'	66°	5°02'	+55'	66°	5°27'	+55'	66°	5°52'	+55'	66°	6°16'	+56'	66°	6°40'	+56'	66°	7°05'	+56'	66°	15
16	5°32'	+54'	65°	5°57'	+55'	65°	6°22'	+55'	65°	6°47'	+55'	65°	7°12'	+56'	66°	7°37'	+56'	66°	8°01'	+56'	66°	16
17	6°26'	+54'	65°	6°51'	+55'	65°	7°17'	+55'	65°	7°42'	+55'	65°	8°07'	+56'	65°	8°33'	+56'	65°	8°58'	+56'	65°	17
18	7°20'	+54'	64°	7°46'	+55'	64°	8°12'	+55'	65°	8°38'	+55'	65°	9°03'	+56'	65°	9°29'	+56'	65°	9°54'	+56'	65°	18
19	8°14'	+54'	64°	8°41'	+55'	64°	9°07'	+55'	64°	9°33'	+55'	64°	9°59'	+56'	64°	10°25'	+56'	65°	10°50'	+56'	65°	19
20	9°08'	+54'	63°	9°35'	+54'	64°	10°02'	+55'	64°	10°28'	+55'	64°	10°55'	+56'	64°	11°21'	+56'	64°	11°47'	+56'	64°	20
21	10°02'	+54'	63°	10°30'	+54'	63°	10°57'	+55'	63°	11°23'	+55'	63°	11°50'	+56'	64°	12°17'	+56'	64°	12°43'	+56'	64°	21
22	10°56'	+54'	63°	11°24'	+54'	63°	11°51'	+55'	63°	12°19'	+55'	63°	12°46'	+56'	63°	13°13'	+56'	64°	13°39'	+56'	64°	22
23	11°51'	+54'	62°	12°19'	+54'	62°	12°46'	+55'	62°	13°14'	+55'	63°	13°41'	+56'	63°	14°09'	+56'	63°	14°36'	+56'	63°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

110° 250° LHA — Latitude SAME as DECLINATION — 110° 250° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

69° 291° LHA — Latitude CONTRARY to Declination — 69° 291° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	9°22'	-54'	109°	9°02'	-55'	109°	8°43'	-55'	109°	8°23'	-55'	109°	8°03'	-56'	109°	7°43'	-56'	110°	7°23'	-56'	110°	0
1	8°28'	-54'	109°	8°08'	-55'	109°	7°48'	-55'	110°	7°27'	-55'	110°	7°07'	-56'	110°	6°47'	-56'	110°	6°26'	-57'	110°	1
2	7°33'	-54'	110°	7°13'	-55'	110°	6°53'	-55'	110°	6°32'	-55'	110°	6°11'	-56'	110°	5°51'	-56'	110°	5°30'	-57'	110°	2
3	6°39'	-54'	110°	6°18'	-55'	110°	5°58'	-55'	110°	5°37'	-55'	110°	5°16'	-56'	111°	4°54'	-56'	111°	4°33'	-57'	111°	3
4	5°45'	-54'	111°	5°24'	-55'	111°	5°02'	-55'	111°	4°41'	-55'	111°	4°20'	-56'	111°	3°58'	-56'	111°	3°37'	-57'	111°	4
5	4°51'	-54'	111°	4°29'	-55'	111°	4°07'	-55'	111°	3°46'	-55'	111°	3°24'	-56'	111°	3°02'	-56'	111°	2°40'	-57'	111°	5
6	3°56'	-54'	111°	3°34'	-55'	112°	3°12'	-55'	112°	2°50'	-55'	112°	2°28'	-56'	112°	2°06'	-56'	112°	1°44'	-57'	112°	6
7	3°02'	-54'	112°	2°40'	-55'	112°	2°17'	-55'	112°	1°55'	-56'	112°	1°32'	-56'	112°	1°10'	-56'	112°	0°47'	-57'	112°	7
8	2°08'	-54'	112°	1°45'	-55'	112°	1°22'	-55'	112°	0°59'	-56'	112°	0°36'	-56'	112°	0°13'	-56'	112°	0°09'	+57'	68°	8
9	1°13'	-54'	113°	0°50'	-55'	113°	0°27'	-55'	113°	0°04'	-56'	113°	0°20'	+56'	67°	0°43'	+56'	67°	1°06'	+57'	67°	9
10	0°19'	-54'	113°	0°05'	+55'	67°	0°28'	+55'	67°	0°52'	+56'	67°	1°15'	+56'	67°	1°39'	+56'	67°	2°03'	+57'	67°	10
11	0°35'	+54'	66°	0°59'	+55'	66°	1°23'	+55'	66°	1°47'	+55'	66°	2°11'	+56'	67°	2°35'	+56'	67°	2°59'	+57'	67°	11
12	1°30'	+54'	66°	1°54'	+55'	66°	2°19'	+55'	66°	2°43'	+55'	66°	3°07'	+56'	66°	3°31'	+56'	66°	3°56'	+57'	66°	12
13	2°24'	+54'	66°	2°49'	+55'	66°	3°14'	+55'	66°	3°38'	+55'	66°	4°03'	+56'	66°	4°28'	+56'	66°	4°52'	+57'	66°	13
14	3°18'	+54'	65°	3°44'	+55'	65°	4°09'	+55'	65°	4°34'	+55'	65°	4°59'	+56'	65°	5°24'	+56'	65°	5°49'	+56'	66°	14
15	4°13'	+54'	65°	4°38'	+55'	65°	5°04'	+55'	65°	5°29'	+55'	65°	5°55'	+56'	65°	6°20'	+56'	65°	6°45'	+56'	65°	15
16	5°07'	+54'	64°	5°33'	+55'	64°	5°59'	+55'	64°	6°25'	+55'	65°	6°50'	+56'	65°	7°16'	+56'	65°	7°42'	+56'	65°	16
17	6°01'	+54'	64°	6°28'	+55'	64°	6°54'	+55'	64°	7°20'	+55'	64°	7°46'	+56'	64°	8°12'	+56'	64°	8°38'	+56'	65°	17
18	6°56'	+54'	63°	7°22'	+55'	64°	7°49'	+55'	64°	8°16'	+55'	64°	8°42'	+56'	64°	9°08'	+56'	64°	9°35'	+56'	64°	18
19	7°50'	+54'	63°	8°17'	+55'	63°	8°44'	+55'	63°	9°11'	+55'	63°	9°38'	+56'	64°	10°04'	+56'	64°	10°31'	+56'	64°	19
20	8°44'	+54'	63°	9°12'	+55'	63°	9°39'	+55'	63°	10°06'	+55'	63°	10°34'	+56'	63°	11°01'	+56'	63°	11°27'	+56'	64°	20
21	9°38'	+54'	62°	10°06'	+55'	62°	10°34'	+55'	62°	11°02'	+55'	63°	11°29'	+56'	63°	11°57'	+56'	63°	12°24'	+56'	63°	21
22	10°32'	+54'	62°	11°01'	+55'	62°	11°29'	+55'	62°	11°57'	+55'	62°	12°25'	+56'	62°	12°53'	+56'	63°	13°20'	+56'	63°	22
23	11°27'	+54'	61°	11°55'	+54'	61°	12°24'	+55'	62°	12°52'	+55'	62°	13°21'	+56'	62°	13°49'	+56'	62°	14°16'	+56'	62°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

111° 249° LHA — Latitude SAME as DECLINATION — 111° 249° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

68° 292° LHA — Latitude CONTRARY to Declination — 68° 292° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	9°48'	-54'	110°	9°27'	-55'	110°	9°07'	-55'	110°	8°46'	-55'	110°	8°25'	-56'	110°	8°04'	-56'	111°	7°43'	-57'	111°	0
1	8°53'	-54'	110°	8°32'	-55'	110°	8°11'	-55'	111°	7°50'	-55'	111°	7°29'	-56'	111°	7°08'	-56'	111°	6°46'	-57'	111°	1
2	7°59'	-54'	111°	7°38'	-55'	111°	7°16'	-55'	111°	6°55'	-56'	111°	6°33'	-56'	111°	6°12'	-56'	111°	5°50'	-57'	111°	2
3	7°05'	-54'	111°	6°43'	-55'	111°	6°21'	-55'	111°	5°59'	-56'	111°	5°37'	-56'	112°	5°15'	-56'	112°	4°53'	-57'	112°	3
4	6°10'	-54'	112°	5°48'	-55'	112°	5°26'	-55'	112°	5°04'	-56'	112°	4°42'	-56'	112°	4°19'	-56'	112°	3°57'	-57'	112°	4
5	5°16'	-54'	112°	4°53'	-55'	112°	4°31'	-55'	112°	4°08'	-56'	112°	3°46'	-56'	112°	3°23'	-56'	112°	3°00'	-57'	112°	5
6	4°22'	-54'	112°	3°59'	-55'	112°	3°36'	-55'	112°	3°13'	-56'	113°	2°50'	-56'	113°	2°27'	-56'	113°	2°04'	-57'	113°	6
7	3°27'	-54'	113°	3°04'	-55'	113°	2°41'	-55'	113°	2°17'	-56'	113°	1°54'	-56'	113°	1°30'	-56'	113°	1°07'	-57'	113°	7
8	2°33'	-54'	113°	2°09'	-55'	113°	1°45'	-55'	113°	1°22'	-56'	113°	0°58'	-56'	113°	0°34'	-56'	113°	0°10'	-57'	113°	8
9	1°38'	-54'	114°	1°14'	-55'	114°	0°50'	-55'	114°	0°26'	-56'	114°	0°02'	-56'	114°	0°22'	+56'	66°	0°46'	+57'	66°	9
10	0°44'	-54'	114°	0°19'	-55'	114°	0°05'	+55'	66°	0°30'	+56'	66°	0°54'	+56'	66°	1°18'	+56'	66°	1°43'	+57'	66°	10
11	0°11'	+54'	66°	0°35'	+55'	66°	1°00'	+55'	66°	1°25'	+56'	66°	1°50'	+56'	66°	2°15'	+56'	66°	2°39'	+57'	66°	11
12	1°05'	+54'	65°	1°30'	+55'	65°	1°55'	+55'	65°	2°21'	+56'	65°	2°46'	+56'	65°	3°11'	+56'	65°	3°36'	+57'	65°	12
13	1°59'	+54'	65°	2°25'	+55'	65°	2°51'	+55'	65°	3°16'	+56'	65°	3°42'	+56'	65°	4°07'	+56'	65°	4°33'	+57'	65°	13
14	2°54'	+54'	64°	3°20'	+55'	64°	3°46'	+55'	64°	4°12'	+56'	64°	4°38'	+56'	64°	5°03'	+56'	65°	5°29'	+57'	65°	14
15	3°48'	+54'	64°	4°15'	+55'	64°	4°41'	+55'	64°	5°07'	+56'	64°	5°34'	+56'	64°	6°00'	+56'	64°	6°26'	+57'	64°	15
16	4°43'	+54'	63°	5°09'	+55'	63°	5°36'	+55'	64°	6°03'	+56'	64°	6°29'	+56'	64°	6°56'	+56'	64°	7°22'	+57'	64°	16
17	5°37'	+54'	63°	6°04'	+55'	63°	6°31'	+55'	63°	6°58'	+55'	63°	7°25'	+56'	63°	7°52'	+56'	64°	8°19'	+57'	64°	17
18	6°31'	+54'	63°	6°59'	+55'	63°	7°26'	+55'	63°	7°54'	+55'	63°	8°21'	+56'	63°	8°48'	+56'	63°	9°15'	+56'	63°	18
19	7°26'	+54'	62°	7°54'	+55'	62°	8°22'	+55'	62°	8°49'	+55'	63°	9°17'	+56'	63°	9°44'	+56'	63°	10°12'	+56'	63°	19
20	8°20'	+54'	62°	8°48'	+55'	62°	9°17'	+55'	62°	9°45'	+55'	62°	10°13'	+56'	62°	10°41'	+56'	62°	11°08'	+56'	63°	20
21	9°14'	+54'	61°	9°43'	+55'	61°	10°12'	+55'	62°	10°40'	+55'	62°	11°08'	+56'	62°	11°37'	+56'	62°	12°05'	+56'	62°	21
22	10°09'	+54'	61°	10°38'	+55'	61°	11°07'	+55'	61°	11°36'	+55'	61°	12°04'	+56'	62°	12°33'	+56'	62°	13°01'	+56'	62°	22
23	11°03'	+54'	60°	11°32'	+55'	61°	12°02'	+55'	61°	12°31'	+55'	61°	13°00'	+56'	61°	13°29'	+56'	61°	13°57'	+56'	62°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

112° 248° LHA — Latitude SAME as DECLINATION — 112° 248° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

67° 293° LHA — Latitude CONTRARY to Declination — 67° 293° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	10°13'	-54'	111°	9°52'	-55'	111°	9°30'	-55'	111°	9°09'	-56'	111°	8°47'	-56'	111°	8°25'	-56'	111°	8°03'	-57'	112°	0
1	9°19'	-54'	111°	8°57'	-55'	111°	8°35'	-55'	111°	8°13'	-56'	112°	7°51'	-56'	112°	7°29'	-56'	112°	7°06'	-57'	112°	1
2	8°24'	-54'	112°	8°02'	-55'	112°	7°40'	-55'	112°	7°18'	-56'	112°	6°55'	-56'	112°	6°32'	-56'	112°	6°10'	-57'	112°	2
3	7°30'	-54'	112°	7°07'	-55'	112°	6°45'	-55'	112°	6°22'	-56'	112°	5°59'	-56'	112°	5°36'	-56'	113°	5°13'	-57'	113°	3
4	6°36'	-54'	112°	6°13'	-55'	113°	5°50'	-55'	113°	5°26'	-56'	113°	5°03'	-56'	113°	4°40'	-56'	113°	4°17'	-57'	113°	4
5	5°41'	-54'	113°	5°18'	-55'	113°	4°54'	-55'	113°	4°31'	-56'	113°	4°07'	-56'	113°	3°44'	-56'	113°	3°20'	-57'	113°	5
6	4°47'	-54'	113°	4°23'	-55'	113°	3°59'	-55'	113°	3°35'	-56'	113°	3°11'	-56'	114°	2°47'	-56'	114°	2°23'	-57'	114°	6
7	3°52'	-54'	114°	3°28'	-55'	114°	3°04'	-55'	114°	2°40'	-56'	114°	2°15'	-56'	114°	1°51'	-56'	114°	1°27'	-57'	114°	7
8	2°58'	-54'	114°	2°33'	-55'	114°	2°09'	-55'	114°	1°44'	-56'	114°	1°19'	-56'	114°	0°55'	-56'	114°	0°30'	-57'	114°	8
9	2°03'	-55'	115°	1°38'	-55'	115°	1°13'	-55'	115°	0°48'	-56'	115°	0°23'	-56'	115°	0°02'	+56'	65°	0°27'	+57'	65°	9
10	1°09'	-55'	115°	0°43'	-55'	115°	0°18'	-55'	115°	0°07'	+56'	65°	0°33'	+56'	65°	0°58'	+56'	65°	1°23'	+57'	65°	10
11	0°14'	-55'	115°	0°12'	+55'	65°	0°37'	+55'	65°	1°03'	+56'	65°	1°29'	+56'	65°	1°54'	+56'	65°	2°20'	+57'	65°	11
12	0°40'	+55'	64°	1°06'	+55'	64°	1°33'	+55'	64°	1°59'	+56'	64°	2°25'	+56'	64°	2°51'	+56'	64°	3°17'	+57'	64°	12
13	1°35'	+55'	64°	2°01'	+55'	64°	2°28'	+55'	64°	2°54'	+56'	64°	3°21'	+56'	64°	3°47'	+56'	64°	4°13'	+57'	64°	13
14	2°29'	+54'	63°	2°56'	+55'	63°	3°23'	+55'	63°	3°50'	+56'	64°	4°17'	+56'	64°	4°43'	+56'	64°	5°10'	+57'	64°	14
15	3°24'	+54'	63°	3°51'	+55'	63°	4°18'	+55'	63°	4°45'	+56'	63°	5°12'	+56'	63°	5°39'	+56'	63°	6°06'	+57'	63°	15
16	4°18'	+54'	63°	4°46'	+55'	63°	5°14'	+55'	63°	5°41'	+56'	63°	6°08'	+56'	63°	6°36'	+56'	63°	7°03'	+57'	63°	16
17	5°13'	+54'	62°	5°41'	+55'	62°	6°09'	+55'	62°	6°37'	+56'	62°	7°04'	+56'	63°	7°32'	+56'	63°	8°00'	+57'	63°	17
18	6°07'	+54'	62°	6°36'	+55'	62°	7°04'	+55'	62°	7°32'	+56'	62°	8°00'	+56'	62°	8°28'	+56'	62°	8°56'	+57'	62°	18
19	7°02'	+54'	61°	7°30'	+55'	61°	7°59'	+55'	62°	8°28'	+56'	62°	8°56'	+56'	62°	9°24'	+56'	62°	9°53'	+57'	62°	19
20	7°56'	+54'	61°	8°25'	+55'	61°	8°54'	+55'	61°	9°23'	+55'	61°	9°52'	+56'	61°	10°21'	+56'	62°	10°49'	+57'	62°	20
21	8°50'	+54'	60°	9°20'	+55'	61°	9°49'	+55'	61°	10°19'	+55'	61°	10°48'	+56'	61°	11°17'	+56'	61°	11°46'	+56'	61°	21
22	9°45'	+54'	60°	10°15'	+55'	60°	10°45'	+55'	60°	11°14'	+55'	60°	11°44'	+56'	61°	12°13'	+56'	61°	12°42'	+56'	61°	22
23	10°39'	+54'	60°	11°09'	+55'	60°	11°40'	+55'	60°	12°10'	+55'	60°	12°39'	+56'	60°	13°09'	+56'	60°	13°39'	+56'	61°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

113° 247° LHA — Latitude SAME as DECLINATION — 113° 247° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

66° 294° LHA — Latitude CONTRARY to Declination — 66° 294° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	10°38'	-54'	112°	10°16'	-55'	112°	9°54'	-55'	112°	9°31'	-56'	112°	9°09'	-56'	112°	8°46'	-56'	112°	8°23'	-57'	113°	0
1	9°44'	-54'	112°	9°21'	-55'	112°	8°59'	-55'	112°	8°36'	-56'	113°	8°13'	-56'	113°	7°50'	-56'	113°	7°26'	-57'	113°	1
2	8°50'	-54'	112°	8°27'	-55'	113°	8°03'	-55'	113°	7°40'	-56'	113°	7°17'	-56'	113°	6°53'	-56'	113°	6°30'	-57'	113°	2
3	7°55'	-54'	113°	7°32'	-55'	113°	7°08'	-55'	113°	6°45'	-56'	113°	6°21'	-56'	113°	5°57'	-56'	113°	5°33'	-57'	114°	3
4	7°01'	-55'	113°	6°37'	-55'	113°	6°13'	-55'	114°	5°49'	-56'	114°	5°25'	-56'	114°	5°01'	-56'	114°	4°36'	-57'	114°	4
5	6°06'	-55'	114°	5°42'	-55'	114°	5°18'	-55'	114°	4°53'	-56'	114°	4°29'	-56'	114°	4°04'	-56'	114°	3°40'	-57'	114°	5
6	5°12'	-55'	114°	4°47'	-55'	114°	4°22'	-55'	114°	3°58'	-56'	114°	3°33'	-56'	114°	3°08'	-56'	115°	2°43'	-57'	115°	6
7	4°17'	-55'	115°	3°52'	-55'	115°	3°27'	-55'	115°	3°02'	-56'	115°	2°37'	-56'	115°	2°11'	-56'	115°	1°46'	-57'	115°	7
8	3°22'	-55'	115°	2°57'	-55'	115°	2°32'	-55'	115°	2°06'	-56'	115°	1°41'	-56'	115°	1°15'	-56'	115°	0°50'	-57'	115°	8
9	2°28'	-55'	115°	2°02'	-55'	115°	1°36'	-55'	115°	1°10'	-56'	116°	0°45'	-56'	116°	0°19'	-56'	116°	0°07'	+57'	64°	9
10	1°33'	-55'	116°	1°07'	-55'	116°	0°41'	-55'	116°	0°15'	-56'	116°	0°11'	+56'	64°	0°38'	+56'	64°	1°04'	+57'	64°	10
11	0°39'	-55'	116°	0°12'	-55'	116°	0°14'	+55'	64°	0°41'	+56'	64°	1°08'	+56'	64°	1°34'	+56'	64°	2°01'	+57'	64°	11
12	0°16'	+55'	63°	0°43'	+55'	63°	1°10'	+55'	63°	1°37'	+56'	63°	2°04'	+56'	63°	2°30'	+56'	63°	2°57'	+57'	63°	12
13	1°11'	+55'	63°	1°38'	+55'	63°	2°05'	+55'	63°	2°32'	+56'	63°	3°00'	+56'	63°	3°27'	+56'	63°	3°54'	+57'	63°	13
14	2°05'	+55'	62°	2°33'	+55'	63°	3°00'	+55'	63°	3°28'	+56'	63°	3°56'	+56'	63°	4°23'	+56'	63°	4°51'	+57'	63°	14
15	3°00'	+55'	62°	3°28'	+55'	62°	3°56'	+55'	62°	4°24'	+56'	62°	4°52'	+56'	62°	5°19'	+56'	62°	5°47'	+57'	62°	15
16	3°54'	+55'	62°	4°23'	+55'	62°	4°51'	+55'	62°	5°19'	+56'	62°	5°48'	+56'	62°	6°16'	+56'	62°	6°44'	+57'	62°	16
17	4°49'	+55'	61°	5°18'	+55'	61°	5°46'	+55'	61°	6°15'	+56'	62°	6°44'	+56'	62°	7°12'	+56'	62°	7°41'	+57'	62°	17
18	5°43'	+55'	61°	6°13'	+55'	61°	6°42'	+55'	61°	7°11'	+56'	61°	7°40'	+56'	61°	8°08'	+56'	61°	8°37'	+57'	61°	18
19	6°38'	+55'	60°	7°07'	+55'	61°	7°37'	+55'	61°	8°06'	+56'	61°	8°36'	+56'	61°	9°05'	+56'	61°	9°34'	+57'	61°	19
20	7°32'	+54'	60°	8°02'	+55'	60°	8°32'	+55'	60°	9°02'	+56'	60°	9°32'	+56'	61°	10°01'	+56'	61°	10°30'	+57'	61°	20
21	8°27'	+54'	60°	8°57'	+55'	60°	9°27'	+55'	60°	9°58'	+56'	60°	10°27'	+56'	60°	10°57'	+56'	60°	11°27'	+57'	60°	21
22	9°21'	+54'	59°	9°52'	+55'	59°	10°23'	+55'	59°	10°53'	+56'	60°	11°23'	+56'	60°	11°53'	+56'	60°	12°23'	+57'	60°	22
23	10°16'	+54'	59°	10°47'	+55'	59°	11°18'	+55'	59°	11°49'	+55'	59°	12°19'	+56'	59°	12°50'	+56'	60°	13°20'	+56'	60°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

114° 246° LHA — Latitude SAME as DECLINATION — 114° 246° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

65° 295° LHA — Latitude CONTRARY to Declination — 65° 295° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	11°04'	-54'	113°	10°41'	-55'	113°	10°17'	-55'	113°	9°54'	-56'	113°	9°30'	-56'	113°	9°07'	-56'	113°	8°43'	-57'	114°	0
1	10°09'	-55'	113°	9°46'	-55'	113°	9°22'	-55'	113°	8°58'	-56'	113°	8°34'	-56'	114°	8°10'	-56'	114°	7°46'	-57'	114°	1
2	9°15'	-55'	113°	8°51'	-55'	114°	8°27'	-55'	114°	8°03'	-56'	114°	7°38'	-56'	114°	7°14'	-56'	114°	6°49'	-57'	114°	2
3	8°20'	-55'	114°	7°56'	-55'	114°	7°31'	-55'	114°	7°07'	-56'	114°	6°42'	-56'	114°	6°17'	-56'	114°	5°53'	-57'	115°	3
4	7°26'	-55'	114°	7°01'	-55'	114°	6°36'	-55'	114°	6°11'	-56'	115°	5°46'	-56'	115°	5°21'	-56'	115°	4°56'	-57'	115°	4
5	6°31'	-55'	115°	6°06'	-55'	115°	5°41'	-55'	115°	5°15'	-56'	115°	4°50'	-56'	115°	4°25'	-56'	115°	3°59'	-57'	115°	5
6	5°36'	-55'	115°	5°11'	-55'	115°	4°45'	-55'	115°	4°20'	-56'	115°	3°54'	-56'	115°	3°28'	-56'	115°	3°02'	-57'	115°	6
7	4°42'	-55'	116°	4°16'	-55'	116°	3°50'	-55'	116°	3°24'	-56'	116°	2°58'	-56'	116°	2°32'	-56'	116°	2°06'	-57'	116°	7
8	3°47'	-55'	116°	3°21'	-55'	116°	2°54'	-55'	116°	2°28'	-56'	116°	2°02'	-56'	116°	1°35'	-56'	116°	1°09'	-57'	116°	8
9	2°52'	-55'	116°	2°26'	-55'	116°	1°59'	-55'	116°	1°32'	-56'	116°	1°06'	-56'	116°	0°39'	-56'	116°	0°12'	-57'	116°	9
10	1°58'	-55'	117°	1°31'	-55'	117°	1°04'	-55'	117°	0°37'	-56'	117°	0°10'	-56'	117°	0°18'	+56'	63°	0°45'	+57'	63°	10
11	1°03'	-55'	117°	0°36'	-55'	117°	0°08'	-55'	117°	0°19'	+56'	63°	0°47'	+56'	63°	1°14'	+56'	63°	1°41'	+57'	63°	11
12	0°08'	-55'	118°	0°19'	+55'	62°	0°47'	+55'	62°	1°15'	+56'	62°	1°43'	+56'	62°	2°10'	+56'	63°	2°38'	+57'	63°	12
13	0°46'	+55'	62°	1°14'	+55'	62°	1°43'	+55'	62°	2°11'	+56'	62°	2°39'	+56'	62°	3°07'	+56'	62°	3°35'	+57'	62°	13
14	1°41'	+55'	62°	2°10'	+55'	62°	2°38'	+55'	62°	3°06'	+56'	62°	3°35'	+56'	62°	4°03'	+56'	62°	4°32'	+57'	62°	14
15	2°36'	+55'	61°	3°05'	+55'	61°	3°33'	+55'	61°	4°02'	+56'	61°	4°31'	+56'	61°	5°00'	+56'	61°	5°28'	+57'	62°	15
16	3°30'	+55'	61°	4°00'	+55'	61°	4°29'	+55'	61°	4°58'	+56'	61°	5°27'	+56'	61°	5°56'	+56'	61°	6°25'	+57'	61°	16
17	4°25'	+55'	60°	4°55'	+55'	60°	5°24'	+55'	61°	5°54'	+56'	61°	6°23'	+56'	61°	6°52'	+56'	61°	7°22'	+57'	61°	17
18	5°20'	+55'	60°	5°50'	+55'	60°	6°20'	+55'	60°	6°49'	+56'	60°	7°19'	+56'	60°	7°49'	+56'	60°	8°18'	+57'	61°	18
19	6°14'	+55'	60°	6°45'	+55'	60°	7°15'	+55'	60°	7°45'	+56'	60°	8°15'	+56'	60°	8°45'	+56'	60°	9°15'	+57'	60°	19
20	7°09'	+55'	59°	7°40'	+55'	59°	8°10'	+55'	59°	8°41'	+56'	59°	9°11'	+56'	60°	9°42'	+56'	60°	10°12'	+57'	60°	20
21	8°04'	+55'	59°	8°35'	+55'	59°	9°06'	+55'	59°	9°36'	+56'	59°	10°07'	+56'	59°	10°38'	+56'	59°	11°08'	+57'	60°	21
22	8°58'	+55'	58°	9°30'	+55'	58°	10°01'	+55'	59°	10°32'	+56'	59°	11°03'	+56'	59°	11°34'	+56'	59°	12°05'	+57'	59°	22
23	9°53'	+55'	58°	10°24'	+55'	58°	10°56'	+55'	58°	11°28'	+56'	58°	11°59'	+56'	59°	12°30'	+56'	59°	13°01'	+57'	59°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

115° 245° LHA — Latitude SAME as DECLINATION — 115° 245° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

64° 296° LHA — Latitude CONTRARY to Declination — 64° 296° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	11°29'	-55'	113°	11°05'	-55'	114°	10°41'	-55'	114°	10°16'	-56'	114°	9°52'	-56'	114°	9°27'	-56'	114°	9°02'	-57'	114°	0
1	10°34'	-55'	114°	10°10'	-55'	114°	9°45'	-55'	114°	9°21'	-56'	114°	8°56'	-56'	115°	8°31'	-56'	115°	8°06'	-57'	115°	1
2	9°40'	-55'	114°	9°15'	-55'	114°	8°50'	-55'	115°	8°25'	-56'	115°	8°00'	-56'	115°	7°34'	-56'	115°	7°09'	-57'	115°	2
3	8°45'	-55'	115°	8°20'	-55'	115°	7°54'	-55'	115°	7°29'	-56'	115°	7°03'	-56'	115°	6°38'	-56'	115°	6°12'	-57'	115°	3
4	7°50'	-55'	115°	7°25'	-55'	115°	6°59'	-55'	115°	6°33'	-56'	116°	6°07'	-56'	116°	5°41'	-56'	116°	5°15'	-57'	116°	4
5	6°56'	-55'	116°	6°30'	-55'	116°	6°04'	-55'	116°	5°37'	-56'	116°	5°11'	-56'	116°	4°45'	-56'	116°	4°19'	-57'	116°	5
6	6°01'	-55'	116°	5°35'	-55'	116°	5°08'	-55'	116°	4°42'	-56'	116°	4°15'	-56'	116°	3°48'	-56'	116°	3°22'	-57'	116°	6
7	5°06'	-55'	116°	4°39'	-55'	116°	4°13'	-55'	117°	3°46'	-56'	117°	3°19'	-56'	117°	2°52'	-56'	117°	2°25'	-57'	117°	7
8	4°11'	-55'	117°	3°44'	-55'	117°	3°17'	-55'	117°	2°50'	-56'	117°	2°23'	-56'	117°	1°55'	-56'	117°	1°28'	-57'	117°	8
9	3°17'	-55'	117°	2°49'	-55'	117°	2°22'	-55'	117°	1°54'	-56'	117°	1°27'	-56'	117°	0°59'	-56'	117°	0°31'	-57'	117°	9
10	2°22'	-55'	118°	1°54'	-55'	118°	1°26'	-56'	118°	0°58'	-56'	118°	0°30'	-56'	118°	0°02'	-56'	118°	0°25'	+57'	62°	10
11	1°27'	-55'	118°	0°59'	-55'	118°	0°31'	-56'	118°	0°02'	-56'	118°	0°26'	+56'	62°	0°54'	+56'	62°	1°22'	+57'	62°	11
12	0°32'	-55'	118°	0°04'	-55'	118°	0°25'	+56'	62°	0°53'	+56'	62°	1°22'	+56'	62°	1°51'	+56'	62°	2°19'	+57'	62°	12
13	0°22'	+55'	61°	0°51'	+55'	61°	1°20'	+55'	61°	1°49'	+56'	61°	2°18'	+56'	61°	2°47'	+56'	61°	3°16'	+57'	61°	13
14	1°17'	+55'	61°	1°47'	+55'	61°	2°16'	+55'	61°	2°45'	+56'	61°	3°14'	+56'	61°	3°43'	+56'	61°	4°13'	+57'	61°	14
15	2°12'	+55'	60°	2°42'	+55'	60°	3°11'	+55'	60°	3°41'	+56'	60°	4°10'	+56'	61°	4°40'	+56'	61°	5°09'	+57'	61°	15
16	3°07'	+55'	60°	3°37'	+55'	60°	4°07'	+55'	60°	4°37'	+56'	60°	5°07'	+56'	60°	5°36'	+56'	60°	6°06'	+57'	60°	16
17	4°01'	+55'	60°	4°32'	+55'	60°	5°02'	+55'	60°	5°33'	+56'	60°	6°03'	+56'	60°	6°33'	+56'	60°	7°03'	+57'	60°	17
18	4°56'	+55'	59°	5°27'	+55'	59°	5°58'	+55'	59°	6°28'	+56'	59°	6°59'	+56'	59°	7°29'	+56'	60°	8°00'	+57'	60°	18
19	5°51'	+55'	59°	6°22'	+55'	59°	6°53'	+55'	59°	7°24'	+56'	59°	7°55'	+56'	59°	8°26'	+56'	59°	8°56'	+57'	59°	19
20	6°46'	+55'	58°	7°17'	+55'	58°	7°49'	+55'	58°	8°20'	+56'	59°	8°51'	+56'	59°	9°22'	+56'	59°	9°53'	+57'	59°	20
21	7°40'	+55'	58°	8°12'	+55'	58°	8°44'	+55'	58°	9°16'	+56'	58°	9°47'	+56'	58°	10°19'	+56'	59°	10°50'	+57'	59°	21
22	8°35'	+55'	57°	9°07'	+55'	58°	9°39'	+55'	58°	10°11'	+56'	58°	10°43'	+56'	58°	11°15'	+56'	58°	11°46'	+57'	58°	22
23	9°30'	+55'	57°	10°02'	+55'	57°	10°35'	+55'	57°	11°07'	+56'	57°	11°39'	+56'	58°	12°11'	+56'	58°	12°43'	+57'	58°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

116° 244° LHA — Latitude SAME as DECLINATION — 116° 244° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

63° 297° LHA — Latitude CONTRARY to Declination — 63° 297° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	11°54'	-55'	114°	11°29'	-55'	115°	11°04'	-55'	115°	10°38'	-56'	115°	10°13'	-56'	115°	9°48'	-56'	115°	9°22'	-57'	115°	0
1	10°59'	-55'	115°	10°34'	-55'	115°	10°08'	-55'	115°	9°43'	-56'	115°	9°17'	-56'	115°	8°51'	-56'	116°	8°25'	-57'	116°	1
2	10°04'	-55'	115°	9°39'	-55'	115°	9°13'	-55'	116°	8°47'	-56'	116°	8°21'	-56'	116°	7°55'	-56'	116°	7°28'	-57'	116°	2
3	9°10'	-55'	116°	8°44'	-55'	116°	8°17'	-55'	116°	7°51'	-56'	116°	7°25'	-56'	116°	6°58'	-57'	116°	6°31'	-57'	116°	3
4	8°15'	-55'	116°	7°48'	-55'	116°	7°22'	-56'	116°	6°55'	-56'	116°	6°28'	-56'	117°	6°02'	-57'	117°	5°35'	-57'	117°	4
5	7°20'	-55'	116°	6°53'	-55'	117°	6°26'	-56'	117°	5°59'	-56'	117°	5°32'	-56'	117°	5°05'	-57'	117°	4°38'	-57'	117°	5
6	6°25'	-55'	117°	5°58'	-55'	117°	5°31'	-56'	117°	5°03'	-56'	117°	4°36'	-56'	117°	4°08'	-57'	117°	3°41'	-57'	117°	6
7	5°30'	-55'	117°	5°03'	-55'	117°	4°35'	-56'	117°	4°08'	-56'	118°	3°40'	-56'	118°	3°12'	-57'	118°	2°44'	-57'	118°	7
8	4°36'	-55'	118°	4°08'	-55'	118°	3°40'	-56'	118°	3°12'	-56'	118°	2°44'	-56'	118°	2°15'	-57'	118°	1°47'	-57'	118°	8
9	3°41'	-55'	118°	3°12'	-55'	118°	2°44'	-56'	118°	2°16'	-56'	118°	1°47'	-56'	118°	1°19'	-57'	118°	0°50'	-57'	118°	9
10	2°46'	-55'	119°	2°17'	-55'	119°	1°49'	-56'	119°	1°20'	-56'	119°	0°51'	-56'	119°	0°22'	-57'	119°	0°06'	+57'	61°	10
11	1°51'	-55'	119°	1°22'	-55'	119°	0°53'	-56'	119°	0°24'	-56'	119°	0°05'	+56'	61°	0°34'	+57'	61°	1°03'	+57'	61°	11
12	0°56'	-55'	119°	0°27'	-55'	119°	0°03'	+56'	61°	0°32'	+56'	61°	1°01'	+56'	61°	1°31'	+57'	61°	2°00'	+57'	61°	12
13	0°01'	-55'	120°	0°28'	+55'	60°	0°58'	+56'	60°	1°28'	+56'	60°	1°58'	+56'	60°	2°27'	+57'	60°	2°57'	+57'	60°	13
14	0°54'	+55'	60°	1°24'	+55'	60°	1°54'	+56'	60°	2°24'	+56'	60°	2°54'	+56'	60°	3°24'	+57'	60°	3°54'	+57'	60°	14
15	1°48'	+55'	59°	2°19'	+55'	59°	2°49'	+56'	60°	3°20'	+56'	60°	3°50'	+56'	60°	4°20'	+57'	60°	4°51'	+57'	60°	15
16	2°43'	+55'	59°	3°14'	+55'	59°	3°45'	+56'	59°	4°16'	+56'	59°	4°46'	+56'	59°	5°17'	+57'	59°	5°48'	+57'	59°	16
17	3°38'	+55'	59°	4°09'	+55'	59°	4°40'	+56'	59°	5°12'	+56'	59°	5°43'	+56'	59°	6°14'	+57'	59°	6°44'	+57'	59°	17
18	4°33'	+55'	58°	5°05'	+55'	58°	5°36'	+56'	58°	6°07'	+56'	58°	6°39'	+56'	59°	7°10'	+56'	59°	7°41'	+57'	59°	18
19	5°28'	+55'	58°	6°00'	+55'	58°	6°32'	+56'	58°	7°03'	+56'	58°	7°35'	+56'	58°	8°07'	+56'	58°	8°38'	+57'	58°	19
20	6°23'	+55'	57°	6°55'	+55'	58°	7°27'	+55'	58°	7°59'	+56'	58°	8°31'	+56'	58°	9°03'	+56'	58°	9°35'	+57'	58°	20
21	7°17'	+55'	57°	7°50'	+55'	57°	8°23'	+55'	57°	8°55'	+56'	57°	9°27'	+56'	57°	9°59'	+56'	58°	10°32'	+57'	58°	21
22	8°12'	+55'	57°	8°45'	+55'	57°	9°18'	+55'	57°	9°51'	+56'	57°	10°23'	+56'	57°	10°56'	+56'	57°	11°28'	+57'	57°	22
23	9°07'	+55'	56°	9°40'	+55'	56°	10°13'	+55'	56°	10°47'	+56'	57°	11°20'	+56'	57°	11°52'	+56'	57°	12°25'	+57'	57°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

117° 243° LHA — Latitude SAME as DECLINATION — 117° 243° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

62° 298° LHA — Latitude CONTRARY to Declination — 62° 298° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	12°18'	-55'	115°	11°53'	-55'	116°	11°27'	-55'	116°	11°00'	-56'	116°	10°34'	-56'	116°	10°08'	-57'	116°	9°41'	-57'	116°	0
1	11°24'	-55'	116°	10°57'	-55'	116°	10°31'	-56'	116°	10°05'	-56'	116°	9°38'	-56'	116°	9°11'	-57'	117°	8°44'	-57'	117°	1
2	10°29'	-55'	116°	10°02'	-55'	116°	9°36'	-56'	117°	9°09'	-56'	117°	8°42'	-56'	117°	8°15'	-57'	117°	7°47'	-57'	117°	2
3	9°34'	-55'	117°	9°07'	-55'	117°	8°40'	-56'	117°	8°13'	-56'	117°	7°46'	-56'	117°	7°18'	-57'	117°	6°51'	-57'	117°	3
4	8°39'	-55'	117°	8°12'	-55'	117°	7°44'	-56'	117°	7°17'	-56'	117°	6°49'	-56'	117°	6°22'	-57'	118°	5°54'	-57'	118°	4
5	7°44'	-55'	117°	7°17'	-55'	118°	6°49'	-56'	118°	6°21'	-56'	118°	5°53'	-56'	118°	5°25'	-57'	118°	4°57'	-57'	118°	5
6	6°49'	-55'	118°	6°21'	-55'	118°	5°53'	-56'	118°	5°25'	-56'	118°	4°57'	-56'	118°	4°28'	-57'	118°	4°00'	-57'	118°	6
7	5°55'	-55'	118°	5°26'	-55'	118°	4°58'	-56'	118°	4°29'	-56'	118°	4°00'	-56'	119°	3°32'	-57'	119°	3°03'	-57'	119°	7
8	5°00'	-55'	119°	4°31'	-55'	119°	4°02'	-56'	119°	3°33'	-56'	119°	3°04'	-56'	119°	2°35'	-57'	119°	2°06'	-57'	119°	8
9	4°05'	-55'	119°	3°36'	-55'	119°	3°06'	-56'	119°	2°37'	-56'	119°	2°08'	-56'	119°	1°39'	-57'	119°	1°09'	-57'	119°	9
10	3°10'	-55'	119°	2°40'	-55'	119°	2°11'	-56'	120°	1°41'	-56'	120°	1°12'	-56'	120°	0°42'	-57'	120°	0°12'	-57'	120°	10
11	2°15'	-55'	120°	1°45'	-55'	120°	1°15'	-56'	120°	0°45'	-56'	120°	0°15'	-56'	120°	0°15'	+57'	60°	0°45'	+57'	60°	11
12	1°20'	-55'	120°	0°50'	-55'	120°	0°19'	-56'	120°	0°11'	+56'	60°	0°41'	+56'	60°	1°11'	+57'	60°	1°42'	+57'	60°	12
13	0°25'	-55'	121°	0°06'	+55'	59°	0°36'	+56'	59°	1°07'	+56'	59°	1°37'	+56'	59°	2°08'	+57'	59°	2°38'	+57'	59°	13
14	0°30'	+55'	59°	1°01'	+55'	59°	1°32'	+56'	59°	2°03'	+56'	59°	2°34'	+56'	59°	3°05'	+57'	59°	3°35'	+57'	59°	14
15	1°25'	+55'	59°	1°56'	+55'	59°	2°28'	+56'	59°	2°59'	+56'	59°	3°30'	+56'	59°	4°01'	+57'	59°	4°32'	+57'	59°	15
16	2°20'	+55'	58°	2°52'	+55'	58°	3°23'	+56'	58°	3°55'	+56'	58°	4°26'	+56'	58°	4°58'	+57'	58°	5°29'	+57'	59°	16
17	3°15'	+55'	58°	3°47'	+55'	58°	4°19'	+56'	58°	4°51'	+56'	58°	5°23'	+56'	58°	5°54'	+57'	58°	6°26'	+57'	58°	17
18	4°10'	+55'	57°	4°42'	+55'	57°	5°15'	+56'	57°	5°47'	+56'	58°	6°19'	+56'	58°	6°51'	+57'	58°	7°23'	+57'	58°	18
19	5°05'	+55'	57°	5°38'	+55'	57°	6°10'	+56'	57°	6°43'	+56'	57°	7°15'	+56'	57°	7°48'	+57'	57°	8°20'	+57'	58°	19
20	6°00'	+55'	57°	6°33'	+55'	57°	7°06'	+56'	57°	7°39'	+56'	57°	8°11'	+56'	57°	8°44'	+57'	57°	9°17'	+57'	57°	20
21	6°55'	+55'	56°	7°28'	+55'	56°	8°01'	+56'	56°	8°35'	+56'	56°	9°08'	+56'	57°	9°41'	+57'	57°	10°13'	+57'	57°	21
22	7°50'	+55'	56°	8°23'	+55'	56°	8°57'	+56'	56°	9°30'	+56'	56°	10°04'	+56'	56°	10°37'	+56'	56°	11°10'	+57'	57°	22
23	8°44'	+55'	55°	9°18'	+55'	55°	9°52'	+56'	56°	10°26'	+56'	56°	11°00'	+56'	56°	11°34'	+56'	56°	12°07'	+57'	56°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

118° 242° LHA — Latitude SAME as DECLINATION — 118° 242° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

61° 299° LHA — Latitude CONTRARY to Declination — 61° 299° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	12°43'	-55'	116°	12°16'	-55'	116°	11°49'	-56'	117°	11°22'	-56'	117°	10°55'	-56'	117°	10°28'	-57'	117°	10°00'	-57'	117°	0
1	11°48'	-55'	117°	11°21'	-55'	117°	10°54'	-56'	117°	10°26'	-56'	117°	9°59'	-56'	117°	9°31'	-57'	118°	9°03'	-57'	118°	1
2	10°53'	-55'	117°	10°26'	-55'	117°	9°58'	-56'	117°	9°30'	-56'	118°	9°03'	-56'	118°	8°35'	-57'	118°	8°07'	-57'	118°	2
3	9°58'	-55'	118°	9°31'	-55'	118°	9°03'	-56'	118°	8°35'	-56'	118°	8°06'	-56'	118°	7°38'	-57'	118°	7°10'	-57'	118°	3
4	9°03'	-55'	118°	8°35'	-55'	118°	8°07'	-56'	118°	7°39'	-56'	118°	7°10'	-56'	118°	6°41'	-57'	119°	6°13'	-57'	119°	4
5	8°08'	-55'	118°	7°40'	-55'	118°	7°11'	-56'	119°	6°43'	-56'	119°	6°14'	-56'	119°	5°45'	-57'	119°	5°16'	-57'	119°	5
6	7°13'	-55'	119°	6°45'	-55'	119°	6°16'	-56'	119°	5°46'	-56'	119°	5°17'	-56'	119°	4°48'	-57'	119°	4°19'	-57'	119°	6
7	6°18'	-55'	119°	5°49'	-55'	119°	5°20'	-56'	119°	4°50'	-56'	119°	4°21'	-56'	119°	3°51'	-57'	120°	3°22'	-57'	120°	7
8	5°23'	-55'	120°	4°54'	-55'	120°	4°24'	-56'	120°	3°54'	-56'	120°	3°25'	-56'	120°	2°55'	-57'	120°	2°25'	-57'	120°	8
9	4°28'	-55'	120°	3°58'	-55'	120°	3°28'	-56'	120°	2°58'	-56'	120°	2°28'	-56'	120°	1°58'	-57'	120°	1°28'	-57'	120°	9
10	3°33'	-55'	120°	3°03'	-55'	120°	2°33'	-56'	120°	2°02'	-56'	120°	1°32'	-56'	120°	1°01'	-57'	121°	0°31'	-57'	121°	10
11	2°38'	-55'	121°	2°08'	-55'	121°	1°37'	-56'	121°	1°06'	-56'	121°	0°35'	-56'	121°	0°05'	-57'	121°	0°26'	+57'	59°	11
12	1°43'	-55'	121°	1°12'	-55'	121°	0°41'	-56'	121°	0°10'	-56'	121°	0°21'	+56'	59°	0°52'	+57'	59°	1°23'	+57'	59°	12
13	0°48'	-55'	122°	0°17'	-55'	122°	0°15'	+56'	58°	0°46'	+56'	58°	1°17'	+56'	58°	1°49'	+57'	58°	2°20'	+57'	59°	13
14	0°07'	+55'	58°	0°39'	+55'	58°	1°10'	+56'	58°	1°42'	+56'	58°	2°14'	+56'	58°	2°45'	+57'	58°	3°17'	+57'	58°	14
15	1°02'	+55'	58°	1°34'	+55'	58°	2°06'	+56'	58°	2°38'	+56'	58°	3°10'	+56'	58°	3°42'	+57'	58°	4°14'	+57'	58°	15
16	1°57'	+55'	57°	2°29'	+55'	57°	3°02'	+56'	57°	3°34'	+56'	57°	4°06'	+56'	57°	4°39'	+57'	58°	5°11'	+57'	58°	16
17	2°52'	+55'	57°	3°25'	+55'	57°	3°58'	+56'	57°	4°30'	+56'	57°	5°03'	+56'	57°	5°35'	+57'	57°	6°08'	+57'	57°	17
18	3°47'	+55'	56°	4°20'	+55'	57°	4°53'	+56'	57°	5°26'	+56'	57°	5°59'	+56'	57°	6°32'	+57'	57°	7°05'	+57'	57°	18
19	4°42'	+55'	56°	5°16'	+55'	56°	5°49'	+56'	56°	6°22'	+56'	56°	6°56'	+56'	56°	7°29'	+57'	57°	8°02'	+57'	57°	19
20	5°37'	+55'	56°	6°11'	+55'	56°	6°45'	+56'	56°	7°18'	+56'	56°	7°52'	+56'	56°	8°25'	+57'	56°	8°59'	+57'	56°	20
21	6°32'	+55'	55°	7°06'	+55'	55°	7°40'	+56'	55°	8°14'	+56'	56°	8°48'	+56'	56°	9°22'	+57'	56°	9°56'	+57'	56°	21
22	7°27'	+55'	55°	8°02'	+55'	55°	8°36'	+56'	55°	9°10'	+56'	55°	9°44'	+56'	55°	10°18'	+57'	56°	10°52'	+57'	56°	22
23	8°22'	+55'	54°	8°57'	+55'	55°	9°32'	+56'	55°	10°06'	+56'	55°	10°41'	+56'	55°	11°15'	+57'	55°	11°49'	+57'	55°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

119° 241° LHA — Latitude SAME as DECLINATION — 119° 241° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

60° 300° LHA — Latitude CONTRARY to Declination — 60° 300° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	13°07'	-55'	117°	12°40'	-55'	117°	12°12'	-56'	118°	11°44'	-56'	118°	11°16'	-56'	118°	10°48'	-57'	118°	10°19'	-57'	118°	0
1	12°12'	-55'	118°	11°44'	-55'	118°	11°16'	-56'	118°	10°48'	-56'	118°	10°20'	-56'	118°	9°51'	-57'	118°	9°22'	-57'	119°	1
2	11°17'	-55'	118°	10°49'	-55'	118°	10°21'	-56'	118°	9°52'	-56'	119°	9°23'	-56'	119°	8°54'	-57'	119°	8°25'	-57'	119°	2
3	10°22'	-55'	118°	9°54'	-55'	119°	9°25'	-56'	119°	8°56'	-56'	119°	8°27'	-56'	119°	7°58'	-57'	119°	7°28'	-57'	119°	3
4	9°27'	-55'	119°	8°58'	-55'	119°	8°29'	-56'	119°	8°00'	-56'	119°	7°31'	-56'	119°	7°01'	-57'	119°	6°31'	-57'	120°	4
5	8°32'	-55'	119°	8°03'	-55'	119°	7°33'	-56'	120°	7°04'	-56'	120°	6°34'	-56'	120°	6°04'	-57'	120°	5°34'	-57'	120°	5
6	7°37'	-55'	120°	7°08'	-55'	120°	6°38'	-56'	120°	6°08'	-56'	120°	5°38'	-56'	120°	5°08'	-57'	120°	4°37'	-57'	120°	6
7	6°42'	-55'	120°	6°12'	-55'	120°	5°42'	-56'	120°	5°12'	-56'	120°	4°41'	-56'	120°	4°11'	-57'	120°	3°40'	-57'	121°	7
8	5°47'	-55'	120°	5°17'	-55'	121°	4°46'	-56'	121°	4°15'	-56'	121°	3°45'	-56'	121°	3°14'	-57'	121°	2°43'	-57'	121°	8
9	4°52'	-55'	121°	4°21'	-55'	121°	3°50'	-56'	121°	3°19'	-56'	121°	2°48'	-56'	121°	2°17'	-57'	121°	1°46'	-57'	121°	9
10	3°57'	-55'	121°	3°26'	-55'	121°	2°54'	-56'	121°	2°23'	-56'	121°	1°52'	-56'	121°	1°21'	-57'	121°	0°49'	-57'	121°	10
11	3°02'	-55'	122°	2°30'	-56'	122°	1°59'	-56'	122°	1°27'	-56'	122°	0°55'	-56'	122°	0°24'	-57'	122°	0°08'	+57'	58°	11
12	2°06'	-55'	122°	1°35'	-56'	122°	1°03'	-56'	122°	0°31'	-56'	122°	0°01'	+56'	58°	0°33'	+57'	58°	1°05'	+57'	58°	12
13	1°11'	-55'	122°	0°39'	-56'	122°	0°07'	-56'	122°	0°25'	+56'	58°	0°57'	+56'	58°	1°30'	+57'	58°	2°02'	+57'	58°	13
14	0°16'	-55'	123°	0°16'	+56'	57°	0°49'	+56'	57°	1°21'	+56'	57°	1°54'	+56'	57°	2°26'	+57'	57°	2°59'	+57'	57°	14
15	0°39'	+55'	57°	1°12'	+56'	57°	1°45'	+56'	57°	2°18'	+56'	57°	2°50'	+56'	57°	3°23'	+57'	57°	3°56'	+57'	57°	15
16	1°34'	+55'	56°	2°07'	+55'	56°	2°41'	+56'	56°	3°14'	+56'	56°	3°47'	+56'	57°	4°20'	+57'	57°	4°53'	+57'	57°	16
17	2°29'	+55'	56°	3°03'	+55'	56°	3°36'	+56'	56°	4°10'	+56'	56°	4°43'	+56'	56°	5°17'	+57'	56°	5°50'	+57'	56°	17
18	3°24'	+55'	56°	3°58'	+55'	56°	4°32'	+56'	56°	5°06'	+56'	56°	5°40'	+56'	56°	6°13'	+57'	56°	6°47'	+57'	56°	18
19	4°20'	+55'	55°	4°54'	+55'	55°	5°28'	+56'	55°	6°02'	+56'	55°	6°36'	+56'	56°	7°10'	+57'	56°	7°44'	+57'	56°	19
20	5°15'	+55'	55°	5°49'	+55'	55°	6°24'	+56'	55°	6°58'	+56'	55°	7°33'	+56'	55°	8°07'	+57'	55°	8°41'	+57'	55°	20
21	6°10'	+55'	54°	6°45'	+55'	55°	7°20'	+56'	55°	7°54'	+56'	55°	8°29'	+56'	55°	9°03'	+57'	55°	9°38'	+57'	55°	21
22	7°05'	+55'	54°	7°40'	+55'	54°	8°15'	+56'	54°	8°50'	+56'	54°	9°25'	+56'	54°	10°00'	+57'	55°	10°35'	+57'	55°	22
23	8°00'	+55'	54°	8°36'	+55'	54°	9°11'	+56'	54°	9°46'	+56'	54°	10°22'	+56'	54°	10°57'	+57'	54°	11°32'	+57'	54°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

120° 240° LHA — Latitude SAME as DECLINATION — 120° 240° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

59° 301° LHA — Latitude CONTRARY to Declination — 59° 301° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	13°31'	-55'	118°	13°03'	-55'	118°	12°34'	-56'	119°	12°06'	-56'	119°	11°37'	-56'	119°	11°07'	-57'	119°	10°38'	-57'	119°	0
1	12°36'	-55'	119°	12°08'	-55'	119°	11°39'	-56'	119°	11°09'	-56'	119°	10°40'	-56'	119°	10°11'	-57'	119°	9°41'	-57'	120°	1
2	11°41'	-55'	119°	11°12'	-55'	119°	10°43'	-56'	119°	10°13'	-56'	119°	9°44'	-56'	120°	9°14'	-57'	120°	8°44'	-57'	120°	2
3	10°46'	-55'	119°	10°17'	-55'	120°	9°47'	-56'	120°	9°17'	-56'	120°	8°47'	-56'	120°	8°17'	-57'	120°	7°47'	-57'	120°	3
4	9°51'	-55'	120°	9°21'	-55'	120°	8°51'	-56'	120°	8°21'	-56'	120°	7°51'	-56'	120°	7°21'	-57'	120°	6°50'	-57'	121°	4
5	8°56'	-55'	120°	8°26'	-56'	120°	7°55'	-56'	120°	7°25'	-56'	121°	6°54'	-56'	121°	6°24'	-57'	121°	5°53'	-57'	121°	5
6	8°01'	-55'	121°	7°30'	-56'	121°	7°00'	-56'	121°	6°29'	-56'	121°	5°58'	-57'	121°	5°27'	-57'	121°	4°56'	-57'	121°	6
7	7°06'	-55'	121°	6°35'	-56'	121°	6°04'	-56'	121°	5°33'	-56'	121°	5°01'	-57'	121°	4°30'	-57'	121°	3°59'	-57'	121°	7
8	6°10'	-55'	121°	5°39'	-56'	121°	5°08'	-56'	122°	4°36'	-56'	122°	4°05'	-57'	122°	3°33'	-57'	122°	3°02'	-57'	122°	8
9	5°15'	-55'	122°	4°44'	-56'	122°	4°12'	-56'	122°	3°40'	-56'	122°	3°08'	-57'	122°	2°37'	-57'	122°	2°05'	-57'	122°	9
10	4°20'	-55'	122°	3°48'	-56'	122°	3°16'	-56'	122°	2°44'	-56'	122°	2°12'	-57'	122°	1°40'	-57'	122°	1°08'	-57'	122°	10
11	3°25'	-55'	123°	2°52'	-56'	123°	2°20'	-56'	123°	1°48'	-56'	123°	1°15'	-57'	123°	0°43'	-57'	123°	0°10'	-57'	123°	11
12	2°29'	-55'	123°	1°57'	-56'	123°	1°24'	-56'	123°	0°51'	-56'	123°	0°19'	-57'	123°	0°14'	+57'	57°	0°47'	+57'	57°	12
13	1°34'	-55'	123°	1°01'	-56'	123°	0°28'	-56'	123°	0°05'	+56'	57°	0°38'	+57'	57°	1°11'	+57'	57°	1°44'	+57'	57°	13
14	0°39'	-55'	124°	0°06'	-56'	124°	0°28'	+56'	56°	1°01'	+56'	56°	1°34'	+57'	56°	2°08'	+57'	56°	2°41'	+57'	56°	14
15	0°16'	+55'	56°	0°50'	+56'	56°	1°24'	+56'	56°	1°57'	+56'	56°	2°31'	+57'	56°	3°04'	+57'	56°	3°38'	+57'	56°	15
16	1°12'	+55'	56°	1°46'	+56'	56°	2°20'	+56'	56°	2°53'	+56'	56°	3°27'	+57'	56°	4°01'	+57'	56°	4°35'	+57'	56°	16
17	2°07'	+55'	55°	2°41'	+56'	55°	3°15'	+56'	55°	3°50'	+56'	55°	4°24'	+57'	55°	4°58'	+57'	55°	5°32'	+57'	55°	17
18	3°02'	+55'	55°	3°37'	+56'	55°	4°11'	+56'	55°	4°46'	+56'	55°	5°20'	+56'	55°	5°55'	+57'	55°	6°29'	+57'	55°	18
19	3°57'	+55'	54°	4°32'	+56'	54°	5°07'	+56'	54°	5°42'	+56'	55°	6°17'	+56'	55°	6°52'	+57'	55°	7°26'	+57'	55°	19
20	4°53'	+55'	54°	5°28'	+56'	54°	6°03'	+56'	54°	6°38'	+56'	54°	7°13'	+56'	54°	7°48'	+57'	54°	8°23'	+57'	55°	20
21	5°48'	+55'	54°	6°23'	+56'	54°	6°59'	+56'	54°	7°34'	+56'	54°	8°10'	+56'	54°	8°45'	+57'	54°	9°20'	+57'	54°	21
22	6°43'	+55'	53°	7°19'	+56'	53°	7°55'	+56'	53°	8°31'	+56'	53°	9°06'	+56'	54°	9°42'	+57'	54°	10°17'	+57'	54°	22
23	7°38'	+55'	53°	8°15'	+55'	53°	8°51'	+56'	53°	9°27'	+56'	53°	10°03'	+56'	53°	10°39'	+57'	53°	11°14'	+57'	54°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

121° 239° LHA — Latitude SAME as DECLINATION — 121° 239° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

58° 302° LHA — Latitude CONTRARY to Declination — 58° 302° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	13°55'	-55'	119°	13°26'	-55'	119°	12°56'	-56'	120°	12°27'	-56'	120°	11°57'	-56'	120°	11°27'	-57'	120°	10°57'	-57'	120°	0
1	13°00'	-55'	120°	12°30'	-55'	120°	12°01'	-56'	120°	11°31'	-56'	120°	11°01'	-56'	120°	10°30'	-57'	120°	10°00'	-57'	121°	1
2	12°05'	-55'	120°	11°35'	-56'	120°	11°05'	-56'	120°	10°35'	-56'	120°	10°04'	-57'	121°	9°33'	-57'	121°	9°03'	-57'	121°	2
3	11°10'	-55'	120°	10°39'	-56'	120°	10°09'	-56'	121°	9°38'	-56'	121°	9°08'	-57'	121°	8°37'	-57'	121°	8°06'	-57'	121°	3
4	10°15'	-55'	121°	9°44'	-56'	121°	9°13'	-56'	121°	8°42'	-56'	121°	8°11'	-57'	121°	7°40'	-57'	121°	7°08'	-57'	122°	4
5	9°19'	-55'	121°	8°48'	-56'	121°	8°17'	-56'	121°	7°46'	-56'	122°	7°14'	-57'	122°	6°43'	-57'	122°	6°11'	-57'	122°	5
6	8°24'	-55'	122°	7°53'	-56'	122°	7°21'	-56'	122°	6°50'	-56'	122°	6°18'	-57'	122°	5°46'	-57'	122°	5°14'	-57'	122°	6
7	7°29'	-55'	122°	6°57'	-56'	122°	6°25'	-56'	122°	5°53'	-56'	122°	5°21'	-57'	122°	4°49'	-57'	122°	4°17'	-57'	122°	7
8	6°34'	-55'	122°	6°01'	-56'	122°	5°29'	-56'	122°	4°57'	-56'	123°	4°25'	-57'	123°	3°52'	-57'	123°	3°20'	-57'	123°	8
9	5°38'	-55'	123°	5°06'	-56'	123°	4°33'	-56'	123°	4°01'	-56'	123°	3°28'	-57'	123°	2°55'	-57'	123°	2°23'	-57'	123°	9
10	4°43'	-55'	123°	4°10'	-56'	123°	3°37'	-56'	123°	3°04'	-56'	123°	2°32'	-57'	123°	1°59'	-57'	123°	1°26'	-57'	123°	10
11	3°48'	-55'	123°	3°14'	-56'	124°	2°41'	-56'	124°	2°08'	-56'	124°	1°35'	-57'	124°	1°02'	-57'	124°	0°28'	-57'	124°	11
12	2°52'	-55'	124°	2°19'	-56'	124°	1°45'	-56'	124°	1°12'	-56'	124°	0°38'	-57'	124°	0°05'	-57'	124°	0°29'	+57'	56°	12
13	1°57'	-55'	124°	1°23'	-56'	124°	0°49'	-56'	124°	0°16'	-56'	124°	0°18'	+57'	56°	0°52'	+57'	56°	1°26'	+57'	56°	13
14	1°01'	-55'	125°	0°27'	-56'	125°	0°07'	+56'	55°	0°41'	+56'	55°	1°15'	+57'	55°	1°49'	+57'	55°	2°23'	+57'	55°	14
15	0°06'	-55'	125°	0°28'	+56'	55°	1°03'	+56'	55°	1°37'	+56'	55°	2°12'	+57'	55°	2°46'	+57'	55°	3°20'	+57'	55°	15
16	0°49'	+55'	55°	1°24'	+56'	55°	1°59'	+56'	55°	2°33'	+56'	55°	3°08'	+57'	55°	3°43'	+57'	55°	4°17'	+57'	55°	16
17	1°45'	+55'	54°	2°20'	+56'	54°	2°55'	+56'	54°	3°30'	+56'	54°	4°05'	+57'	54°	4°40'	+57'	54°	5°14'	+57'	55°	17
18	2°40'	+55'	54°	3°15'	+56'	54°	3°51'	+56'	54°	4°26'	+56'	54°	5°01'	+57'	54°	5°36'	+57'	54°	6°12'	+57'	54°	18
19	3°35'	+55'	53°	4°11'	+56'	54°	4°47'	+56'	54°	5°22'	+56'	54°	5°58'	+57'	54°	6°33'	+57'	54°	7°09'	+57'	54°	19
20	4°31'	+55'	53°	5°07'	+56'	53°	5°43'	+56'	53°	6°19'	+56'	53°	6°54'	+57'	53°	7°30'	+57'	53°	8°06'	+57'	54°	20
21	5°26'	+55'	53°	6°02'	+56'	53°	6°39'	+56'	53°	7°15'	+56'	53°	7°51'	+57'	53°	8°27'	+57'	53°	9°03'	+57'	53°	21
22	6°21'	+55'	52°	6°58'	+56'	52°	7°35'	+56'	52°	8°11'	+56'	53°	8°48'	+57'	53°	9°24'	+57'	53°	10°00'	+57'	53°	22
23	7°17'	+55'	52°	7°54'	+56'	52°	8°31'	+56'	52°	9°07'	+56'	52°	9°44'	+56'	52°	10°21'	+57'	53°	10°57'	+57'	53°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

122° 238° LHA — Latitude SAME as DECLINATION — 122° 238° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

57° 303° LHA — Latitude CONTRARY to Declination — 57° 303° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	14°19'	-55'	120°	13°49'	-56'	120°	13°18'	-56'	120°	12°48'	-56'	121°	12°17'	-57'	121°	11°46'	-57'	121°	11°15'	-57'	121°	0
1	1°14'	-55'	120°	1°12'	-56'	121°	1°11'	-56'	121°	1°09'	-56'	121°	1°07'	-57'	121°	1°05'	-57'	121°	1°04'	-57'	122°	1
2	12°29'	-55'	121°	11°58'	-56'	121°	11°27'	-56'	121°	10°55'	-56'	121°	10°24'	-57'	122°	9°53'	-57'	122°	9°21'	-57'	122°	2
3	11°33'	-55'	121°	11°02'	-56'	121°	10°31'	-56'	122°	9°59'	-56'	122°	9°28'	-57'	122°	8°56'	-57'	122°	8°24'	-57'	122°	3
4	10°38'	-55'	122°	10°06'	-56'	122°	9°35'	-56'	122°	9°03'	-56'	122°	8°31'	-57'	122°	7°59'	-57'	122°	7°27'	-57'	122°	4
5	9°43'	-55'	122°	9°11'	-56'	122°	8°39'	-56'	122°	8°07'	-56'	122°	7°34'	-57'	123°	7°02'	-57'	123°	6°30'	-57'	123°	5
6	8°47'	-55'	122°	8°15'	-56'	123°	7°43'	-56'	123°	7°10'	-56'	123°	6°38'	-57'	123°	6°05'	-57'	123°	5°32'	-57'	123°	6
7	7°52'	-55'	123°	7°19'	-56'	123°	6°47'	-56'	123°	6°14'	-56'	123°	5°41'	-57'	123°	5°08'	-57'	123°	4°35'	-57'	123°	7
8	6°56'	-55'	123°	6°24'	-56'	123°	5°51'	-56'	123°	5°18'	-56'	123°	4°44'	-57'	124°	4°11'	-57'	124°	3°38'	-57'	124°	8
9	6°01'	-55'	124°	5°28'	-56'	124°	4°55'	-56'	124°	4°21'	-56'	124°	3°48'	-57'	124°	3°14'	-57'	124°	2°41'	-57'	124°	9
10	5°06'	-55'	124°	4°32'	-56'	124°	3°58'	-56'	124°	3°25'	-56'	124°	2°51'	-57'	124°	2°17'	-57'	124°	1°43'	-57'	124°	10
11	4°10'	-55'	124°	3°36'	-56'	124°	3°02'	-56'	124°	2°28'	-56'	125°	1°54'	-57'	125°	1°20'	-57'	125°	0°46'	-57'	125°	11
12	3°15'	-55'	125°	2°40'	-56'	125°	2°06'	-56'	125°	1°32'	-56'	125°	0°58'	-57'	125°	0°23'	-57'	125°	0°11'	+57'	55°	12
13	2°19'	-55'	125°	1°45'	-56'	125°	1°10'	-56'	125°	0°36'	-56'	125°	0°01'	-57'	125°	0°34'	+57'	55°	1°08'	+57'	55°	13
14	1°24'	-55'	126°	0°49'	-56'	126°	0°14'	-56'	126°	0°21'	+56'	54°	0°56'	+57'	54°	1°31'	+57'	54°	2°05'	+57'	55°	14
15	0°28'	-55'	126°	0°07'	+56'	54°	0°42'	+56'	54°	1°17'	+56'	54°	1°52'	+57'	54°	2°28'	+57'	54°	3°03'	+57'	54°	15
16	0°27'	+55'	54°	1°03'	+56'	54°	1°38'	+56'	54°	2°14'	+56'	54°	2°49'	+57'	54°	3°24'	+57'	54°	4°00'	+57'	54°	16
17	1°23'	+55'	53°	1°58'	+56'	53°	2°34'	+56'	53°	3°10'	+56'	53°	3°46'	+57'	53°	4°21'	+57'	54°	4°57'	+57'	54°	17
18	2°18'	+55'	53°	2°54'	+56'	53°	3°30'	+56'	53°	4°06'	+56'	53°	4°42'	+57'	53°	5°18'	+57'	53°	5°54'	+57'	53°	18
19	3°14'	+55'	53°	3°50'	+56'	53°	4°26'	+56'	53°	5°03'	+56'	53°	5°39'	+57'	53°	6°15'	+57'	53°	6°51'	+57'	53°	19
20	4°09'	+55'	52°	4°46'	+56'	52°	5°23'	+56'	52°	5°59'	+56'	52°	6°36'	+57'	52°	7°12'	+57'	53°	7°49'	+57'	53°	20
21	5°05'	+55'	52°	5°42'	+56'	52°	6°19'	+56'	52°	6°56'	+56'	52°	7°32'	+57'	52°	8°09'	+57'	52°	8°46'	+57'	52°	21
22	6°00'	+55'	51°	6°37'	+56'	52°	7°15'	+56'	52°	7°52'	+56'	52°	8°29'	+57'	52°	9°06'	+57'	52°	9°43'	+57'	52°	22
23	6°55'	+55'	51°	7°33'	+56'	51°	8°11'	+56'	51°	8°48'	+56'	51°	9°26'	+57'	51°	10°03'	+57'	52°	10°40'	+57'	52°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

123° 237° LHA — Latitude SAME as DECLINATION — 123° 237° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

56° 304° LHA — Latitude CONTRARY to Declination — 56° 304° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	14°42'	-55'	121°	14°11'	-56'	121°	13°40'	-56'	121°	13°09'	-56'	122°	12°37'	-57'	122°	12°06'	-57'	122°	11°34'	-57'	122°	0
1	13°47'	-55'	121°	13°16'	-56'	122°	12°44'	-56'	122°	12°12'	-56'	122°	11°41'	-57'	122°	11°09'	-57'	122°	10°36'	-57'	123°	1
2	12°52'	-55'	122°	12°20'	-56'	122°	11°48'	-56'	122°	11°16'	-56'	122°	10°44'	-57'	123°	10°12'	-57'	123°	9°39'	-57'	123°	2
3	11°56'	-55'	122°	11°24'	-56'	122°	10°52'	-56'	123°	10°20'	-56'	123°	9°47'	-57'	123°	9°15'	-57'	123°	8°42'	-57'	123°	3
4	11°01'	-55'	123°	10°29'	-56'	123°	9°56'	-56'	123°	9°23'	-56'	123°	8°51'	-57'	123°	8°18'	-57'	123°	7°45'	-57'	123°	4
5	10°06'	-55'	123°	9°33'	-56'	123°	9°00'	-56'	123°	8°27'	-56'	123°	7°54'	-57'	124°	7°21'	-57'	124°	6°48'	-57'	124°	5
6	9°10'	-55'	123°	8°37'	-56'	123°	8°04'	-56'	124°	7°31'	-56'	124°	6°57'	-57'	124°	6°24'	-57'	124°	5°50'	-57'	124°	6
7	8°15'	-56'	124°	7°41'	-56'	124°	7°08'	-56'	124°	6°34'	-56'	124°	6°01'	-57'	124°	5°27'	-57'	124°	4°53'	-57'	124°	7
8	7°19'	-56'	124°	6°45'	-56'	124°	6°12'	-56'	124°	5°38'	-56'	124°	5°04'	-57'	124°	4°30'	-57'	125°	3°56'	-57'	125°	8
9	6°24'	-56'	125°	5°50'	-56'	125°	5°15'	-56'	125°	4°41'	-56'	125°	4°07'	-57'	125°	3°33'	-57'	125°	2°58'	-57'	125°	9
10	5°28'	-56'	125°	4°54'	-56'	125°	4°19'	-56'	125°	3°45'	-56'	125°	3°10'	-57'	125°	2°36'	-57'	125°	2°01'	-57'	125°	10
11	4°33'	-56'	125°	3°58'	-56'	125°	3°23'	-56'	125°	2°48'	-56'	125°	2°14'	-57'	125°	1°39'	-57'	125°	1°04'	-57'	126°	11
12	3°37'	-56'	126°	3°02'	-56'	126°	2°27'	-56'	126°	1°52'	-56'	126°	1°17'	-57'	126°	0°42'	-57'	126°	0°07'	-57'	126°	12
13	2°41'	-56'	126°	2°06'	-56'	126°	1°31'	-56'	126°	0°55'	-56'	126°	0°20'	-57'	126°	0°15'	+57'	54°	0°51'	+57'	54°	13
14	1°46'	-56'	126°	1°10'	-56'	126°	0°35'	-56'	126°	0°01'	+56'	54°	0°37'	+57'	54°	1°12'	+57'	54°	1°48'	+57'	54°	14
15	0°50'	-56'	127°	0°14'	-56'	127°	0°22'	+56'	53°	0°58'	+56'	53°	1°34'	+57'	53°	2°09'	+57'	53°	2°45'	+57'	53°	15
16	0°05'	+56'	53°	0°42'	+56'	53°	1°18'	+56'	53°	1°54'	+56'	53°	2°30'	+57'	53°	3°06'	+57'	53°	3°43'	+57'	53°	16
17	1°01'	+56'	52°	1°38'	+56'	52°	2°14'	+56'	53°	2°51'	+56'	53°	3°27'	+57'	53°	4°03'	+57'	53°	4°40'	+57'	53°	17
18	1°57'	+56'	52°	2°33'	+56'	52°	3°10'	+56'	52°	3°47'	+56'	52°	4°24'	+57'	52°	5°00'	+57'	52°	5°37'	+57'	52°	18
19	2°52'	+56'	52°	3°29'	+56'	52°	4°06'	+56'	52°	4°43'	+56'	52°	5°21'	+57'	52°	5°57'	+57'	52°	6°34'	+57'	52°	19
20	3°48'	+56'	51°	4°25'	+56'	51°	5°03'	+56'	51°	5°40'	+56'	52°	6°17'	+57'	52°	6°54'	+57'	52°	7°32'	+57'	52°	20
21	4°43'	+56'	51°	5°21'	+56'	51°	5°59'	+56'	51°	6°36'	+56'	51°	7°14'	+57'	51°	7°51'	+57'	51°	8°29'	+57'	51°	21
22	5°39'	+56'	51°	6°17'	+56'	51°	6°55'	+56'	51°	7°33'	+56'	51°	8°11'	+57'	51°	8°48'	+57'	51°	9°26'	+57'	51°	22
23	6°34'	+56'	50°	7°13'	+56'	50°	7°51'	+56'	50°	8°29'	+56'	50°	9°07'	+57'	51°	9°45'	+57'	51°	10°23'	+57'	51°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

124° 236° LHA — Latitude SAME as DECLINATION — 124° 236° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

55° 305° LHA — Latitude CONTRARY to Declination — 55° 305° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	15°06'	-55'	122°	14°34'	-56'	122°	14°02'	-56'	122°	13°29'	-56'	123°	12°57'	-57'	123°	12°24'	-57'	123°	11°52'	-57'	123°	0
1	14°10'	-55'	122°	13°38'	-56'	123°	13°06'	-56'	123°	12°33'	-56'	123°	12°00'	-57'	123°	11°27'	-57'	123°	10°54'	-57'	123°	1
2	13°15'	-55'	123°	12°42'	-56'	123°	12°10'	-56'	123°	11°37'	-56'	123°	11°04'	-57'	123°	10°30'	-57'	124°	9°57'	-57'	124°	2
3	12°19'	-55'	123°	11°46'	-56'	123°	11°13'	-56'	123°	10°40'	-56'	124°	10°07'	-57'	124°	9°33'	-57'	124°	9°00'	-57'	124°	3
4	11°24'	-56'	124°	10°51'	-56'	124°	10°17'	-56'	124°	9°44'	-56'	124°	9°10'	-57'	124°	8°36'	-57'	124°	8°03'	-57'	124°	4
5	10°28'	-56'	124°	9°55'	-56'	124°	9°21'	-56'	124°	8°47'	-56'	124°	8°13'	-57'	124°	7°39'	-57'	125°	7°05'	-57'	125°	5
6	9°33'	-56'	124°	8°59'	-56'	124°	8°25'	-56'	125°	7°51'	-57'	125°	7°17'	-57'	125°	6°42'	-57'	125°	6°08'	-57'	125°	6
7	8°37'	-56'	125°	8°03'	-56'	125°	7°29'	-56'	125°	6°54'	-57'	125°	6°20'	-57'	125°	5°45'	-57'	125°	5°11'	-57'	125°	7
8	7°42'	-56'	125°	7°07'	-56'	125°	6°32'	-56'	125°	5°58'	-57'	125°	5°23'	-57'	125°	4°48'	-57'	126°	4°13'	-57'	126°	8
9	6°46'	-56'	125°	6°11'	-56'	126°	5°36'	-56'	126°	5°01'	-57'	126°	4°26'	-57'	126°	3°51'	-57'	126°	3°16'	-57'	126°	9
10	5°50'	-56'	126°	5°15'	-56'	126°	4°40'	-56'	126°	4°05'	-57'	126°	3°29'	-57'	126°	2°54'	-57'	126°	2°19'	-57'	126°	10
11	4°55'	-56'	126°	4°19'	-56'	126°	3°44'	-56'	126°	3°08'	-57'	126°	2°33'	-57'	126°	1°57'	-57'	126°	1°21'	-57'	126°	11
12	3°59'	-56'	127°	3°23'	-56'	127°	2°47'	-56'	127°	2°12'	-57'	127°	1°36'	-57'	127°	1°00'	-57'	127°	0°24'	-57'	127°	12
13	3°03'	-56'	127°	2°27'	-56'	127°	1°51'	-56'	127°	1°15'	-57'	127°	0°39'	-57'	127°	0°03'	-57'	127°	0°33'	+57'	53°	13
14	2°08'	-56'	127°	1°31'	-56'	127°	0°55'	-56'	127°	0°18'	-57'	127°	0°18'	+57'	53°	0°54'	+57'	53°	1°31'	+57'	53°	14
15	1°12'	-56'	128°	0°35'	-56'	128°	0°01'	+56'	52°	0°38'	+57'	52°	1°15'	+57'	52°	1°52'	+57'	52°	2°28'	+57'	52°	15
16	0°16'	-56'	128°	0°21'	+56'	52°	0°58'	+56'	52°	1°35'	+57'	52°	2°12'	+57'	52°	2°49'	+57'	52°	3°25'	+57'	52°	16
17	0°39'	+56'	52°	1°17'	+56'	52°	1°54'	+56'	52°	2°31'	+57'	52°	3°09'	+57'	52°	3°46'	+57'	52°	4°23'	+57'	52°	17
18	1°35'	+56'	51°	2°13'	+56'	51°	2°50'	+56'	51°	3°28'	+57'	51°	4°05'	+57'	51°	4°43'	+57'	51°	5°20'	+57'	51°	18
19	2°31'	+56'	51°	3°09'	+56'	51°	3°47'	+56'	51°	4°24'	+57'	51°	5°02'	+57'	51°	5°40'	+57'	51°	6°18'	+57'	51°	19
20	3°27'	+56'	50°	4°05'	+56'	51°	4°43'	+56'	51°	5°21'	+57'	51°	5°59'	+57'	51°	6°37'	+57'	51°	7°15'	+57'	51°	20
21	4°22'	+56'	50°	5°01'	+56'	50°	5°39'	+56'	50°	6°17'	+57'	50°	6°56'	+57'	50°	7°34'	+57'	50°	8°12'	+57'	51°	21
22	5°18'	+56'	50°	5°57'	+56'	50°	6°35'	+56'	50°	7°14'	+57'	50°	7°53'	+57'	50°	8°31'	+57'	50°	9°09'	+57'	50°	22
23	6°14'	+56'	49°	6°53'	+56'	49°	7°32'	+56'	50°	8°11'	+56'	50°	8°49'	+57'	50°	9°28'	+57'	50°	10°07'	+57'	50°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

125° 235° LHA — Latitude SAME as DECLINATION — 125° 235° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

54° 306° LHA — Latitude CONTRARY to Declination — 54° 306° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	15°29'	-55'	123°	14°56'	-56'	123°	14°23'	-56'	123°	13°50'	-56'	124°	13°17'	-57'	124°	12°43'	-57'	124°	12°10'	-57'	124°	0
1	14°33'	-56'	123°	14°00'	-56'	124°	13°27'	-56'	124°	12°53'	-56'	124°	12°20'	-57'	124°	11°46'	-57'	124°	11°12'	-57'	124°	1
2	13°38'	-56'	124°	13°04'	-56'	124°	12°31'	-56'	124°	11°57'	-57'	124°	11°23'	-57'	124°	10°49'	-57'	125°	10°15'	-57'	125°	2
3	12°42'	-56'	124°	12°08'	-56'	124°	11°34'	-56'	124°	11°00'	-57'	125°	10°26'	-57'	125°	9°52'	-57'	125°	9°18'	-57'	125°	3
4	11°46'	-56'	124°	11°12'	-56'	125°	10°38'	-56'	125°	10°04'	-57'	125°	9°29'	-57'	125°	8°55'	-57'	125°	8°20'	-57'	125°	4
5	10°51'	-56'	125°	10°16'	-56'	125°	9°42'	-56'	125°	9°07'	-57'	125°	8°33'	-57'	125°	7°58'	-57'	126°	7°23'	-57'	126°	5
6	9°55'	-56'	125°	9°20'	-56'	125°	8°46'	-56'	126°	8°11'	-57'	126°	7°36'	-57'	126°	7°01'	-57'	126°	6°26'	-57'	126°	6
7	8°59'	-56'	126°	8°24'	-56'	126°	7°49'	-56'	126°	7°14'	-57'	126°	6°39'	-57'	126°	6°04'	-57'	126°	5°28'	-57'	126°	7
8	8°04'	-56'	126°	7°28'	-56'	126°	6°53'	-56'	126°	6°18'	-57'	126°	5°42'	-57'	126°	5°06'	-57'	126°	4°31'	-57'	127°	8
9	7°08'	-56'	126°	6°32'	-56'	126°	5°57'	-56'	127°	5°21'	-57'	127°	4°45'	-57'	127°	4°09'	-57'	127°	3°33'	-57'	127°	9
10	6°12'	-56'	127°	5°36'	-56'	127°	5°00'	-56'	127°	4°24'	-57'	127°	3°48'	-57'	127°	3°12'	-57'	127°	2°36'	-57'	127°	10
11	5°16'	-56'	127°	4°40'	-56'	127°	4°04'	-56'	127°	3°28'	-57'	127°	2°51'	-57'	127°	2°15'	-57'	127°	1°38'	-57'	127°	11
12	4°21'	-56'	127°	3°44'	-56'	128°	3°08'	-56'	128°	2°31'	-57'	128°	1°54'	-57'	128°	1°18'	-57'	128°	0°41'	-57'	128°	12
13	3°25'	-56'	128°	2°48'	-56'	128°	2°11'	-56'	128°	1°34'	-57'	128°	0°57'	-57'	128°	0°21'	-57'	128°	0°16'	+57'	52°	13
14	2°29'	-56'	128°	1°52'	-56'	128°	1°15'	-56'	128°	0°38'	-57'	128°	0°01'	-57'	128°	0°37'	+57'	52°	1°14'	+57'	52°	14
15	1°33'	-56'	129°	0°56'	-56'	129°	0°18'	-56'	129°	0°19'	+57'	51°	0°56'	+57'	51°	1°34'	+57'	51°	2°11'	+57'	51°	15
16	0°38'	-56'	129°	0°00'	+56'	51°	0°38'	+56'	51°	1°16'	+57'	51°	1°53'	+57'	51°	2°31'	+57'	51°	3°09'	+57'	51°	16
17	0°18'	+56'	51°	0°56'	+56'	51°	1°34'	+56'	51°	2°12'	+57'	51°	2°50'	+57'	51°	3°28'	+57'	51°	4°06'	+57'	51°	17
18	1°14'	+56'	50°	1°52'	+56'	50°	2°31'	+56'	50°	3°09'	+57'	50°	3°47'	+57'	50°	4°25'	+57'	51°	5°03'	+57'	51°	18
19	2°10'	+56'	50°	2°48'	+56'	50°	3°27'	+56'	50°	4°06'	+57'	50°	4°44'	+57'	50°	5°22'	+57'	50°	6°01'	+57'	50°	19
20	3°06'	+56'	50°	3°45'	+56'	50°	4°23'	+56'	50°	5°02'	+57'	50°	5°41'	+57'	50°	6°20'	+57'	50°	6°58'	+57'	50°	20
21	4°01'	+56'	49°	4°41'	+56'	49°	5°20'	+56'	49°	5°59'	+57'	49°	6°38'	+57'	49°	7°17'	+57'	50°	7°56'	+57'	50°	21
22	4°57'	+56'	49°	5°37'	+56'	49°	6°16'	+56'	49°	6°55'	+57'	49°	7°35'	+57'	49°	8°14'	+57'	49°	8°53'	+57'	49°	22
23	5°53'	+56'	48°	6°33'	+56'	49°	7°12'	+56'	49°	7°52'	+57'	49°	8°32'	+57'	49°	9°11'	+57'	49°	9°50'	+57'	49°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

126° 234° LHA — Latitude SAME as DECLINATION — 126° 234° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

53° 307° LHA — Latitude CONTRARY to Declination — 53° 307° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	15°51'	-56'	124°	15°18'	-56'	124°	14°44'	-56'	124°	14°10'	-57'	125°	13°36'	-57'	125°	13°02'	-57'	125°	12°27'	-57'	125°	0
1	14°56'	-56'	124°	14°22'	-56'	124°	13°48'	-56'	125°	13°14'	-57'	125°	12°39'	-57'	125°	12°05'	-57'	125°	11°30'	-57'	125°	1
2	14°00'	-56'	125°	13°26'	-56'	125°	12°52'	-56'	125°	12°17'	-57'	125°	11°42'	-57'	125°	11°07'	-57'	126°	10°33'	-57'	126°	2
3	13°04'	-56'	125°	12°30'	-56'	125°	11°55'	-56'	125°	11°20'	-57'	126°	10°45'	-57'	126°	10°10'	-57'	126°	9°35'	-57'	126°	3
4	12°09'	-56'	125°	11°34'	-56'	126°	10°59'	-56'	126°	10°24'	-57'	126°	9°49'	-57'	126°	9°13'	-57'	126°	8°38'	-57'	126°	4
5	11°13'	-56'	126°	10°38'	-56'	126°	10°03'	-56'	126°	9°27'	-57'	126°	8°52'	-57'	126°	8°16'	-57'	126°	7°40'	-57'	127°	5
6	10°17'	-56'	126°	9°42'	-56'	126°	9°06'	-56'	126°	8°30'	-57'	127°	7°55'	-57'	127°	7°19'	-57'	127°	6°43'	-57'	127°	6
7	9°21'	-56'	127°	8°46'	-56'	127°	8°10'	-56'	127°	7°34'	-57'	127°	6°58'	-57'	127°	6°22'	-57'	127°	5°45'	-57'	127°	7
8	8°26'	-56'	127°	7°50'	-56'	127°	7°13'	-56'	127°	6°37'	-57'	127°	6°01'	-57'	127°	5°24'	-57'	127°	4°48'	-57'	127°	8
9	7°30'	-56'	127°	6°53'	-56'	127°	6°17'	-56'	127°	5°40'	-57'	128°	5°04'	-57'	128°	4°27'	-57'	128°	3°50'	-57'	128°	9
10	6°34'	-56'	128°	5°57'	-56'	128°	5°21'	-56'	128°	4°44'	-57'	128°	4°07'	-57'	128°	3°30'	-57'	128°	2°53'	-57'	128°	10
11	5°38'	-56'	128°	5°01'	-56'	128°	4°24'	-56'	128°	3°47'	-57'	128°	3°10'	-57'	128°	2°33'	-57'	128°	1°55'	-57'	128°	11
12	4°42'	-56'	128°	4°05'	-56'	128°	3°28'	-56'	128°	2°50'	-57'	129°	2°13'	-57'	129°	1°35'	-57'	129°	0°58'	-57'	129°	12
13	3°46'	-56'	129°	3°09'	-56'	129°	2°31'	-56'	129°	1°53'	-57'	129°	1°16'	-57'	129°	0°38'	-57'	129°	0°00'	-57'	129°	13
14	2°50'	-56'	129°	2°13'	-56'	129°	1°35'	-56'	129°	0°57'	-57'	129°	0°19'	-57'	129°	0°19'	+57'	51°	0°57'	+57'	51°	14
15	1°54'	-56'	129°	1°16'	-56'	130°	0°38'	-56'	130°	0°00'	+57'	50°	0°38'	+57'	50°	1°16'	+57'	50°	1°55'	+57'	51°	15
16	0°59'	-56'	130°	0°20'	-56'	130°	0°18'	+56'	50°	0°57'	+57'	50°	1°35'	+57'	50°	2°14'	+57'	50°	2°52'	+57'	50°	16
17	0°03'	-56'	130°	0°36'	+56'	50°	1°15'	+56'	50°	1°54'	+57'	50°	2°32'	+57'	50°	3°11'	+57'	50°	3°49'	+57'	50°	17
18	0°53'	+56'	49°	1°32'	+56'	49°	2°11'	+56'	49°	2°50'	+57'	50°	3°29'	+57'	50°	4°08'	+57'	50°	4°47'	+57'	50°	18
19	1°49'	+56'	49°	2°28'	+56'	49°	3°08'	+56'	49°	3°47'	+57'	49°	4°26'	+57'	49°	5°05'	+57'	49°	5°44'	+57'	49°	19
20	2°45'	+56'	49°	3°25'	+56'	49°	4°04'	+56'	49°	4°44'	+57'	49°	5°23'	+57'	49°	6°03'	+57'	49°	6°42'	+57'	49°	20
21	3°41'	+56'	48°	4°21'	+56'	48°	5°01'	+56'	48°	5°40'	+57'	49°	6°20'	+57'	49°	7°00'	+57'	49°	7°39'	+57'	49°	21
22	4°37'	+56'	48°	5°17'	+56'	48°	5°57'	+56'	48°	6°37'	+57'	48°	7°17'	+57'	48°	7°57'	+57'	48°	8°37'	+57'	48°	22
23	5°33'	+56'	48°	6°13'	+56'	48°	6°54'	+56'	48°	7°34'	+57'	48°	8°14'	+57'	48°	8°54'	+57'	48°	9°34'	+57'	48°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

127° 233° LHA — Latitude SAME as DECLINATION — 127° 233° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

52° 308° LHA — Latitude CONTRARY to Declination — 52° 308° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	16°14'	-56'	125°	15°39'	-56'	125°	15°05'	-56'	125°	14°30'	-57'	126°	13°55'	-57'	126°	13°20'	-57'	126°	12°45'	-57'	126°	0
1	15°18'	-56'	125°	14°43'	-56'	125°	14°09'	-56'	126°	13°33'	-57'	126°	12°58'	-57'	126°	12°23'	-57'	126°	11°47'	-57'	126°	1
2	14°22'	-56'	126°	13°47'	-56'	126°	13°12'	-56'	126°	12°37'	-57'	126°	12°01'	-57'	126°	11°26'	-57'	127°	10°50'	-57'	127°	2
3	13°27'	-56'	126°	12°51'	-56'	126°	12°16'	-56'	126°	11°40'	-57'	127°	11°04'	-57'	127°	10°28'	-57'	127°	9°52'	-57'	127°	3
4	12°31'	-56'	126°	11°55'	-56'	127°	11°19'	-56'	127°	10°43'	-57'	127°	10°07'	-57'	127°	9°31'	-57'	127°	8°55'	-58'	127°	4
5	11°35'	-56'	127°	10°59'	-56'	127°	10°23'	-56'	127°	9°47'	-57'	127°	9°10'	-57'	127°	8°34'	-57'	127°	7°57'	-58'	128°	5
6	10°39'	-56'	127°	10°03'	-56'	127°	9°26'	-56'	127°	8°50'	-57'	128°	8°13'	-57'	128°	7°37'	-57'	128°	7°00'	-58'	128°	6
7	9°43'	-56'	127°	9°07'	-56'	128°	8°30'	-57'	128°	7°53'	-57'	128°	7°16'	-57'	128°	6°39'	-57'	128°	6°02'	-58'	128°	7
8	8°47'	-56'	128°	8°10'	-56'	128°	7°33'	-57'	128°	6°56'	-57'	128°	6°19'	-57'	128°	5°42'	-57'	128°	5°05'	-58'	128°	8
9	7°51'	-56'	128°	7°14'	-56'	128°	6°37'	-57'	128°	6°00'	-57'	129°	5°22'	-57'	129°	4°45'	-57'	129°	4°07'	-58'	129°	9
10	6°55'	-56'	129°	6°18'	-56'	129°	5°40'	-57'	129°	5°03'	-57'	129°	4°25'	-57'	129°	3°47'	-57'	129°	3°10'	-58'	129°	10
11	5°59'	-56'	129°	5°22'	-56'	129°	4°44'	-57'	129°	4°06'	-57'	129°	3°28'	-57'	129°	2°50'	-57'	129°	2°12'	-58'	129°	11
12	5°03'	-56'	129°	4°25'	-56'	129°	3°47'	-57'	129°	3°09'	-57'	129°	2°31'	-57'	130°	1°53'	-57'	130°	1°15'	-58'	130°	12
13	4°07'	-56'	130°	3°29'	-56'	130°	2°51'	-57'	130°	2°12'	-57'	130°	1°34'	-57'	130°	0°56'	-57'	130°	0°17'	-58'	130°	13
14	3°11'	-56'	130°	2°33'	-56'	130°	1°54'	-57'	130°	1°16'	-57'	130°	0°37'	-57'	130°	0°02'	+57'	50°	0°40'	+58'	50°	14
15	2°15'	-56'	130°	1°36'	-56'	130°	0°58'	-57'	130°	0°19'	-57'	130°	0°20'	+57'	50°	0°59'	+57'	50°	1°38'	+58'	50°	15
16	1°19'	-56'	131°	0°40'	-56'	131°	0°01'	-57'	131°	0°38'	+57'	49°	1°17'	+57'	49°	1°56'	+57'	49°	2°36'	+58'	49°	16
17	0°23'	-56'	131°	0°16'	+56'	49°	0°56'	+57'	49°	1°35'	+57'	49°	2°14'	+57'	49°	2°54'	+57'	49°	3°33'	+58'	49°	17
18	0°33'	+56'	49°	1°12'	+56'	49°	1°52'	+57'	49°	2°32'	+57'	49°	3°11'	+57'	49°	3°51'	+57'	49°	4°31'	+58'	49°	18
19	1°29'	+56'	48°	2°09'	+56'	48°	2°49'	+57'	48°	3°29'	+57'	48°	4°09'	+57'	48°	4°48'	+57'	48°	5°28'	+58'	48°	19
20	2°25'	+56'	48°	3°05'	+56'	48°	3°45'	+57'	48°	4°25'	+57'	48°	5°06'	+57'	48°	5°46'	+57'	48°	6°26'	+58'	48°	20
21	3°21'	+56'	47°	4°01'	+56'	48°	4°42'	+57'	48°	5°22'	+57'	48°	6°03'	+57'	48°	6°43'	+57'	48°	7°23'	+58'	48°	21
22	4°17'	+56'	47°	4°58'	+56'	47°	5°38'	+57'	47°	6°19'	+57'	47°	7°00'	+57'	47°	7°40'	+57'	47°	8°21'	+57'	48°	22
23	5°13'	+56'	47°	5°54'	+56'	47°	6°35'	+57'	47°	7°16'	+57'	47°	7°57'	+57'	47°	8°38'	+57'	47°	9°18'	+57'	47°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

128° 232° LHA — Latitude SAME as DECLINATION — 128° 232° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

51° 309° LHA — Latitude CONTRARY to Declination — 51° 309° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	16°36'	-56'	126°	16°01'	-56'	126°	15°25'	-56'	126°	14°50'	-57'	126°	14°14'	-57'	127°	13°38'	-57'	127°	13°02'	-58'	127°	0
1	15°40'	-56'	126°	15°05'	-56'	126°	14°29'	-56'	127°	13°53'	-57'	127°	13°17'	-57'	127°	12°41'	-57'	127°	12°05'	-58'	127°	1
2	14°44'	-56'	127°	14°09'	-56'	127°	13°33'	-56'	127°	12°56'	-57'	127°	12°20'	-57'	127°	11°44'	-57'	128°	11°07'	-58'	128°	2
3	13°49'	-56'	127°	13°12'	-56'	127°	12°36'	-57'	127°	12°00'	-57'	127°	11°23'	-57'	128°	10°46'	-57'	128°	10°09'	-58'	128°	3
4	12°53'	-56'	127°	12°16'	-56'	127°	11°40'	-57'	128°	11°03'	-57'	128°	10°26'	-57'	128°	9°49'	-57'	128°	9°12'	-58'	128°	4
5	11°57'	-56'	128°	11°20'	-56'	128°	10°43'	-57'	128°	10°06'	-57'	128°	9°29'	-57'	128°	8°52'	-57'	128°	8°14'	-58'	129°	5
6	11°01'	-56'	128°	10°24'	-56'	128°	9°46'	-57'	128°	9°09'	-57'	128°	8°32'	-57'	129°	7°54'	-57'	129°	7°17'	-58'	129°	6
7	10°05'	-56'	128°	9°27'	-56'	129°	8°50'	-57'	129°	8°12'	-57'	129°	7°35'	-57'	129°	6°57'	-57'	129°	6°19'	-58'	129°	7
8	9°09'	-56'	129°	8°31'	-56'	129°	7°53'	-57'	129°	7°15'	-57'	129°	6°38'	-57'	129°	6°00'	-57'	129°	5°22'	-58'	129°	8
9	8°13'	-56'	129°	7°35'	-56'	129°	6°57'	-57'	129°	6°19'	-57'	129°	5°40'	-57'	130°	5°02'	-57'	130°	4°24'	-58'	130°	9
10	7°17'	-56'	130°	6°38'	-56'	130°	6°00'	-57'	130°	5°22'	-57'	130°	4°43'	-57'	130°	4°05'	-57'	130°	3°26'	-58'	130°	10
11	6°20'	-56'	130°	5°42'	-56'	130°	5°03'	-57'	130°	4°25'	-57'	130°	3°46'	-57'	130°	3°07'	-57'	130°	2°29'	-58'	130°	11
12	5°24'	-56'	130°	4°46'	-56'	130°	4°07'	-57'	130°	3°28'	-57'	130°	2°49'	-57'	130°	2°10'	-57'	130°	1°31'	-58'	130°	12
13	4°28'	-56'	131°	3°49'	-56'	131°	3°10'	-57'	131°	2°31'	-57'	131°	1°52'	-57'	131°	1°13'	-57'	131°	0°33'	-58'	131°	13
14	3°32'	-56'	131°	2°53'	-56'	131°	2°13'	-57'	131°	1°34'	-57'	131°	0°55'	-57'	131°	0°15'	-57'	131°	0°24'	+58'	49°	14
15	2°36'	-56'	131°	1°56'	-56'	131°	1°17'	-57'	131°	0°37'	-57'	131°	0°03'	+57'	49°	0°42'	+57'	49°	1°22'	+58'	49°	15
16	1°40'	-56'	132°	1°00'	-56'	132°	0°20'	-57'	132°	0°20'	+57'	48°	1°00'	+57'	48°	1°40'	+57'	48°	2°19'	+58'	48°	16
17	0°44'	-56'	132°	0°04'	-56'	132°	0°37'	+57'	48°	1°17'	+57'	48°	1°57'	+57'	48°	2°37'	+57'	48°	3°17'	+58'	48°	17
18	0°12'	+56'	48°	0°53'	+56'	48°	1°33'	+57'	48°	2°14'	+57'	48°	2°54'	+57'	48°	3°34'	+57'	48°	4°15'	+58'	48°	18
19	1°09'	+56'	47°	1°49'	+56'	47°	2°30'	+57'	47°	3°11'	+57'	47°	3°51'	+57'	47°	4°32'	+57'	47°	5°12'	+58'	48°	19
20	2°05'	+56'	47°	2°46'	+56'	47°	3°27'	+57'	47°	4°07'	+57'	47°	4°48'	+57'	47°	5°29'	+57'	47°	6°10'	+58'	47°	20
21	3°01'	+56'	47°	3°42'	+56'	47°	4°23'	+57'	47°	5°04'	+57'	47°	5°45'	+57'	47°	6°26'	+57'	47°	7°07'	+58'	47°	21
22	3°57'	+56'	46°	4°38'	+56'	46°	5°20'	+57'	46°	6°01'	+57'	46°	6°43'	+57'	47°	7°24'	+57'	47°	8°05'	+58'	47°	22
23	4°53'	+56'	46°	5°35'	+56'	46°	6°17'	+57'	46°	6°58'	+57'	46°	7°40'	+57'	46°	8°21'	+57'	46°	9°03'	+58'	46°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

129° 231° LHA — Latitude SAME as DECLINATION — 129° 231° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

50° 310° LHA — Latitude CONTRARY to Declination — 50° 310° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	16°58'	-56'	127°	16°22'	-56'	127°	15°46'	-57'	127°	15°09'	-57'	127°	14°33'	-57'	128°	13°56'	-57'	128°	13°19'	-58'	128°	0
1	16°02'	-56'	127°	15°26'	-56'	127°	14°49'	-57'	128°	14°13'	-57'	128°	13°36'	-57'	128°	12°59'	-57'	128°	12°22'	-58'	128°	1
2	15°06'	-56'	128°	14°30'	-56'	128°	13°53'	-57'	128°	13°16'	-57'	128°	12°39'	-57'	128°	12°01'	-57'	128°	11°24'	-58'	129°	2
3	14°10'	-56'	128°	13°33'	-56'	128°	12°56'	-57'	128°	12°19'	-57'	128°	11°41'	-57'	129°	11°04'	-57'	129°	10°26'	-58'	129°	3
4	13°14'	-56'	128°	12°37'	-56'	128°	12°00'	-57'	129°	11°22'	-57'	129°	10°44'	-57'	129°	10°07'	-57'	129°	9°29'	-58'	129°	4
5	12°18'	-56'	129°	11°41'	-56'	129°	11°03'	-57'	129°	10°25'	-57'	129°	9°47'	-57'	129°	9°09'	-57'	129°	8°31'	-58'	129°	5
6	11°22'	-56'	129°	10°44'	-56'	129°	10°06'	-57'	129°	9°28'	-57'	129°	8°50'	-57'	130°	8°12'	-57'	130°	7°33'	-58'	130°	6
7	10°26'	-56'	129°	9°48'	-56'	130°	9°10'	-57'	130°	8°31'	-57'	130°	7°53'	-57'	130°	7°14'	-57'	130°	6°36'	-58'	130°	7
8	9°30'	-56'	130°	8°51'	-56'	130°	8°13'	-57'	130°	7°34'	-57'	130°	6°56'	-57'	130°	6°17'	-57'	130°	5°38'	-58'	130°	8
9	8°34'	-56'	130°	7°55'	-56'	130°	7°16'	-57'	130°	6°37'	-57'	130°	5°58'	-57'	130°	5°19'	-57'	131°	4°40'	-58'	131°	9
10	7°37'	-56'	130°	6°58'	-56'	131°	6°19'	-57'	131°	5°40'	-57'	131°	5°01'	-57'	131°	4°22'	-57'	131°	3°43'	-58'	131°	10
11	6°41'	-56'	131°	6°02'	-56'	131°	5°23'	-57'	131°	4°43'	-57'	131°	4°04'	-57'	131°	3°25'	-57'	131°	2°45'	-58'	131°	11
12	5°45'	-56'	131°	5°06'	-56'	131°	4°26'	-57'	131°	3°46'	-57'	131°	3°07'	-57'	131°	2°27'	-57'	131°	1°47'	-58'	131°	12
13	4°49'	-56'	131°	4°09'	-57'	132°	3°29'	-57'	132°	2°49'	-57'	132°	2°09'	-57'	132°	1°30'	-57'	132°	0°50'	-58'	132°	13
14	3°53'	-56'	132°	3°13'	-57'	132°	2°32'	-57'	132°	1°52'	-57'	132°	1°12'	-57'	132°	0°32'	-57'	132°	0°08'	+58'	48°	14
15	2°56'	-56'	132°	2°16'	-57'	132°	1°36'	-57'	132°	0°55'	-57'	132°	0°15'	-57'	132°	0°25'	+57'	48°	1°06'	+58'	48°	15
16	2°00'	-56'	133°	1°19'	-57'	133°	0°39'	-57'	133°	0°02'	+57'	47°	0°42'	+57'	47°	1°23'	+57'	47°	2°03'	+58'	47°	16
17	1°04'	-56'	133°	0°23'	-57'	133°	0°18'	+57'	47°	0°59'	+57'	47°	1°40'	+57'	47°	2°20'	+57'	47°	3°01'	+58'	47°	17
18	0°08'	-56'	133°	0°34'	+57'	47°	1°15'	+57'	47°	1°56'	+57'	47°	2°37'	+57'	47°	3°18'	+57'	47°	3°59'	+58'	47°	18
19	0°49'	+56'	46°	1°30'	+57'	46°	2°11'	+57'	46°	2°53'	+57'	46°	3°34'	+57'	47°	4°15'	+57'	47°	4°56'	+58'	47°	19
20	1°45'	+56'	46°	2°27'	+57'	46°	3°08'	+57'	46°	3°50'	+57'	46°	4°31'	+57'	46°	5°13'	+57'	46°	5°54'	+58'	46°	20
21	2°41'	+56'	46°	3°23'	+56'	46°	4°05'	+57'	46°	4°47'	+57'	46°	5°28'	+57'	46°	6°10'	+57'	46°	6°52'	+58'	46°	21
22	3°37'	+56'	45°	4°20'	+56'	45°	5°02'	+57'	45°	5°44'	+57'	46°	6°26'	+57'	46°	7°08'	+57'	46°	7°49'	+58'	46°	22
23	4°34'	+56'	45°	5°16'	+56'	45°	5°58'	+57'	45°	6°41'	+57'	45°	7°23'	+57'	45°	8°05'	+57'	45°	8°47'	+58'	46°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

130° 230° LHA — Latitude SAME as DECLINATION — 130° 230° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

49° 311° LHA — Latitude CONTRARY to Declination — 49° 311° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	17°20'	-56'	128°	16°43'	-56'	128°	16°06'	-57'	128°	15°29'	-57'	128°	14°51'	-57'	129°	14°14'	-57'	129°	13°36'	-58'	129°	0
1	16°24'	-56'	128°	15°47'	-56'	128°	15°09'	-57'	129°	14°32'	-57'	129°	13°54'	-57'	129°	13°16'	-57'	129°	12°38'	-58'	129°	1
2	15°28'	-56'	129°	14°50'	-56'	129°	14°13'	-57'	129°	13°35'	-57'	129°	12°57'	-57'	129°	12°19'	-57'	129°	11°41'	-58'	130°	2
3	14°32'	-56'	129°	13°54'	-56'	129°	13°16'	-57'	129°	12°38'	-57'	129°	12°00'	-57'	130°	11°21'	-57'	130°	10°43'	-58'	130°	3
4	13°35'	-56'	129°	12°57'	-56'	129°	12°19'	-57'	130°	11°41'	-57'	130°	11°02'	-57'	130°	10°24'	-57'	130°	9°45'	-58'	130°	4
5	12°39'	-56'	130°	12°01'	-56'	130°	11°22'	-57'	130°	10°44'	-57'	130°	10°05'	-57'	130°	9°26'	-57'	130°	8°48'	-58'	130°	5
6	11°43'	-56'	130°	11°04'	-56'	130°	10°26'	-57'	130°	9°47'	-57'	130°	9°08'	-57'	131°	8°29'	-58'	131°	7°50'	-58'	131°	6
7	10°47'	-56'	130°	10°08'	-57'	130°	9°29'	-57'	131°	8°50'	-57'	131°	8°11'	-57'	131°	7°31'	-58'	131°	6°52'	-58'	131°	7
8	9°51'	-56'	131°	9°11'	-57'	131°	8°32'	-57'	131°	7°53'	-57'	131°	7°13'	-57'	131°	6°34'	-58'	131°	5°54'	-58'	131°	8
9	8°54'	-56'	131°	8°15'	-57'	131°	7°35'	-57'	131°	6°56'	-57'	131°	6°16'	-57'	131°	5°36'	-58'	131°	4°57'	-58'	132°	9
10	7°58'	-56'	131°	7°18'	-57'	131°	6°39'	-57'	132°	5°59'	-57'	132°	5°19'	-57'	132°	4°39'	-58'	132°	3°59'	-58'	132°	10
11	7°02'	-56'	132°	6°22'	-57'	132°	5°42'	-57'	132°	5°02'	-57'	132°	4°21'	-57'	132°	3°41'	-58'	132°	3°01'	-58'	132°	11
12	6°05'	-56'	132°	5°25'	-57'	132°	4°45'	-57'	132°	4°05'	-57'	132°	3°24'	-57'	132°	2°44'	-58'	132°	2°03'	-58'	132°	12
13	5°09'	-56'	132°	4°29'	-57'	132°	3°48'	-57'	133°	3°07'	-57'	133°	2°27'	-57'	133°	1°46'	-58'	133°	1°06'	-58'	133°	13
14	4°13'	-56'	133°	3°32'	-57'	133°	2°51'	-57'	133°	2°10'	-57'	133°	1°30'	-57'	133°	0°49'	-58'	133°	0°08'	-58'	133°	14
15	3°16'	-56'	133°	2°35'	-57'	133°	1°54'	-57'	133°	1°13'	-57'	133°	0°32'	-57'	133°	0°09'	+58'	47°	0°50'	+58'	47°	15
16	2°20'	-56'	133°	1°39'	-57'	133°	0°57'	-57'	133°	0°16'	-57'	133°	0°25'	+57'	47°	1°06'	+58'	47°	1°48'	+58'	47°	16
17	1°24'	-56'	134°	0°42'	-57'	134°	0°01'	-57'	134°	0°41'	+57'	46°	1°22'	+57'	46°	2°04'	+58'	46°	2°45'	+58'	46°	17
18	0°27'	-56'	134°	0°15'	+57'	46°	0°56'	+57'	46°	1°38'	+57'	46°	2°20'	+57'	46°	3°02'	+58'	46°	3°43'	+58'	46°	18
19	0°29'	+56'	46°	1°11'	+57'	46°	1°53'	+57'	46°	2°35'	+57'	46°	3°17'	+57'	46°	3°59'	+58'	46°	4°41'	+58'	46°	19
20	1°25'	+56'	45°	2°08'	+57'	45°	2°50'	+57'	45°	3°32'	+57'	45°	4°14'	+57'	45°	4°57'	+58'	45°	5°39'	+58'	45°	20
21	2°22'	+56'	45°	3°04'	+57'	45°	3°47'	+57'	45°	4°29'	+57'	45°	5°12'	+57'	45°	5°54'	+58'	45°	6°36'	+58'	45°	21
22	3°18'	+56'	45°	4°01'	+57'	45°	4°44'	+57'	45°	5°26'	+57'	45°	6°09'	+57'	45°	6°52'	+58'	45°	7°34'	+58'	45°	22
23	4°15'	+56'	44°	4°58'	+57'	44°	5°41'	+57'	44°	6°23'	+57'	44°	7°06'	+57'	44°	7°49'	+57'	45°	8°32'	+58'	45°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

131° 229° LHA — Latitude SAME as DECLINATION — 131° 229° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

48° 312° LHA — Latitude CONTRARY to Declination — 48° 312° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	17°41'	-56'	129°	17°03'	-56'	129°	16°26'	-57'	129°	15°48'	-57'	129°	15°09'	-57'	130°	14°31'	-57'	130°	13°52'	-58'	130°	0
1	16°45'	-56'	129°	16°07'	-56'	129°	15°29'	-57'	130°	14°51'	-57'	130°	14°12'	-57'	130°	13°34'	-57'	130°	12°55'	-58'	130°	1
2	15°49'	-56'	129°	15°11'	-56'	130°	14°32'	-57'	130°	13°54'	-57'	130°	13°15'	-57'	130°	12°36'	-58'	130°	11°57'	-58'	131°	2
3	14°53'	-56'	130°	14°14'	-57'	130°	13°35'	-57'	130°	12°57'	-57'	130°	12°18'	-57'	131°	11°39'	-58'	131°	10°59'	-58'	131°	3
4	13°56'	-56'	130°	13°18'	-57'	130°	12°39'	-57'	131°	12°00'	-57'	131°	11°20'	-57'	131°	10°41'	-58'	131°	10°02'	-58'	131°	4
5	13°00'	-56'	131°	12°21'	-57'	131°	11°42'	-57'	131°	11°02'	-57'	131°	10°23'	-57'	131°	9°43'	-58'	131°	9°04'	-58'	131°	5
6	12°04'	-56'	131°	11°24'	-57'	131°	10°45'	-57'	131°	10°05'	-57'	131°	9°26'	-57'	131°	8°46'	-58'	132°	8°06'	-58'	132°	6
7	11°07'	-56'	131°	10°28'	-57'	131°	9°48'	-57'	132°	9°08'	-57'	132°	8°28'	-57'	132°	7°48'	-58'	132°	7°08'	-58'	132°	7
8	10°11'	-56'	132°	9°31'	-57'	132°	8°51'	-57'	132°	8°11'	-57'	132°	7°31'	-57'	132°	6°51'	-58'	132°	6°10'	-58'	132°	8
9	9°15'	-56'	132°	8°35'	-57'	132°	7°54'	-57'	132°	7°14'	-57'	132°	6°34'	-57'	132°	5°53'	-58'	132°	5°13'	-58'	133°	9
10	8°18'	-56'	132°	7°38'	-57'	132°	6°57'	-57'	132°	6°17'	-57'	133°	5°36'	-57'	133°	4°55'	-58'	133°	4°15'	-58'	133°	10
11	7°22'	-56'	133°	6°41'	-57'	133°	6°00'	-57'	133°	5°20'	-57'	133°	4°39'	-57'	133°	3°58'	-58'	133°	3°17'	-58'	133°	11
12	6°25'	-56'	133°	5°45'	-57'	133°	5°04'	-57'	133°	4°22'	-57'	133°	3°41'	-57'	133°	3°00'	-58'	133°	2°19'	-58'	133°	12
13	5°29'	-56'	133°	4°48'	-57'	133°	4°07'	-57'	133°	3°25'	-57'	133°	2°44'	-57'	134°	2°03'	-58'	134°	1°21'	-58'	134°	13
14	4°33'	-56'	134°	3°51'	-57'	134°	3°10'	-57'	134°	2°28'	-57'	134°	1°47'	-57'	134°	1°05'	-58'	134°	0°23'	-58'	134°	14
15	3°36'	-56'	134°	2°54'	-57'	134°	2°13'	-57'	134°	1°31'	-57'	134°	0°49'	-57'	134°	0°07'	-58'	134°	0°34'	+58'	46°	15
16	2°40'	-56'	134°	1°58'	-57'	134°	1°16'	-57'	134°	0°34'	-57'	134°	0°08'	+57'	46°	0°50'	+58'	46°	1°32'	+58'	46°	16
17	1°43'	-56'	135°	1°01'	-57'	135°	0°19'	-57'	135°	0°23'	+57'	45°	1°06'	+57'	45°	1°48'	+58'	45°	2°30'	+58'	45°	17
18	0°47'	-56'	135°	0°04'	-57'	135°	0°38'	+57'	45°	1°21'	+57'	45°	2°03'	+57'	45°	2°45'	+58'	45°	3°28'	+58'	45°	18
19	0°10'	+56'	45°	0°53'	+57'	45°	1°35'	+57'	45°	2°18'	+57'	45°	3°00'	+57'	45°	3°43'	+58'	45°	4°26'	+58'	45°	19
20	1°06'	+56'	44°	1°49'	+57'	44°	2°32'	+57'	44°	3°15'	+57'	44°	3°58'	+57'	44°	4°41'	+58'	44°	5°24'	+58'	45°	20
21	2°03'	+56'	44°	2°46'	+57'	44°	3°29'	+57'	44°	4°12'	+57'	44°	4°55'	+57'	44°	5°38'	+58'	44°	6°21'	+58'	44°	21
22	2°59'	+56'	44°	3°43'	+57'	44°	4°26'	+57'	44°	5°09'	+57'	44°	5°53'	+57'	44°	6°36'	+58'	44°	7°19'	+58'	44°	22
23	3°56'	+56'	43°	4°39'	+57'	43°	5°23'	+57'	43°	6°07'	+57'	43°	6°50'	+57'	44°	7°34'	+58'	44°	8°17'	+58'	44°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

132° 228° LHA — Latitude SAME as DECLINATION — 132° 228° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

47° 313° LHA — Latitude CONTRARY to Declination — 47° 313° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	18°02'	-56'	130°	17°24'	-57'	130°	16°45'	-57'	130°	16°06'	-57'	130°	15°27'	-57'	131°	14°48'	-58'	131°	14°09'	-58'	131°	0
1	17°06'	-56'	130°	16°27'	-57'	130°	15°48'	-57'	131°	15°09'	-57'	131°	14°30'	-57'	131°	13°51'	-58'	131°	13°11'	-58'	131°	1
2	16°10'	-56'	130°	15°31'	-57'	131°	14°51'	-57'	131°	14°12'	-57'	131°	13°33'	-57'	131°	12°53'	-58'	131°	12°13'	-58'	132°	2
3	15°13'	-56'	131°	14°34'	-57'	131°	13°55'	-57'	131°	13°15'	-57'	131°	12°35'	-57'	132°	11°55'	-58'	132°	11°15'	-58'	132°	3
4	14°17'	-56'	131°	13°37'	-57'	131°	12°58'	-57'	132°	12°18'	-57'	132°	11°38'	-57'	132°	10°58'	-58'	132°	10°18'	-58'	132°	4
5	13°21'	-56'	132°	12°41'	-57'	132°	12°01'	-57'	132°	11°21'	-57'	132°	10°40'	-57'	132°	10°00'	-58'	132°	9°20'	-58'	132°	5
6	12°24'	-56'	132°	11°44'	-57'	132°	11°04'	-57'	132°	10°24'	-57'	132°	9°43'	-57'	132°	9°03'	-58'	133°	8°22'	-58'	133°	6
7	11°28'	-56'	132°	10°47'	-57'	132°	10°07'	-57'	132°	9°26'	-57'	133°	8°46'	-57'	133°	8°05'	-58'	133°	7°24'	-58'	133°	7
8	10°31'	-56'	133°	9°51'	-57'	133°	9°10'	-57'	133°	8°29'	-57'	133°	7°48'	-57'	133°	7°07'	-58'	133°	6°26'	-58'	133°	8
9	9°35'	-57'	133°	8°54'	-57'	133°	8°13'	-57'	133°	7°32'	-57'	133°	6°51'	-57'	133°	6°10'	-58'	133°	5°28'	-58'	133°	9
10	8°38'	-57'	133°	7°57'	-57'	133°	7°16'	-57'	133°	6°35'	-57'	134°	5°53'	-57'	134°	5°12'	-58'	134°	4°30'	-58'	134°	10
11	7°42'	-57'	134°	7°00'	-57'	134°	6°19'	-57'	134°	5°37'	-57'	134°	4°56'	-57'	134°	4°14'	-58'	134°	3°33'	-58'	134°	11
12	6°45'	-57'	134°	6°04'	-57'	134°	5°22'	-57'	134°	4°40'	-57'	134°	3°58'	-57'	134°	3°16'	-58'	134°	2°35'	-58'	134°	12
13	5°49'	-57'	134°	5°07'	-57'	134°	4°25'	-57'	134°	3°43'	-57'	134°	3°01'	-57'	134°	2°19'	-58'	135°	1°37'	-58'	135°	13
14	4°52'	-57'	135°	4°10'	-57'	135°	3°28'	-57'	135°	2°46'	-57'	135°	2°03'	-57'	135°	1°21'	-58'	135°	0°39'	-58'	135°	14
15	3°56'	-57'	135°	3°13'	-57'	135°	2°31'	-57'	135°	1°48'	-57'	135°	1°06'	-57'	135°	0°23'	-58'	135°	0°19'	+58'	45°	15
16	2°59'	-57'	135°	2°16'	-57'	135°	1°34'	-57'	135°	0°51'	-57'	135°	0°08'	-57'	135°	0°34'	+58'	45°	1°17'	+58'	45°	16
17	2°02'	-57'	136°	1°19'	-57'	136°	0°37'	-57'	136°	0°06'	+57'	44°	0°49'	+57'	44°	1°32'	+58'	44°	2°15'	+58'	44°	17
18	1°06'	-57'	136°	0°23'	-57'	136°	0°20'	+57'	44°	1°04'	+57'	44°	1°47'	+57'	44°	2°30'	+58'	44°	3°13'	+58'	44°	18
19	0°09'	-57'	136°	0°34'	+57'	44°	1°18'	+57'	44°	2°01'	+57'	44°	2°44'	+57'	44°	3°27'	+58'	44°	4°11'	+58'	44°	19
20	0°47'	+57'	43°	1°31'	+57'	43°	2°15'	+57'	43°	2°58'	+57'	43°	3°42'	+57'	44°	4°25'	+58'	44°	5°09'	+58'	44°	20
21	1°44'	+57'	43°	2°28'	+57'	43°	3°12'	+57'	43°	3°55'	+57'	43°	4°39'	+57'	43°	5°23'	+58'	43°	6°06'	+58'	43°	21
22	2°41'	+57'	43°	3°25'	+57'	43°	4°09'	+57'	43°	4°53'	+57'	43°	5°37'	+57'	43°	6°20'	+58'	43°	7°04'	+58'	43°	22
23	3°37'	+57'	42°	4°21'	+57'	42°	5°06'	+57'	43°	5°50'	+57'	43°	6°34'	+57'	43°	7°18'	+58'	43°	8°02'	+58'	43°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

133° 227° LHA — Latitude SAME as DECLINATION — 133° 227° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

46° 314° LHA — Latitude CONTRARY to Declination — 46° 314° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	18°23'	-56'	131°	17°44'	-57'	131°	17°04'	-57'	131°	16°25'	-57'	131°	15°45'	-57'	132°	15°05'	-58'	132°	14°25'	-58'	132°	0
1	17°27'	-56'	131°	16°47'	-57'	131°	16°07'	-57'	132°	15°28'	-57'	132°	14°48'	-57'	132°	14°07'	-58'	132°	13°27'	-58'	132°	1
2	16°30'	-56'	131°	15°50'	-57'	132°	15°10'	-57'	132°	14°30'	-57'	132°	13°50'	-57'	132°	13°10'	-58'	132°	12°29'	-58'	133°	2
3	15°34'	-56'	132°	14°54'	-57'	132°	14°14'	-57'	132°	13°33'	-57'	132°	12°53'	-57'	133°	12°12'	-58'	133°	11°31'	-58'	133°	3
4	14°37'	-56'	132°	13°57'	-57'	132°	13°17'	-57'	132°	12°36'	-57'	133°	11°55'	-57'	133°	11°14'	-58'	133°	10°33'	-58'	133°	4
5	13°41'	-57'	132°	13°00'	-57'	133°	12°20'	-57'	133°	11°39'	-57'	133°	10°58'	-57'	133°	10°17'	-58'	133°	9°36'	-58'	133°	5
6	12°44'	-57'	133°	12°03'	-57'	133°	11°23'	-57'	133°	10°41'	-57'	133°	10°00'	-58'	133°	9°19'	-58'	134°	8°38'	-58'	134°	6
7	11°48'	-57'	133°	11°07'	-57'	133°	10°25'	-57'	133°	9°44'	-57'	134°	9°03'	-58'	134°	8°21'	-58'	134°	7°40'	-58'	134°	7
8	10°51'	-57'	134°	10°10'	-57'	134°	9°28'	-57'	134°	8°47'	-57'	134°	8°05'	-58'	134°	7°24'	-58'	134°	6°42'	-58'	134°	8
9	9°55'	-57'	134°	9°13'	-57'	134°	8°31'	-57'	134°	7°50'	-57'	134°	7°08'	-58'	134°	6°26'	-58'	134°	5°44'	-58'	134°	9
10	8°58'	-57'	134°	8°16'	-57'	134°	7°34'	-57'	134°	6°52'	-57'	134°	6°10'	-58'	135°	5°28'	-58'	135°	4°46'	-58'	135°	10
11	8°01'	-57'	135°	7°19'	-57'	135°	6°37'	-57'	135°	5°55'	-57'	135°	5°13'	-58'	135°	4°30'	-58'	135°	3°48'	-58'	135°	11
12	7°05'	-57'	135°	6°22'	-57'	135°	5°40'	-57'	135°	4°58'	-57'	135°	4°15'	-58'	135°	3°32'	-58'	135°	2°50'	-58'	135°	12
13	6°08'	-57'	135°	5°25'	-57'	135°	4°43'	-57'	135°	4°00'	-57'	135°	3°17'	-58'	135°	2°35'	-58'	135°	1°52'	-58'	135°	13
14	5°11'	-57'	136°	4°29'	-57'	136°	3°46'	-57'	136°	3°03'	-57'	136°	2°20'	-58'	136°	1°37'	-58'	136°	0°54'	-58'	136°	14
15	4°15'	-57'	136°	3°32'	-57'	136°	2°49'	-57'	136°	2°05'	-57'	136°	1°22'	-58'	136°	0°39'	-58'	136°	0°04'	+58'	44°	15
16	3°18'	-57'	136°	2°35'	-57'	136°	1°51'	-57'	136°	1°08'	-57'	136°	0°25'	-58'	136°	0°19'	+58'	44°	1°02'	+58'	44°	16
17	2°21'	-57'	136°	1°38'	-57'	137°	0°54'	-57'	137°	0°11'	-57'	137°	0°33'	+58'	43°	1°16'	+58'	43°	2°00'	+58'	43°	17
18	1°25'	-57'	137°	0°41'	-57'	137°	0°03'	+57'	43°	0°47'	+57'	43°	1°30'	+58'	43°	2°14'	+58'	43°	2°58'	+58'	43°	18
19	0°28'	-57'	137°	0°16'	+57'	43°	1°00'	+57'	43°	1°44'	+57'	43°	2°28'	+58'	43°	3°12'	+58'	43°	3°56'	+58'	43°	19
20	0°29'	+57'	43°	1°13'	+57'	43°	1°57'	+57'	43°	2°41'	+57'	43°	3°26'	+58'	43°	4°10'	+58'	43°	4°54'	+58'	43°	20
21	1°26'	+57'	42°	2°10'	+57'	42°	2°54'	+57'	42°	3°39'	+57'	42°	4°23'	+58'	42°	5°08'	+58'	42°	5°52'	+58'	42°	21
22	2°22'	+57'	42°	3°07'	+57'	42°	3°52'	+57'	42°	4°36'	+57'	42°	5°21'	+58'	42°	6°05'	+58'	42°	6°50'	+58'	42°	22
23	3°19'	+57'	42°	4°04'	+57'	42°	4°49'	+57'	42°	5°34'	+57'	42°	6°18'	+58'	42°	7°03'	+58'	42°	7°48'	+58'	42°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

134° 226° LHA — Latitude SAME as DECLINATION — 134° 226° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

45° 315° LHA — Latitude CONTRARY to Declination — 45° 315° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	18°43'	-56'	132°	18°03'	-57'	132°	17°23'	-57'	132°	16°43'	-57'	132°	16°02'	-57'	133°	15°22'	-58'	133°	14°41'	-58'	133°	0
1	17°47'	-57'	132°	17°07'	-57'	132°	16°26'	-57'	133°	15°46'	-57'	133°	15°05'	-58'	133°	14°24'	-58'	133°	13°43'	-58'	133°	1
2	16°51'	-57'	132°	16°10'	-57'	133°	15°29'	-57'	133°	14°48'	-57'	133°	14°07'	-58'	133°	13°26'	-58'	133°	12°45'	-58'	134°	2
3	15°54'	-57'	133°	15°13'	-57'	133°	14°32'	-57'	133°	13°51'	-57'	133°	13°10'	-58'	134°	12°28'	-58'	134°	11°47'	-58'	134°	3
4	14°57'	-57'	133°	14°16'	-57'	133°	13°35'	-57'	133°	12°54'	-57'	134°	12°12'	-58'	134°	11°31'	-58'	134°	10°49'	-58'	134°	4
5	14°01'	-57'	133°	13°19'	-57'	134°	12°38'	-57'	134°	11°56'	-57'	134°	11°15'	-58'	134°	10°33'	-58'	134°	9°51'	-58'	134°	5
6	13°04'	-57'	134°	12°23'	-57'	134°	11°41'	-57'	134°	10°59'	-57'	134°	10°17'	-58'	134°	9°35'	-58'	135°	8°53'	-58'	135°	6
7	12°07'	-57'	134°	11°26'	-57'	134°	10°44'	-57'	134°	10°02'	-57'	135°	9°20'	-58'	135°	8°37'	-58'	135°	7°55'	-58'	135°	7
8	11°11'	-57'	134°	10°29'	-57'	135°	9°47'	-57'	135°	9°04'	-57'	135°	8°22'	-58'	135°	7°40'	-58'	135°	6°57'	-58'	135°	8
9	10°14'	-57'	135°	9°32'	-57'	135°	8°49'	-57'	135°	8°07'	-57'	135°	7°24'	-58'	135°	6°42'	-58'	135°	5°59'	-58'	135°	9
10	9°17'	-57'	135°	8°35'	-57'	135°	7°52'	-57'	135°	7°09'	-57'	135°	6°27'	-58'	136°	5°44'	-58'	136°	5°01'	-58'	136°	10
11	8°21'	-57'	135°	7°38'	-57'	136°	6°55'	-57'	136°	6°12'	-57'	136°	5°29'	-58'	136°	4°46'	-58'	136°	4°03'	-58'	136°	11
12	7°24'	-57'	136°	6°41'	-57'	136°	5°58'	-57'	136°	5°15'	-57'	136°	4°31'	-58'	136°	3°48'	-58'	136°	3°05'	-58'	136°	12
13	6°27'	-57'	136°	5°44'	-57'	136°	5°01'	-57'	136°	4°17'	-57'	136°	3°34'	-58'	136°	2°50'	-58'	136°	2°07'	-58'	136°	13
14	5°30'	-57'	136°	4°47'	-57'	136°	4°03'	-57'	137°	3°20'	-57'	137°	2°36'	-58'	137°	1°52'	-58'	137°	1°09'	-58'	137°	14
15	4°33'	-57'	137°	3°50'	-57'	137°	3°06'	-57'	137°	2°22'	-57'	137°	1°38'	-58'	137°	0°55'	-58'	137°	0°11'	-58'	137°	15
16	3°37'	-57'	137°	2°53'	-57'	137°	2°09'	-57'	137°	1°25'	-57'	137°	0°41'	-58'	137°	0°03'	+58'	43°	0°47'	+58'	43°	16
17	2°40'	-57'	137°	1°56'	-57'	137°	1°12'	-57'	137°	0°27'	-57'	137°	0°17'	+58'	43°	1°01'	+58'	43°	1°45'	+58'	43°	17
18	1°43'	-57'	138°	0°59'	-57'	138°	0°14'	-57'	138°	0°30'	+57'	42°	1°15'	+58'	42°	1°59'	+58'	42°	2°43'	+58'	42°	18
19	0°46'	-57'	138°	0°02'	-57'	138°	0°43'	+57'	42°	1°28'	+57'	42°	2°12'	+58'	42°	2°57'	+58'	42°	3°41'	+58'	42°	19
20	0°11'	+57'	42°	0°55'	+57'	42°	1°40'	+57'	42°	2°25'	+57'	42°	3°10'	+58'	42°	3°55'	+58'	42°	4°39'	+58'	42°	20
21	1°07'	+57'	41°	1°52'	+57'	41°	2°38'	+57'	41°	3°23'	+57'	41°	4°08'	+58'	41°	4°52'	+58'	41°	5°37'	+58'	42°	21
22	2°04'	+57'	41°	2°50'	+57'	41°	3°35'	+57'	41°	4°20'	+57'	41°	5°05'	+58'	41°	5°50'	+58'	41°	6°35'	+58'	41°	22
23	3°01'	+57'	41°	3°47'	+57'	41°	4°32'	+57'	41°	5°17'	+57'	41°	6°03'	+58'	41°	6°48'	+58'	41°	7°33'	+58'	41°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

135° 225° LHA — Latitude SAME as DECLINATION — 135° 225° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

44° 316° LHA — Latitude CONTRARY to Declination — 44° 316° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	19°04'	-57'	133°	18°23'	-57'	133°	17°42'	-57'	133°	17°01'	-57'	133°	16°19'	-58'	134°	15°38'	-58'	134°	14°56'	-58'	134°	0
1	18°07'	-57'	133°	17°26'	-57'	133°	16°45'	-57'	134°	16°03'	-57'	134°	15°22'	-58'	134°	14°40'	-58'	134°	13°58'	-58'	134°	1
2	17°10'	-57'	133°	16°29'	-57'	134°	15°48'	-57'	134°	15°06'	-57'	134°	14°24'	-58'	134°	13°42'	-58'	134°	13°00'	-58'	135°	2
3	16°14'	-57'	134°	15°32'	-57'	134°	14°51'	-57'	134°	14°09'	-57'	134°	13°27'	-58'	134°	12°45'	-58'	135°	12°02'	-58'	135°	3
4	15°17'	-57'	134°	14°35'	-57'	134°	13°53'	-57'	134°	13°11'	-57'	135°	12°29'	-58'	135°	11°47'	-58'	135°	11°04'	-58'	135°	4
5	14°20'	-57'	134°	13°38'	-57'	135°	12°56'	-57'	135°	12°14'	-57'	135°	11°31'	-58'	135°	10°49'	-58'	135°	10°06'	-58'	135°	5
6	13°24'	-57'	135°	12°41'	-57'	135°	11°59'	-57'	135°	11°16'	-57'	135°	10°34'	-58'	135°	9°51'	-58'	135°	9°08'	-58'	136°	6
7	12°27'	-57'	135°	11°44'	-57'	135°	11°02'	-57'	135°	10°19'	-57'	136°	9°36'	-58'	136°	8°53'	-58'	136°	8°10'	-58'	136°	7
8	11°30'	-57'	135°	10°47'	-57'	136°	10°04'	-57'	136°	9°21'	-57'	136°	8°38'	-58'	136°	7°55'	-58'	136°	7°12'	-58'	136°	8
9	10°33'	-57'	136°	9°50'	-57'	136°	9°07'	-57'	136°	8°24'	-58'	136°	7°41'	-58'	136°	6°57'	-58'	136°	6°14'	-58'	136°	9
10	9°36'	-57'	136°	8°53'	-57'	136°	8°10'	-57'	136°	7°26'	-58'	136°	6°43'	-58'	136°	5°59'	-58'	137°	5°16'	-58'	137°	10
11	8°40'	-57'	136°	7°56'	-57'	136°	7°13'	-57'	137°	6°29'	-58'	137°	5°45'	-58'	137°	5°02'	-58'	137°	4°18'	-58'	137°	11
12	7°43'	-57'	137°	6°59'	-57'	137°	6°15'	-57'	137°	5°31'	-58'	137°	4°48'	-58'	137°	4°04'	-58'	137°	3°20'	-58'	137°	12
13	6°46'	-57'	137°	6°02'	-57'	137°	5°18'	-57'	137°	4°34'	-58'	137°	3°50'	-58'	137°	3°06'	-58'	137°	2°22'	-58'	137°	13
14	5°49'	-57'	137°	5°05'	-57'	137°	4°21'	-57'	137°	3°36'	-58'	138°	2°52'	-58'	138°	2°08'	-58'	138°	1°23'	-58'	138°	14
15	4°52'	-57'	138°	4°08'	-57'	138°	3°23'	-57'	138°	2°39'	-58'	138°	1°54'	-58'	138°	1°10'	-58'	138°	0°25'	-58'	138°	15
16	3°55'	-57'	138°	3°10'	-57'	138°	2°26'	-57'	138°	1°41'	-58'	138°	0°57'	-58'	138°	0°12'	-58'	138°	0°33'	+58'	42°	16
17	2°58'	-57'	138°	2°13'	-57'	138°	1°29'	-57'	138°	0°44'	-58'	138°	0°01'	+58'	42°	0°46'	+58'	42°	1°31'	+58'	42°	17
18	2°01'	-57'	139°	1°16'	-57'	139°	0°31'	-57'	139°	0°14'	+58'	41°	0°59'	+58'	41°	1°44'	+58'	41°	2°29'	+58'	41°	18
19	1°04'	-57'	139°	0°19'	-57'	139°	0°26'	+57'	41°	1°11'	+58'	41°	1°57'	+58'	41°	2°42'	+58'	41°	3°27'	+58'	41°	19
20	0°07'	-57'	139°	0°38'	+57'	41°	1°24'	+57'	41°	2°09'	+58'	41°	2°54'	+58'	41°	3°40'	+58'	41°	4°25'	+58'	41°	20
21	0°50'	+57'	40°	1°35'	+57'	40°	2°21'	+57'	40°	3°07'	+58'	41°	3°52'	+58'	41°	4°38'	+58'	41°	5°23'	+58'	41°	21
22	1°47'	+57'	40°	2°32'	+57'	40°	3°18'	+57'	40°	4°04'	+58'	40°	4°50'	+58'	40°	5°36'	+58'	40°	6°21'	+58'	40°	22
23	2°43'	+57'	40°	3°30'	+57'	40°	4°16'	+57'	40°	5°02'	+58'	40°	5°48'	+58'	40°	6°34'	+58'	40°	7°19'	+58'	40°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

136° 224° LHA — Latitude SAME as DECLINATION — 136° 224° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

43° 317° LHA — Latitude CONTRARY to Declination — 43° 317° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	19°24'	-57'	134°	18°42'	-57'	134°	18°00'	-57'	134°	17°18'	-57'	134°	16°36'	-58'	135°	15°54'	-58'	135°	15°12'	-58'	135°	0
1	18°27'	-57'	134°	17°45'	-57'	134°	17°03'	-57'	135°	16°21'	-57'	135°	15°39'	-58'	135°	14°56'	-58'	135°	14°14'	-58'	135°	1
2	17°30'	-57'	134°	16°48'	-57'	135°	16°06'	-57'	135°	15°23'	-57'	135°	14°41'	-58'	135°	13°58'	-58'	135°	13°16'	-58'	136°	2
3	16°33'	-57'	135°	15°51'	-57'	135°	15°09'	-57'	135°	14°26'	-57'	135°	13°43'	-58'	135°	13°00'	-58'	136°	12°17'	-58'	136°	3
4	15°37'	-57'	135°	14°54'	-57'	135°	14°11'	-57'	135°	13°28'	-58'	136°	12°46'	-58'	136°	12°03'	-58'	136°	11°19'	-58'	136°	4
5	14°40'	-57'	135°	13°57'	-57'	136°	13°14'	-57'	136°	12°31'	-58'	136°	11°48'	-58'	136°	11°05'	-58'	136°	10°21'	-58'	136°	5
6	13°43'	-57'	136°	13°00'	-57'	136°	12°17'	-57'	136°	11°33'	-58'	136°	10°50'	-58'	136°	10°07'	-58'	136°	9°23'	-58'	137°	6
7	12°46'	-57'	136°	12°03'	-57'	136°	11°19'	-57'	136°	10°36'	-58'	136°	9°52'	-58'	137°	9°09'	-58'	137°	8°25'	-58'	137°	7
8	11°49'	-57'	136°	11°06'	-57'	137°	10°22'	-57'	137°	9°38'	-58'	137°	8°55'	-58'	137°	8°11'	-58'	137°	7°27'	-58'	137°	8
9	10°52'	-57'	137°	10°08'	-57'	137°	9°25'	-57'	137°	8°41'	-58'	137°	7°57'	-58'	137°	7°13'	-58'	137°	6°29'	-58'	137°	9
10	9°55'	-57'	137°	9°11'	-57'	137°	8°27'	-57'	137°	7°43'	-58'	137°	6°59'	-58'	137°	6°15'	-58'	137°	5°31'	-58'	138°	10
11	8°58'	-57'	137°	8°14'	-57'	137°	7°30'	-57'	138°	6°46'	-58'	138°	6°01'	-58'	138°	5°17'	-58'	138°	4°32'	-58'	138°	11
12	8°01'	-57'	138°	7°17'	-57'	138°	6°32'	-57'	138°	5°48'	-58'	138°	5°03'	-58'	138°	4°19'	-58'	138°	3°34'	-58'	138°	12
13	7°04'	-57'	138°	6°20'	-57'	138°	5°35'	-57'	138°	4°50'	-58'	138°	4°06'	-58'	138°	3°21'	-58'	138°	2°36'	-58'	138°	13
14	6°07'	-57'	138°	5°22'	-57'	138°	4°38'	-57'	138°	3°53'	-58'	138°	3°08'	-58'	138°	2°23'	-58'	139°	1°38'	-58'	139°	14
15	5°10'	-57'	139°	4°25'	-57'	139°	3°40'	-57'	139°	2°55'	-58'	139°	2°10'	-58'	139°	1°25'	-58'	139°	0°40'	-58'	139°	15
16	4°13'	-57'	139°	3°28'	-57'	139°	2°43'	-57'	139°	1°57'	-58'	139°	1°12'	-58'	139°	0°27'	-58'	139°	0°19'	+58'	41°	16
17	3°16'	-57'	139°	2°31'	-57'	139°	1°45'	-57'	139°	1°00'	-58'	139°	0°14'	-58'	139°	0°31'	+58'	41°	1°17'	+58'	41°	17
18	2°19'	-57'	140°	1°33'	-57'	140°	0°48'	-57'	140°	0°02'	-58'	140°	0°44'	+58'	40°	1°29'	+58'	40°	2°15'	+58'	40°	18
19	1°22'	-57'	140°	0°36'	-57'	140°	0°10'	+57'	40°	0°56'	+58'	40°	1°41'	+58'	40°	2°27'	+58'	40°	3°13'	+58'	40°	19
20	0°25'	-57'	140°	0°21'	+57'	40°	1°07'	+57'	40°	1°53'	+58'	40°	2°39'	+58'	40°	3°25'	+58'	40°	4°11'	+58'	40°	20
21	0°32'	+57'	40°	1°18'	+57'	40°	2°05'	+57'	40°	2°51'	+58'	40°	3°37'	+58'	40°	4°23'	+58'	40°	5°09'	+58'	40°	21
22	1°29'	+57'	39°	2°16'	+57'	39°	3°02'	+57'	39°	3°48'	+58'	39°	4°35'	+58'	39°	5°21'	+58'	39°	6°08'	+58'	39°	22
23	2°26'	+57'	39°	3°13'	+57'	39°	3°59'	+57'	39°	4°46'	+58'	39°	5°33'	+58'	39°	6°19'	+58'	39°	7°06'	+58'	39°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

137° 223° LHA — Latitude SAME as DECLINATION — 137° 223° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

42° 318° LHA — Latitude CONTRARY to Declination — 42° 318° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	19°43'	-57'	135°	19°01'	-57'	135°	18°18'	-57'	135°	17°36'	-58'	135°	16°53'	-58'	136°	16°10'	-58'	136°	15°27'	-58'	136°	0
1	18°46'	-57'	135°	18°04'	-57'	135°	17°21'	-57'	135°	16°38'	-58'	136°	15°55'	-58'	136°	15°12'	-58'	136°	14°29'	-58'	136°	1
2	17°49'	-57'	135°	17°07'	-57'	136°	16°24'	-57'	136°	15°41'	-58'	136°	14°57'	-58'	136°	14°14'	-58'	136°	13°30'	-58'	137°	2
3	16°53'	-57'	136°	16°09'	-57'	136°	15°26'	-57'	136°	14°43'	-58'	136°	14°00'	-58'	136°	13°16'	-58'	137°	12°32'	-58'	137°	3
4	15°56'	-57'	136°	15°12'	-57'	136°	14°29'	-57'	136°	13°45'	-58'	137°	13°02'	-58'	137°	12°18'	-58'	137°	11°34'	-58'	137°	4
5	14°59'	-57'	136°	14°15'	-57'	137°	13°32'	-57'	137°	12°48'	-58'	137°	12°04'	-58'	137°	11°20'	-58'	137°	10°36'	-58'	137°	5
6	14°02'	-57'	137°	13°18'	-57'	137°	12°34'	-57'	137°	11°50'	-58'	137°	11°06'	-58'	137°	10°22'	-58'	137°	9°38'	-58'	138°	6
7	13°05'	-57'	137°	12°21'	-57'	137°	11°37'	-57'	137°	10°53'	-58'	137°	10°08'	-58'	138°	9°24'	-58'	138°	8°40'	-58'	138°	7
8	12°08'	-57'	137°	11°24'	-57'	137°	10°39'	-57'	138°	9°55'	-58'	138°	9°10'	-58'	138°	8°26'	-58'	138°	7°41'	-58'	138°	8
9	11°11'	-57'	138°	10°26'	-57'	138°	9°42'	-57'	138°	8°57'	-58'	138°	8°13'	-58'	138°	7°28'	-58'	138°	6°43'	-58'	138°	9
10	10°14'	-57'	138°	9°29'	-57'	138°	8°44'	-57'	138°	8°00'	-58'	138°	7°15'	-58'	138°	6°30'	-58'	138°	5°45'	-58'	139°	10
11	9°16'	-57'	138°	8°32'	-57'	138°	7°47'	-58'	138°	7°02'	-58'	139°	6°17'	-58'	139°	5°32'	-58'	139°	4°47'	-58'	139°	11
12	8°19'	-57'	139°	7°34'	-57'	139°	6°49'	-58'	139°	6°04'	-58'	139°	5°19'	-58'	139°	4°34'	-58'	139°	3°48'	-58'	139°	12
13	7°22'	-57'	139°	6°37'	-57'	139°	5°52'	-58'	139°	5°06'	-58'	139°	4°21'	-58'	139°	3°36'	-58'	139°	2°50'	-58'	139°	13
14	6°25'	-57'	139°	5°40'	-57'	139°	4°54'	-58'	139°	4°09'	-58'	139°	3°23'	-58'	139°	2°38'	-58'	139°	1°52'	-58'	139°	14
15	5°28'	-57'	140°	4°42'	-57'	140°	3°57'	-58'	140°	3°11'	-58'	140°	2°25'	-58'	140°	1°39'	-58'	140°	0°54'	-58'	140°	15
16	4°31'	-57'	140°	3°45'	-57'	140°	2°59'	-58'	140°	2°13'	-58'	140°	1°27'	-58'	140°	0°41'	-58'	140°	0°05'	+58'	40°	16
17	3°34'	-57'	140°	2°48'	-57'	140°	2°02'	-58'	140°	1°16'	-58'	140°	0°29'	-58'	140°	0°17'	+58'	40°	1°03'	+58'	40°	17
18	2°37'	-57'	140°	1°50'	-57'	140°	1°04'	-58'	140°	0°18'	-58'	140°	0°29'	+58'	40°	1°15'	+58'	40°	2°01'	+58'	40°	18
19	1°39'	-57'	141°	0°53'	-57'	141°	0°07'	-58'	141°	0°40'	+58'	39°	1°26'	+58'	39°	2°13'	+58'	39°	2°59'	+58'	39°	19
20	0°42'	-57'	141°	0°04'	+57'	39°	0°51'	+58'	39°	1°38'	+58'	39°	2°24'	+58'	39°	3°11'	+58'	39°	3°58'	+58'	39°	20
21	0°15'	+57'	39°	1°02'	+57'	39°	1°49'	+58'	39°	2°35'	+58'	39°	3°22'	+58'	39°	4°09'	+58'	39°	4°56'	+58'	39°	21
22	1°12'	+57'	38°	1°59'	+57'	38°	2°46'	+58'	38°	3°33'	+58'	38°	4°20'	+58'	38°	5°07'	+58'	39°	5°54'	+58'	39°	22
23	2°09'	+57'	38°	2°56'	+57'	38°	3°44'	+58'	38°	4°31'	+58'	38°	5°18'	+58'	38°	6°05'	+58'	38°	6°52'	+58'	38°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

138° 222° LHA — Latitude SAME as DECLINATION — 138° 222° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

41° 319° LHA — Latitude CONTRARY to Declination — 41° 319° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	20°02'	-57'	136°	19°19'	-57'	136°	18°36'	-57'	136°	17°53'	-58'	136°	17°09'	-58'	137°	16°25'	-58'	137°	15°42'	-58'	137°	0
1	19°05'	-57'	136°	18°22'	-57'	136°	17°39'	-57'	137°	16°55'	-58'	137°	16°11'	-58'	137°	15°27'	-58'	137°	14°43'	-58'	137°	1
2	18°08'	-57'	136°	17°25'	-57'	137°	16°41'	-57'	137°	15°57'	-58'	137°	15°13'	-58'	137°	14°29'	-58'	137°	13°45'	-58'	138°	2
3	17°11'	-57'	137°	16°28'	-57'	137°	15°44'	-57'	137°	15°00'	-58'	137°	14°16'	-58'	137°	13°31'	-58'	138°	12°47'	-58'	138°	3
4	16°14'	-57'	137°	15°30'	-57'	137°	14°46'	-57'	137°	14°02'	-58'	138°	13°18'	-58'	138°	12°33'	-58'	138°	11°49'	-58'	138°	4
5	15°17'	-57'	137°	14°33'	-57'	138°	13°49'	-58'	138°	13°04'	-58'	138°	12°20'	-58'	138°	11°35'	-58'	138°	10°50'	-58'	138°	5
6	14°20'	-57'	138°	13°36'	-57'	138°	12°51'	-58'	138°	12°07'	-58'	138°	11°22'	-58'	138°	10°37'	-58'	138°	9°52'	-58'	139°	6
7	13°23'	-57'	138°	12°38'	-57'	138°	11°54'	-58'	138°	11°09'	-58'	138°	10°24'	-58'	139°	9°39'	-58'	139°	8°54'	-58'	139°	7
8	12°26'	-57'	138°	11°41'	-57'	138°	10°56'	-58'	139°	10°11'	-58'	139°	9°26'	-58'	139°	8°41'	-58'	139°	7°56'	-58'	139°	8
9	11°29'	-57'	139°	10°44'	-57'	139°	9°59'	-58'	139°	9°13'	-58'	139°	8°28'	-58'	139°	7°43'	-58'	139°	6°57'	-58'	139°	9
10	10°32'	-57'	139°	9°46'	-57'	139°	9°01'	-58'	139°	8°16'	-58'	139°	7°30'	-58'	139°	6°45'	-58'	139°	5°59'	-58'	139°	10
11	9°34'	-57'	139°	8°49'	-57'	139°	8°03'	-58'	139°	7°18'	-58'	140°	6°32'	-58'	140°	5°46'	-58'	140°	5°01'	-58'	140°	11
12	8°37'	-57'	140°	7°52'	-57'	140°	7°06'	-58'	140°	6°20'	-58'	140°	5°34'	-58'	140°	4°48'	-58'	140°	4°02'	-58'	140°	12
13	7°40'	-57'	140°	6°54'	-57'	140°	6°08'	-58'	140°	5°22'	-58'	140°	4°36'	-58'	140°	3°50'	-58'	140°	3°04'	-58'	140°	13
14	6°43'	-57'	140°	5°57'	-57'	140°	5°11'	-58'	140°	4°24'	-58'	140°	3°38'	-58'	140°	2°52'	-58'	140°	2°06'	-58'	140°	14
15	5°46'	-57'	140°	4°59'	-57'	140°	4°13'	-58'	141°	3°27'	-58'	141°	2°40'	-58'	141°	1°54'	-58'	141°	1°07'	-58'	141°	15
16	4°48'	-57'	141°	4°02'	-57'	141°	3°15'	-58'	141°	2°29'	-58'	141°	1°42'	-58'	141°	0°56'	-58'	141°	0°09'	-58'	141°	16
17	3°51'	-57'	141°	3°04'	-57'	141°	2°18'	-58'	141°	1°31'	-58'	141°	0°44'	-58'	141°	0°02'	+58'	39°	0°49'	+58'	39°	17
18	2°54'	-57'	141°	2°07'	-57'	141°	1°20'	-58'	141°	0°33'	-58'	141°	0°14'	+58'	39°	1°01'	+58'	39°	1°48'	+58'	39°	18
19	1°56'	-57'	142°	1°09'	-57'	142°	0°22'	-58'	142°	0°25'	+58'	38°	1°12'	+58'	38°	1°59'	+58'	38°	2°46'	+58'	38°	19
20	0°59'	-57'	142°	0°12'	-57'	142°	0°35'	+58'	38°	1°22'	+58'	38°	2°10'	+58'	38°	2°57'	+58'	38°	3°44'	+58'	38°	20
21	0°02'	-57'	142°	0°45'	+57'	38°	1°33'	+58'	38°	2°20'	+58'	38°	3°08'	+58'	38°	3°55'	+58'	38°	4°42'	+58'	38°	21
22	0°55'	+57'	37°	1°43'	+57'	37°	2°31'	+58'	38°	3°18'	+58'	38°	4°06'	+58'	38°	4°53'	+58'	38°	5°41'	+58'	38°	22
23	1°53'	+57'	37°	2°40'	+57'	37°	3°28'	+58'	37°	4°16'	+58'	37°	5°04'	+58'	37°	5°51'	+58'	37°	6°39'	+58'	37°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

139° 221° LHA — Latitude SAME as DECLINATION — 139° 221° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

40° 320° LHA — Latitude CONTRARY to Declination — 40° 320° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	20°21'	-57'	137°	19°37'	-57'	137°	18°53'	-57'	137°	18°09'	-58'	137°	17°25'	-58'	138°	16°41'	-58'	138°	15°56'	-58'	138°	0
1	19°24'	-57'	137°	18°40'	-57'	137°	17°56'	-58'	138°	17°12'	-58'	138°	16°27'	-58'	138°	15°42'	-58'	138°	14°58'	-58'	138°	1
2	18°27'	-57'	137°	17°43'	-57'	138°	16°58'	-58'	138°	16°14'	-58'	138°	15°29'	-58'	138°	14°44'	-58'	138°	13°59'	-58'	139°	2
3	17°30'	-57'	138°	16°45'	-57'	138°	16°01'	-58'	138°	15°16'	-58'	138°	14°31'	-58'	138°	13°46'	-58'	139°	13°01'	-58'	139°	3
4	16°33'	-57'	138°	15°48'	-57'	138°	15°03'	-58'	138°	14°18'	-58'	139°	13°33'	-58'	139°	12°48'	-58'	139°	12°03'	-58'	139°	4
5	15°36'	-57'	138°	14°51'	-57'	139°	14°06'	-58'	139°	13°21'	-58'	139°	12°35'	-58'	139°	11°50'	-58'	139°	11°05'	-58'	139°	5
6	14°38'	-57'	139°	13°53'	-57'	139°	13°08'	-58'	139°	12°23'	-58'	139°	11°37'	-58'	139°	10°52'	-58'	139°	10°06'	-58'	140°	6
7	13°41'	-57'	139°	12°56'	-57'	139°	12°10'	-58'	139°	11°25'	-58'	139°	10°39'	-58'	140°	9°54'	-58'	140°	9°08'	-58'	140°	7
8	12°44'	-57'	139°	11°58'	-57'	139°	11°13'	-58'	140°	10°27'	-58'	140°	9°41'	-58'	140°	8°55'	-58'	140°	8°10'	-58'	140°	8
9	11°47'	-57'	140°	11°01'	-57'	140°	10°15'	-58'	140°	9°29'	-58'	140°	8°43'	-58'	140°	7°57'	-58'	140°	7°11'	-58'	140°	9
10	10°49'	-57'	140°	10°03'	-57'	140°	9°17'	-58'	140°	8°31'	-58'	140°	7°45'	-58'	140°	6°59'	-58'	140°	6°13'	-58'	140°	10
11	9°52'	-57'	140°	9°06'	-58'	140°	8°20'	-58'	140°	7°34'	-58'	140°	6°47'	-58'	141°	6°01'	-58'	141°	5°14'	-58'	141°	11
12	8°55'	-57'	140°	8°08'	-58'	141°	7°22'	-58'	141°	6°36'	-58'	141°	5°49'	-58'	141°	5°03'	-58'	141°	4°16'	-58'	141°	12
13	7°57'	-57'	141°	7°11'	-58'	141°	6°24'	-58'	141°	5°38'	-58'	141°	4°51'	-58'	141°	4°04'	-58'	141°	3°18'	-58'	141°	13
14	7°00'	-57'	141°	6°13'	-58'	141°	5°27'	-58'	141°	4°40'	-58'	141°	3°53'	-58'	141°	3°06'	-58'	141°	2°19'	-58'	141°	14
15	6°03'	-57'	141°	5°16'	-58'	141°	4°29'	-58'	141°	3°42'	-58'	142°	2°55'	-58'	142°	2°08'	-58'	142°	1°21'	-58'	142°	15
16	5°05'	-57'	142°	4°18'	-58'	142°	3°31'	-58'	142°	2°44'	-58'	142°	1°57'	-58'	142°	1°10'	-58'	142°	0°23'	-58'	142°	16
17	4°08'	-57'	142°	3°21'	-58'	142°	2°33'	-58'	142°	1°46'	-58'	142°	0°59'	-58'	142°	0°11'	-58'	142°	0°36'	+58'	38°	17
18	3°11'	-57'	142°	2°23'	-58'	142°	1°36'	-58'	142°	0°48'	-58'	142°	0°01'	-58'	142°	0°47'	+58'	38°	1°34'	+58'	38°	18
19	2°13'	-57'	143°	1°26'	-58'	143°	0°38'	-58'	143°	0°10'	+58'	37°	0°57'	+58'	37°	1°45'	+58'	37°	2°33'	+58'	37°	19
20	1°16'	-57'	143°	0°28'	-58'	143°	0°20'	+58'	37°	1°08'	+58'	37°	1°55'	+58'	37°	2°43'	+58'	37°	3°31'	+58'	37°	20
21	0°18'	-57'	143°	0°30'	+58'	37°	1°18'	+58'	37°	2°06'	+58'	37°	2°53'	+58'	37°	3°41'	+58'	37°	4°29'	+58'	37°	21
22	0°39'	+57'	37°	1°27'	+58'	37°	2°15'	+58'	37°	3°03'	+58'	37°	3°52'	+58'	37°	4°40'	+58'	37°	5°28'	+58'	37°	22
23	1°36'	+57'	36°	2°25'	+58'	36°	3°13'	+58'	36°	4°01'	+58'	36°	4°50'	+58'	36°	5°38'	+58'	36°	6°26'	+58'	37°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

140° 220° LHA — Latitude SAME as DECLINATION — 140° 220° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

39° 321° LHA — Latitude CONTRARY to Declination — 39° 321° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	20°40'	-57'	138°	19°55'	-57'	138°	19°10'	-58'	138°	18°26'	-58'	138°	17°41'	-58'	139°	16°56'	-58'	139°	16°10'	-58'	139°	0
1	19°42'	-57'	138°	18°58'	-57'	138°	18°13'	-58'	139°	17°28'	-58'	139°	16°43'	-58'	139°	15°57'	-58'	139°	15°12'	-58'	139°	1
2	18°45'	-57'	138°	18°00'	-57'	139°	17°15'	-58'	139°	16°30'	-58'	139°	15°45'	-58'	139°	14°59'	-58'	139°	14°14'	-58'	140°	2
3	17°48'	-57'	139°	17°03'	-57'	139°	16°18'	-58'	139°	15°32'	-58'	139°	14°47'	-58'	139°	14°01'	-58'	140°	13°15'	-58'	140°	3
4	16°51'	-57'	139°	16°05'	-57'	139°	15°20'	-58'	139°	14°34'	-58'	140°	13°49'	-58'	140°	13°03'	-58'	140°	12°17'	-58'	140°	4
5	15°53'	-57'	139°	15°08'	-58'	140°	14°22'	-58'	140°	13°36'	-58'	140°	12°51'	-58'	140°	12°05'	-58'	140°	11°18'	-58'	140°	5
6	14°56'	-57'	140°	14°10'	-58'	140°	13°25'	-58'	140°	12°39'	-58'	140°	11°52'	-58'	140°	11°06'	-58'	140°	10°20'	-58'	140°	6
7	13°59'	-57'	140°	13°13'	-58'	140°	12°27'	-58'	140°	11°41'	-58'	140°	10°54'	-58'	140°	10°08'	-58'	141°	9°22'	-58'	141°	7
8	13°02'	-57'	140°	12°15'	-58'	140°	11°29'	-58'	141°	10°43'	-58'	141°	9°56'	-58'	141°	9°10'	-58'	141°	8°23'	-58'	141°	8
9	12°04'	-57'	141°	11°18'	-58'	141°	10°31'	-58'	141°	9°45'	-58'	141°	8°58'	-58'	141°	8°12'	-58'	141°	7°25'	-58'	141°	9
10	11°07'	-57'	141°	10°20'	-58'	141°	9°34'	-58'	141°	8°47'	-58'	141°	8°00'	-58'	141°	7°13'	-58'	141°	6°26'	-58'	141°	10
11	10°09'	-57'	141°	9°23'	-58'	141°	8°36'	-58'	141°	7°49'	-58'	141°	7°02'	-58'	142°	6°15'	-58'	142°	5°28'	-58'	142°	11
12	9°12'	-57'	141°	8°25'	-58'	142°	7°38'	-58'	142°	6°51'	-58'	142°	6°04'	-58'	142°	5°17'	-58'	142°	4°30'	-58'	142°	12
13	8°14'	-57'	142°	7°27'	-58'	142°	6°40'	-58'	142°	5°53'	-58'	142°	5°06'	-58'	142°	4°18'	-58'	142°	3°31'	-58'	142°	13
14	7°17'	-57'	142°	6°30'	-58'	142°	5°42'	-58'	142°	4°55'	-58'	142°	4°08'	-58'	142°	3°20'	-58'	142°	2°33'	-58'	142°	14
15	6°20'	-57'	142°	5°32'	-58'	142°	4°45'	-58'	142°	3°57'	-58'	142°	3°09'	-58'	142°	2°22'	-58'	143°	1°34'	-58'	143°	15
16	5°22'	-57'	143°	4°34'	-58'	143°	3°47'	-58'	143°	2°59'	-58'	143°	2°11'	-58'	143°	1°23'	-58'	143°	0°36'	-58'	143°	16
17	4°25'	-57'	143°	3°37'	-58'	143°	2°49'	-58'	143°	2°01'	-58'	143°	1°13'	-58'	143°	0°25'	-58'	143°	0°23'	+58'	37°	17
18	3°27'	-57'	143°	2°39'	-58'	143°	1°51'	-58'	143°	1°03'	-58'	143°	0°15'	-58'	143°	0°33'	+58'	37°	1°21'	+58'	37°	18
19	2°30'	-57'	143°	1°41'	-58'	143°	0°53'	-58'	143°	0°05'	-58'	143°	0°43'	+58'	37°	1°31'	+58'	37°	2°20'	+58'	37°	19
20	1°32'	-57'	144°	0°44'	-58'	144°	0°05'	+58'	36°	0°53'	+58'	36°	1°41'	+58'	36°	2°30'	+58'	36°	3°18'	+58'	36°	20
21	0°35'	-57'	144°	0°14'	+58'	36°	1°02'	+58'	36°	1°51'	+58'	36°	2°40'	+58'	36°	3°28'	+58'	36°	4°17'	+58'	36°	21
22	0°23'	+57'	36°	1°12'	+58'	36°	2°00'	+58'	36°	2°49'	+58'	36°	3°38'	+58'	36°	4°26'	+58'	36°	5°15'	+58'	36°	22
23	1°20'	+57'	35°	2°09'	+58'	35°	2°58'	+58'	35°	3°47'	+58'	35°	4°36'	+58'	36°	5°25'	+58'	36°	6°13'	+58'	36°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

141° 219° LHA — Latitude SAME as DECLINATION — 141° 219° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

38° 322° LHA — Latitude CONTRARY to Declination — 38° 322° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	20°58'	-57'	139°	20°13'	-57'	139°	19°27'	-58'	139°	18°42'	-58'	139°	17°56'	-58'	140°	17°10'	-58'	140°	16°24'	-58'	140°	0
1	20°00'	-57'	139°	19°15'	-58'	139°	18°29'	-58'	140°	17°44'	-58'	140°	16°58'	-58'	140°	16°12'	-58'	140°	15°26'	-58'	140°	1
2	19°03'	-57'	139°	18°18'	-58'	140°	17°32'	-58'	140°	16°46'	-58'	140°	16°00'	-58'	140°	15°14'	-58'	140°	14°27'	-58'	141°	2
3	18°06'	-57'	140°	17°20'	-58'	140°	16°34'	-58'	140°	15°48'	-58'	140°	15°02'	-58'	140°	14°15'	-58'	141°	13°29'	-58'	141°	3
4	17°08'	-57'	140°	16°22'	-58'	140°	15°36'	-58'	140°	14°50'	-58'	141°	14°04'	-58'	141°	13°17'	-58'	141°	12°31'	-58'	141°	4
5	16°11'	-57'	140°	15°25'	-58'	140°	14°38'	-58'	141°	13°52'	-58'	141°	13°05'	-58'	141°	12°19'	-58'	141°	11°32'	-58'	141°	5
6	15°14'	-57'	141°	14°27'	-58'	141°	13°41'	-58'	141°	12°54'	-58'	141°	12°07'	-58'	141°	11°21'	-58'	141°	10°34'	-58'	141°	6
7	14°16'	-57'	141°	13°30'	-58'	141°	12°43'	-58'	141°	11°56'	-58'	141°	11°09'	-58'	141°	10°22'	-58'	142°	9°35'	-58'	142°	7
8	13°19'	-57'	141°	12°32'	-58'	141°	11°45'	-58'	141°	10°58'	-58'	142°	10°11'	-58'	142°	9°24'	-58'	142°	8°37'	-58'	142°	8
9	12°21'	-58'	142°	11°34'	-58'	142°	10°47'	-58'	142°	10°00'	-58'	142°	9°13'	-58'	142°	8°26'	-58'	142°	7°38'	-58'	142°	9
10	11°24'	-58'	142°	10°37'	-58'	142°	9°49'	-58'	142°	9°02'	-58'	142°	8°15'	-58'	142°	7°27'	-58'	142°	6°40'	-59'	142°	10
11	10°26'	-58'	142°	9°39'	-58'	142°	8°51'	-58'	142°	8°04'	-58'	142°	7°16'	-58'	142°	6°29'	-58'	143°	5°41'	-59'	143°	11
12	9°29'	-58'	142°	8°41'	-58'	142°	7°54'	-58'	143°	7°06'	-58'	143°	6°18'	-58'	143°	5°30'	-58'	143°	4°43'	-59'	143°	12
13	8°31'	-58'	143°	7°43'	-58'	143°	6°56'	-58'	143°	6°08'	-58'	143°	5°20'	-58'	143°	4°32'	-58'	143°	3°44'	-59'	143°	13
14	7°34'	-58'	143°	6°46'	-58'	143°	5°58'	-58'	143°	5°10'	-58'	143°	4°22'	-58'	143°	3°34'	-58'	143°	2°46'	-59'	143°	14
15	6°36'	-58'	143°	5°48'	-58'	143°	5°00'	-58'	143°	4°12'	-58'	143°	3°24'	-58'	143°	2°35'	-58'	143°	1°47'	-59'	143°	15
16	5°38'	-58'	144°	4°50'	-58'	144°	4°02'	-58'	144°	3°14'	-58'	144°	2°25'	-58'	144°	1°37'	-58'	144°	0°49'	-59'	144°	16
17	4°41'	-58'	144°	3°52'	-58'	144°	3°04'	-58'	144°	2°16'	-58'	144°	1°27'	-58'	144°	0°39'	-58'	144°	0°10'	+59'	36°	17
18	3°43'	-58'	144°	2°55'	-58'	144°	2°06'	-58'	144°	1°17'	-58'	144°	0°29'	-58'	144°	0°20'	+58'	36°	1°08'	+59'	36°	18
19	2°46'	-58'	144°	1°57'	-58'	144°	1°08'	-58'	144°	0°19'	-58'	144°	0°29'	+58'	36°	1°18'	+58'	36°	2°07'	+59'	36°	19
20	1°48'	-58'	145°	0°59'	-58'	145°	0°10'	-58'	145°	0°39'	+58'	35°	1°28'	+58'	35°	2°17'	+58'	35°	3°06'	+59'	35°	20
21	0°50'	-58'	145°	0°01'	-58'	145°	0°48'	+58'	35°	1°37'	+58'	35°	2°26'	+58'	35°	3°15'	+58'	35°	4°04'	+59'	35°	21
22	0°07'	+58'	35°	0°56'	+58'	35°	1°46'	+58'	35°	2°35'	+58'	35°	3°24'	+58'	35°	4°13'	+58'	35°	5°03'	+59'	35°	22
23	1°05'	+58'	35°	1°54'	+58'	35°	2°44'	+58'	35°	3°33'	+58'	35°	4°22'	+58'	35°	5°12'	+58'	35°	6°01'	+59'	35°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

142° 218° LHA — Latitude SAME as DECLINATION — 142° 218° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

37° 323° LHA — Latitude CONTRARY to Declination — 37° 323° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	21°15'	-57'	140°	20°30'	-58'	140°	19°44'	-58'	140°	18°57'	-58'	140°	18°11'	-58'	141°	17°24'	-58'	141°	16°38'	-58'	141°	0
1	20°18'	-57'	140°	19°32'	-58'	140°	18°46'	-58'	141°	17°59'	-58'	141°	17°13'	-58'	141°	16°26'	-58'	141°	15°39'	-58'	141°	1
2	19°21'	-57'	140°	18°34'	-58'	141°	17°48'	-58'	141°	17°01'	-58'	141°	16°15'	-58'	141°	15°28'	-58'	141°	14°41'	-58'	142°	2
3	18°23'	-57'	141°	17°37'	-58'	141°	16°50'	-58'	141°	16°03'	-58'	141°	15°16'	-58'	141°	14°29'	-58'	142°	13°42'	-59'	142°	3
4	17°26'	-58'	141°	16°39'	-58'	141°	15°52'	-58'	141°	15°05'	-58'	142°	14°18'	-58'	142°	13°31'	-58'	142°	12°44'	-59'	142°	4
5	16°28'	-58'	141°	15°41'	-58'	141°	14°54'	-58'	142°	14°07'	-58'	142°	13°20'	-58'	142°	12°33'	-58'	142°	11°45'	-59'	142°	5
6	15°31'	-58'	142°	14°44'	-58'	142°	13°57'	-58'	142°	13°09'	-58'	142°	12°22'	-58'	142°	11°34'	-58'	142°	10°47'	-59'	142°	6
7	14°33'	-58'	142°	13°46'	-58'	142°	12°59'	-58'	142°	12°11'	-58'	142°	11°24'	-58'	142°	10°36'	-58'	143°	9°48'	-59'	143°	7
8	13°36'	-58'	142°	12°48'	-58'	142°	12°01'	-58'	142°	11°13'	-58'	143°	10°25'	-58'	143°	9°38'	-58'	143°	8°50'	-59'	143°	8
9	12°38'	-58'	142°	11°50'	-58'	143°	11°03'	-58'	143°	10°15'	-58'	143°	9°27'	-58'	143°	8°39'	-58'	143°	7°51'	-59'	143°	9
10	11°40'	-58'	143°	10°53'	-58'	143°	10°05'	-58'	143°	9°17'	-58'	143°	8°29'	-58'	143°	7°41'	-58'	143°	6°53'	-59'	143°	10
11	10°43'	-58'	143°	9°55'	-58'	143°	9°07'	-58'	143°	8°19'	-58'	143°	7°31'	-58'	143°	6°42'	-58'	143°	5°54'	-59'	144°	11
12	9°45'	-58'	143°	8°57'	-58'	143°	8°09'	-58'	144°	7°21'	-58'	144°	6°32'	-58'	144°	5°44'	-58'	144°	4°55'	-59'	144°	12
13	8°48'	-58'	144°	7°59'	-58'	144°	7°11'	-58'	144°	6°22'	-58'	144°	5°34'	-58'	144°	4°45'	-58'	144°	3°57'	-59'	144°	13
14	7°50'	-58'	144°	7°01'	-58'	144°	6°13'	-58'	144°	5°24'	-58'	144°	4°36'	-58'	144°	3°47'	-58'	144°	2°58'	-59'	144°	14
15	6°52'	-58'	144°	6°04'	-58'	144°	5°15'	-58'	144°	4°26'	-58'	144°	3°37'	-58'	144°	2°49'	-58'	144°	2°00'	-59'	144°	15
16	5°54'	-58'	144°	5°06'	-58'	144°	4°17'	-58'	145°	3°28'	-58'	145°	2°39'	-58'	145°	1°50'	-58'	145°	1°01'	-59'	145°	16
17	4°57'	-58'	145°	4°08'	-58'	145°	3°19'	-58'	145°	2°30'	-58'	145°	1°41'	-58'	145°	0°52'	-58'	145°	0°03'	-59'	145°	17
18	3°59'	-58'	145°	3°10'	-58'	145°	2°21'	-58'	145°	1°32'	-58'	145°	0°42'	-58'	145°	0°07'	+58'	35°	0°56'	+59'	35°	18
19	3°01'	-58'	145°	2°12'	-58'	145°	1°23'	-58'	145°	0°33'	-58'	145°	0°16'	+58'	35°	1°05'	+58'	35°	1°55'	+59'	35°	19
20	2°04'	-58'	146°	1°14'	-58'	146°	0°25'	-58'	146°	0°25'	+58'	34°	1°14'	+58'	34°	2°04'	+58'	34°	2°53'	+59'	34°	20
21	1°06'	-58'	146°	0°16'	-58'	146°	0°33'	+58'	34°	1°23'	+58'	34°	2°13'	+58'	34°	3°02'	+58'	34°	3°52'	+59'	34°	21
22	0°08'	-58'	146°	0°42'	+58'	34°	1°31'	+58'	34°	2°21'	+58'	34°	3°11'	+58'	34°	4°01'	+58'	34°	4°50'	+59'	34°	22
23	0°49'	+58'	34°	1°39'	+58'	34°	2°29'	+58'	34°	3°19'	+58'	34°	4°09'	+58'	34°	4°59'	+58'	34°	5°49'	+59'	34°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

143° 217° LHA — Latitude SAME as DECLINATION — 143° 217° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

36° 324° LHA — Latitude CONTRARY to Declination — 36° 324° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	21°33'	-57'	141°	20°46'	-58'	141°	20°00'	-58'	141°	19°13'	-58'	142°	18°26'	-58'	142°	17°39'	-58'	142°	16°51'	-59'	142°	0
1	20°35'	-58'	141°	19°49'	-58'	141°	19°02'	-58'	142°	18°15'	-58'	142°	17°27'	-58'	142°	16°40'	-58'	142°	15°53'	-59'	142°	1
2	19°38'	-58'	141°	18°51'	-58'	142°	18°04'	-58'	142°	17°17'	-58'	142°	16°29'	-58'	142°	15°42'	-58'	142°	14°54'	-59'	143°	2
3	18°40'	-58'	142°	17°53'	-58'	142°	17°06'	-58'	142°	16°18'	-58'	142°	15°31'	-58'	142°	14°43'	-58'	143°	13°56'	-59'	143°	3
4	17°43'	-58'	142°	16°55'	-58'	142°	16°08'	-58'	142°	15°20'	-58'	143°	14°33'	-58'	143°	13°45'	-58'	143°	12°57'	-59'	143°	4
5	16°45'	-58'	142°	15°58'	-58'	142°	15°10'	-58'	143°	14°22'	-58'	143°	13°34'	-58'	143°	12°46'	-58'	143°	11°58'	-59'	143°	5
6	15°47'	-58'	143°	15°00'	-58'	143°	14°12'	-58'	143°	13°24'	-58'	143°	12°36'	-58'	143°	11°48'	-58'	143°	11°00'	-59'	143°	6
7	14°50'	-58'	143°	14°02'	-58'	143°	13°14'	-58'	143°	12°26'	-58'	143°	11°38'	-58'	143°	10°49'	-58'	144°	10°01'	-59'	144°	7
8	13°52'	-58'	143°	13°04'	-58'	143°	12°16'	-58'	143°	11°28'	-58'	144°	10°39'	-58'	144°	9°51'	-58'	144°	9°03'	-59'	144°	8
9	12°54'	-58'	143°	12°06'	-58'	144°	11°18'	-58'	144°	10°30'	-58'	144°	9°41'	-58'	144°	8°53'	-58'	144°	8°04'	-59'	144°	9
10	11°57'	-58'	144°	11°08'	-58'	144°	10°20'	-58'	144°	9°31'	-58'	144°	8°43'	-58'	144°	7°54'	-59'	144°	7°05'	-59'	144°	10
11	10°59'	-58'	144°	10°10'	-58'	144°	9°22'	-58'	144°	8°33'	-58'	144°	7°44'	-58'	144°	6°56'	-59'	144°	6°07'	-59'	145°	11
12	10°01'	-58'	144°	9°13'	-58'	144°	8°24'	-58'	144°	7°35'	-58'	145°	6°46'	-58'	145°	5°57'	-59'	145°	5°08'	-59'	145°	12
13	9°03'	-58'	145°	8°15'	-58'	145°	7°26'	-58'	145°	6°37'	-58'	145°	5°48'	-58'	145°	4°59'	-59'	145°	4°09'	-59'	145°	13
14	8°06'	-58'	145°	7°17'	-58'	145°	6°28'	-58'	145°	5°38'	-58'	145°	4°49'	-58'	145°	4°00'	-59'	145°	3°11'	-59'	145°	14
15	7°08'	-58'	145°	6°19'	-58'	145°	5°29'	-58'	145°	4°40'	-58'	145°	3°51'	-58'	145°	3°01'	-59'	145°	2°12'	-59'	145°	15
16	6°10'	-58'	145°	5°21'	-58'	145°	4°31'	-58'	145°	3°42'	-58'	146°	2°52'	-58'	146°	2°03'	-59'	146°	1°13'	-59'	146°	16
17	5°12'	-58'	146°	4°23'	-58'	146°	3°33'	-58'	146°	2°44'	-58'	146°	1°54'	-58'	146°	1°04'	-59'	146°	0°15'	-59'	146°	17
18	4°15'	-58'	146°	3°25'	-58'	146°	2°35'	-58'	146°	1°45'	-58'	146°	0°56'	-58'	146°	0°06'	-59'	146°	0°44'	+59'	34°	18
19	3°17'	-58'	146°	2°27'	-58'	146°	1°37'	-58'	146°	0°47'	-58'	146°	0°03'	+58'	34°	0°53'	+59'	34°	1°43'	+59'	34°	19
20	2°19'	-58'	146°	1°29'	-58'	146°	0°39'	-58'	146°	0°11'	+58'	34°	1°01'	+58'	34°	1°51'	+59'	34°	2°41'	+59'	34°	20
21	1°21'	-58'	147°	0°31'	-58'	147°	0°19'	+58'	33°	1°09'	+58'	33°	2°00'	+58'	33°	2°50'	+59'	33°	3°40'	+59'	33°	21
22	0°23'	-58'	147°	0°27'	+58'	33°	1°17'	+58'	33°	2°08'	+58'	33°	2°58'	+58'	33°	3°48'	+59'	33°	4°38'	+59'	33°	22
23	0°35'	+58'	33°	1°25'	+58'	33°	2°15'	+58'	33°	3°06'	+58'	33°	3°56'	+58'	33°	4°47'	+59'	33°	5°37'	+59'	33°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

144° 216° LHA — Latitude SAME as DECLINATION — 144° 216° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

35° 325° LHA — Latitude CONTRARY to Declination — 35° 325° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	21°50'	-58'	142°	21°03'	-58'	142°	20°15'	-58'	142°	19°28'	-58'	143°	18°40'	-58'	143°	17°52'	-58'	143°	17°04'	-59'	143°	0
1	20°52'	-58'	142°	20°05'	-58'	142°	19°17'	-58'	143°	18°30'	-58'	143°	17°42'	-58'	143°	16°54'	-58'	143°	16°06'	-59'	143°	1
2	19°55'	-58'	142°	19°07'	-58'	143°	18°19'	-58'	143°	17°31'	-58'	143°	16°43'	-58'	143°	15°55'	-58'	143°	15°07'	-59'	144°	2
3	18°57'	-58'	143°	18°09'	-58'	143°	17°21'	-58'	143°	16°33'	-58'	143°	15°45'	-58'	143°	14°57'	-59'	144°	14°08'	-59'	144°	3
4	17°59'	-58'	143°	17°11'	-58'	143°	16°23'	-58'	143°	15°35'	-58'	144°	14°47'	-58'	144°	13°58'	-59'	144°	13°10'	-59'	144°	4
5	17°02'	-58'	143°	16°13'	-58'	143°	15°25'	-58'	144°	14°37'	-58'	144°	13°48'	-58'	144°	13°00'	-59'	144°	12°11'	-59'	144°	5
6	16°04'	-58'	144°	15°16'	-58'	144°	14°27'	-58'	144°	13°39'	-58'	144°	12°50'	-58'	144°	12°01'	-59'	144°	11°12'	-59'	144°	6
7	15°06'	-58'	144°	14°18'	-58'	144°	13°29'	-58'	144°	12°40'	-58'	144°	11°52'	-58'	144°	11°03'	-59'	145°	10°14'	-59'	145°	7
8	14°08'	-58'	144°	13°20'	-58'	144°	12°31'	-58'	144°	11°42'	-58'	145°	10°53'	-58'	145°	10°04'	-59'	145°	9°15'	-59'	145°	8
9	13°10'	-58'	144°	12°22'	-58'	145°	11°33'	-58'	145°	10°44'	-58'	145°	9°55'	-58'	145°	9°06'	-59'	145°	8°16'	-59'	145°	9
10	12°13'	-58'	145°	11°24'	-58'	145°	10°35'	-58'	145°	9°45'	-58'	145°	8°56'	-58'	145°	8°07'	-59'	145°	7°18'	-59'	145°	10
11	11°15'	-58'	145°	10°26'	-58'	145°	9°36'	-58'	145°	8°47'	-58'	145°	7°58'	-58'	145°	7°08'	-59'	145°	6°19'	-59'	145°	11
12	10°17'	-58'	145°	9°28'	-58'	145°	8°38'	-58'	145°	7°49'	-58'	146°	6°59'	-58'	146°	6°10'	-59'	146°	5°20'	-59'	146°	12
13	9°19'	-58'	146°	8°30'	-58'	146°	7°40'	-58'	146°	6°51'	-58'	146°	6°01'	-58'	146°	5°11'	-59'	146°	4°22'	-59'	146°	13
14	8°21'	-58'	146°	7°32'	-58'	146°	6°42'	-58'	146°	5°52'	-58'	146°	5°02'	-58'	146°	4°13'	-59'	146°	3°23'	-59'	146°	14
15	7°23'	-58'	146°	6°34'	-58'	146°	5°44'	-58'	146°	4°54'	-58'	146°	4°04'	-58'	146°	3°14'	-59'	146°	2°24'	-59'	146°	15
16	6°25'	-58'	146°	5°36'	-58'	146°	4°46'	-58'	146°	3°56'	-58'	146°	3°06'	-58'	146°	2°16'	-59'	147°	1°25'	-59'	147°	16
17	5°28'	-58'	147°	4°37'	-58'	147°	3°47'	-58'	147°	2°57'	-58'	147°	2°07'	-58'	147°	1°17'	-59'	147°	0°27'	-59'	147°	17
18	4°30'	-58'	147°	3°39'	-58'	147°	2°49'	-58'	147°	1°59'	-58'	147°	1°09'	-58'	147°	0°18'	-59'	147°	0°32'	+59'	33°	18
19	3°32'	-58'	147°	2°41'	-58'	147°	1°51'	-58'	147°	1°01'	-58'	147°	0°10'	-58'	147°	0°40'	+59'	33°	1°31'	+59'	33°	19
20	2°34'	-58'	147°	1°43'	-58'	147°	0°53'	-58'	147°	0°02'	-58'	147°	0°48'	+58'	33°	1°39'	+59'	33°	2°29'	+59'	33°	20
21	1°36'	-58'	148°	0°45'	-58'	148°	0°05'	+58'	32°	0°56'	+58'	32°	1°47'	+58'	32°	2°37'	+59'	32°	3°28'	+59'	32°	21
22	0°38'	-58'	148°	0°13'	+58'	32°	1°04'	+58'	32°	1°55'	+58'	32°	2°45'	+58'	32°	3°36'	+59'	32°	4°27'	+59'	32°	22
23	0°20'	+58'	32°	1°11'	+58'	32°	2°02'	+58'	32°	2°53'	+58'	32°	3°44'	+58'	32°	4°35'	+59'	32°	5°26'	+59'	32°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

145° 215° LHA — Latitude SAME as DECLINATION — 145° 215° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

34° 326° LHA — Latitude CONTRARY to Declination — 34° 326° LHA

Dec°	63 Hc°	d'	Z°	64 Hc°	d'	Z°	65 Hc°	d'	Z°	66 Hc°	d'	Z°	67 Hc°	d'	Z°	68 Hc°	d'	Z°	69 Hc°	d'	Z°	Dec°
0	22°07'	-58'	143°	21°19'	-58'	143°	20°31'	-58'	143°	19°42'	-58'	144°	18°54'	-58'	144°	18°06'	-59'	144°	17°17'	-59'	144°	0
1	21°09'	-58'	143°	20°21'	-58'	143°	19°33'	-58'	144°	18°44'	-58'	144°	17°56'	-58'	144°	17°07'	-59'	144°	16°18'	-59'	144°	1
2	20°11'	-58'	143°	19°23'	-58'	144°	18°34'	-58'	144°	17°46'	-58'	144°	16°57'	-58'	144°	16°09'	-59'	144°	15°20'	-59'	145°	2
3	19°13'	-58'	144°	18°25'	-58'	144°	17°36'	-58'	144°	16°48'	-58'	144°	15°59'	-58'	144°	15°10'	-59'	145°	14°21'	-59'	145°	3
4	18°16'	-58'	144°	17°27'	-58'	144°	16°38'	-58'	144°	15°49'	-58'	145°	15°00'	-58'	145°	14°11'	-59'	145°	13°22'	-59'	145°	4
5	17°18'	-58'	144°	16°29'	-58'	144°	15°40'	-58'	145°	14°51'	-58'	145°	14°02'	-58'	145°	13°13'	-59'	145°	12°24'	-59'	145°	5
6	16°20'	-58'	145°	15°31'	-58'	145°	14°42'	-58'	145°	13°53'	-58'	145°	13°03'	-58'	145°	12°14'	-59'	145°	11°25'	-59'	145°	6
7	15°22'	-58'	145°	14°33'	-58'	145°	13°44'	-58'	145°	12°54'	-58'	145°	12°05'	-58'	145°	11°16'	-59'	146°	10°26'	-59'	146°	7
8	14°24'	-58'	145°	13°35'	-58'	145°	12°45'	-58'	145°	11°56'	-58'	146°	11°07'	-58'	146°	10°17'	-59'	146°	9°27'	-59'	146°	8
9	13°26'	-58'	145°	12°37'	-58'	146°	11°47'	-58'	146°	10°58'	-58'	146°	10°08'	-59'	146°	9°18'	-59'	146°	8°29'	-59'	146°	9
10	12°28'	-58'	146°	11°39'	-58'	146°	10°49'	-58'	146°	9°59'	-58'	146°	9°10'	-59'	146°	8°20'	-59'	146°	7°30'	-59'	146°	10
11	11°30'	-58'	146°	10°41'	-58'	146°	9°51'	-58'	146°	9°01'	-58'	146°	8°11'	-59'	146°	7°21'	-59'	146°	6°31'	-59'	146°	11
12	10°32'	-58'	146°	9°42'	-58'	146°	8°52'	-58'	146°	8°03'	-58'	146°	7°12'	-59'	147°	6°22'	-59'	147°	5°32'	-59'	147°	12
13	9°34'	-58'	146°	8°44'	-58'	147°	7°54'	-58'	147°	7°04'	-58'	147°	6°14'	-59'	147°	5°24'	-59'	147°	4°34'	-59'	147°	13
14	8°36'	-58'	147°	7°46'	-58'	147°	6°56'	-58'	147°	6°06'	-58'	147°	5°15'	-59'	147°	4°25'	-59'	147°	3°35'	-59'	147°	14
15	7°38'	-58'	147°	6°48'	-58'	147°	5°58'	-58'	147°	5°07'	-58'	147°	4°17'	-59'	147°	3°26'	-59'	147°	2°36'	-59'	147°	15
16	6°40'	-58'	147°	5°50'	-58'	147°	4°59'	-58'	147°	4°09'	-58'	147°	3°18'	-59'	147°	2°28'	-59'	147°	1°37'	-59'	147°	16
17	5°42'	-58'	147°	4°52'	-58'	148°	4°01'	-58'	148°	3°10'	-58'	148°	2°20'	-59'	148°	1°29'	-59'	148°	0°38'	-59'	148°	17
18	4°44'	-58'	148°	3°54'	-58'	148°	3°03'	-58'	148°	2°12'	-58'	148°	1°21'	-59'	148°	0°30'	-59'	148°	0°20'	+59'	32°	18
19	3°46'	-58'	148°	2°55'	-58'	148°	2°05'	-58'	148°	1°14'	-58'	148°	0°23'	-59'	148°	0°28'	+59'	32°	1°19'	+59'	32°	19
20	2°48'	-58'	148°	1°57'	-58'	148°	1°06'	-58'	148°	0°15'	-58'	148°	0°36'	+59'	32°	1°27'	+59'	32°	2°18'	+59'	32°	20
21	1°50'	-58'	149°	0°59'	-58'	149°	0°08'	-58'	149°	0°43'	+58'	31°	1°34'	+59'	31°	2°26'	+59'	32°	3°17'	+59'	32°	21
22	0°52'	-58'	149°	0°01'	-58'	149°	0°50'	+58'	31°	1°42'	+58'	31°	2°33'	+59'	31°	3°24'	+59'	31°	4°16'	+59'	31°	22
23	0°06'	+58'	31°	0°57'	+58'	31°	1°49'	+58'	31°	2°40'	+58'	31°	3°32'	+59'	31°	4°23'	+59'	31°	5°14'	+59'	31°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

146° 214° LHA — Latitude SAME as DECLINATION — 146° 214° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

33° 327° LHA — Latitude CONTRARY to Declination — 33° 327° LHA

Dec°	63 Hc°	d'	Z°	64 Hc°	d'	Z°	65 Hc°	d'	Z°	66 Hc°	d'	Z°	67 Hc°	d'	Z°	68 Hc°	d'	Z°	69 Hc°	d'	Z°	Dec°
0	22°23'	-58'	144°	21°34'	-58'	144°	20°46'	-58'	144°	19°57'	-58'	145°	19°08'	-58'	145°	18°19'	-59'	145°	17°29'	-59'	145°	0
1	21°25'	-58'	144°	20°36'	-58'	144°	19°47'	-58'	145°	18°58'	-58'	145°	18°09'	-58'	145°	17°20'	-59'	145°	16°31'	-59'	145°	1
2	20°27'	-58'	144°	19°38'	-58'	145°	18°49'	-58'	145°	18°00'	-58'	145°	17°11'	-59'	145°	16°21'	-59'	145°	15°32'	-59'	146°	2
3	19°29'	-58'	145°	18°40'	-58'	145°	17°51'	-58'	145°	17°02'	-58'	145°	16°12'	-59'	146°	15°23'	-59'	146°	14°33'	-59'	146°	3
4	18°31'	-58'	145°	17°42'	-58'	145°	16°53'	-58'	145°	16°03'	-58'	146°	15°14'	-59'	146°	14°24'	-59'	146°	13°34'	-59'	146°	4
5	17°33'	-58'	145°	16°44'	-58'	145°	15°54'	-58'	146°	15°05'	-58'	146°	14°15'	-59'	146°	13°25'	-59'	146°	12°36'	-59'	146°	5
6	16°35'	-58'	146°	15°46'	-58'	146°	14°56'	-58'	146°	14°07'	-58'	146°	13°17'	-59'	146°	12°27'	-59'	146°	11°37'	-59'	146°	6
7	15°37'	-58'	146°	14°48'	-58'	146°	13°58'	-58'	146°	13°08'	-58'	146°	12°18'	-59'	146°	11°28'	-59'	147°	10°38'	-59'	147°	7
8	14°39'	-58'	146°	13°50'	-58'	146°	13°00'	-58'	146°	12°10'	-58'	147°	11°20'	-59'	147°	10°29'	-59'	147°	9°39'	-59'	147°	8
9	13°41'	-58'	146°	12°51'	-58'	147°	12°01'	-58'	147°	11°11'	-58'	147°	10°21'	-59'	147°	9°31'	-59'	147°	8°40'	-59'	147°	9
10	12°43'	-58'	147°	11°53'	-58'	147°	11°03'	-58'	147°	10°13'	-58'	147°	9°22'	-59'	147°	8°32'	-59'	147°	7°42'	-59'	147°	10
11	11°45'	-58'	147°	10°55'	-58'	147°	10°05'	-58'	147°	9°14'	-58'	147°	8°24'	-59'	147°	7°33'	-59'	147°	6°43'	-59'	147°	11
12	10°47'	-58'	147°	9°57'	-58'	147°	9°06'	-58'	147°	8°16'	-58'	147°	7°25'	-59'	148°	6°35'	-59'	148°	5°44'	-59'	148°	12
13	9°49'	-58'	147°	8°59'	-58'	148°	8°08'	-58'	148°	7°17'	-58'	148°	6°27'	-59'	148°	5°36'	-59'	148°	4°45'	-59'	148°	13
14	8°51'	-58'	148°	8°00'	-58'	148°	7°10'	-58'	148°	6°19'	-58'	148°	5°28'	-59'	148°	4°37'	-59'	148°	3°46'	-59'	148°	14
15	7°53'	-58'	148°	7°02'	-58'	148°	6°11'	-58'	148°	5°20'	-58'	148°	4°29'	-59'	148°	3°38'	-59'	148°	2°47'	-59'	148°	15
16	6°55'	-58'	148°	6°04'	-58'	148°	5°13'	-58'	148°	4°22'	-59'	148°	3°31'	-59'	148°	2°40'	-59'	148°	1°49'	-59'	148°	16
17	5°57'	-58'	148°	5°06'	-58'	148°	4°15'	-58'	149°	3°23'	-59'	149°	2°32'	-59'	149°	1°41'	-59'	149°	0°50'	-59'	149°	17
18	4°59'	-58'	149°	4°07'	-58'	149°	3°16'	-58'	149°	2°25'	-59'	149°	1°34'	-59'	149°	0°42'	-59'	149°	0°09'	+59'	31°	18
19	4°01'	-58'	149°	3°09'	-58'	149°	2°18'	-58'	149°	1°26'	-59'	149°	0°35'	-59'	149°	0°17'	+59'	31°	1°08'	+59'	31°	19
20	3°02'	-58'	149°	2°11'	-58'	149°	1°19'	-58'	149°	0°28'	-59'	149°	0°24'	+59'	31°	1°15'	+59'	31°	2°07'	+59'	31°	20
21	2°04'	-58'	149°	1°13'	-58'	149°	0°21'	-58'	149°	0°31'	+59'	31°	1°22'	+59'	31°	2°14'	+59'	31°	3°06'	+59'	31°	21
22	1°06'	-58'	150°	0°14'	-58'	150°	0°37'	+58'	30°	1°29'	+59'	30°	2°21'	+59'	30°	3°13'	+59'	30°	4°04'	+59'	30°	22
23	0°08'	-58'	150°	0°44'	+58'	30°	1°36'	+58'	30°	2°28'	+59'	30°	3°20'	+59'	30°	4°11'	+59'	30°	5°03'	+59'	30°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

147° 213° LHA — Latitude SAME as DECLINATION — 147° 213° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

32° 328° LHA — Latitude CONTRARY to Declination — 32° 328° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	22°39'	-58'	145°	21°49'	-58'	145°	21°00'	-58'	145°	20°11'	-58'	146°	19°21'	-59'	146°	18°31'	-59'	146°	17°42'	-59'	146°	0
1	21°41'	-58'	145°	20°51'	-58'	145°	20°02'	-58'	146°	19°12'	-58'	146°	18°23'	-59'	146°	17°33'	-59'	146°	16°43'	-59'	146°	1
2	20°43'	-58'	146°	19°53'	-58'	146°	19°04'	-58'	146°	18°14'	-58'	146°	17°24'	-59'	146°	16°34'	-59'	146°	15°44'	-59'	147°	2
3	19°45'	-58'	146°	18°55'	-58'	146°	18°05'	-58'	146°	17°15'	-58'	146°	16°25'	-59'	147°	15°35'	-59'	147°	14°45'	-59'	147°	3
4	18°47'	-58'	146°	17°57'	-58'	146°	17°07'	-58'	146°	16°17'	-58'	147°	15°27'	-59'	147°	14°37'	-59'	147°	13°46'	-59'	147°	4
5	17°49'	-58'	146°	16°59'	-58'	146°	16°09'	-58'	147°	15°18'	-58'	147°	14°28'	-59'	147°	13°38'	-59'	147°	12°47'	-59'	147°	5
6	16°51'	-58'	147°	16°00'	-58'	147°	15°10'	-58'	147°	14°20'	-59'	147°	13°30'	-59'	147°	12°39'	-59'	147°	11°49'	-59'	147°	6
7	15°53'	-58'	147°	15°02'	-58'	147°	14°12'	-58'	147°	13°21'	-59'	147°	12°31'	-59'	147°	11°40'	-59'	148°	10°50'	-59'	148°	7
8	14°54'	-58'	147°	14°04'	-58'	147°	13°14'	-58'	147°	12°23'	-59'	148°	11°32'	-59'	148°	10°42'	-59'	148°	9°51'	-59'	148°	8
9	13°56'	-58'	147°	13°06'	-58'	147°	12°15'	-58'	148°	11°24'	-59'	148°	10°34'	-59'	148°	9°43'	-59'	148°	8°52'	-59'	148°	9
10	12°58'	-58'	148°	12°07'	-58'	148°	11°17'	-58'	148°	10°26'	-59'	148°	9°35'	-59'	148°	8°44'	-59'	148°	7°53'	-59'	148°	10
11	12°00'	-58'	148°	11°09'	-58'	148°	10°18'	-58'	148°	9°27'	-59'	148°	8°36'	-59'	148°	7°45'	-59'	148°	6°54'	-59'	148°	11
12	11°02'	-58'	148°	10°11'	-58'	148°	9°20'	-58'	148°	8°29'	-59'	148°	7°38'	-59'	148°	6°46'	-59'	149°	5°55'	-59'	149°	12
13	10°04'	-58'	148°	9°13'	-58'	148°	8°21'	-58'	149°	7°30'	-59'	149°	6°39'	-59'	149°	5°48'	-59'	149°	4°56'	-59'	149°	13
14	9°06'	-58'	149°	8°14'	-58'	149°	7°23'	-58'	149°	6°32'	-59'	149°	5°40'	-59'	149°	4°49'	-59'	149°	3°58'	-59'	149°	14
15	8°07'	-58'	149°	7°16'	-58'	149°	6°25'	-58'	149°	5°33'	-59'	149°	4°42'	-59'	149°	3°50'	-59'	149°	2°59'	-59'	149°	15
16	7°09'	-58'	149°	6°18'	-58'	149°	5°26'	-58'	149°	4°34'	-59'	149°	3°43'	-59'	149°	2°51'	-59'	149°	2°00'	-59'	149°	16
17	6°11'	-58'	149°	5°19'	-58'	149°	4°28'	-58'	149°	3°36'	-59'	149°	2°44'	-59'	150°	1°53'	-59'	150°	1°01'	-59'	150°	17
18	5°13'	-58'	150°	4°21'	-58'	150°	3°29'	-58'	150°	2°37'	-59'	150°	1°46'	-59'	150°	0°54'	-59'	150°	0°02'	-59'	150°	18
19	4°14'	-58'	150°	3°23'	-58'	150°	2°31'	-58'	150°	1°39'	-59'	150°	0°47'	-59'	150°	0°05'	+59'	30°	0°57'	+59'	30°	19
20	3°16'	-58'	150°	2°24'	-58'	150°	1°32'	-58'	150°	0°40'	-59'	150°	0°12'	+59'	30°	1°04'	+59'	30°	1°56'	+59'	30°	20
21	2°18'	-58'	150°	1°26'	-58'	150°	0°34'	-58'	150°	0°18'	+59'	30°	1°11'	+59'	30°	2°03'	+59'	30°	2°55'	+59'	30°	21
22	1°20'	-58'	151°	0°27'	-58'	151°	0°25'	+58'	29°	1°17'	+59'	29°	2°09'	+59'	29°	3°02'	+59'	29°	3°54'	+59'	30°	22
23	0°22'	-58'	151°	0°31'	+58'	29°	1°23'	+58'	29°	2°16'	+59'	29°	3°08'	+59'	29°	4°00'	+59'	29°	4°53'	+59'	29°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

148° 212° LHA — Latitude SAME as DECLINATION — 148° 212° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

31° 329° LHA — Latitude CONTRARY to Declination — 31° 329° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	22°54'	-58'	146°	22°04'	-58'	146°	21°14'	-58'	146°	20°24'	-58'	147°	19°34'	-59'	147°	18°44'	-59'	147°	17°53'	-59'	147°	0
1	21°56'	-58'	146°	21°06'	-58'	146°	20°16'	-58'	147°	19°26'	-59'	147°	18°35'	-59'	147°	17°45'	-59'	147°	16°54'	-59'	147°	1
2	20°58'	-58'	147°	20°08'	-58'	147°	19°18'	-58'	147°	18°27'	-59'	147°	17°37'	-59'	147°	16°46'	-59'	147°	15°56'	-59'	148°	2
3	20°00'	-58'	147°	19°10'	-58'	147°	18°19'	-58'	147°	17°29'	-59'	147°	16°38'	-59'	148°	15°47'	-59'	148°	14°57'	-59'	148°	3
4	19°02'	-58'	147°	18°11'	-58'	147°	17°21'	-58'	147°	16°30'	-59'	148°	15°39'	-59'	148°	14°49'	-59'	148°	13°58'	-59'	148°	4
5	18°04'	-58'	147°	17°13'	-58'	148°	16°22'	-58'	148°	15°32'	-59'	148°	14°41'	-59'	148°	13°50'	-59'	148°	12°59'	-59'	148°	5
6	17°05'	-58'	148°	16°15'	-58'	148°	15°24'	-58'	148°	14°33'	-59'	148°	13°42'	-59'	148°	12°51'	-59'	148°	12°00'	-59'	148°	6
7	16°07'	-58'	148°	15°16'	-58'	148°	14°25'	-58'	148°	13°34'	-59'	148°	12°43'	-59'	148°	11°52'	-59'	149°	11°01'	-59'	149°	7
8	15°09'	-58'	148°	14°18'	-58'	148°	13°27'	-58'	148°	12°36'	-59'	148°	11°45'	-59'	149°	10°53'	-59'	149°	10°02'	-59'	149°	8
9	14°11'	-58'	148°	13°20'	-58'	148°	12°29'	-58'	149°	11°37'	-59'	149°	10°46'	-59'	149°	9°55'	-59'	149°	9°03'	-59'	149°	9
10	13°13'	-58'	149°	12°21'	-58'	149°	11°30'	-59'	149°	10°39'	-59'	149°	9°47'	-59'	149°	8°56'	-59'	149°	8°04'	-59'	149°	10
11	12°14'	-58'	149°	11°23'	-58'	149°	10°32'	-59'	149°	9°40'	-59'	149°	8°48'	-59'	149°	7°57'	-59'	149°	7°05'	-59'	149°	11
12	11°16'	-58'	149°	10°25'	-58'	149°	9°33'	-59'	149°	8°41'	-59'	149°	7°50'	-59'	149°	6°58'	-59'	150°	6°06'	-59'	150°	12
13	10°18'	-58'	149°	9°26'	-58'	149°	8°34'	-59'	150°	7°43'	-59'	150°	6°51'	-59'	150°	5°59'	-59'	150°	5°07'	-59'	150°	13
14	9°19'	-58'	150°	8°28'	-58'	150°	7°36'	-59'	150°	6°44'	-59'	150°	5°52'	-59'	150°	5°00'	-59'	150°	4°08'	-59'	150°	14
15	8°21'	-58'	150°	7°29'	-58'	150°	6°37'	-59'	150°	5°45'	-59'	150°	4°53'	-59'	150°	4°01'	-59'	150°	3°09'	-59'	150°	15
16	7°23'	-58'	150°	6°31'	-58'	150°	5°39'	-59'	150°	4°47'	-59'	150°	3°55'	-59'	150°	3°03'	-59'	150°	2°11'	-59'	150°	16
17	6°25'	-58'	150°	5°32'	-58'	150°	4°40'	-59'	150°	3°48'	-59'	150°	2°56'	-59'	150°	2°04'	-59'	150°	1°12'	-59'	150°	17
18	5°26'	-58'	151°	4°34'	-58'	151°	3°42'	-59'	151°	2°49'	-59'	151°	1°57'	-59'	151°	1°05'	-59'	151°	0°13'	-59'	151°	18
19	4°28'	-58'	151°	3°36'	-58'	151°	2°43'	-59'	151°	1°51'	-59'	151°	0°58'	-59'	151°	0°06'	-59'	151°	0°46'	+59'	29°	19
20	3°30'	-58'	151°	2°37'	-58'	151°	1°45'	-59'	151°	0°52'	-59'	151°	0°00'	+59'	29°	0°53'	+59'	29°	1°45'	+59'	29°	20
21	2°31'	-58'	151°	1°39'	-58'	151°	0°46'	-59'	151°	0°07'	+59'	29°	0°59'	+59'	29°	1°52'	+59'	29°	2°44'	+59'	29°	21
22	1°33'	-58'	151°	0°40'	-58'	151°	0°12'	+59'	29°	1°05'	+59'	29°	1°58'	+59'	29°	2°51'	+59'	29°	3°43'	+59'	29°	22
23	0°35'	-58'	152°	0°18'	+58'	28°	1°11'	+59'	28°	2°04'	+59'	28°	2°57'	+59'	28°	3°49'	+59'	28°	4°42'	+59'	28°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

149° 211° LHA — Latitude SAME as DECLINATION — 149° 211° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

30° 330° LHA — Latitude CONTRARY to Declination — 30° 330° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	23°09'	-58'	147°	22°19'	-58'	147°	21°28'	-58'	148°	20°37'	-59'	148°	19°47'	-59'	148°	18°56'	-59'	148°	18°05'	-59'	148°	0
1	22°11'	-58'	147°	21°20'	-58'	148°	20°30'	-58'	148°	19°39'	-59'	148°	18°48'	-59'	148°	17°57'	-59'	148°	17°06'	-59'	148°	1
2	21°13'	-58'	148°	20°22'	-58'	148°	19°31'	-58'	148°	18°40'	-59'	148°	17°49'	-59'	148°	16°58'	-59'	149°	16°07'	-59'	149°	2
3	20°15'	-58'	148°	19°24'	-58'	148°	18°33'	-58'	148°	17°42'	-59'	148°	16°51'	-59'	149°	15°59'	-59'	149°	15°08'	-59'	149°	3
4	19°16'	-58'	148°	18°25'	-58'	148°	17°34'	-59'	148°	16°43'	-59'	149°	15°52'	-59'	149°	15°00'	-59'	149°	14°09'	-59'	149°	4
5	18°18'	-58'	148°	17°27'	-58'	149°	16°36'	-59'	149°	15°44'	-59'	149°	14°53'	-59'	149°	14°02'	-59'	149°	13°10'	-59'	149°	5
6	17°20'	-58'	149°	16°29'	-58'	149°	15°37'	-59'	149°	14°46'	-59'	149°	13°54'	-59'	149°	13°03'	-59'	149°	12°11'	-59'	149°	6
7	16°22'	-58'	149°	15°30'	-58'	149°	14°39'	-59'	149°	13°47'	-59'	149°	12°56'	-59'	149°	12°04'	-59'	150°	11°12'	-59'	150°	7
8	15°23'	-58'	149°	14°32'	-58'	149°	13°40'	-59'	149°	12°48'	-59'	149°	11°57'	-59'	150°	11°05'	-59'	150°	10°13'	-59'	150°	8
9	14°25'	-58'	149°	13°33'	-58'	149°	12°42'	-59'	150°	11°50'	-59'	150°	10°58'	-59'	150°	10°06'	-59'	150°	9°14'	-59'	150°	9
10	13°27'	-58'	150°	12°35'	-58'	150°	11°43'	-59'	150°	10°51'	-59'	150°	9°59'	-59'	150°	9°07'	-59'	150°	8°15'	-59'	150°	10
11	12°28'	-58'	150°	11°36'	-58'	150°	10°44'	-59'	150°	9°52'	-59'	150°	9°00'	-59'	150°	8°08'	-59'	150°	7°16'	-59'	150°	11
12	11°30'	-58'	150°	10°38'	-58'	150°	9°46'	-59'	150°	8°54'	-59'	150°	8°01'	-59'	150°	7°09'	-59'	150°	6°17'	-59'	151°	12
13	10°31'	-58'	150°	9°39'	-59'	150°	8°47'	-59'	150°	7°55'	-59'	151°	7°03'	-59'	151°	6°10'	-59'	151°	5°18'	-59'	151°	13
14	9°33'	-58'	151°	8°41'	-59'	151°	7°49'	-59'	151°	6°56'	-59'	151°	6°04'	-59'	151°	5°11'	-59'	151°	4°19'	-59'	151°	14
15	8°35'	-58'	151°	7°42'	-59'	151°	6°50'	-59'	151°	5°57'	-59'	151°	5°05'	-59'	151°	4°13'	-59'	151°	3°20'	-59'	151°	15
16	7°36'	-58'	151°	6°44'	-59'	151°	5°51'	-59'	151°	4°59'	-59'	151°	4°06'	-59'	151°	3°14'	-59'	151°	2°21'	-59'	151°	16
17	6°38'	-58'	151°	5°45'	-59'	151°	4°53'	-59'	151°	4°00'	-59'	151°	3°07'	-59'	151°	2°15'	-59'	151°	1°22'	-59'	151°	17
18	5°39'	-58'	151°	4°47'	-59'	151°	3°54'	-59'	152°	3°01'	-59'	152°	2°08'	-59'	152°	1°16'	-59'	152°	0°23'	-59'	152°	18
19	4°41'	-58'	152°	3°48'	-59'	152°	2°55'	-59'	152°	2°03'	-59'	152°	1°10'	-59'	152°	0°17'	-59'	152°	0°36'	+59'	28°	19
20	3°43'	-58'	152°	2°50'	-59'	152°	1°57'	-59'	152°	1°04'	-59'	152°	0°11'	-59'	152°	0°42'	+59'	28°	1°35'	+59'	28°	20
21	2°44'	-58'	152°	1°51'	-59'	152°	0°58'	-59'	152°	0°05'	-59'	152°	0°48'	+59'	28°	1°41'	+59'	28°	2°34'	+59'	28°	21
22	1°46'	-58'	152°	0°53'	-59'	152°	0°01'	+59'	28°	0°54'	+59'	28°	1°47'	+59'	28°	2°40'	+59'	28°	3°33'	+59'	28°	22
23	0°47'	-58'	153°	0°06'	+59'	27°	0°59'	+59'	27°	1°52'	+59'	27°	2°46'	+59'	27°	3°39'	+59'	27°	4°32'	+59'	27°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

150° 210° LHA — Latitude SAME as DECLINATION — 150° 210° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

29° 331° LHA — Latitude CONTRARY to Declination — 29° 331° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	23°24'	-58'	148°	22°33'	-58'	148°	21°42'	-59'	149°	20°50'	-59'	149°	19°59'	-59'	149°	19°08'	-59'	149°	18°16'	-59'	149°	0
1	22°25'	-58'	148°	21°34'	-58'	149°	20°43'	-59'	149°	19°52'	-59'	149°	19°00'	-59'	149°	18°09'	-59'	149°	17°17'	-59'	149°	1
2	21°27'	-58'	149°	20°36'	-58'	149°	19°44'	-59'	149°	18°53'	-59'	149°	18°01'	-59'	149°	17°10'	-59'	150°	16°18'	-59'	150°	2
3	20°29'	-58'	149°	19°37'	-58'	149°	18°46'	-59'	149°	17°54'	-59'	149°	17°03'	-59'	150°	16°11'	-59'	150°	15°19'	-59'	150°	3
4	19°31'	-58'	149°	18°39'	-58'	149°	17°47'	-59'	149°	16°56'	-59'	150°	16°04'	-59'	150°	15°12'	-59'	150°	14°20'	-59'	150°	4
5	18°32'	-58'	149°	17°40'	-58'	150°	16°49'	-59'	150°	15°57'	-59'	150°	15°05'	-59'	150°	14°13'	-59'	150°	13°21'	-59'	150°	5
6	17°34'	-58'	150°	16°42'	-59'	150°	15°50'	-59'	150°	14°58'	-59'	150°	14°06'	-59'	150°	13°14'	-59'	150°	12°22'	-59'	150°	6
7	16°35'	-58'	150°	15°43'	-59'	150°	14°51'	-59'	150°	13°59'	-59'	150°	13°07'	-59'	150°	12°15'	-59'	151°	11°23'	-59'	151°	7
8	15°37'	-58'	150°	14°45'	-59'	150°	13°53'	-59'	150°	13°01'	-59'	150°	12°08'	-59'	151°	11°16'	-59'	151°	10°24'	-59'	151°	8
9	14°39'	-58'	150°	13°46'	-59'	150°	12°54'	-59'	151°	12°02'	-59'	151°	11°10'	-59'	151°	10°17'	-59'	151°	9°25'	-59'	151°	9
10	13°40'	-58'	151°	12°48'	-59'	151°	11°56'	-59'	151°	11°03'	-59'	151°	10°11'	-59'	151°	9°18'	-59'	151°	8°26'	-59'	151°	10
11	12°42'	-58'	151°	11°49'	-59'	151°	10°57'	-59'	151°	10°04'	-59'	151°	9°12'	-59'	151°	8°19'	-59'	151°	7°27'	-59'	151°	11
12	11°43'	-58'	151°	10°51'	-59'	151°	9°58'	-59'	151°	9°06'	-59'	151°	8°13'	-59'	151°	7°20'	-59'	151°	6°28'	-59'	151°	12
13	10°45'	-58'	151°	9°52'	-59'	151°	8°59'	-59'	151°	8°07'	-59'	151°	7°14'	-59'	152°	6°21'	-59'	152°	5°28'	-59'	152°	13
14	9°46'	-58'	151°	8°54'	-59'	152°	8°01'	-59'	152°	7°08'	-59'	152°	6°15'	-59'	152°	5°22'	-59'	152°	4°29'	-59'	152°	14
15	8°48'	-58'	152°	7°55'	-59'	152°	7°02'	-59'	152°	6°09'	-59'	152°	5°16'	-59'	152°	4°23'	-59'	152°	3°30'	-59'	152°	15
16	7°49'	-59'	152°	6°56'	-59'	152°	6°03'	-59'	152°	5°10'	-59'	152°	4°17'	-59'	152°	3°24'	-59'	152°	2°31'	-59'	152°	16
17	6°51'	-59'	152°	5°58'	-59'	152°	5°05'	-59'	152°	4°12'	-59'	152°	3°18'	-59'	152°	2°25'	-59'	152°	1°32'	-59'	152°	17
18	5°52'	-59'	152°	4°59'	-59'	152°	4°06'	-59'	152°	3°13'	-59'	152°	2°19'	-59'	153°	1°26'	-59'	153°	0°33'	-59'	153°	18
19	4°54'	-59'	153°	4°00'	-59'	153°	3°07'	-59'	153°	2°14'	-59'	153°	1°21'	-59'	153°	0°27'	-59'	153°	0°26'	+59'	27°	19
20	3°55'	-59'	153°	3°02'	-59'	153°	2°08'	-59'	153°	1°15'	-59'	153°	0°22'	-59'	153°	0°32'	+59'	27°	1°25'	+59'	27°	20
21	2°57'	-59'	153°	2°03'	-59'	153°	1°10'	-59'	153°	0°16'	-59'	153°	0°37'	+59'	27°	1°31'	+59'	27°	2°24'	+59'	27°	21
22	1°58'	-59'	153°	1°05'	-59'	153°	0°11'	-59'	153°	0°43'	+59'	27°	1°36'	+59'	27°	2°30'	+59'	27°	3°23'	+59'	27°	22
23	1°00'	-59'	153°	0°06'	-59'	153°	0°48'	+59'	27°	1°41'	+59'	27°	2°35'	+59'	27°	3°29'	+59'	27°	4°22'	+59'	27°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

151° 209° LHA — Latitude SAME as DECLINATION — 151° 209° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

28° 332° LHA — Latitude CONTRARY to Declination — 28° 332° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	23°38'	-58'	149°	22°46'	-58'	149°	21°55'	-59'	150°	21°03'	-59'	150°	20°11'	-59'	150°	19°19'	-59'	150°	18°27'	-59'	150°	0
1	22°40'	-58'	149°	21°48'	-59'	150°	20°56'	-59'	150°	20°04'	-59'	150°	19°12'	-59'	150°	18°20'	-59'	150°	17°28'	-59'	151°	1
2	21°41'	-58'	150°	20°49'	-59'	150°	19°57'	-59'	150°	19°05'	-59'	150°	18°13'	-59'	150°	17°21'	-59'	151°	16°29'	-59'	151°	2
3	20°43'	-58'	150°	19°51'	-59'	150°	18°59'	-59'	150°	18°07'	-59'	150°	17°14'	-59'	151°	16°22'	-59'	151°	15°30'	-59'	151°	3
4	19°44'	-58'	150°	18°52'	-59'	150°	18°00'	-59'	150°	17°08'	-59'	151°	16°15'	-59'	151°	15°23'	-59'	151°	14°31'	-59'	151°	4
5	18°46'	-58'	150°	17°54'	-59'	151°	17°01'	-59'	151°	16°09'	-59'	151°	15°17'	-59'	151°	14°24'	-59'	151°	13°31'	-59'	151°	5
6	17°47'	-58'	151°	16°55'	-59'	151°	16°03'	-59'	151°	15°10'	-59'	151°	14°18'	-59'	151°	13°25'	-59'	151°	12°32'	-59'	151°	6
7	16°49'	-59'	151°	15°56'	-59'	151°	15°04'	-59'	151°	14°11'	-59'	151°	13°19'	-59'	151°	12°26'	-59'	151°	11°33'	-59'	152°	7
8	15°50'	-59'	151°	14°58'	-59'	151°	14°05'	-59'	151°	13°12'	-59'	151°	12°20'	-59'	152°	11°27'	-59'	152°	10°34'	-59'	152°	8
9	14°52'	-59'	151°	13°59'	-59'	151°	13°06'	-59'	152°	12°14'	-59'	152°	11°21'	-59'	152°	10°28'	-59'	152°	9°35'	-59'	152°	9
10	13°53'	-59'	152°	13°01'	-59'	152°	12°08'	-59'	152°	11°15'	-59'	152°	10°22'	-59'	152°	9°29'	-59'	152°	8°36'	-59'	152°	10
11	12°55'	-59'	152°	12°02'	-59'	152°	11°09'	-59'	152°	10°16'	-59'	152°	9°23'	-59'	152°	8°30'	-59'	152°	7°37'	-59'	152°	11
12	11°56'	-59'	152°	11°03'	-59'	152°	10°10'	-59'	152°	9°17'	-59'	152°	8°24'	-59'	152°	7°31'	-59'	152°	6°38'	-59'	152°	12
13	10°58'	-59'	152°	10°05'	-59'	152°	9°11'	-59'	152°	8°18'	-59'	152°	7°25'	-59'	153°	6°32'	-59'	153°	5°38'	-59'	153°	13
14	9°59'	-59'	152°	9°06'	-59'	153°	8°13'	-59'	153°	7°19'	-59'	153°	6°26'	-59'	153°	5°33'	-59'	153°	4°39'	-59'	153°	14
15	9°01'	-59'	153°	8°07'	-59'	153°	7°14'	-59'	153°	6°20'	-59'	153°	5°27'	-59'	153°	4°34'	-59'	153°	3°40'	-59'	153°	15
16	8°02'	-59'	153°	7°09'	-59'	153°	6°15'	-59'	153°	5°22'	-59'	153°	4°28'	-59'	153°	3°35'	-59'	153°	2°41'	-59'	153°	16
17	7°03'	-59'	153°	6°10'	-59'	153°	5°16'	-59'	153°	4°23'	-59'	153°	3°29'	-59'	153°	2°36'	-59'	153°	1°42'	-59'	153°	17
18	6°05'	-59'	153°	5°11'	-59'	153°	4°17'	-59'	153°	3°24'	-59'	153°	2°30'	-59'	153°	1°36'	-59'	153°	0°43'	-59'	153°	18
19	5°06'	-59'	154°	4°12'	-59'	154°	3°19'	-59'	154°	2°25'	-59'	154°	1°31'	-59'	154°	0°37'	-59'	154°	0°16'	+59'	26°	19
20	4°08'	-59'	154°	3°14'	-59'	154°	2°20'	-59'	154°	1°26'	-59'	154°	0°32'	-59'	154°	0°22'	+59'	26°	1°16'	+59'	26°	20
21	3°09'	-59'	154°	2°15'	-59'	154°	1°21'	-59'	154°	0°27'	-59'	154°	0°27'	+59'	26°	1°21'	+59'	26°	2°15'	+59'	26°	21
22	2°10'	-59'	154°	1°16'	-59'	154°	0°22'	-59'	154°	0°32'	+59'	26°	1°26'	+59'	26°	2°20'	+59'	26°	3°14'	+59'	26°	22
23	1°12'	-59'	154°	0°18'	-59'	154°	0°37'	+59'	26°	1°31'	+59'	26°	2°25'	+59'	26°	3°19'	+59'	26°	4°13'	+59'	26°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

152° 208° LHA — Latitude SAME as DECLINATION — 152° 208° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

27° 333° LHA — Latitude CONTRARY to Declination — 27° 333° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	23°52'	-58'	150°	22°59'	-59'	150°	22°07'	-59'	151°	21°15'	-59'	151°	20°22'	-59'	151°	19°30'	-59'	151°	18°37'	-59'	151°	0
1	22°53'	-58'	150°	22°01'	-59'	151°	21°09'	-59'	151°	20°16'	-59'	151°	19°24'	-59'	151°	18°31'	-59'	151°	17°38'	-59'	152°	1
2	21°55'	-59'	151°	21°02'	-59'	151°	20°10'	-59'	151°	19°17'	-59'	151°	18°25'	-59'	151°	17°32'	-59'	152°	16°39'	-59'	152°	2
3	20°56'	-59'	151°	20°04'	-59'	151°	19°11'	-59'	151°	18°18'	-59'	151°	17°26'	-59'	152°	16°33'	-59'	152°	15°40'	-59'	152°	3
4	19°58'	-59'	151°	19°05'	-59'	151°	18°12'	-59'	152°	17°20'	-59'	152°	16°27'	-59'	152°	15°34'	-59'	152°	14°41'	-59'	152°	4
5	18°59'	-59'	151°	18°06'	-59'	152°	17°14'	-59'	152°	16°21'	-59'	152°	15°28'	-59'	152°	14°35'	-59'	152°	13°42'	-59'	152°	5
6	18°01'	-59'	152°	17°08'	-59'	152°	16°15'	-59'	152°	15°22'	-59'	152°	14°29'	-59'	152°	13°36'	-59'	152°	12°42'	-59'	152°	6
7	17°02'	-59'	152°	16°09'	-59'	152°	15°16'	-59'	152°	14°23'	-59'	152°	13°30'	-59'	152°	12°37'	-59'	153°	11°43'	-59'	153°	7
8	16°03'	-59'	152°	15°10'	-59'	152°	14°17'	-59'	152°	13°24'	-59'	152°	12°31'	-59'	153°	11°37'	-59'	153°	10°44'	-59'	153°	8
9	15°05'	-59'	152°	14°12'	-59'	152°	13°18'	-59'	153°	12°25'	-59'	153°	11°32'	-59'	153°	10°38'	-59'	153°	9°45'	-59'	153°	9
10	14°06'	-59'	153°	13°13'	-59'	153°	12°19'	-59'	153°	11°26'	-59'	153°	10°33'	-59'	153°	9°39'	-59'	153°	8°46'	-59'	153°	10
11	13°07'	-59'	153°	12°14'	-59'	153°	11°21'	-59'	153°	10°27'	-59'	153°	9°34'	-59'	153°	8°40'	-59'	153°	7°47'	-59'	153°	11
12	12°09'	-59'	153°	11°15'	-59'	153°	10°22'	-59'	153°	9°28'	-59'	153°	8°35'	-59'	153°	7°41'	-59'	153°	6°47'	-59'	153°	12
13	11°10'	-59'	153°	10°17'	-59'	153°	9°23'	-59'	153°	8°29'	-59'	153°	7°36'	-59'	153°	6°42'	-59'	154°	5°48'	-59'	154°	13
14	10°11'	-59'	153°	9°18'	-59'	153°	8°24'	-59'	154°	7°30'	-59'	154°	6°37'	-59'	154°	5°43'	-59'	154°	4°49'	-59'	154°	14
15	9°13'	-59'	154°	8°19'	-59'	154°	7°25'	-59'	154°	6°31'	-59'	154°	5°38'	-59'	154°	4°44'	-59'	154°	3°50'	-59'	154°	15
16	8°14'	-59'	154°	7°20'	-59'	154°	6°26'	-59'	154°	5°32'	-59'	154°	4°39'	-59'	154°	3°45'	-59'	154°	2°51'	-59'	154°	16
17	7°15'	-59'	154°	6°21'	-59'	154°	5°28'	-59'	154°	4°34'	-59'	154°	3°39'	-59'	154°	2°45'	-59'	154°	1°51'	-59'	154°	17
18	6°17'	-59'	154°	5°23'	-59'	154°	4°29'	-59'	154°	3°35'	-59'	154°	2°40'	-59'	154°	1°46'	-59'	154°	0°52'	-59'	154°	18
19	5°18'	-59'	154°	4°24'	-59'	154°	3°30'	-59'	155°	2°36'	-59'	155°	1°41'	-59'	155°	0°47'	-59'	155°	0°07'	+59'	25°	19
20	4°19'	-59'	155°	3°25'	-59'	155°	2°31'	-59'	155°	1°37'	-59'	155°	0°42'	-59'	155°	0°12'	+59'	25°	1°06'	+59'	25°	20
21	3°21'	-59'	155°	2°26'	-59'	155°	1°32'	-59'	155°	0°38'	-59'	155°	0°17'	+59'	25°	1°11'	+59'	25°	2°05'	+59'	25°	21
22	2°22'	-59'	155°	1°28'	-59'	155°	0°33'	-59'	155°	0°21'	+59'	25°	1°16'	+59'	25°	2°10'	+59'	25°	3°05'	+59'	25°	22
23	1°23'	-59'	155°	0°29'	-59'	155°	0°26'	+59'	25°	1°20'	+59'	25°	2°15'	+59'	25°	3°09'	+59'	25°	4°04'	+59'	25°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

153° 207° LHA — Latitude SAME as DECLINATION — 153° 207° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

26° 334° LHA — Latitude CONTRARY to Declination — 26° 334° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	24°05'	-59'	151°	23°12'	-59'	152°	22°19'	-59'	152°	21°27'	-59'	152°	20°34'	-59'	152°	19°41'	-59'	152°	18°47'	-59'	152°	0
1	23°06'	-59'	152°	22°14'	-59'	152°	21°21'	-59'	152°	20°28'	-59'	152°	19°35'	-59'	152°	18°41'	-59'	152°	17°48'	-59'	153°	1
2	22°08'	-59'	152°	21°15'	-59'	152°	20°22'	-59'	152°	19°29'	-59'	152°	18°36'	-59'	152°	17°42'	-59'	153°	16°49'	-59'	153°	2
3	21°09'	-59'	152°	20°16'	-59'	152°	19°23'	-59'	152°	18°30'	-59'	153°	17°37'	-59'	153°	16°43'	-59'	153°	15°50'	-59'	153°	3
4	20°11'	-59'	152°	19°17'	-59'	152°	18°24'	-59'	153°	17°31'	-59'	153°	16°38'	-59'	153°	15°44'	-59'	153°	14°51'	-59'	153°	4
5	19°12'	-59'	152°	18°19'	-59'	153°	17°25'	-59'	153°	16°32'	-59'	153°	15°39'	-59'	153°	14°45'	-59'	153°	13°51'	-59'	153°	5
6	18°13'	-59'	153°	17°20'	-59'	153°	16°26'	-59'	153°	15°33'	-59'	153°	14°39'	-59'	153°	13°46'	-59'	153°	12°52'	-59'	153°	6
7	17°15'	-59'	153°	16°21'	-59'	153°	15°28'	-59'	153°	14°34'	-59'	153°	13°40'	-59'	153°	12°47'	-59'	154°	11°53'	-59'	154°	7
8	16°16'	-59'	153°	15°22'	-59'	153°	14°29'	-59'	153°	13°35'	-59'	153°	12°41'	-59'	154°	11°48'	-59'	154°	10°54'	-59'	154°	8
9	15°17'	-59'	153°	14°24'	-59'	153°	13°30'	-59'	154°	12°36'	-59'	154°	11°42'	-59'	154°	10°48'	-59'	154°	9°55'	-59'	154°	9
10	14°18'	-59'	154°	13°25'	-59'	154°	12°31'	-59'	154°	11°37'	-59'	154°	10°43'	-59'	154°	9°49'	-59'	154°	8°55'	-59'	154°	10
11	13°20'	-59'	154°	12°26'	-59'	154°	11°32'	-59'	154°	10°38'	-59'	154°	9°44'	-59'	154°	8°50'	-59'	154°	7°56'	-59'	154°	11
12	12°21'	-59'	154°	11°27'	-59'	154°	10°33'	-59'	154°	9°39'	-59'	154°	8°45'	-59'	154°	7°51'	-59'	154°	6°57'	-59'	154°	12
13	11°22'	-59'	154°	10°28'	-59'	154°	9°34'	-59'	154°	8°40'	-59'	154°	7°46'	-59'	154°	6°52'	-59'	155°	5°58'	-59'	155°	13
14	10°23'	-59'	154°	9°29'	-59'	154°	8°35'	-59'	155°	7°41'	-59'	155°	6°47'	-59'	155°	5°53'	-59'	155°	4°58'	-59'	155°	14
15	9°25'	-59'	155°	8°31'	-59'	155°	7°36'	-59'	155°	6°42'	-59'	155°	5°48'	-59'	155°	4°53'	-59'	155°	3°59'	-59'	155°	15
16	8°26'	-59'	155°	7°32'	-59'	155°	6°37'	-59'	155°	5°43'	-59'	155°	4°49'	-59'	155°	3°54'	-59'	155°	3°00'	-59'	155°	16
17	7°27'	-59'	155°	6°33'	-59'	155°	5°38'	-59'	155°	4°44'	-59'	155°	3°50'	-59'	155°	2°55'	-59'	155°	2°01'	-59'	155°	17
18	6°28'	-59'	155°	5°34'	-59'	155°	4°39'	-59'	155°	3°45'	-59'	155°	2°50'	-59'	155°	1°56'	-59'	155°	1°01'	-59'	155°	18
19	5°30'	-59'	155°	4°35'	-59'	155°	3°40'	-59'	155°	2°46'	-59'	155°	1°51'	-59'	155°	0°57'	-59'	156°	0°02'	-59'	156°	19
20	4°31'	-59'	156°	3°36'	-59'	156°	2°42'	-59'	156°	1°47'	-59'	156°	0°52'	-59'	156°	0°02'	+59'	24°	0°57'	+59'	24°	20
21	3°32'	-59'	156°	2°37'	-59'	156°	1°43'	-59'	156°	0°48'	-59'	156°	0°07'	+59'	24°	1°02'	+59'	24°	1°56'	+59'	24°	21
22	2°33'	-59'	156°	1°38'	-59'	156°	0°44'	-59'	156°	0°11'	+59'	24°	1°06'	+59'	24°	2°01'	+59'	24°	2°56'	+59'	24°	22
23	1°34'	-59'	156°	0°40'	-59'	156°	0°15'	+59'	24°	1°10'	+59'	24°	2°05'	+59'	24°	3°00'	+59'	24°	3°55'	+59'	24°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

154° 206° LHA — Latitude SAME as DECLINATION — 154° 206° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

25° 335° LHA — Latitude CONTRARY to Declination — 25° 335° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	24°18'	-59'	152°	23°25'	-59'	153°	22°31'	-59'	153°	21°38'	-59'	153°	20°44'	-59'	153°	19°51'	-59'	153°	18°57'	-59'	153°	0
1	23°19'	-59'	153°	22°26'	-59'	153°	21°32'	-59'	153°	20°39'	-59'	153°	19°45'	-59'	153°	18°52'	-59'	153°	17°58'	-59'	154°	1
2	22°20'	-59'	153°	21°27'	-59'	153°	20°33'	-59'	153°	19°40'	-59'	153°	18°46'	-59'	154°	17°53'	-59'	154°	16°59'	-59'	154°	2
3	21°22'	-59'	153°	20°28'	-59'	153°	19°35'	-59'	153°	18°41'	-59'	154°	17°47'	-59'	154°	16°53'	-59'	154°	15°59'	-59'	154°	3
4	20°23'	-59'	153°	19°29'	-59'	153°	18°36'	-59'	154°	17°42'	-59'	154°	16°48'	-59'	154°	15°54'	-59'	154°	15°00'	-59'	154°	4
5	19°24'	-59'	153°	18°31'	-59'	154°	17°37'	-59'	154°	16°43'	-59'	154°	15°49'	-59'	154°	14°55'	-59'	154°	14°01'	-59'	154°	5
6	18°26'	-59'	154°	17°32'	-59'	154°	16°38'	-59'	154°	15°44'	-59'	154°	14°50'	-59'	154°	13°56'	-59'	154°	13°02'	-59'	154°	6
7	17°27'	-59'	154°	16°33'	-59'	154°	15°39'	-59'	154°	14°45'	-59'	154°	13°51'	-59'	154°	12°57'	-59'	155°	12°02'	-59'	155°	7
8	16°28'	-59'	154°	15°34'	-59'	154°	14°40'	-59'	154°	13°46'	-59'	154°	12°52'	-59'	155°	11°57'	-59'	155°	11°03'	-59'	155°	8
9	15°29'	-59'	154°	14°35'	-59'	154°	13°41'	-59'	155°	12°47'	-59'	155°	11°52'	-59'	155°	10°58'	-59'	155°	10°04'	-59'	155°	9
10	14°30'	-59'	155°	13°36'	-59'	155°	12°42'	-59'	155°	11°48'	-59'	155°	10°53'	-59'	155°	9°59'	-59'	155°	9°05'	-59'	155°	10
11	13°32'	-59'	155°	12°37'	-59'	155°	11°43'	-59'	155°	10°49'	-59'	155°	9°54'	-59'	155°	9°00'	-59'	155°	8°05'	-59'	155°	11
12	12°33'	-59'	155°	11°38'	-59'	155°	10°44'	-59'	155°	9°49'	-59'	155°	8°55'	-59'	155°	8°01'	-59'	155°	7°06'	-59'	155°	12
13	11°34'	-59'	155°	10°39'	-59'	155°	9°45'	-59'	155°	8°50'	-59'	155°	7°56'	-59'	155°	7°01'	-59'	155°	6°07'	-59'	156°	13
14	10°35'	-59'	155°	9°41'	-59'	155°	8°46'	-59'	155°	7°51'	-59'	156°	6°57'	-59'	156°	6°02'	-59'	156°	5°07'	-59'	156°	14
15	9°36'	-59'	156°	8°42'	-59'	156°	7°47'	-59'	156°	6°52'	-59'	156°	5°58'	-59'	156°	5°03'	-59'	156°	4°08'	-59'	156°	15
16	8°37'	-59'	156°	7°43'	-59'	156°	6°48'	-59'	156°	5°53'	-59'	156°	4°58'	-59'	156°	4°04'	-59'	156°	3°09'	-59'	156°	16
17	7°38'	-59'	156°	6°44'	-59'	156°	5°49'	-59'	156°	4°54'	-59'	156°	3°59'	-59'	156°	3°04'	-59'	156°	2°09'	-59'	156°	17
18	6°40'	-59'	156°	5°45'	-59'	156°	4°50'	-59'	156°	3°55'	-59'	156°	3°00'	-59'	156°	2°05'	-59'	156°	1°10'	-59'	156°	18
19	5°41'	-59'	156°	4°46'	-59'	156°	3°51'	-59'	156°	2°56'	-59'	156°	2°01'	-59'	156°	1°06'	-59'	156°	0°11'	-59'	156°	19
20	4°42'	-59'	157°	3°47'	-59'	157°	2°52'	-59'	157°	1°57'	-59'	157°	1°02'	-59'	157°	0°07'	-59'	157°	0°48'	+59'	23°	20
21	3°43'	-59'	157°	2°48'	-59'	157°	1°53'	-59'	157°	0°58'	-59'	157°	0°02'	-59'	157°	0°53'	+59'	23°	1°48'	+59'	23°	21
22	2°44'	-59'	157°	1°49'	-59'	157°	0°54'	-59'	157°	0°01'	+59'	23°	0°57'	+59'	23°	1°52'	+59'	23°	2°47'	+59'	23°	22
23	1°45'	-59'	157°	0°50'	-59'	157°	0°05'	+59'	23°	1°01'	+59'	23°	1°56'	+59'	23°	2°51'	+59'	23°	3°46'	+59'	23°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

155° 205° LHA — Latitude SAME as DECLINATION — 155° 205° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

24° 336° LHA — Latitude CONTRARY to Declination — 24° 336° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	24°30'	-59'	153°	23°36'	-59'	154°	22°43'	-59'	154°	21°49'	-59'	154°	20°55'	-59'	154°	20°01'	-59'	154°	19°07'	-59'	155°	0
1	23°31'	-59'	154°	22°38'	-59'	154°	21°44'	-59'	154°	20°50'	-59'	154°	19°56'	-59'	154°	19°02'	-59'	155°	18°07'	-59'	155°	1
2	22°33'	-59'	154°	21°39'	-59'	154°	20°45'	-59'	154°	19°51'	-59'	154°	18°57'	-59'	155°	18°02'	-59'	155°	17°08'	-59'	155°	2
3	21°34'	-59'	154°	20°40'	-59'	154°	19°46'	-59'	154°	18°52'	-59'	155°	17°57'	-59'	155°	17°03'	-59'	155°	16°09'	-59'	155°	3
4	20°35'	-59'	154°	19°41'	-59'	154°	18°47'	-59'	155°	17°53'	-59'	155°	16°58'	-59'	155°	16°04'	-59'	155°	15°09'	-59'	155°	4
5	19°36'	-59'	155°	18°42'	-59'	155°	17°48'	-59'	155°	16°53'	-59'	155°	15°59'	-59'	155°	15°05'	-59'	155°	14°10'	-59'	155°	5
6	18°37'	-59'	155°	17°43'	-59'	155°	16°49'	-59'	155°	15°54'	-59'	155°	15°00'	-59'	155°	14°05'	-59'	155°	13°11'	-59'	155°	6
7	17°39'	-59'	155°	16°44'	-59'	155°	15°50'	-59'	155°	14°55'	-59'	155°	14°01'	-59'	155°	13°06'	-59'	156°	12°11'	-59'	156°	7
8	16°40'	-59'	155°	15°45'	-59'	155°	14°51'	-59'	155°	13°56'	-59'	155°	13°01'	-59'	156°	12°07'	-59'	156°	11°12'	-59'	156°	8
9	15°41'	-59'	155°	14°46'	-59'	155°	13°52'	-59'	156°	12°57'	-59'	156°	12°02'	-59'	156°	11°08'	-59'	156°	10°13'	-59'	156°	9
10	14°42'	-59'	156°	13°47'	-59'	156°	12°53'	-59'	156°	11°58'	-59'	156°	11°03'	-59'	156°	10°08'	-59'	156°	9°13'	-59'	156°	10
11	13°43'	-59'	156°	12°48'	-59'	156°	11°53'	-59'	156°	10°59'	-59'	156°	10°04'	-59'	156°	9°09'	-59'	156°	8°14'	-59'	156°	11
12	12°44'	-59'	156°	11°49'	-59'	156°	10°54'	-59'	156°	10°00'	-59'	156°	9°05'	-59'	156°	8°10'	-59'	156°	7°15'	-59'	156°	12
13	11°45'	-59'	156°	10°50'	-59'	156°	9°55'	-59'	156°	9°00'	-59'	156°	8°05'	-59'	156°	7°10'	-59'	156°	6°15'	-59'	157°	13
14	10°46'	-59'	156°	9°51'	-59'	156°	8°56'	-59'	156°	8°01'	-59'	157°	7°06'	-59'	157°	6°11'	-59'	157°	5°16'	-59'	157°	14
15	9°47'	-59'	157°	8°52'	-59'	157°	7°57'	-59'	157°	7°02'	-59'	157°	6°07'	-59'	157°	5°12'	-59'	157°	4°17'	-59'	157°	15
16	8°48'	-59'	157°	7°53'	-59'	157°	6°58'	-59'	157°	6°03'	-59'	157°	5°08'	-59'	157°	4°13'	-59'	157°	3°17'	-59'	157°	16
17	7°49'	-59'	157°	6°54'	-59'	157°	5°59'	-59'	157°	5°04'	-59'	157°	4°09'	-59'	157°	3°13'	-59'	157°	2°18'	-59'	157°	17
18	6°50'	-59'	157°	5°55'	-59'	157°	5°00'	-59'	157°	4°05'	-59'	157°	3°09'	-59'	157°	2°14'	-59'	157°	1°19'	-59'	157°	18
19	5°51'	-59'	157°	4°56'	-59'	157°	4°01'	-59'	157°	3°05'	-59'	157°	2°10'	-59'	157°	1°15'	-59'	157°	0°19'	-59'	157°	19
20	4°53'	-59'	157°	3°57'	-59'	157°	3°02'	-59'	157°	2°06'	-59'	158°	1°11'	-59'	158°	0°15'	-59'	158°	0°40'	+59'	22°	20
21	3°54'	-59'	158°	2°58'	-59'	158°	2°03'	-59'	158°	1°07'	-59'	158°	0°12'	-59'	158°	0°44'	+59'	22°	1°39'	+59'	22°	21
22	2°55'	-59'	158°	1°59'	-59'	158°	1°03'	-59'	158°	0°08'	-59'	158°	0°48'	+59'	22°	1°43'	+59'	22°	2°39'	+59'	22°	22
23	1°56'	-59'	158°	1°00'	-59'	158°	0°04'	-59'	158°	0°51'	+59'	22°	1°47'	+59'	22°	2°43'	+59'	22°	3°38'	+59'	22°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

156° 204° LHA — Latitude SAME as DECLINATION — 156° 204° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

23° 337° LHA — Latitude CONTRARY to Declination — 23° 337° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	24°42'	-59'	155°	23°48'	-59'	155°	22°54'	-59'	155°	21°59'	-59'	155°	21°05'	-59'	155°	20°10'	-59'	155°	19°16'	-59'	156°	0
1	23°43'	-59'	155°	22°49'	-59'	155°	21°55'	-59'	155°	21°00'	-59'	155°	20°06'	-59'	155°	19°11'	-59'	156°	18°16'	-59'	156°	1
2	22°44'	-59'	155°	21°50'	-59'	155°	20°56'	-59'	155°	20°01'	-59'	155°	19°06'	-59'	156°	18°12'	-59'	156°	17°17'	-59'	156°	2
3	21°46'	-59'	155°	20°51'	-59'	155°	19°56'	-59'	155°	19°02'	-59'	156°	18°07'	-59'	156°	17°12'	-59'	156°	16°18'	-59'	156°	3
4	20°47'	-59'	155°	19°52'	-59'	156°	18°57'	-59'	156°	18°03'	-59'	156°	17°08'	-59'	156°	16°13'	-59'	156°	15°18'	-59'	156°	4
5	19°48'	-59'	156°	18°53'	-59'	156°	17°58'	-59'	156°	17°04'	-59'	156°	16°09'	-59'	156°	15°14'	-59'	156°	14°19'	-59'	156°	5
6	18°49'	-59'	156°	17°54'	-59'	156°	16°59'	-59'	156°	16°04'	-59'	156°	15°09'	-59'	156°	14°15'	-59'	156°	13°20'	-59'	156°	6
7	17°50'	-59'	156°	16°55'	-59'	156°	16°00'	-59'	156°	15°05'	-59'	156°	14°10'	-59'	156°	13°15'	-59'	157°	12°20'	-59'	157°	7
8	16°51'	-59'	156°	15°56'	-59'	156°	15°01'	-59'	156°	14°06'	-59'	156°	13°11'	-59'	157°	12°16'	-59'	157°	11°21'	-59'	157°	8
9	15°52'	-59'	156°	14°57'	-59'	156°	14°02'	-59'	157°	13°07'	-59'	157°	12°12'	-59'	157°	11°17'	-59'	157°	10°21'	-59'	157°	9
10	14°53'	-59'	157°	13°58'	-59'	157°	13°03'	-59'	157°	12°08'	-59'	157°	11°12'	-59'	157°	10°17'	-59'	157°	9°22'	-59'	157°	10
11	13°54'	-59'	157°	12°59'	-59'	157°	12°04'	-59'	157°	11°08'	-59'	157°	10°13'	-59'	157°	9°18'	-59'	157°	8°23'	-59'	157°	11
12	12°55'	-59'	157°	12°00'	-59'	157°	11°04'	-59'	157°	10°09'	-59'	157°	9°14'	-59'	157°	8°19'	-59'	157°	7°23'	-59'	157°	12
13	11°56'	-59'	157°	11°01'	-59'	157°	10°05'	-59'	157°	9°10'	-59'	157°	8°15'	-59'	157°	7°19'	-59'	157°	6°24'	-59'	157°	13
14	10°57'	-59'	157°	10°02'	-59'	157°	9°06'	-59'	157°	8°11'	-59'	157°	7°15'	-59'	158°	6°20'	-59'	158°	5°24'	-59'	158°	14
15	9°58'	-59'	157°	9°02'	-59'	158°	8°07'	-59'	158°	7°12'	-59'	158°	6°16'	-59'	158°	5°21'	-59'	158°	4°25'	-59'	158°	15
16	8°59'	-59'	158°	8°03'	-59'	158°	7°08'	-59'	158°	6°12'	-59'	158°	5°17'	-59'	158°	4°21'	-59'	158°	3°26'	-59'	158°	16
17	8°00'	-59'	158°	7°04'	-59'	158°	6°09'	-59'	158°	5°13'	-59'	158°	4°17'	-59'	158°	3°22'	-59'	158°	2°26'	-59'	158°	17
18	7°01'	-59'	158°	6°05'	-59'	158°	5°10'	-59'	158°	4°14'	-59'	158°	3°18'	-59'	158°	2°22'	-59'	158°	1°27'	-59'	158°	18
19	6°02'	-59'	158°	5°06'	-59'	158°	4°10'	-59'	158°	3°15'	-59'	158°	2°19'	-59'	158°	1°23'	-59'	158°	0°27'	-59'	158°	19
20	5°03'	-59'	158°	4°07'	-59'	158°	3°11'	-59'	158°	2°15'	-59'	158°	1°20'	-59'	158°	0°24'	-59'	158°	0°32'	+59'	22°	20
21	4°04'	-59'	159°	3°08'	-59'	159°	2°12'	-59'	159°	1°16'	-59'	159°	0°20'	-59'	159°	0°36'	+59'	21°	1°31'	+59'	21°	21
22	3°05'	-59'	159°	2°09'	-59'	159°	1°13'	-59'	159°	0°17'	-59'	159°	0°39'	+59'	21°	1°35'	+59'	21°	2°31'	+59'	21°	22
23	2°06'	-59'	159°	1°10'	-59'	159°	0°14'	-59'	159°	0°42'	+59'	21°	1°38'	+59'	21°	2°34'	+59'	21°	3°30'	+59'	21°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

157° 203° LHA — Latitude SAME as DECLINATION — 157° 203° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

22° 338° LHA — Latitude CONTRARY to Declination — 22° 338° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	24°54'	-59'	156°	23°59'	-59'	156°	23°04'	-59'	156°	22°09'	-59'	156°	21°14'	-59'	156°	20°19'	-59'	156°	19°24'	-59'	157°	0
1	23°55'	-59'	156°	23°00'	-59'	156°	22°05'	-59'	156°	21°10'	-59'	156°	20°15'	-59'	156°	19°20'	-59'	157°	18°25'	-59'	157°	1
2	22°56'	-59'	156°	22°01'	-59'	156°	21°06'	-59'	156°	20°11'	-59'	156°	19°16'	-59'	157°	18°21'	-59'	157°	17°26'	-59'	157°	2
3	21°57'	-59'	156°	21°02'	-59'	156°	20°07'	-59'	157°	19°12'	-59'	157°	18°17'	-59'	157°	17°21'	-59'	157°	16°26'	-59'	157°	3
4	20°58'	-59'	156°	20°03'	-59'	157°	19°08'	-59'	157°	18°13'	-59'	157°	17°17'	-59'	157°	16°22'	-59'	157°	15°27'	-59'	157°	4
5	19°59'	-59'	157°	19°04'	-59'	157°	18°08'	-59'	157°	17°13'	-59'	157°	16°18'	-59'	157°	15°23'	-59'	157°	14°27'	-59'	157°	5
6	19°00'	-59'	157°	18°05'	-59'	157°	17°09'	-59'	157°	16°14'	-59'	157°	15°19'	-59'	157°	14°23'	-59'	157°	13°28'	-59'	157°	6
7	18°01'	-59'	157°	17°05'	-59'	157°	16°10'	-59'	157°	15°15'	-59'	157°	14°19'	-59'	157°	13°24'	-59'	158°	12°29'	-59'	158°	7
8	17°02'	-59'	157°	16°06'	-59'	157°	15°11'	-59'	157°	14°16'	-59'	157°	13°20'	-59'	158°	12°25'	-59'	158°	11°29'	-59'	158°	8
9	16°03'	-59'	157°	15°07'	-59'	157°	14°12'	-59'	158°	13°16'	-59'	158°	12°21'	-59'	158°	11°25'	-59'	158°	10°30'	-59'	158°	9
10	15°04'	-59'	158°	14°08'	-59'	158°	13°13'	-59'	158°	12°17'	-59'	158°	11°21'	-59'	158°	10°26'	-59'	158°	9°30'	-59'	158°	10
11	14°04'	-59'	158°	13°09'	-59'	158°	12°13'	-59'	158°	11°18'	-59'	158°	10°22'	-59'	158°	9°26'	-59'	158°	8°31'	-59'	158°	11
12	13°05'	-59'	158°	12°10'	-59'	158°	11°14'	-59'	158°	10°18'	-59'	158°	9°23'	-59'	158°	8°27'	-59'	158°	7°31'	-59'	158°	12
13	12°06'	-59'	158°	11°11'	-59'	158°	10°15'	-59'	158°	9°19'	-59'	158°	8°23'	-59'	158°	7°28'	-59'	158°	6°32'	-59'	158°	13
14	11°07'	-59'	158°	10°11'	-59'	158°	9°16'	-59'	158°	8°20'	-59'	158°	7°24'	-59'	158°	6°28'	-59'	159°	5°32'	-59'	159°	14
15	10°08'	-59'	158°	9°12'	-59'	158°	8°16'	-59'	159°	7°21'	-59'	159°	6°25'	-59'	159°	5°29'	-59'	159°	4°33'	-59'	159°	15
16	9°09'	-59'	159°	8°13'	-59'	159°	7°17'	-59'	159°	6°21'	-59'	159°	5°25'	-59'	159°	4°29'	-59'	159°	3°34'	-59'	159°	16
17	8°10'	-59'	159°	7°14'	-59'	159°	6°18'	-59'	159°	5°22'	-59'	159°	4°26'	-59'	159°	3°30'	-59'	159°	2°34'	-59'	159°	17
18	7°11'	-59'	159°	6°15'	-59'	159°	5°19'	-59'	159°	4°23'	-59'	159°	3°27'	-59'	159°	2°31'	-59'	159°	1°35'	-59'	159°	18
19	6°12'	-59'	159°	5°16'	-59'	159°	4°20'	-59'	159°	3°23'	-59'	159°	2°27'	-59'	159°	1°31'	-59'	159°	0°35'	-59'	159°	19
20	5°13'	-59'	159°	4°16'	-59'	159°	3°20'	-59'	159°	2°24'	-59'	159°	1°28'	-59'	159°	0°32'	-59'	159°	0°24'	+59'	21°	20
21	4°13'	-59'	159°	3°17'	-59'	159°	2°21'	-59'	160°	1°25'	-59'	160°	0°29'	-59'	160°	0°28'	+59'	20°	1°24'	+59'	20°	21
22	3°14'	-59'	160°	2°18'	-59'	160°	1°22'	-59'	160°	0°26'	-59'	160°	0°31'	+59'	20°	1°27'	+59'	20°	2°23'	+59'	20°	22
23	2°15'	-59'	160°	1°19'	-59'	160°	0°23'	-59'	160°	0°34'	+59'	20°	1°30'	+59'	20°	2°26'	+59'	20°	3°23'	+59'	20°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

158° 202° LHA — Latitude SAME as DECLINATION — 158° 202° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

21° 339° LHA — Latitude CONTRARY to Declination — 21° 339° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	25°05'	-59'	157°	24°09'	-59'	157°	23°14'	-59'	157°	22°19'	-59'	157°	21°24'	-59'	157°	20°28'	-59'	158°	19°33'	-59'	158°	0
1	24°06'	-59'	157°	23°10'	-59'	157°	22°15'	-59'	157°	21°20'	-59'	157°	20°24'	-59'	158°	19°29'	-59'	158°	18°33'	-59'	158°	1
2	23°07'	-59'	157°	22°11'	-59'	157°	21°16'	-59'	157°	20°20'	-59'	158°	19°25'	-59'	158°	18°29'	-59'	158°	17°34'	-59'	158°	2
3	22°07'	-59'	157°	21°12'	-59'	157°	20°17'	-59'	158°	19°21'	-59'	158°	18°26'	-59'	158°	17°30'	-59'	158°	16°34'	-59'	158°	3
4	21°08'	-59'	157°	20°13'	-59'	158°	19°17'	-59'	158°	18°22'	-59'	158°	17°26'	-59'	158°	16°31'	-59'	158°	15°35'	-59'	158°	4
5	20°09'	-59'	158°	19°14'	-59'	158°	18°18'	-59'	158°	17°23'	-59'	158°	16°27'	-59'	158°	15°31'	-59'	158°	14°35'	-59'	158°	5
6	19°10'	-59'	158°	18°15'	-59'	158°	17°19'	-59'	158°	16°23'	-59'	158°	15°28'	-59'	158°	14°32'	-59'	158°	13°36'	-59'	158°	6
7	18°11'	-59'	158°	17°15'	-59'	158°	16°20'	-59'	158°	15°24'	-59'	158°	14°28'	-59'	158°	13°32'	-59'	159°	12°37'	-59'	159°	7
8	17°12'	-59'	158°	16°16'	-59'	158°	15°21'	-59'	158°	14°25'	-59'	159°	13°29'	-59'	159°	12°33'	-59'	159°	11°37'	-59'	159°	8
9	16°13'	-59'	158°	15°17'	-59'	158°	14°21'	-59'	159°	13°25'	-59'	159°	12°29'	-59'	159°	11°34'	-59'	159°	10°38'	-59'	159°	9
10	15°14'	-59'	159°	14°18'	-59'	159°	13°22'	-59'	159°	12°26'	-59'	159°	11°30'	-59'	159°	10°34'	-59'	159°	9°38'	-59'	159°	10
11	14°15'	-59'	159°	13°19'	-59'	159°	12°23'	-59'	159°	11°27'	-59'	159°	10°31'	-59'	159°	9°35'	-59'	159°	8°39'	-59'	159°	11
12	13°15'	-59'	159°	12°19'	-59'	159°	11°23'	-59'	159°	10°27'	-59'	159°	9°31'	-59'	159°	8°35'	-59'	159°	7°39'	-59'	159°	12
13	12°16'	-59'	159°	11°20'	-59'	159°	10°24'	-59'	159°	9°28'	-59'	159°	8°32'	-59'	159°	7°36'	-59'	159°	6°40'	-59'	159°	13
14	11°17'	-59'	159°	10°21'	-59'	159°	9°25'	-59'	159°	8°29'	-59'	159°	7°33'	-59'	159°	6°36'	-59'	160°	5°40'	-59'	160°	14
15	10°18'	-59'	159°	9°22'	-59'	159°	8°26'	-59'	160°	7°29'	-59'	160°	6°33'	-59'	160°	5°37'	-59'	160°	4°41'	-60'	160°	15
16	9°19'	-59'	160°	8°23'	-59'	160°	7°26'	-59'	160°	6°30'	-59'	160°	5°34'	-59'	160°	4°37'	-59'	160°	3°41'	-60'	160°	16
17	8°20'	-59'	160°	7°23'	-59'	160°	6°27'	-59'	160°	5°31'	-59'	160°	4°34'	-59'	160°	3°38'	-59'	160°	2°42'	-60'	160°	17
18	7°20'	-59'	160°	6°24'	-59'	160°	5°28'	-59'	160°	4°31'	-59'	160°	3°35'	-59'	160°	2°39'	-59'	160°	1°42'	-60'	160°	18
19	6°21'	-59'	160°	5°25'	-59'	160°	4°28'	-59'	160°	3°32'	-59'	160°	2°36'	-59'	160°	1°39'	-59'	160°	0°43'	-60'	160°	19
20	5°22'	-59'	160°	4°26'	-59'	160°	3°29'	-59'	160°	2°33'	-59'	160°	1°36'	-59'	160°	0°40'	-59'	160°	0°17'	+60'	20°	20
21	4°23'	-59'	160°	3°26'	-59'	160°	2°30'	-59'	160°	1°33'	-59'	160°	0°37'	-59'	160°	0°20'	+59'	20°	1°16'	+60'	20°	21
22	3°24'	-59'	161°	2°27'	-59'	161°	1°30'	-59'	161°	0°34'	-59'	161°	0°23'	+59'	19°	1°19'	+59'	19°	2°16'	+60'	19°	22
23	2°24'	-59'	161°	1°28'	-59'	161°	0°31'	-59'	161°	0°25'	+59'	19°	1°22'	+59'	19°	2°19'	+59'	19°	3°15'	+60'	19°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

159° 201° LHA — Latitude SAME as DECLINATION — 159° 201° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

20° 340° LHA — Latitude CONTRARY to Declination — 20° 340° LHA

Dec°	63 Hc°	d'	Z°	64 Hc°	d'	Z°	65 Hc°	d'	Z°	66 Hc°	d'	Z°	67 Hc°	d'	Z°	68 Hc°	d'	Z°	69 Hc°	d'	Z°	Dec°
0	25°15'	-59'	158°	24°20'	-59'	158°	23°24'	-59'	158°	22°28'	-59'	158°	21°32'	-59'	158°	20°37'	-59'	159°	19°41'	-59'	159°	0
1	24°16'	-59'	158°	23°20'	-59'	158°	22°25'	-59'	158°	21°29'	-59'	158°	20°33'	-59'	159°	19°37'	-59'	159°	18°41'	-59'	159°	1
2	23°17'	-59'	158°	22°21'	-59'	158°	21°25'	-59'	158°	20°30'	-59'	159°	19°34'	-59'	159°	18°38'	-59'	159°	17°42'	-60'	159°	2
3	22°18'	-59'	158°	21°22'	-59'	158°	20°26'	-59'	159°	19°30'	-59'	159°	18°34'	-59'	159°	17°38'	-59'	159°	16°42'	-60'	159°	3
4	21°19'	-59'	159°	20°23'	-59'	159°	19°27'	-59'	159°	18°31'	-59'	159°	17°35'	-59'	159°	16°39'	-59'	159°	15°43'	-60'	159°	4
5	20°19'	-59'	159°	19°24'	-59'	159°	18°28'	-59'	159°	17°32'	-59'	159°	16°35'	-59'	159°	15°39'	-59'	159°	14°43'	-60'	159°	5
6	19°20'	-59'	159°	18°24'	-59'	159°	17°28'	-59'	159°	16°32'	-59'	159°	15°36'	-59'	159°	14°40'	-59'	159°	13°44'	-60'	160°	6
7	18°21'	-59'	159°	17°25'	-59'	159°	16°29'	-59'	159°	15°33'	-59'	159°	14°37'	-59'	159°	13°40'	-59'	160°	12°44'	-60'	160°	7
8	17°22'	-59'	159°	16°26'	-59'	159°	15°30'	-59'	159°	14°33'	-59'	160°	13°37'	-59'	160°	12°41'	-59'	160°	11°45'	-60'	160°	8
9	16°23'	-59'	159°	15°27'	-59'	159°	14°30'	-59'	160°	13°34'	-59'	160°	12°38'	-59'	160°	11°41'	-59'	160°	10°45'	-60'	160°	9
10	15°23'	-59'	160°	14°27'	-59'	160°	13°31'	-59'	160°	12°35'	-59'	160°	11°38'	-59'	160°	10°42'	-59'	160°	9°46'	-60'	160°	10
11	14°24'	-59'	160°	13°28'	-59'	160°	12°32'	-59'	160°	11°35'	-59'	160°	10°39'	-59'	160°	9°42'	-59'	160°	8°46'	-60'	160°	11
12	13°25'	-59'	160°	12°29'	-59'	160°	11°32'	-59'	160°	10°36'	-59'	160°	9°39'	-59'	160°	8°43'	-59'	160°	7°47'	-60'	160°	12
13	12°26'	-59'	160°	11°29'	-59'	160°	10°33'	-59'	160°	9°36'	-59'	160°	8°40'	-59'	160°	7°44'	-59'	160°	6°47'	-60'	160°	13
14	11°27'	-59'	160°	10°30'	-59'	160°	9°34'	-59'	160°	8°37'	-59'	160°	7°41'	-59'	160°	6°44'	-59'	160°	5°47'	-60'	161°	14
15	10°27'	-59'	160°	9°31'	-59'	160°	8°34'	-59'	160°	7°38'	-59'	161°	6°41'	-59'	161°	5°45'	-60'	161°	4°48'	-60'	161°	15
16	9°28'	-59'	161°	8°31'	-59'	161°	7°35'	-59'	161°	6°38'	-59'	161°	5°42'	-59'	161°	4°45'	-60'	161°	3°48'	-60'	161°	16
17	8°29'	-59'	161°	7°32'	-59'	161°	6°36'	-59'	161°	5°39'	-59'	161°	4°42'	-59'	161°	3°46'	-60'	161°	2°49'	-60'	161°	17
18	7°30'	-59'	161°	6°33'	-59'	161°	5°36'	-59'	161°	4°39'	-59'	161°	3°43'	-59'	161°	2°46'	-60'	161°	1°49'	-60'	161°	18
19	6°30'	-59'	161°	5°34'	-59'	161°	4°37'	-59'	161°	3°40'	-59'	161°	2°43'	-59'	161°	1°47'	-60'	161°	0°50'	-60'	161°	19
20	5°31'	-59'	161°	4°34'	-59'	161°	3°37'	-59'	161°	2°41'	-59'	161°	1°44'	-59'	161°	0°47'	-60'	161°	0°10'	+60'	19°	20
21	4°32'	-59'	161°	3°35'	-59'	161°	2°38'	-59'	161°	1°41'	-59'	161°	0°44'	-59'	161°	0°13'	+60'	19°	1°09'	+60'	19°	21
22	3°32'	-59'	161°	2°36'	-59'	161°	1°39'	-59'	162°	0°42'	-59'	162°	0°15'	+59'	18°	1°12'	+60'	18°	2°09'	+60'	19°	22
23	2°33'	-59'	162°	1°36'	-59'	162°	0°39'	-59'	162°	0°18'	+59'	18°	1°15'	+59'	18°	2°12'	+60'	18°	3°08'	+60'	18°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

160° 200° LHA — Latitude SAME as DECLINATION — 160° 200° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

19° 341° LHA — Latitude CONTRARY to Declination — 19° 341° LHA

Dec°	63 Hc°	d'	Z°	64 Hc°	d'	Z°	65 Hc°	d'	Z°	66 Hc°	d'	Z°	67 Hc°	d'	Z°	68 Hc°	d'	Z°	69 Hc°	d'	Z°	Dec°
0	25°25'	-59'	159°	24°29'	-59'	159°	23°33'	-59'	159°	22°37'	-59'	159°	21°41'	-59'	159°	20°45'	-59'	160°	19°48'	-60'	160°	0
1	24°26'	-59'	159°	23°30'	-59'	159°	22°34'	-59'	159°	21°38'	-59'	160°	20°41'	-59'	160°	19°45'	-59'	160°	18°49'	-60'	160°	1
2	23°27'	-59'	159°	22°31'	-59'	159°	21°35'	-59'	160°	20°38'	-59'	160°	19°42'	-59'	160°	18°46'	-60'	160°	17°49'	-60'	160°	2
3	22°28'	-59'	159°	21°31'	-59'	160°	20°35'	-59'	160°	19°39'	-59'	160°	18°43'	-59'	160°	17°46'	-60'	160°	16°50'	-60'	160°	3
4	21°28'	-59'	160°	20°32'	-59'	160°	19°36'	-59'	160°	18°39'	-59'	160°	17°43'	-59'	160°	16°47'	-60'	160°	15°50'	-60'	160°	4
5	20°29'	-59'	160°	19°33'	-59'	160°	18°36'	-59'	160°	17°40'	-59'	160°	16°44'	-59'	160°	15°47'	-60'	160°	14°51'	-60'	160°	5
6	19°30'	-59'	160°	18°33'	-59'	160°	17°37'	-59'	160°	16°41'	-59'	160°	15°44'	-59'	160°	14°48'	-60'	160°	13°51'	-60'	161°	6
7	18°31'	-59'	160°	17°34'	-59'	160°	16°38'	-59'	160°	15°41'	-59'	160°	14°45'	-59'	160°	13°48'	-60'	161°	12°52'	-60'	161°	7
8	17°31'	-59'	160°	16°35'	-59'	160°	15°38'	-59'	160°	14°42'	-59'	161°	13°45'	-59'	161°	12°49'	-60'	161°	11°52'	-60'	161°	8
9	16°32'	-59'	160°	15°36'	-59'	160°	14°39'	-59'	161°	13°42'	-59'	161°	12°46'	-59'	161°	11°49'	-60'	161°	10°52'	-60'	161°	9
10	15°33'	-59'	161°	14°36'	-59'	161°	13°40'	-59'	161°	12°43'	-59'	161°	11°46'	-59'	161°	10°50'	-60'	161°	9°53'	-60'	161°	10
11	14°33'	-59'	161°	13°37'	-59'	161°	12°40'	-59'	161°	11°43'	-59'	161°	10°47'	-59'	161°	9°50'	-60'	161°	8°53'	-60'	161°	11
12	13°34'	-59'	161°	12°37'	-59'	161°	11°41'	-59'	161°	10°44'	-59'	161°	9°47'	-59'	161°	8°50'	-60'	161°	7°54'	-60'	161°	12
13	12°35'	-59'	161°	11°38'	-59'	161°	10°41'	-59'	161°	9°45'	-59'	161°	8°48'	-60'	161°	7°51'	-60'	161°	6°54'	-60'	161°	13
14	11°36'	-59'	161°	10°39'	-59'	161°	9°42'	-59'	161°	8°45'	-59'	161°	7°48'	-60'	161°	6°51'	-60'	161°	5°54'	-60'	161°	14
15	10°36'	-59'	161°	9°39'	-59'	161°	8°43'	-59'	161°	7°46'	-59'	161°	6°49'	-60'	162°	5°52'	-60'	162°	4°55'	-60'	162°	15
16	9°37'	-59'	161°	8°40'	-59'	162°	7°43'	-59'	162°	6°46'	-59'	162°	5°49'	-60'	162°	4°52'	-60'	162°	3°55'	-60'	162°	16
17	8°38'	-59'	162°	7°41'	-59'	162°	6°44'	-59'	162°	5°47'	-59'	162°	4°50'	-60'	162°	3°53'	-60'	162°	2°56'	-60'	162°	17
18	7°38'	-59'	162°	6°41'	-59'	162°	5°44'	-59'	162°	4°47'	-59'	162°	3°50'	-60'	162°	2°53'	-60'	162°	1°56'	-60'	162°	18
19	6°39'	-59'	162°	5°42'	-59'	162°	4°45'	-59'	162°	3°48'	-59'	162°	2°51'	-60'	162°	1°54'	-60'	162°	0°57'	-60'	162°	19
20	5°40'	-59'	162°	4°43'	-59'	162°	3°45'	-59'	162°	2°48'	-59'	162°	1°51'	-60'	162°	0°54'	-60'	162°	0°03'	+60'	18°	20
21	4°40'	-59'	162°	3°43'	-59'	162°	2°46'	-59'	162°	1°49'	-59'	162°	0°52'	-60'	162°	0°06'	+60'	18°	1°03'	+60'	18°	21
22	3°41'	-59'	162°	2°44'	-59'	162°	1°47'	-59'	162°	0°49'	-59'	162°	0°08'	+60'	18°	1°05'	+60'	18°	2°02'	+60'	18°	22
23	2°42'	-59'	163°	1°44'	-59'	163°	0°47'	-59'	163°	0°10'	+59'	17°	1°07'	+60'	17°	2°05'	+60'	17°	3°02'	+60'	17°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

161° 199° LHA — Latitude SAME as DECLINATION — 161° 199° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

18° 342° LHA — Latitude CONTRARY to Declination — 18° 342° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	25°35'	-59'	160°	24°38'	-59'	160°	23°42'	-59'	160°	22°45'	-59'	160°	21°49'	-59'	161°	20°52'	-60'	161°	19°56'	-60'	161°	0
1	24°36'	-59'	160°	23°39'	-59'	160°	22°43'	-59'	160°	21°46'	-59'	161°	20°49'	-60'	161°	19°53'	-60'	161°	18°56'	-60'	161°	1
2	23°36'	-59'	160°	22°40'	-59'	160°	21°43'	-59'	161°	20°47'	-59'	161°	19°50'	-60'	161°	18°53'	-60'	161°	17°56'	-60'	161°	2
3	22°37'	-59'	160°	21°40'	-59'	161°	20°44'	-59'	161°	19°47'	-59'	161°	18°50'	-60'	161°	17°54'	-60'	161°	16°57'	-60'	161°	3
4	21°38'	-59'	161°	20°41'	-59'	161°	19°44'	-59'	161°	18°48'	-59'	161°	17°51'	-60'	161°	16°54'	-60'	161°	15°57'	-60'	161°	4
5	20°38'	-59'	161°	19°42'	-59'	161°	18°45'	-59'	161°	17°48'	-59'	161°	16°51'	-60'	161°	15°55'	-60'	161°	14°58'	-60'	161°	5
6	19°39'	-59'	161°	18°42'	-59'	161°	17°45'	-59'	161°	16°49'	-59'	161°	15°52'	-60'	161°	14°55'	-60'	161°	13°58'	-60'	162°	6
7	18°40'	-59'	161°	17°43'	-59'	161°	16°46'	-59'	161°	15°49'	-59'	161°	14°52'	-60'	161°	13°55'	-60'	162°	12°58'	-60'	162°	7
8	17°40'	-59'	161°	16°43'	-59'	161°	15°47'	-59'	161°	14°50'	-59'	162°	13°53'	-60'	162°	12°56'	-60'	162°	11°59'	-60'	162°	8
9	16°41'	-59'	161°	15°44'	-59'	162°	14°47'	-59'	162°	13°50'	-59'	162°	12°53'	-60'	162°	11°56'	-60'	162°	10°59'	-60'	162°	9
10	15°42'	-59'	162°	14°45'	-59'	162°	13°48'	-59'	162°	12°51'	-60'	162°	11°54'	-60'	162°	10°57'	-60'	162°	10°00'	-60'	162°	10
11	14°42'	-59'	162°	13°45'	-59'	162°	12°48'	-59'	162°	11°51'	-60'	162°	10°54'	-60'	162°	9°57'	-60'	162°	9°00'	-60'	162°	11
12	13°43'	-59'	162°	12°46'	-59'	162°	11°49'	-59'	162°	10°52'	-60'	162°	9°55'	-60'	162°	8°57'	-60'	162°	8°00'	-60'	162°	12
13	12°43'	-59'	162°	11°46'	-59'	162°	10°49'	-59'	162°	9°52'	-60'	162°	8°55'	-60'	162°	7°58'	-60'	162°	7°01'	-60'	162°	13
14	11°44'	-59'	162°	10°47'	-59'	162°	9°50'	-59'	162°	8°53'	-60'	162°	7°56'	-60'	162°	6°58'	-60'	162°	6°01'	-60'	162°	14
15	10°45'	-59'	162°	9°48'	-59'	162°	8°50'	-59'	162°	7°53'	-60'	162°	6°56'	-60'	163°	5°59'	-60'	163°	5°01'	-60'	163°	15
16	9°45'	-59'	162°	8°48'	-59'	163°	7°51'	-59'	163°	6°54'	-60'	163°	5°56'	-60'	163°	4°59'	-60'	163°	4°02'	-60'	163°	16
17	8°46'	-59'	163°	7°49'	-59'	163°	6°51'	-59'	163°	5°54'	-60'	163°	4°57'	-60'	163°	4°00'	-60'	163°	3°02'	-60'	163°	17
18	7°47'	-59'	163°	6°49'	-59'	163°	5°52'	-59'	163°	4°55'	-60'	163°	3°57'	-60'	163°	3°00'	-60'	163°	2°03'	-60'	163°	18
19	6°47'	-59'	163°	5°50'	-59'	163°	4°52'	-59'	163°	3°55'	-60'	163°	2°58'	-60'	163°	2°00'	-60'	163°	1°03'	-60'	163°	19
20	5°48'	-59'	163°	4°50'	-59'	163°	3°53'	-59'	163°	2°56'	-60'	163°	1°58'	-60'	163°	1°01'	-60'	163°	0°03'	-60'	163°	20
21	4°48'	-59'	163°	3°51'	-59'	163°	2°53'	-59'	163°	1°56'	-60'	163°	0°59'	-60'	163°	0°01'	-60'	163°	0°56'	+60'	17°	21
22	3°49'	-59'	163°	2°51'	-59'	163°	1°54'	-59'	163°	0°57'	-60'	163°	0°01'	+60'	17°	0°58'	+60'	17°	1°56'	+60'	17°	22
23	2°50'	-59'	163°	1°52'	-59'	163°	0°55'	-59'	163°	0°03'	+60'	17°	1°01'	+60'	17°	1°58'	+60'	17°	2°56'	+60'	17°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

162° 198° LHA — Latitude SAME as DECLINATION — 162° 198° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

17° 343° LHA — Latitude CONTRARY to Declination — 17° 343° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	25°44'	-59'	161°	24°47'	-59'	161°	23°50'	-59'	161°	22°53'	-60'	161°	21°56'	-60'	162°	21°00'	-60'	162°	20°03'	-60'	162°	0
1	24°45'	-59'	161°	23°48'	-59'	161°	22°51'	-59'	162°	21°54'	-60'	162°	20°57'	-60'	162°	20°00'	-60'	162°	19°03'	-60'	162°	1
2	23°45'	-59'	161°	22°48'	-59'	162°	21°51'	-59'	162°	20°54'	-60'	162°	19°57'	-60'	162°	19°00'	-60'	162°	18°03'	-60'	162°	2
3	22°46'	-59'	162°	21°49'	-59'	162°	20°52'	-59'	162°	19°55'	-60'	162°	18°58'	-60'	162°	18°01'	-60'	162°	17°04'	-60'	162°	3
4	21°46'	-59'	162°	20°49'	-59'	162°	19°52'	-59'	162°	18°55'	-60'	162°	17°58'	-60'	162°	17°01'	-60'	162°	16°04'	-60'	162°	4
5	20°47'	-59'	162°	19°50'	-59'	162°	18°53'	-59'	162°	17°56'	-60'	162°	16°59'	-60'	162°	16°02'	-60'	162°	15°04'	-60'	162°	5
6	19°48'	-59'	162°	18°51'	-59'	162°	17°53'	-59'	162°	16°56'	-60'	162°	15°59'	-60'	162°	15°02'	-60'	162°	14°05'	-60'	163°	6
7	18°48'	-59'	162°	17°51'	-59'	162°	16°54'	-60'	162°	15°57'	-60'	162°	15°00'	-60'	163°	14°02'	-60'	163°	13°05'	-60'	163°	7
8	17°49'	-59'	162°	16°52'	-59'	162°	15°54'	-60'	162°	14°57'	-60'	163°	14°00'	-60'	163°	13°03'	-60'	163°	12°05'	-60'	163°	8
9	16°49'	-59'	162°	15°52'	-59'	163°	14°55'	-60'	163°	13°58'	-60'	163°	13°00'	-60'	163°	12°03'	-60'	163°	11°06'	-60'	163°	9
10	15°50'	-59'	163°	14°53'	-59'	163°	13°55'	-60'	163°	12°58'	-60'	163°	12°01'	-60'	163°	11°03'	-60'	163°	10°06'	-60'	163°	10
11	14°51'	-59'	163°	13°53'	-59'	163°	12°56'	-60'	163°	11°59'	-60'	163°	11°01'	-60'	163°	10°04'	-60'	163°	9°06'	-60'	163°	11
12	13°51'	-59'	163°	12°54'	-59'	163°	11°56'	-60'	163°	10°59'	-60'	163°	10°02'	-60'	163°	9°04'	-60'	163°	8°07'	-60'	163°	12
13	12°52'	-59'	163°	11°54'	-59'	163°	10°57'	-60'	163°	9°59'	-60'	163°	9°02'	-60'	163°	8°05'	-60'	163°	7°07'	-60'	163°	13
14	11°52'	-59'	163°	10°55'	-59'	163°	9°57'	-60'	163°	9°00'	-60'	163°	8°02'	-60'	163°	7°05'	-60'	163°	6°07'	-60'	163°	14
15	10°53'	-59'	163°	9°55'	-59'	163°	8°58'	-60'	163°	8°00'	-60'	163°	7°03'	-60'	163°	6°05'	-60'	164°	5°08'	-60'	164°	15
16	9°53'	-59'	163°	8°56'	-59'	163°	7°58'	-60'	164°	7°01'	-60'	164°	6°03'	-60'	164°	5°06'	-60'	164°	4°08'	-60'	164°	16
17	8°54'	-59'	164°	7°56'	-59'	164°	6°59'	-60'	164°	6°01'	-60'	164°	5°04'	-60'	164°	4°06'	-60'	164°	3°08'	-60'	164°	17
18	7°54'	-59'	164°	6°57'	-59'	164°	5°59'	-60'	164°	5°02'	-60'	164°	4°04'	-60'	164°	3°06'	-60'	164°	2°09'	-60'	164°	18
19	6°55'	-59'	164°	5°57'	-60'	164°	5°00'	-60'	164°	4°02'	-60'	164°	3°04'	-60'	164°	2°07'	-60'	164°	1°09'	-60'	164°	19
20	5°56'	-59'	164°	4°58'	-60'	164°	4°00'	-60'	164°	3°02'	-60'	164°	2°05'	-60'	164°	1°07'	-60'	164°	0°09'	-60'	164°	20
21	4°56'	-59'	164°	3°58'	-60'	164°	3°01'	-60'	164°	2°03'	-60'	164°	1°05'	-60'	164°	0°07'	-60'	164°	0°50'	+60'	16°	21
22	3°57'	-59'	164°	2°59'	-60'	164°	2°01'	-60'	164°	1°03'	-60'	164°	0°06'	-60'	164°	0°52'	+60'	16°	1°50'	+60'	16°	22
23	2°57'	-59'	164°	1°59'	-60'	164°	1°02'	-60'	164°	0°04'	-60'	164°	0°54'	+60'	16°	1°52'	+60'	16°	2°50'	+60'	16°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

163° 197° LHA — Latitude SAME as DECLINATION — 163° 197° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

16° 344° LHA — Latitude CONTRARY to Declination — 16° 344° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	25°52'	-59'	162°	24°55'	-59'	162°	23°58'	-60'	162°	23°01'	-60'	163°	22°04'	-60'	163°	21°06'	-60'	163°	20°09'	-60'	163°	0
1	24°53'	-59'	162°	23°56'	-59'	162°	22°59'	-60'	163°	22°01'	-60'	163°	21°04'	-60'	163°	20°07'	-60'	163°	19°09'	-60'	163°	1
2	23°54'	-59'	162°	22°56'	-59'	163°	21°59'	-60'	163°	21°02'	-60'	163°	20°04'	-60'	163°	19°07'	-60'	163°	18°10'	-60'	163°	2
3	22°54'	-59'	163°	21°57'	-59'	163°	21°00'	-60'	163°	20°02'	-60'	163°	19°05'	-60'	163°	18°07'	-60'	163°	17°10'	-60'	163°	3
4	21°55'	-59'	163°	20°57'	-59'	163°	20°00'	-60'	163°	19°03'	-60'	163°	18°05'	-60'	163°	17°08'	-60'	163°	16°10'	-60'	163°	4
5	20°55'	-59'	163°	19°58'	-60'	163°	19°01'	-60'	163°	18°03'	-60'	163°	17°06'	-60'	163°	16°08'	-60'	163°	15°11'	-60'	163°	5
6	19°56'	-59'	163°	18°58'	-60'	163°	18°01'	-60'	163°	17°04'	-60'	163°	16°06'	-60'	163°	15°08'	-60'	164°	14°11'	-60'	164°	6
7	18°56'	-59'	163°	17°59'	-60'	163°	17°01'	-60'	163°	16°04'	-60'	163°	15°06'	-60'	164°	14°09'	-60'	164°	13°11'	-60'	164°	7
8	17°57'	-59'	163°	16°59'	-60'	163°	16°02'	-60'	164°	15°04'	-60'	164°	14°07'	-60'	164°	13°09'	-60'	164°	12°12'	-60'	164°	8
9	16°57'	-59'	163°	16°00'	-60'	164°	15°02'	-60'	164°	14°05'	-60'	164°	13°07'	-60'	164°	12°10'	-60'	164°	11°12'	-60'	164°	9
10	15°58'	-59'	164°	15°00'	-60'	164°	14°03'	-60'	164°	13°05'	-60'	164°	12°07'	-60'	164°	11°10'	-60'	164°	10°12'	-60'	164°	10
11	14°58'	-59'	164°	14°01'	-60'	164°	13°03'	-60'	164°	12°06'	-60'	164°	11°08'	-60'	164°	10°10'	-60'	164°	9°12'	-60'	164°	11
12	13°59'	-60'	164°	13°01'	-60'	164°	12°04'	-60'	164°	11°06'	-60'	164°	10°08'	-60'	164°	9°11'	-60'	164°	8°13'	-60'	164°	12
13	12°59'	-60'	164°	12°02'	-60'	164°	11°04'	-60'	164°	10°06'	-60'	164°	9°09'	-60'	164°	8°11'	-60'	164°	7°13'	-60'	164°	13
14	12°00'	-60'	164°	11°02'	-60'	164°	10°04'	-60'	164°	9°07'	-60'	164°	8°09'	-60'	164°	7°11'	-60'	164°	6°13'	-60'	164°	14
15	11°00'	-60'	164°	10°03'	-60'	164°	9°05'	-60'	164°	8°07'	-60'	164°	7°09'	-60'	164°	6°11'	-60'	164°	5°14'	-60'	164°	15
16	10°01'	-60'	164°	9°03'	-60'	164°	8°05'	-60'	164°	7°07'	-60'	165°	6°10'	-60'	165°	5°12'	-60'	165°	4°14'	-60'	165°	16
17	9°01'	-60'	165°	8°04'	-60'	165°	7°06'	-60'	165°	6°08'	-60'	165°	5°10'	-60'	165°	4°12'	-60'	165°	3°14'	-60'	165°	17
18	8°02'	-60'	165°	7°04'	-60'	165°	6°06'	-60'	165°	5°08'	-60'	165°	4°10'	-60'	165°	3°12'	-60'	165°	2°15'	-60'	165°	18
19	7°02'	-60'	165°	6°04'	-60'	165°	5°07'	-60'	165°	4°09'	-60'	165°	3°11'	-60'	165°	2°13'	-60'	165°	1°15'	-60'	165°	19
20	6°03'	-60'	165°	5°05'	-60'	165°	4°07'	-60'	165°	3°09'	-60'	165°	2°11'	-60'	165°	1°13'	-60'	165°	0°15'	-60'	165°	20
21	5°03'	-60'	165°	4°05'	-60'	165°	3°07'	-60'	165°	2°09'	-60'	165°	1°11'	-60'	165°	0°13'	-60'	165°	0°45'	+60'	15°	21
22	4°04'	-60'	165°	3°06'	-60'	165°	2°08'	-60'	165°	1°10'	-60'	165°	0°12'	-60'	165°	0°46'	+60'	15°	1°44'	+60'	15°	22
23	3°04'	-60'	165°	2°06'	-60'	165°	1°08'	-60'	165°	0°10'	-60'	165°	0°48'	+60'	15°	1°46'	+60'	15°	2°44'	+60'	15°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

164° 196° LHA — Latitude SAME as DECLINATION — 164° 196° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

15° 345° LHA — Latitude CONTRARY to Declination — 15° 345° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°01'	-59'	163°	25°03'	-60'	163°	24°06'	-60'	164°	23°08'	-60'	164°	22°10'	-60'	164°	21°13'	-60'	164°	20°15'	-60'	164°	0
1	25°01'	-59'	163°	24°04'	-60'	164°	23°06'	-60'	164°	22°08'	-60'	164°	21°11'	-60'	164°	20°13'	-60'	164°	19°15'	-60'	164°	1
2	24°02'	-60'	164°	23°04'	-60'	164°	22°06'	-60'	164°	21°09'	-60'	164°	20°11'	-60'	164°	19°13'	-60'	164°	18°16'	-60'	164°	2
3	23°02'	-60'	164°	22°04'	-60'	164°	21°07'	-60'	164°	20°09'	-60'	164°	19°11'	-60'	164°	18°14'	-60'	164°	17°16'	-60'	164°	3
4	22°03'	-60'	164°	21°05'	-60'	164°	20°07'	-60'	164°	19°10'	-60'	164°	18°12'	-60'	164°	17°14'	-60'	164°	16°16'	-60'	164°	4
5	21°03'	-60'	164°	20°05'	-60'	164°	19°08'	-60'	164°	18°10'	-60'	164°	17°12'	-60'	164°	16°14'	-60'	164°	15°17'	-60'	164°	5
6	20°04'	-60'	164°	19°06'	-60'	164°	18°08'	-60'	164°	17°10'	-60'	164°	16°13'	-60'	164°	15°15'	-60'	165°	14°17'	-60'	165°	6
7	19°04'	-60'	164°	18°06'	-60'	164°	17°08'	-60'	164°	16°11'	-60'	164°	15°13'	-60'	165°	14°15'	-60'	165°	13°17'	-60'	165°	7
8	18°04'	-60'	164°	17°07'	-60'	164°	16°09'	-60'	165°	15°11'	-60'	165°	14°13'	-60'	165°	13°15'	-60'	165°	12°17'	-60'	165°	8
9	17°05'	-60'	164°	16°07'	-60'	165°	15°09'	-60'	165°	14°11'	-60'	165°	13°13'	-60'	165°	12°16'	-60'	165°	11°18'	-60'	165°	9
10	16°05'	-60'	165°	15°08'	-60'	165°	14°10'	-60'	165°	13°12'	-60'	165°	12°14'	-60'	165°	11°16'	-60'	165°	10°18'	-60'	165°	10
11	15°06'	-60'	165°	14°08'	-60'	165°	13°10'	-60'	165°	12°12'	-60'	165°	11°14'	-60'	165°	10°16'	-60'	165°	9°18'	-60'	165°	11
12	14°06'	-60'	165°	13°08'	-60'	165°	12°10'	-60'	165°	11°12'	-60'	165°	10°14'	-60'	165°	9°16'	-60'	165°	8°18'	-60'	165°	12
13	13°07'	-60'	165°	12°09'	-60'	165°	11°11'	-60'	165°	10°13'	-60'	165°	9°15'	-60'	165°	8°17'	-60'	165°	7°19'	-60'	165°	13
14	12°07'	-60'	165°	11°09'	-60'	165°	10°11'	-60'	165°	9°13'	-60'	165°	8°15'	-60'	165°	7°17'	-60'	165°	6°19'	-60'	165°	14
15	11°08'	-60'	165°	10°10'	-60'	165°	9°12'	-60'	165°	8°13'	-60'	165°	7°15'	-60'	165°	6°17'	-60'	165°	5°19'	-60'	165°	15
16	10°08'	-60'	165°	9°10'	-60'	165°	8°12'	-60'	165°	7°14'	-60'	165°	6°16'	-60'	166°	5°18'	-60'	166°	4°20'	-60'	166°	16
17	9°08'	-60'	165°	8°10'	-60'	166°	7°12'	-60'	166°	6°14'	-60'	166°	5°16'	-60'	166°	4°18'	-60'	166°	3°20'	-60'	166°	17
18	8°09'	-60'	166°	7°11'	-60'	166°	6°13'	-60'	166°	5°14'	-60'	166°	4°16'	-60'	166°	3°18'	-60'	166°	2°20'	-60'	166°	18
19	7°09'	-60'	166°	6°11'	-60'	166°	5°13'	-60'	166°	4°15'	-60'	166°	3°17'	-60'	166°	2°18'	-60'	166°	1°20'	-60'	166°	19
20	6°10'	-60'	166°	5°12'	-60'	166°	4°13'	-60'	166°	3°15'	-60'	166°	2°17'	-60'	166°	1°19'	-60'	166°	0°21'	-60'	166°	20
21	5°10'	-60'	166°	4°12'	-60'	166°	3°14'	-60'	166°	2°15'	-60'	166°	1°17'	-60'	166°	0°19'	-60'	166°	0°39'	+60'	14°	21
22	4°11'	-60'	166°	3°12'	-60'	166°	2°14'	-60'	166°	1°16'	-60'	166°	0°18'	-60'	166°	0°41'	+60'	14°	1°39'	+60'	14°	22
23	3°11'	-60'	166°	2°13'	-60'	166°	1°14'	-60'	166°	0°16'	-60'	166°	0°42'	+60'	14°	1°40'	+60'	14°	2°39'	+60'	14°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

165° 195° LHA — Latitude SAME as DECLINATION — 165° 195° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

14° 346° LHA — Latitude CONTRARY to Declination — 14° 346° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°08'	-60'	164°	25°10'	-60'	164°	24°13'	-60'	165°	23°15'	-60'	165°	22°17'	-60'	165°	21°19'	-60'	165°	20°21'	-60'	165°	0
1	25°09'	-60'	165°	24°11'	-60'	165°	23°13'	-60'	165°	22°15'	-60'	165°	21°17'	-60'	165°	20°19'	-60'	165°	19°21'	-60'	165°	1
2	24°09'	-60'	165°	23°11'	-60'	165°	22°13'	-60'	165°	21°15'	-60'	165°	20°17'	-60'	165°	19°19'	-60'	165°	18°21'	-60'	165°	2
3	23°09'	-60'	165°	22°12'	-60'	165°	21°14'	-60'	165°	20°16'	-60'	165°	19°18'	-60'	165°	18°20'	-60'	165°	17°22'	-60'	165°	3
4	22°10'	-60'	165°	21°12'	-60'	165°	20°14'	-60'	165°	19°16'	-60'	165°	18°18'	-60'	165°	17°20'	-60'	165°	16°22'	-60'	165°	4
5	21°10'	-60'	165°	20°12'	-60'	165°	19°14'	-60'	165°	18°16'	-60'	165°	17°18'	-60'	165°	16°20'	-60'	165°	15°22'	-60'	166°	5
6	20°11'	-60'	165°	19°13'	-60'	165°	18°15'	-60'	165°	17°17'	-60'	165°	16°19'	-60'	165°	15°20'	-60'	166°	14°22'	-60'	166°	6
7	19°11'	-60'	165°	18°13'	-60'	165°	17°15'	-60'	165°	16°17'	-60'	166°	15°19'	-60'	166°	14°21'	-60'	166°	13°23'	-60'	166°	7
8	18°12'	-60'	165°	17°13'	-60'	165°	16°15'	-60'	166°	15°17'	-60'	166°	14°19'	-60'	166°	13°21'	-60'	166°	12°23'	-60'	166°	8
9	17°12'	-60'	166°	16°14'	-60'	166°	15°16'	-60'	166°	14°18'	-60'	166°	13°19'	-60'	166°	12°21'	-60'	166°	11°23'	-60'	166°	9
10	16°12'	-60'	166°	15°14'	-60'	166°	14°16'	-60'	166°	13°18'	-60'	166°	12°20'	-60'	166°	11°22'	-60'	166°	10°23'	-60'	166°	10
11	15°13'	-60'	166°	14°15'	-60'	166°	13°16'	-60'	166°	12°18'	-60'	166°	11°20'	-60'	166°	10°22'	-60'	166°	9°24'	-60'	166°	11
12	14°13'	-60'	166°	13°15'	-60'	166°	12°17'	-60'	166°	11°19'	-60'	166°	10°20'	-60'	166°	9°22'	-60'	166°	8°24'	-60'	166°	12
13	13°14'	-60'	166°	12°15'	-60'	166°	11°17'	-60'	166°	10°19'	-60'	166°	9°21'	-60'	166°	8°22'	-60'	166°	7°24'	-60'	166°	13
14	12°14'	-60'	166°	11°16'	-60'	166°	10°17'	-60'	166°	9°19'	-60'	166°	8°21'	-60'	166°	7°23'	-60'	166°	6°24'	-60'	166°	14
15	11°14'	-60'	166°	10°16'	-60'	166°	9°18'	-60'	166°	8°19'	-60'	166°	7°21'	-60'	166°	6°23'	-60'	166°	5°24'	-60'	166°	15
16	10°15'	-60'	166°	9°16'	-60'	166°	8°18'	-60'	166°	7°20'	-60'	166°	6°21'	-60'	166°	5°23'	-60'	166°	4°25'	-60'	167°	16
17	9°15'	-60'	166°	8°17'	-60'	166°	7°18'	-60'	167°	6°20'	-60'	167°	5°22'	-60'	167°	4°23'	-60'	167°	3°25'	-60'	167°	17
18	8°15'	-60'	167°	7°17'	-60'	167°	6°19'	-60'	167°	5°20'	-60'	167°	4°22'	-60'	167°	3°24'	-60'	167°	2°25'	-60'	167°	18
19	7°16'	-60'	167°	6°17'	-60'	167°	5°19'	-60'	167°	4°21'	-60'	167°	3°22'	-60'	167°	2°24'	-60'	167°	1°25'	-60'	167°	19
20	6°16'	-60'	167°	5°18'	-60'	167°	4°19'	-60'	167°	3°21'	-60'	167°	2°22'	-60'	167°	1°24'	-60'	167°	0°26'	-60'	167°	20
21	5°17'	-60'	167°	4°18'	-60'	167°	3°20'	-60'	167°	2°21'	-60'	167°	1°23'	-60'	167°	0°24'	-60'	167°	0°34'	+60'	13°	21
22	4°17'	-60'	167°	3°18'	-60'	167°	2°20'	-60'	167°	1°21'	-60'	167°	0°23'	-60'	167°	0°35'	+60'	13°	1°34'	+60'	13°	22
23	3°17'	-60'	167°	2°19'	-60'	167°	1°20'	-60'	167°	0°22'	-60'	167°	0°37'	+60'	13°	1°35'	+60'	13°	2°34'	+60'	13°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

166° 194° LHA — Latitude SAME as DECLINATION — 166° 194° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

13° 347° LHA — Latitude CONTRARY to Declination — 13° 347° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°15'	-60'	165°	25°17'	-60'	166°	24°19'	-60'	166°	23°21'	-60'	166°	22°23'	-60'	166°	21°24'	-60'	166°	20°26'	-60'	166°	0
1	25°16'	-60'	166°	24°18'	-60'	166°	23°19'	-60'	166°	22°21'	-60'	166°	21°23'	-60'	166°	20°25'	-60'	166°	19°26'	-60'	166°	1
2	24°16'	-60'	166°	23°18'	-60'	166°	22°20'	-60'	166°	21°21'	-60'	166°	20°23'	-60'	166°	19°25'	-60'	166°	18°27'	-60'	166°	2
3	23°16'	-60'	166°	22°18'	-60'	166°	21°20'	-60'	166°	20°22'	-60'	166°	19°23'	-60'	166°	18°25'	-60'	166°	17°27'	-60'	166°	3
4	22°17'	-60'	166°	21°19'	-60'	166°	20°20'	-60'	166°	19°22'	-60'	166°	18°24'	-60'	166°	17°25'	-60'	166°	16°27'	-60'	166°	4
5	21°17'	-60'	166°	20°19'	-60'	166°	19°21'	-60'	166°	18°22'	-60'	166°	17°24'	-60'	166°	16°26'	-60'	166°	15°27'	-60'	167°	5
6	20°17'	-60'	166°	19°19'	-60'	166°	18°21'	-60'	166°	17°23'	-60'	166°	16°24'	-60'	167°	15°26'	-60'	167°	14°28'	-60'	167°	6
7	19°18'	-60'	166°	18°20'	-60'	166°	17°21'	-60'	166°	16°23'	-60'	167°	15°25'	-60'	167°	14°26'	-60'	167°	13°28'	-60'	167°	7
8	18°18'	-60'	166°	17°20'	-60'	167°	16°22'	-60'	167°	15°23'	-60'	167°	14°25'	-60'	167°	13°26'	-60'	167°	12°28'	-60'	167°	8
9	17°19'	-60'	167°	16°20'	-60'	167°	15°22'	-60'	167°	14°23'	-60'	167°	13°25'	-60'	167°	12°27'	-60'	167°	11°28'	-60'	167°	9
10	16°19'	-60'	167°	15°20'	-60'	167°	14°22'	-60'	167°	13°24'	-60'	167°	12°25'	-60'	167°	11°27'	-60'	167°	10°28'	-60'	167°	10
11	15°19'	-60'	167°	14°21'	-60'	167°	13°22'	-60'	167°	12°24'	-60'	167°	11°25'	-60'	167°	10°27'	-60'	167°	9°29'	-60'	167°	11
12	14°20'	-60'	167°	13°21'	-60'	167°	12°23'	-60'	167°	11°24'	-60'	167°	10°26'	-60'	167°	9°27'	-60'	167°	8°29'	-60'	167°	12
13	13°20'	-60'	167°	12°21'	-60'	167°	11°23'	-60'	167°	10°24'	-60'	167°	9°26'	-60'	167°	8°27'	-60'	167°	7°29'	-60'	167°	13
14	12°20'	-60'	167°	11°22'	-60'	167°	10°23'	-60'	167°	9°25'	-60'	167°	8°26'	-60'	167°	7°28'	-60'	167°	6°29'	-60'	167°	14
15	11°21'	-60'	167°	10°22'	-60'	167°	9°24'	-60'	167°	8°25'	-60'	167°	7°26'	-60'	167°	6°28'	-60'	167°	5°29'	-60'	167°	15
16	10°21'	-60'	167°	9°22'	-60'	167°	8°24'	-60'	167°	7°25'	-60'	167°	6°27'	-60'	167°	5°28'	-60'	167°	4°30'	-60'	167°	16
17	9°21'	-60'	167°	8°23'	-60'	167°	7°24'	-60'	167°	6°25'	-60'	167°	5°27'	-60'	168°	4°28'	-60'	168°	3°30'	-60'	168°	17
18	8°22'	-60'	168°	7°23'	-60'	168°	6°24'	-60'	168°	5°26'	-60'	168°	4°27'	-60'	168°	3°29'	-60'	168°	2°30'	-60'	168°	18
19	7°22'	-60'	168°	6°23'	-60'	168°	5°25'	-60'	168°	4°26'	-60'	168°	3°27'	-60'	168°	2°29'	-60'	168°	1°30'	-60'	168°	19
20	6°22'	-60'	168°	5°24'	-60'	168°	4°25'	-60'	168°	3°26'	-60'	168°	2°28'	-60'	168°	1°29'	-60'	168°	0°30'	-60'	168°	20
21	5°22'	-60'	168°	4°24'	-60'	168°	3°25'	-60'	168°	2°27'	-60'	168°	1°28'	-60'	168°	0°29'	-60'	168°	0°29'	+60'	12°	21
22	4°23'	-60'	168°	3°24'	-60'	168°	2°25'	-60'	168°	1°27'	-60'	168°	0°28'	-60'	168°	0°31'	+60'	12°	1°29'	+60'	12°	22
23	3°23'	-60'	168°	2°24'	-60'	168°	1°26'	-60'	168°	0°27'	-60'	168°	0°32'	+60'	12°	1°30'	+60'	12°	2°29'	+60'	12°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

167° 193° LHA — Latitude SAME as DECLINATION — 167° 193° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

12° 348° LHA — Latitude CONTRARY to Declination — 12° 348° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°22'	-60'	167°	25°23'	-60'	167°	24°25'	-60'	167°	23°27'	-60'	167°	22°28'	-60'	167°	21°30'	-60'	167°	20°31'	-60'	167°	0
1	25°22'	-60'	167°	24°24'	-60'	167°	23°25'	-60'	167°	22°27'	-60'	167°	21°28'	-60'	167°	20°30'	-60'	167°	19°31'	-60'	167°	1
2	24°22'	-60'	167°	23°24'	-60'	167°	22°26'	-60'	167°	21°27'	-60'	167°	20°29'	-60'	167°	19°30'	-60'	167°	18°32'	-60'	167°	2
3	23°23'	-60'	167°	22°24'	-60'	167°	21°26'	-60'	167°	20°27'	-60'	167°	19°29'	-60'	167°	18°30'	-60'	167°	17°32'	-60'	167°	3
4	22°23'	-60'	167°	21°25'	-60'	167°	20°26'	-60'	167°	19°28'	-60'	167°	18°29'	-60'	167°	17°31'	-60'	167°	16°32'	-60'	168°	4
5	21°23'	-60'	167°	20°25'	-60'	167°	19°26'	-60'	167°	18°28'	-60'	167°	17°29'	-60'	167°	16°31'	-60'	168°	15°32'	-60'	168°	5
6	20°24'	-60'	167°	19°25'	-60'	167°	18°27'	-60'	167°	17°28'	-60'	167°	16°30'	-60'	168°	15°31'	-60'	168°	14°32'	-60'	168°	6
7	19°24'	-60'	167°	18°25'	-60'	167°	17°27'	-60'	168°	16°28'	-60'	168°	15°30'	-60'	168°	14°31'	-60'	168°	13°32'	-60'	168°	7
8	18°24'	-60'	167°	17°26'	-60'	168°	16°27'	-60'	168°	15°29'	-60'	168°	14°30'	-60'	168°	13°31'	-60'	168°	12°33'	-60'	168°	8
9	17°25'	-60'	168°	16°26'	-60'	168°	15°27'	-60'	168°	14°29'	-60'	168°	13°30'	-60'	168°	12°32'	-60'	168°	11°33'	-60'	168°	9
10	16°25'	-60'	168°	15°26'	-60'	168°	14°28'	-60'	168°	13°29'	-60'	168°	12°30'	-60'	168°	11°32'	-60'	168°	10°33'	-60'	168°	10
11	15°25'	-60'	168°	14°27'	-60'	168°	13°28'	-60'	168°	12°29'	-60'	168°	11°31'	-60'	168°	10°32'	-60'	168°	9°33'	-60'	168°	11
12	14°26'	-60'	168°	13°27'	-60'	168°	12°28'	-60'	168°	11°29'	-60'	168°	10°31'	-60'	168°	9°32'	-60'	168°	8°33'	-60'	168°	12
13	13°26'	-60'	168°	12°27'	-60'	168°	11°28'	-60'	168°	10°30'	-60'	168°	9°31'	-60'	168°	8°32'	-60'	168°	7°34'	-60'	168°	13
14	12°26'	-60'	168°	11°27'	-60'	168°	10°29'	-60'	168°	9°30'	-60'	168°	8°31'	-60'	168°	7°32'	-60'	168°	6°34'	-60'	168°	14
15	11°26'	-60'	168°	10°28'	-60'	168°	9°29'	-60'	168°	8°30'	-60'	168°	7°31'	-60'	168°	6°33'	-60'	168°	5°34'	-60'	168°	15
16	10°27'	-60'	168°	9°28'	-60'	168°	8°29'	-60'	168°	7°30'	-60'	168°	6°32'	-60'	168°	5°33'	-60'	168°	4°34'	-60'	168°	16
17	9°27'	-60'	168°	8°28'	-60'	168°	7°29'	-60'	168°	6°31'	-60'	168°	5°32'	-60'	168°	4°33'	-60'	168°	3°34'	-60'	169°	17
18	8°27'	-60'	168°	7°28'	-60'	168°	6°30'	-60'	169°	5°31'	-60'	169°	4°32'	-60'	169°	3°33'	-60'	169°	2°34'	-60'	169°	18
19	7°27'	-60'	169°	6°29'	-60'	169°	5°30'	-60'	169°	4°31'	-60'	169°	3°32'	-60'	169°	2°33'	-60'	169°	1°35'	-60'	169°	19
20	6°28'	-60'	169°	5°29'	-60'	169°	4°30'	-60'	169°	3°31'	-60'	169°	2°32'	-60'	169°	1°34'	-60'	169°	0°35'	-60'	169°	20
21	5°28'	-60'	169°	4°29'	-60'	169°	3°30'	-60'	169°	2°31'	-60'	169°	1°33'	-60'	169°	0°34'	-60'	169°	0°25'	+60'	11°	21
22	4°28'	-60'	169°	3°29'	-60'	169°	2°31'	-60'	169°	1°32'	-60'	169°	0°33'	-60'	169°	0°26'	+60'	11°	1°25'	+60'	11°	22
23	3°29'	-60'	169°	2°30'	-60'	169°	1°31'	-60'	169°	0°32'	-60'	169°	0°27'	+60'	11°	1°26'	+60'	11°	2°25'	+60'	11°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

168° 192° LHA — Latitude SAME as DECLINATION — 168° 192° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

11° 349° LHA — Latitude CONTRARY to Declination — 11° 349° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°28'	-60'	168°	25°29'	-60'	168°	24°31'	-60'	168°	23°32'	-60'	168°	22°33'	-60'	168°	21°35'	-60'	168°	20°36'	-60'	168°	0
1	25°28'	-60'	168°	24°30'	-60'	168°	23°31'	-60'	168°	22°32'	-60'	168°	21°33'	-60'	168°	20°35'	-60'	168°	19°36'	-60'	168°	1
2	24°28'	-60'	168°	23°30'	-60'	168°	22°31'	-60'	168°	21°32'	-60'	168°	20°34'	-60'	168°	19°35'	-60'	168°	18°36'	-60'	168°	2
3	23°29'	-60'	168°	22°30'	-60'	168°	21°31'	-60'	168°	20°33'	-60'	168°	19°34'	-60'	168°	18°35'	-60'	168°	17°36'	-60'	168°	3
4	22°29'	-60'	168°	21°30'	-60'	168°	20°32'	-60'	168°	19°33'	-60'	168°	18°34'	-60'	168°	17°35'	-60'	168°	16°36'	-60'	169°	4
5	21°29'	-60'	168°	20°31'	-60'	168°	19°32'	-60'	168°	18°33'	-60'	168°	17°34'	-60'	168°	16°35'	-60'	169°	15°37'	-60'	169°	5
6	20°30'	-60'	168°	19°31'	-60'	168°	18°32'	-60'	168°	17°33'	-60'	169°	16°34'	-60'	169°	15°36'	-60'	169°	14°37'	-60'	169°	6
7	19°30'	-60'	168°	18°31'	-60'	168°	17°32'	-60'	169°	16°33'	-60'	169°	15°35'	-60'	169°	14°36'	-60'	169°	13°37'	-60'	169°	7
8	18°30'	-60'	169°	17°31'	-60'	169°	16°32'	-60'	169°	15°34'	-60'	169°	14°35'	-60'	169°	13°36'	-60'	169°	12°37'	-60'	169°	8
9	17°30'	-60'	169°	16°31'	-60'	169°	15°33'	-60'	169°	14°34'	-60'	169°	13°35'	-60'	169°	12°36'	-60'	169°	11°37'	-60'	169°	9
10	16°31'	-60'	169°	15°32'	-60'	169°	14°33'	-60'	169°	13°34'	-60'	169°	12°35'	-60'	169°	11°36'	-60'	169°	10°37'	-60'	169°	10
11	15°31'	-60'	169°	14°32'	-60'	169°	13°33'	-60'	169°	12°34'	-60'	169°	11°35'	-60'	169°	10°36'	-60'	169°	9°37'	-60'	169°	11
12	14°31'	-60'	169°	13°32'	-60'	169°	12°33'	-60'	169°	11°34'	-60'	169°	10°35'	-60'	169°	9°37'	-60'	169°	8°38'	-60'	169°	12
13	13°31'	-60'	169°	12°32'	-60'	169°	11°33'	-60'	169°	10°35'	-60'	169°	9°36'	-60'	169°	8°37'	-60'	169°	7°38'	-60'	169°	13
14	12°31'	-60'	169°	11°33'	-60'	169°	10°34'	-60'	169°	9°35'	-60'	169°	8°36'	-60'	169°	7°37'	-60'	169°	6°38'	-60'	169°	14
15	11°32'	-60'	169°	10°33'	-60'	169°	9°34'	-60'	169°	8°35'	-60'	169°	7°36'	-60'	169°	6°37'	-60'	169°	5°38'	-60'	169°	15
16	10°32'	-60'	169°	9°33'	-60'	169°	8°34'	-60'	169°	7°35'	-60'	169°	6°36'	-60'	169°	5°37'	-60'	169°	4°38'	-60'	169°	16
17	9°32'	-60'	169°	8°33'	-60'	169°	7°34'	-60'	169°	6°35'	-60'	169°	5°36'	-60'	169°	4°37'	-60'	169°	3°38'	-60'	169°	17
18	8°32'	-60'	169°	7°33'	-60'	169°	6°34'	-60'	169°	5°35'	-60'	169°	4°36'	-60'	170°	3°37'	-60'	170°	2°38'	-60'	170°	18
19	7°33'	-60'	170°	6°34'	-60'	170°	5°35'	-60'	170°	4°36'	-60'	170°	3°37'	-60'	170°	2°38'	-60'	170°	1°39'	-60'	170°	19
20	6°33'	-60'	170°	5°34'	-60'	170°	4°35'	-60'	170°	3°36'	-60'	170°	2°37'	-60'	170°	1°38'	-60'	170°	0°39'	-60'	170°	20
21	5°33'	-60'	170°	4°34'	-60'	170°	3°35'	-60'	170°	2°36'	-60'	170°	1°37'	-60'	170°	0°38'	-60'	170°	0°21'	+60'	10°	21
22	4°33'	-60'	170°	3°34'	-60'	170°	2°35'	-60'	170°	1°36'	-60'	170°	0°37'	-60'	170°	0°22'	+60'	10°	1°21'	+60'	10°	22
23	3°34'	-60'	170°	2°34'	-60'	170°	1°35'	-60'	170°	0°36'	-60'	170°	0°23'	+60'	10°	1°22'	+60'	10°	2°21'	+60'	10°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

169° 191° LHA — Latitude SAME as DECLINATION — 169° 191° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

10° 350° LHA — Latitude CONTRARY to Declination — 10° 350° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	26°33'	-60'	169°	25°35'	-60'	169°	24°36'	-60'	169°	23°37'	-60'	169°	22°38'	-60'	169°	21°39'	-60'	169°	20°40'	-60'	169°	0
1	25°34'	-60'	169°	24°35'	-60'	169°	23°36'	-60'	169°	22°37'	-60'	169°	21°38'	-60'	169°	20°39'	-60'	169°	19°40'	-60'	169°	1
2	24°34'	-60'	169°	23°35'	-60'	169°	22°36'	-60'	169°	21°37'	-60'	169°	20°38'	-60'	169°	19°39'	-60'	169°	18°40'	-60'	169°	2
3	23°34'	-60'	169°	22°35'	-60'	169°	21°36'	-60'	169°	20°37'	-60'	169°	19°38'	-60'	169°	18°39'	-60'	169°	17°40'	-60'	170°	3
4	22°34'	-60'	169°	21°35'	-60'	169°	20°36'	-60'	169°	19°37'	-60'	169°	18°38'	-60'	169°	17°39'	-60'	170°	16°40'	-60'	170°	4
5	21°35'	-60'	169°	20°36'	-60'	169°	19°37'	-60'	169°	18°38'	-60'	169°	17°39'	-60'	170°	16°40'	-60'	170°	15°41'	-60'	170°	5
6	20°35'	-60'	169°	19°36'	-60'	169°	18°37'	-60'	170°	17°38'	-60'	170°	16°39'	-60'	170°	15°40'	-60'	170°	14°41'	-60'	170°	6
7	19°35'	-60'	169°	18°36'	-60'	170°	17°37'	-60'	170°	16°38'	-60'	170°	15°39'	-60'	170°	14°40'	-60'	170°	13°41'	-60'	170°	7
8	18°35'	-60'	170°	17°36'	-60'	170°	16°37'	-60'	170°	15°38'	-60'	170°	14°39'	-60'	170°	13°40'	-60'	170°	12°41'	-60'	170°	8
9	17°35'	-60'	170°	16°36'	-60'	170°	15°37'	-60'	170°	14°38'	-60'	170°	13°39'	-60'	170°	12°40'	-60'	170°	11°41'	-60'	170°	9
10	16°36'	-60'	170°	15°37'	-60'	170°	14°38'	-60'	170°	13°38'	-60'	170°	12°39'	-60'	170°	11°40'	-60'	170°	10°41'	-60'	170°	10
11	15°36'	-60'	170°	14°37'	-60'	170°	13°38'	-60'	170°	12°39'	-60'	170°	11°40'	-60'	170°	10°40'	-60'	170°	9°41'	-60'	170°	11
12	14°36'	-60'	170°	13°37'	-60'	170°	12°38'	-60'	170°	11°39'	-60'	170°	10°40'	-60'	170°	9°41'	-60'	170°	8°41'	-60'	170°	12
13	13°36'	-60'	170°	12°37'	-60'	170°	11°38'	-60'	170°	10°39'	-60'	170°	9°40'	-60'	170°	8°41'	-60'	170°	7°42'	-60'	170°	13
14	12°36'	-60'	170°	11°37'	-60'	170°	10°38'	-60'	170°	9°39'	-60'	170°	8°40'	-60'	170°	7°41'	-60'	170°	6°42'	-60'	170°	14
15	11°37'	-60'	170°	10°37'	-60'	170°	9°38'	-60'	170°	8°39'	-60'	170°	7°40'	-60'	170°	6°41'	-60'	170°	5°42'	-60'	170°	15
16	10°37'	-60'	170°	9°38'	-60'	170°	8°39'	-60'	170°	7°39'	-60'	170°	6°40'	-60'	170°	5°41'	-60'	170°	4°42'	-60'	170°	16
17	9°37'	-60'	170°	8°38'	-60'	170°	7°39'	-60'	170°	6°40'	-60'	170°	5°40'	-60'	170°	4°41'	-60'	170°	3°42'	-60'	170°	17
18	8°37'	-60'	170°	7°38'	-60'	170°	6°39'	-60'	170°	5°40'	-60'	170°	4°41'	-60'	170°	3°41'	-60'	170°	2°42'	-60'	170°	18
19	7°37'	-60'	170°	6°38'	-60'	170°	5°39'	-60'	171°	4°40'	-60'	171°	3°41'	-60'	171°	2°41'	-60'	171°	1°42'	-60'	171°	19
20	6°38'	-60'	171°	5°38'	-60'	171°	4°39'	-60'	171°	3°40'	-60'	171°	2°41'	-60'	171°	1°42'	-60'	171°	0°42'	-60'	171°	20
21	5°38'	-60'	171°	4°39'	-60'	171°	3°39'	-60'	171°	2°40'	-60'	171°	1°41'	-60'	171°	0°42'	-60'	171°	0°17'	+60'	9°	21
22	4°38'	-60'	171°	3°39'	-60'	171°	2°40'	-60'	171°	1°40'	-60'	171°	0°41'	-60'	171°	0°18'	+60'	9°	1°17'	+60'	9°	22
23	3°38'	-60'	171°	2°39'	-60'	171°	1°40'	-60'	171°	0°40'	-60'	171°	0°19'	+60'	9°	1°18'	+60'	9°	2°17'	+60'	9°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

170° 190° LHA — Latitude SAME as DECLINATION — 170° 190° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

9° 351° LHA — Latitude CONTRARY to Declination — 9° 351° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	26°38'	-60'	170°	25°39'	-60'	170°	24°40'	-60'	170°	23°41'	-60'	170°	22°42'	-60'	170°	21°43'	-60'	170°	20°44'	-60'	170°	0
1	25°39'	-60'	170°	24°40'	-60'	170°	23°40'	-60'	170°	22°41'	-60'	170°	21°42'	-60'	170°	20°43'	-60'	170°	19°44'	-60'	170°	1
2	24°39'	-60'	170°	23°40'	-60'	170°	22°41'	-60'	170°	21°41'	-60'	170°	20°42'	-60'	170°	19°43'	-60'	170°	18°44'	-60'	170°	2
3	23°39'	-60'	170°	22°40'	-60'	170°	21°41'	-60'	170°	20°42'	-60'	170°	19°42'	-60'	170°	18°43'	-60'	171°	17°44'	-60'	171°	3
4	22°39'	-60'	170°	21°40'	-60'	170°	20°41'	-60'	170°	19°42'	-60'	170°	18°43'	-60'	171°	17°43'	-60'	171°	16°44'	-60'	171°	4
5	21°39'	-60'	170°	20°40'	-60'	170°	19°41'	-60'	170°	18°42'	-60'	171°	17°43'	-60'	171°	16°43'	-60'	171°	15°44'	-60'	171°	5
6	20°40'	-60'	170°	19°40'	-60'	170°	18°41'	-60'	171°	17°42'	-60'	171°	16°43'	-60'	171°	15°44'	-60'	171°	14°44'	-60'	171°	6
7	19°40'	-60'	171°	18°41'	-60'	171°	17°41'	-60'	171°	16°42'	-60'	171°	15°43'	-60'	171°	14°44'	-60'	171°	13°44'	-60'	171°	7
8	18°40'	-60'	171°	17°41'	-60'	171°	16°41'	-60'	171°	15°42'	-60'	171°	14°43'	-60'	171°	13°44'	-60'	171°	12°45'	-60'	171°	8
9	17°40'	-60'	171°	16°41'	-60'	171°	15°42'	-60'	171°	14°42'	-60'	171°	13°43'	-60'	171°	12°44'	-60'	171°	11°45'	-60'	171°	9
10	16°40'	-60'	171°	15°41'	-60'	171°	14°42'	-60'	171°	13°43'	-60'	171°	12°43'	-60'	171°	11°44'	-60'	171°	10°45'	-60'	171°	10
11	15°40'	-60'	171°	14°41'	-60'	171°	13°42'	-60'	171°	12°43'	-60'	171°	11°43'	-60'	171°	10°44'	-60'	171°	9°45'	-60'	171°	11
12	14°41'	-60'	171°	13°41'	-60'	171°	12°42'	-60'	171°	11°43'	-60'	171°	10°44'	-60'	171°	9°44'	-60'	171°	8°45'	-60'	171°	12
13	13°41'	-60'	171°	12°41'	-60'	171°	11°42'	-60'	171°	10°43'	-60'	171°	9°44'	-60'	171°	8°44'	-60'	171°	7°45'	-60'	171°	13
14	12°41'	-60'	171°	11°42'	-60'	171°	10°42'	-60'	171°	9°43'	-60'	171°	8°44'	-60'	171°	7°44'	-60'	171°	6°45'	-60'	171°	14
15	11°41'	-60'	171°	10°42'	-60'	171°	9°42'	-60'	171°	8°43'	-60'	171°	7°44'	-60'	171°	6°45'	-60'	171°	5°45'	-60'	171°	15
16	10°41'	-60'	171°	9°42'	-60'	171°	8°43'	-60'	171°	7°43'	-60'	171°	6°44'	-60'	171°	5°45'	-60'	171°	4°45'	-60'	171°	16
17	9°41'	-60'	171°	8°42'	-60'	171°	7°43'	-60'	171°	6°43'	-60'	171°	5°44'	-60'	171°	4°45'	-60'	171°	3°45'	-60'	171°	17
18	8°42'	-60'	171°	7°42'	-60'	171°	6°43'	-60'	171°	5°44'	-60'	171°	4°44'	-60'	171°	3°45'	-60'	171°	2°46'	-60'	171°	18
19	7°42'	-60'	171°	6°42'	-60'	171°	5°43'	-60'	171°	4°44'	-60'	171°	3°44'	-60'	171°	2°45'	-60'	171°	1°46'	-60'	171°	19
20	6°42'	-60'	171°	5°42'	-60'	172°	4°43'	-60'	172°	3°44'	-60'	172°	2°44'	-60'	172°	1°45'	-60'	172°	0°46'	-60'	172°	20
21	5°42'	-60'	172°	4°43'	-60'	172°	3°43'	-60'	172°	2°44'	-60'	172°	1°45'	-60'	172°	0°45'	-60'	172°	0°14'	+60'	8°	21
22	4°42'	-60'	172°	3°43'	-60'	172°	2°43'	-60'	172°	1°44'	-60'	172°	0°45'	-60'	172°	0°15'	+60'	8°	1°14'	+60'	8°	22
23	3°42'	-60'	172°	2°43'	-60'	172°	1°44'	-60'	172°	0°44'	-60'	172°	0°15'	+60'	8°	1°15'	+60'	8°	2°14'	+60'	8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

171° 189° LHA — Latitude SAME as DECLINATION — 171° 189° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

8° 352° LHA — Latitude CONTRARY to Declination — 8° 352° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°43'	-60'	171°	25°44'	-60'	171°	24°44'	-60'	171°	23°45'	-60'	171°	22°46'	-60'	171°	21°46'	-60'	171°	20°47'	-60'	171°	0
1	25°43'	-60'	171°	24°44'	-60'	171°	23°45'	-60'	171°	22°45'	-60'	171°	21°46'	-60'	171°	20°47'	-60'	171°	19°47'	-60'	171°	1
2	24°43'	-60'	171°	23°44'	-60'	171°	22°45'	-60'	171°	21°45'	-60'	171°	20°46'	-60'	171°	19°47'	-60'	172°	18°47'	-60'	172°	2
3	23°43'	-60'	171°	22°44'	-60'	171°	21°45'	-60'	171°	20°45'	-60'	171°	19°46'	-60'	172°	18°47'	-60'	172°	17°47'	-60'	172°	3
4	22°44'	-60'	171°	21°44'	-60'	171°	20°45'	-60'	171°	19°46'	-60'	172°	18°46'	-60'	172°	17°47'	-60'	172°	16°48'	-60'	172°	4
5	21°44'	-60'	171°	20°44'	-60'	171°	19°45'	-60'	172°	18°46'	-60'	172°	17°46'	-60'	172°	16°47'	-60'	172°	15°48'	-60'	172°	5
6	20°44'	-60'	171°	19°44'	-60'	172°	18°45'	-60'	172°	17°46'	-60'	172°	16°46'	-60'	172°	15°47'	-60'	172°	14°48'	-60'	172°	6
7	19°44'	-60'	172°	18°45'	-60'	172°	17°45'	-60'	172°	16°46'	-60'	172°	15°47'	-60'	172°	14°47'	-60'	172°	13°48'	-60'	172°	7
8	18°44'	-60'	172°	17°45'	-60'	172°	16°45'	-60'	172°	15°46'	-60'	172°	14°47'	-60'	172°	13°47'	-60'	172°	12°48'	-60'	172°	8
9	17°44'	-60'	172°	16°45'	-60'	172°	15°45'	-60'	172°	14°46'	-60'	172°	13°47'	-60'	172°	12°47'	-60'	172°	11°48'	-60'	172°	9
10	16°44'	-60'	172°	15°45'	-60'	172°	14°46'	-60'	172°	13°46'	-60'	172°	12°47'	-60'	172°	11°47'	-60'	172°	10°48'	-60'	172°	10
11	15°44'	-60'	172°	14°45'	-60'	172°	13°46'	-60'	172°	12°46'	-60'	172°	11°47'	-60'	172°	10°47'	-60'	172°	9°48'	-60'	172°	11
12	14°45'	-60'	172°	13°45'	-60'	172°	12°46'	-60'	172°	11°46'	-60'	172°	10°47'	-60'	172°	9°48'	-60'	172°	8°48'	-60'	172°	12
13	13°45'	-60'	172°	12°45'	-60'	172°	11°46'	-60'	172°	10°46'	-60'	172°	9°47'	-60'	172°	8°48'	-60'	172°	7°48'	-60'	172°	13
14	12°45'	-60'	172°	11°45'	-60'	172°	10°46'	-60'	172°	9°47'	-60'	172°	8°47'	-60'	172°	7°48'	-60'	172°	6°48'	-60'	172°	14
15	11°45'	-60'	172°	10°46'	-60'	172°	9°46'	-60'	172°	8°47'	-60'	172°	7°47'	-60'	172°	6°48'	-60'	172°	5°48'	-60'	172°	15
16	10°45'	-60'	172°	9°46'	-60'	172°	8°46'	-60'	172°	7°47'	-60'	172°	6°47'	-60'	172°	5°48'	-60'	172°	4°48'	-60'	172°	16
17	9°45'	-60'	172°	8°46'	-60'	172°	7°46'	-60'	172°	6°47'	-60'	172°	5°47'	-60'	172°	4°48'	-60'	172°	3°49'	-60'	172°	17
18	8°45'	-60'	172°	7°46'	-60'	172°	6°46'	-60'	172°	5°47'	-60'	172°	4°48'	-60'	172°	3°48'	-60'	172°	2°49'	-60'	172°	18
19	7°46'	-60'	172°	6°46'	-60'	172°	5°47'	-60'	172°	4°47'	-60'	172°	3°48'	-60'	172°	2°48'	-60'	172°	1°49'	-60'	172°	19
20	6°46'	-60'	172°	5°46'	-60'	172°	4°47'	-60'	172°	3°47'	-60'	172°	2°48'	-60'	172°	1°48'	-60'	172°	0°49'	-60'	172°	20
21	5°46'	-60'	172°	4°46'	-60'	173°	3°47'	-60'	173°	2°47'	-60'	173°	1°48'	-60'	173°	0°48'	-60'	173°	0°11'	+60'	7°	21
22	4°46'	-60'	173°	3°46'	-60'	173°	2°47'	-60'	173°	1°47'	-60'	173°	0°48'	-60'	173°	0°12'	+60'	7°	1°11'	+60'	7°	22
23	3°46'	-60'	173°	2°46'	-60'	173°	1°47'	-60'	173°	0°47'	-60'	173°	0°12'	+60'	7°	1°12'	+60'	7°	2°11'	+60'	7°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

172° 188° LHA — Latitude SAME as DECLINATION — 172° 188° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

7° 353° LHA — Latitude CONTRARY to Declination — 7° 353° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°47'	-60'	172°	25°48'	-60'	172°	24°48'	-60'	172°	23°49'	-60'	172°	22°49'	-60'	172°	21°50'	-60'	172°	20°50'	-60'	173°	0
1	25°47'	-60'	172°	24°48'	-60'	172°	23°48'	-60'	172°	22°49'	-60'	172°	21°49'	-60'	172°	20°50'	-60'	173°	19°50'	-60'	173°	1
2	24°47'	-60'	172°	23°48'	-60'	172°	22°48'	-60'	172°	21°49'	-60'	172°	20°49'	-60'	173°	19°50'	-60'	173°	18°50'	-60'	173°	2
3	23°47'	-60'	172°	22°48'	-60'	172°	21°48'	-60'	172°	20°49'	-60'	173°	19°49'	-60'	173°	18°50'	-60'	173°	17°50'	-60'	173°	3
4	22°47'	-60'	172°	21°48'	-60'	172°	20°48'	-60'	173°	19°49'	-60'	173°	18°49'	-60'	173°	17°50'	-60'	173°	16°50'	-60'	173°	4
5	21°48'	-60'	172°	20°48'	-60'	173°	19°49'	-60'	173°	18°49'	-60'	173°	17°50'	-60'	173°	16°50'	-60'	173°	15°50'	-60'	173°	5
6	20°48'	-60'	173°	19°48'	-60'	173°	18°49'	-60'	173°	17°49'	-60'	173°	16°50'	-60'	173°	15°50'	-60'	173°	14°51'	-60'	173°	6
7	19°48'	-60'	173°	18°48'	-60'	173°	17°49'	-60'	173°	16°49'	-60'	173°	15°50'	-60'	173°	14°50'	-60'	173°	13°51'	-60'	173°	7
8	18°48'	-60'	173°	17°48'	-60'	173°	16°49'	-60'	173°	15°49'	-60'	173°	14°50'	-60'	173°	13°50'	-60'	173°	12°51'	-60'	173°	8
9	17°48'	-60'	173°	16°48'	-60'	173°	15°49'	-60'	173°	14°49'	-60'	173°	13°50'	-60'	173°	12°50'	-60'	173°	11°51'	-60'	173°	9
10	16°48'	-60'	173°	15°48'	-60'	173°	14°49'	-60'	173°	13°49'	-60'	173°	12°50'	-60'	173°	11°50'	-60'	173°	10°51'	-60'	173°	10
11	15°48'	-60'	173°	14°49'	-60'	173°	13°49'	-60'	173°	12°50'	-60'	173°	11°50'	-60'	173°	10°50'	-60'	173°	9°51'	-60'	173°	11
12	14°48'	-60'	173°	13°49'	-60'	173°	12°49'	-60'	173°	11°50'	-60'	173°	10°50'	-60'	173°	9°50'	-60'	173°	8°51'	-60'	173°	12
13	13°48'	-60'	173°	12°49'	-60'	173°	11°49'	-60'	173°	10°50'	-60'	173°	9°50'	-60'	173°	8°51'	-60'	173°	7°51'	-60'	173°	13
14	12°48'	-60'	173°	11°49'	-60'	173°	10°49'	-60'	173°	9°50'	-60'	173°	8°50'	-60'	173°	7°51'	-60'	173°	6°51'	-60'	173°	14
15	11°49'	-60'	173°	10°49'	-60'	173°	9°49'	-60'	173°	8°50'	-60'	173°	7°50'	-60'	173°	6°51'	-60'	173°	5°51'	-60'	173°	15
16	10°49'	-60'	173°	9°49'	-60'	173°	8°49'	-60'	173°	7°50'	-60'	173°	6°50'	-60'	173°	5°51'	-60'	173°	4°51'	-60'	173°	16
17	9°49'	-60'	173°	8°49'	-60'	173°	7°50'	-60'	173°	6°50'	-60'	173°	5°50'	-60'	173°	4°51'	-60'	173°	3°51'	-60'	173°	17
18	8°49'	-60'	173°	7°49'	-60'	173°	6°50'	-60'	173°	5°50'	-60'	173°	4°50'	-60'	173°	3°51'	-60'	173°	2°51'	-60'	173°	18
19	7°49'	-60'	173°	6°49'	-60'	173°	5°50'	-60'	173°	4°50'	-60'	173°	3°51'	-60'	173°	2°51'	-60'	173°	1°51'	-60'	173°	19
20	6°49'	-60'	173°	5°49'	-60'	173°	4°50'	-60'	173°	3°50'	-60'	173°	2°51'	-60'	173°	1°51'	-60'	173°	0°51'	-60'	173°	20
21	5°49'	-60'	173°	4°49'	-60'	173°	3°50'	-60'	173°	2°50'	-60'	173°	1°51'	-60'	173°	0°51'	-60'	173°	0°09'	+60'	7°	21
22	4°49'	-60'	173°	3°50'	-60'	173°	2°50'	-60'	174°	1°50'	-60'	174°	0°51'	-60'	174°	0°09'	+60'	6°	1°09'	+60'	6°	22
23	3°49'	-60'	174°	2°50'	-60'	174°	1°50'	-60'	174°	0°50'	-60'	174°	0°09'	+60'	6°	1°09'	+60'	6°	2°08'	+60'	6°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

173° 187° LHA — Latitude SAME as DECLINATION — 173° 187° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

6° 354° LHA — Latitude CONTRARY to Declination — 6° 354° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°50'	-60'	173°	25°51'	-60'	173°	24°51'	-60'	173°	23°52'	-60'	173°	22°52'	-60'	173°	21°52'	-60'	174°	20°53'	-60'	174°	0
1	25°50'	-60'	173°	24°51'	-60'	173°	23°51'	-60'	173°	22°52'	-60'	173°	21°52'	-60'	174°	20°52'	-60'	174°	19°53'	-60'	174°	1
2	24°51'	-60'	173°	23°51'	-60'	173°	22°51'	-60'	173°	21°52'	-60'	174°	20°52'	-60'	174°	19°53'	-60'	174°	18°53'	-60'	174°	2
3	23°51'	-60'	173°	22°51'	-60'	173°	21°51'	-60'	174°	20°52'	-60'	174°	19°52'	-60'	174°	18°53'	-60'	174°	17°53'	-60'	174°	3
4	22°51'	-60'	174°	21°51'	-60'	174°	20°51'	-60'	174°	19°52'	-60'	174°	18°52'	-60'	174°	17°53'	-60'	174°	16°53'	-60'	174°	4
5	21°51'	-60'	174°	20°51'	-60'	174°	19°52'	-60'	174°	18°52'	-60'	174°	17°52'	-60'	174°	16°53'	-60'	174°	15°53'	-60'	174°	5
6	20°51'	-60'	174°	19°51'	-60'	174°	18°52'	-60'	174°	17°52'	-60'	174°	16°52'	-60'	174°	15°53'	-60'	174°	14°53'	-60'	174°	6
7	19°51'	-60'	174°	18°51'	-60'	174°	17°52'	-60'	174°	16°52'	-60'	174°	15°52'	-60'	174°	14°53'	-60'	174°	13°53'	-60'	174°	7
8	18°51'	-60'	174°	17°51'	-60'	174°	16°52'	-60'	174°	15°52'	-60'	174°	14°52'	-60'	174°	13°53'	-60'	174°	12°53'	-60'	174°	8
9	17°51'	-60'	174°	16°51'	-60'	174°	15°52'	-60'	174°	14°52'	-60'	174°	13°53'	-60'	174°	12°53'	-60'	174°	11°53'	-60'	174°	9
10	16°51'	-60'	174°	15°52'	-60'	174°	14°52'	-60'	174°	13°52'	-60'	174°	12°53'	-60'	174°	11°53'	-60'	174°	10°53'	-60'	174°	10
11	15°51'	-60'	174°	14°52'	-60'	174°	13°52'	-60'	174°	12°52'	-60'	174°	11°53'	-60'	174°	10°53'	-60'	174°	9°53'	-60'	174°	11
12	14°51'	-60'	174°	13°52'	-60'	174°	12°52'	-60'	174°	11°52'	-60'	174°	10°53'	-60'	174°	9°53'	-60'	174°	8°53'	-60'	174°	12
13	13°51'	-60'	174°	12°52'	-60'	174°	11°52'	-60'	174°	10°52'	-60'	174°	9°53'	-60'	174°	8°53'	-60'	174°	7°53'	-60'	174°	13
14	12°51'	-60'	174°	11°52'	-60'	174°	10°52'	-60'	174°	9°52'	-60'	174°	8°53'	-60'	174°	7°53'	-60'	174°	6°53'	-60'	174°	14
15	11°52'	-60'	174°	10°52'	-60'	174°	9°52'	-60'	174°	8°53'	-60'	174°	7°53'	-60'	174°	6°53'	-60'	174°	5°53'	-60'	174°	15
16	10°52'	-60'	174°	9°52'	-60'	174°	8°52'	-60'	174°	7°53'	-60'	174°	6°53'	-60'	174°	5°53'	-60'	174°	4°53'	-60'	174°	16
17	9°52'	-60'	174°	8°52'	-60'	174°	7°52'	-60'	174°	6°53'	-60'	174°	5°53'	-60'	174°	4°53'	-60'	174°	3°54'	-60'	174°	17
18	8°52'	-60'	174°	7°52'	-60'	174°	6°52'	-60'	174°	5°53'	-60'	174°	4°53'	-60'	174°	3°53'	-60'	174°	2°54'	-60'	174°	18
19	7°52'	-60'	174°	6°52'	-60'	174°	5°52'	-60'	174°	4°53'	-60'	174°	3°53'	-60'	174°	2°53'	-60'	174°	1°54'	-60'	174°	19
20	6°52'	-60'	174°	5°52'	-60'	174°	4°52'	-60'	174°	3°53'	-60'	174°	2°53'	-60'	174°	1°53'	-60'	174°	0°54'	-60'	174°	20
21	5°52'	-60'	174°	4°52'	-60'	174°	3°53'	-60'	174°	2°53'	-60'	174°	1°53'	-60'	174°	0°53'	-60'	174°	0°06'	+60'	6°	21
22	4°52'	-60'	174°	3°52'	-60'	174°	2°53'	-60'	174°	1°53'	-60'	174°	0°53'	-60'	174°	0°07'	+60'	6°	1°06'	+60'	6°	22
23	3°52'	-60'	174°	2°52'	-60'	174°	1°53'	-60'	174°	0°53'	-60'	174°	0°07'	+60'	6°	1°06'	+60'	6°	2°06'	+60'	6°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

174° 186° LHA — Latitude SAME as DECLINATION — 174° 186° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

5° 355° LHA — Latitude CONTRARY to Declination — 5° 355° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°53'	-60'	174°	25°54'	-60'	174°	24°54'	-60'	174°	23°54'	-60'	175°	22°54'	-60'	175°	21°55'	-60'	175°	20°55'	-60'	175°	0
1	25°53'	-60'	174°	24°54'	-60'	174°	23°54'	-60'	175°	22°54'	-60'	175°	21°54'	-60'	175°	20°55'	-60'	175°	19°55'	-60'	175°	1
2	24°53'	-60'	174°	23°54'	-60'	175°	22°54'	-60'	175°	21°54'	-60'	175°	20°55'	-60'	175°	19°55'	-60'	175°	18°55'	-60'	175°	2
3	23°54'	-60'	175°	22°54'	-60'	175°	21°54'	-60'	175°	20°54'	-60'	175°	19°55'	-60'	175°	18°55'	-60'	175°	17°55'	-60'	175°	3
4	22°54'	-60'	175°	21°54'	-60'	175°	20°54'	-60'	175°	19°54'	-60'	175°	18°55'	-60'	175°	17°55'	-60'	175°	16°55'	-60'	175°	4
5	21°54'	-60'	175°	20°54'	-60'	175°	19°54'	-60'	175°	18°54'	-60'	175°	17°55'	-60'	175°	16°55'	-60'	175°	15°55'	-60'	175°	5
6	20°54'	-60'	175°	19°54'	-60'	175°	18°54'	-60'	175°	17°54'	-60'	175°	16°55'	-60'	175°	15°55'	-60'	175°	14°55'	-60'	175°	6
7	19°54'	-60'	175°	18°54'	-60'	175°	17°54'	-60'	175°	16°54'	-60'	175°	15°55'	-60'	175°	14°55'	-60'	175°	13°55'	-60'	175°	7
8	18°54'	-60'	175°	17°54'	-60'	175°	16°54'	-60'	175°	15°55'	-60'	175°	14°55'	-60'	175°	13°55'	-60'	175°	12°55'	-60'	175°	8
9	17°54'	-60'	175°	16°54'	-60'	175°	15°54'	-60'	175°	14°55'	-60'	175°	13°55'	-60'	175°	12°55'	-60'	175°	11°55'	-60'	175°	9
10	16°54'	-60'	175°	15°54'	-60'	175°	14°54'	-60'	175°	13°55'	-60'	175°	12°55'	-60'	175°	11°55'	-60'	175°	10°55'	-60'	175°	10
11	15°54'	-60'	175°	14°54'	-60'	175°	13°54'	-60'	175°	12°55'	-60'	175°	11°55'	-60'	175°	10°55'	-60'	175°	9°55'	-60'	175°	11
12	14°54'	-60'	175°	13°54'	-60'	175°	12°54'	-60'	175°	11°55'	-60'	175°	10°55'	-60'	175°	9°55'	-60'	175°	8°55'	-60'	175°	12
13	13°54'	-60'	175°	12°54'	-60'	175°	11°54'	-60'	175°	10°55'	-60'	175°	9°55'	-60'	175°	8°55'	-60'	175°	7°55'	-60'	175°	13
14	12°54'	-60'	175°	11°54'	-60'	175°	10°55'	-60'	175°	9°55'	-60'	175°	8°55'	-60'	175°	7°55'	-60'	175°	6°55'	-60'	175°	14
15	11°54'	-60'	175°	10°54'	-60'	175°	9°55'	-60'	175°	8°55'	-60'	175°	7°55'	-60'	175°	6°55'	-60'	175°	5°55'	-60'	175°	15
16	10°54'	-60'	175°	9°54'	-60'	175°	8°55'	-60'	175°	7°55'	-60'	175°	6°55'	-60'	175°	5°55'	-60'	175°	4°55'	-60'	175°	16
17	9°54'	-60'	175°	8°54'	-60'	175°	7°55'	-60'	175°	6°55'	-60'	175°	5°55'	-60'	175°	4°55'	-60'	175°	3°56'	-60'	175°	17
18	8°54'	-60'	175°	7°54'	-60'	175°	6°55'	-60'	175°	5°55'	-60'	175°	4°55'	-60'	175°	3°55'	-60'	175°	2°56'	-60'	175°	18
19	7°54'	-60'	175°	6°55'	-60'	175°	5°55'	-60'	175°	4°55'	-60'	175°	3°55'	-60'	175°	2°55'	-60'	175°	1°56'	-60'	175°	19
20	6°54'	-60'	175°	5°55'	-60'	175°	4°55'	-60'	175°	3°55'	-60'	175°	2°55'	-60'	175°	1°55'	-60'	175°	0°56'	-60'	175°	20
21	5°54'	-60'	175°	4°55'	-60'	175°	3°55'	-60'	175°	2°55'	-60'	175°	1°55'	-60'	175°	0°55'	-60'	175°	0°04'	+60'	5°	21
22	4°54'	-60'	175°	3°55'	-60'	175°	2°55'	-60'	175°	1°55'	-60'	175°	0°55'	-60'	175°	0°05'	+60'	5°	1°04'	+60'	5°	22
23	3°55'	-60'	175°	2°55'	-60'	175°	1°55'	-60'	175°	0°55'	-60'	175°	0°05'	+60'	5°	1°05'	+60'	5°	2°04'	+60'	5°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

175° 185° LHA — Latitude SAME as DECLINATION — 175° 185° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

4° 356° LHA — Latitude CONTRARY to Declination — 4° 356° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°56'	-60'	176°	25°56'	-60'	176°	24°56'	-60'	176°	23°56'	-60'	176°	22°56'	-60'	176°	21°57'	-60'	176°	20°57'	-60'	176°	0
1	25°56'	-60'	176°	24°56'	-60'	176°	23°56'	-60'	176°	22°56'	-60'	176°	21°56'	-60'	176°	20°57'	-60'	176°	19°57'	-60'	176°	1
2	24°56'	-60'	176°	23°56'	-60'	176°	22°56'	-60'	176°	21°56'	-60'	176°	20°56'	-60'	176°	19°57'	-60'	176°	18°57'	-60'	176°	2
3	23°56'	-60'	176°	22°56'	-60'	176°	21°56'	-60'	176°	20°56'	-60'	176°	19°57'	-60'	176°	18°57'	-60'	176°	17°57'	-60'	176°	3
4	22°56'	-60'	176°	21°56'	-60'	176°	20°56'	-60'	176°	19°56'	-60'	176°	18°57'	-60'	176°	17°57'	-60'	176°	16°57'	-60'	176°	4
5	21°56'	-60'	176°	20°56'	-60'	176°	19°56'	-60'	176°	18°56'	-60'	176°	17°57'	-60'	176°	16°57'	-60'	176°	15°57'	-60'	176°	5
6	20°56'	-60'	176°	19°56'	-60'	176°	18°56'	-60'	176°	17°56'	-60'	176°	16°57'	-60'	176°	15°57'	-60'	176°	14°57'	-60'	176°	6
7	19°56'	-60'	176°	18°56'	-60'	176°	17°56'	-60'	176°	16°56'	-60'	176°	15°57'	-60'	176°	14°57'	-60'	176°	13°57'	-60'	176°	7
8	18°56'	-60'	176°	17°56'	-60'	176°	16°56'	-60'	176°	15°56'	-60'	176°	14°57'	-60'	176°	13°57'	-60'	176°	12°57'	-60'	176°	8
9	17°56'	-60'	176°	16°56'	-60'	176°	15°56'	-60'	176°	14°57'	-60'	176°	13°57'	-60'	176°	12°57'	-60'	176°	11°57'	-60'	176°	9
10	16°56'	-60'	176°	15°56'	-60'	176°	14°56'	-60'	176°	13°57'	-60'	176°	12°57'	-60'	176°	11°57'	-60'	176°	10°57'	-60'	176°	10
11	15°56'	-60'	176°	14°56'	-60'	176°	13°56'	-60'	176°	12°57'	-60'	176°	11°57'	-60'	176°	10°57'	-60'	176°	9°57'	-60'	176°	11
12	14°56'	-60'	176°	13°56'	-60'	176°	12°56'	-60'	176°	11°57'	-60'	176°	10°57'	-60'	176°	9°57'	-60'	176°	8°57'	-60'	176°	12
13	13°56'	-60'	176°	12°56'	-60'	176°	11°56'	-60'	176°	10°57'	-60'	176°	9°57'	-60'	176°	8°57'	-60'	176°	7°57'	-60'	176°	13
14	12°56'	-60'	176°	11°56'	-60'	176°	10°57'	-60'	176°	9°57'	-60'	176°	8°57'	-60'	176°	7°57'	-60'	176°	6°57'	-60'	176°	14
15	11°56'	-60'	176°	10°56'	-60'	176°	9°57'	-60'	176°	8°57'	-60'	176°	7°57'	-60'	176°	6°57'	-60'	176°	5°57'	-60'	176°	15
16	10°56'	-60'	176°	9°56'	-60'	176°	8°57'	-60'	176°	7°57'	-60'	176°	6°57'	-60'	176°	5°57'	-60'	176°	4°57'	-60'	176°	16
17	9°56'	-60'	176°	8°56'	-60'	176°	7°57'	-60'	176°	6°57'	-60'	176°	5°57'	-60'	176°	4°57'	-60'	176°	3°57'	-60'	176°	17
18	8°56'	-60'	176°	7°56'	-60'	176°	6°57'	-60'	176°	5°57'	-60'	176°	4°57'	-60'	176°	3°57'	-60'	176°	2°57'	-60'	176°	18
19	7°56'	-60'	176°	6°57'	-60'	176°	5°57'	-60'	176°	4°57'	-60'	176°	3°57'	-60'	176°	2°57'	-60'	176°	1°57'	-60'	176°	19
20	6°56'	-60'	176°	5°57'	-60'	176°	4°57'	-60'	176°	3°57'	-60'	176°	2°57'	-60'	176°	1°57'	-60'	176°	0°57'	-60'	176°	20
21	5°56'	-60'	176°	4°57'	-60'	176°	3°57'	-60'	176°	2°57'	-60'	176°	1°57'	-60'	176°	0°57'	-60'	176°	0°03'	+60'	4°	21
22	4°56'	-60'	176°	3°57'	-60'	176°	2°57'	-60'	176°	1°57'	-60'	176°	0°57'	-60'	176°	0°03'	+60'	4°	1°03'	+60'	4°	22
23	3°56'	-60'	176°	2°57'	-60'	176°	1°57'	-60'	176°	0°57'	-60'	176°	0°03'	+60'	4°	1°03'	+60'	4°	2°03'	+60'	4°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

176° 184° LHA — Latitude SAME as DECLINATION — 176° 184° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

3° 357° LHA — Latitude CONTRARY to Declination — 3° 357° LHA

Dec°	63			64			65			66			67			68			69			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°58'	-60'	177°	25°58'	-60'	177°	24°58'	-60'	177°	23°58'	-60'	177°	22°58'	-60'	177°	21°58'	-60'	177°	20°58'	-60'	177°	0
1	25°58'	-60'	177°	24°58'	-60'	177°	23°58'	-60'	177°	22°58'	-60'	177°	21°58'	-60'	177°	20°58'	-60'	177°	19°58'	-60'	177°	1
2	24°58'	-60'	177°	23°58'	-60'	177°	22°58'	-60'	177°	21°58'	-60'	177°	20°58'	-60'	177°	19°58'	-60'	177°	18°58'	-60'	177°	2
3	23°58'	-60'	177°	22°58'	-60'	177°	21°58'	-60'	177°	20°58'	-60'	177°	19°58'	-60'	177°	18°58'	-60'	177°	17°58'	-60'	177°	3
4	22°58'	-60'	177°	21°58'	-60'	177°	20°58'	-60'	177°	19°58'	-60'	177°	18°58'	-60'	177°	17°58'	-60'	177°	16°58'	-60'	177°	4
5	21°58'	-60'	177°	20°58'	-60'	177°	19°58'	-60'	177°	18°58'	-60'	177°	17°58'	-60'	177°	16°58'	-60'	177°	15°58'	-60'	177°	5
6	20°58'	-60'	177°	19°58'	-60'	177°	18°58'	-60'	177°	17°58'	-60'	177°	16°58'	-60'	177°	15°58'	-60'	177°	14°58'	-60'	177°	6
7	19°58'	-60'	177°	18°58'	-60'	177°	17°58'	-60'	177°	16°58'	-60'	177°	15°58'	-60'	177°	14°58'	-60'	177°	13°58'	-60'	177°	7
8	18°58'	-60'	177°	17°58'	-60'	177°	16°58'	-60'	177°	15°58'	-60'	177°	14°58'	-60'	177°	13°58'	-60'	177°	12°58'	-60'	177°	8
9	17°58'	-60'	177°	16°58'	-60'	177°	15°58'	-60'	177°	14°58'	-60'	177°	13°58'	-60'	177°	12°58'	-60'	177°	11°58'	-60'	177°	9
10	16°58'	-60'	177°	15°58'	-60'	177°	14°58'	-60'	177°	13°58'	-60'	177°	12°58'	-60'	177°	11°58'	-60'	177°	10°58'	-60'	177°	10
11	15°58'	-60'	177°	14°58'	-60'	177°	13°58'	-60'	177°	12°58'	-60'	177°	11°58'	-60'	177°	10°58'	-60'	177°	9°58'	-60'	177°	11
12	14°58'	-60'	177°	13°58'	-60'	177°	12°58'	-60'	177°	11°58'	-60'	177°	10°58'	-60'	177°	9°58'	-60'	177°	8°58'	-60'	177°	12
13	13°58'	-60'	177°	12°58'	-60'	177°	11°58'	-60'	177°	10°58'	-60'	177°	9°58'	-60'	177°	8°58'	-60'	177°	7°58'	-60'	177°	13
14	12°58'	-60'	177°	11°58'	-60'	177°	10°58'	-60'	177°	9°58'	-60'	177°	8°58'	-60'	177°	7°58'	-60'	177°	6°58'	-60'	177°	14
15	11°58'	-60'	177°	10°58'	-60'	177°	9°58'	-60'	177°	8°58'	-60'	177°	7°58'	-60'	177°	6°58'	-60'	177°	5°58'	-60'	177°	15
16	10°58'	-60'	177°	9°58'	-60'	177°	8°58'	-60'	177°	7°58'	-60'	177°	6°58'	-60'	177°	5°58'	-60'	177°	4°58'	-60'	177°	16
17	9°58'	-60'	177°	8°58'	-60'	177°	7°58'	-60'	177°	6°58'	-60'	177°	5°58'	-60'	177°	4°58'	-60'	177°	3°58'	-60'	177°	17
18	8°58'	-60'	177°	7°58'	-60'	177°	6°58'	-60'	177°	5°58'	-60'	177°	4°58'	-60'	177°	3°58'	-60'	177°	2°58'	-60'	177°	18
19	7°58'	-60'	177°	6°58'	-60'	177°	5°58'	-60'	177°	4°58'	-60'	177°	3°58'	-60'	177°	2°58'	-60'	177°	1°58'	-60'	177°	19
20	6°58'	-60'	177°	5°58'	-60'	177°	4°58'	-60'	177°	3°58'	-60'	177°	2°58'	-60'	177°	1°58'	-60'	177°	0°58'	-60'	177°	20
21	5°58'	-60'	177°	4°58'	-60'	177°	3°58'	-60'	177°	2°58'	-60'	177°	1°58'	-60'	177°	0°58'	-60'	177°	0°02'	+60'	3°	21
22	4°58'	-60'	177°	3°58'	-60'	177°	2°58'	-60'	177°	1°58'	-60'	177°	0°58'	-60'	177°	0°02'	+60'	3°	1°02'	+60'	3°	22
23	3°58'	-60'	177°	2°58'	-60'	177°	1°58'	-60'	177°	0°58'	-60'	177°	0°02'	+60'	3°	1°02'	+60'	3°	2°02'	+60'	3°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

177° 183° LHA — Latitude SAME as DECLINATION — 177° 183° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

2° 358° LHA — Latitude CONTRARY to Declination — 2° 358° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	26°59'	-60'	178°	25°59'	-60'	178°	24°59'	-60'	178°	23°59'	-60'	178°	22°59'	-60'	178°	21°59'	-60'	178°	20°59'	-60'	178°	0
1	25°59'	-60'	178°	24°59'	-60'	178°	23°59'	-60'	178°	22°59'	-60'	178°	21°59'	-60'	178°	20°59'	-60'	178°	19°59'	-60'	178°	1
2	24°59'	-60'	178°	23°59'	-60'	178°	22°59'	-60'	178°	21°59'	-60'	178°	20°59'	-60'	178°	19°59'	-60'	178°	18°59'	-60'	178°	2
3	23°59'	-60'	178°	22°59'	-60'	178°	21°59'	-60'	178°	20°59'	-60'	178°	19°59'	-60'	178°	18°59'	-60'	178°	17°59'	-60'	178°	3
4	22°59'	-60'	178°	21°59'	-60'	178°	20°59'	-60'	178°	19°59'	-60'	178°	18°59'	-60'	178°	17°59'	-60'	178°	16°59'	-60'	178°	4
5	21°59'	-60'	178°	20°59'	-60'	178°	19°59'	-60'	178°	18°59'	-60'	178°	17°59'	-60'	178°	16°59'	-60'	178°	15°59'	-60'	178°	5
6	20°59'	-60'	178°	19°59'	-60'	178°	18°59'	-60'	178°	17°59'	-60'	178°	16°59'	-60'	178°	15°59'	-60'	178°	14°59'	-60'	178°	6
7	19°59'	-60'	178°	18°59'	-60'	178°	17°59'	-60'	178°	16°59'	-60'	178°	15°59'	-60'	178°	14°59'	-60'	178°	13°59'	-60'	178°	7
8	18°59'	-60'	178°	17°59'	-60'	178°	16°59'	-60'	178°	15°59'	-60'	178°	14°59'	-60'	178°	13°59'	-60'	178°	12°59'	-60'	178°	8
9	17°59'	-60'	178°	16°59'	-60'	178°	15°59'	-60'	178°	14°59'	-60'	178°	13°59'	-60'	178°	12°59'	-60'	178°	11°59'	-60'	178°	9
10	16°59'	-60'	178°	15°59'	-60'	178°	14°59'	-60'	178°	13°59'	-60'	178°	12°59'	-60'	178°	11°59'	-60'	178°	10°59'	-60'	178°	10
11	15°59'	-60'	178°	14°59'	-60'	178°	13°59'	-60'	178°	12°59'	-60'	178°	11°59'	-60'	178°	10°59'	-60'	178°	9°59'	-60'	178°	11
12	14°59'	-60'	178°	13°59'	-60'	178°	12°59'	-60'	178°	11°59'	-60'	178°	10°59'	-60'	178°	9°59'	-60'	178°	8°59'	-60'	178°	12
13	13°59'	-60'	178°	12°59'	-60'	178°	11°59'	-60'	178°	10°59'	-60'	178°	9°59'	-60'	178°	8°59'	-60'	178°	7°59'	-60'	178°	13
14	12°59'	-60'	178°	11°59'	-60'	178°	10°59'	-60'	178°	9°59'	-60'	178°	8°59'	-60'	178°	7°59'	-60'	178°	6°59'	-60'	178°	14
15	11°59'	-60'	178°	10°59'	-60'	178°	9°59'	-60'	178°	8°59'	-60'	178°	7°59'	-60'	178°	6°59'	-60'	178°	5°59'	-60'	178°	15
16	10°59'	-60'	178°	9°59'	-60'	178°	8°59'	-60'	178°	7°59'	-60'	178°	6°59'	-60'	178°	5°59'	-60'	178°	4°59'	-60'	178°	16
17	9°59'	-60'	178°	8°59'	-60'	178°	7°59'	-60'	178°	6°59'	-60'	178°	5°59'	-60'	178°	4°59'	-60'	178°	3°59'	-60'	178°	17
18	8°59'	-60'	178°	7°59'	-60'	178°	6°59'	-60'	178°	5°59'	-60'	178°	4°59'	-60'	178°	3°59'	-60'	178°	2°59'	-60'	178°	18
19	7°59'	-60'	178°	6°59'	-60'	178°	5°59'	-60'	178°	4°59'	-60'	178°	3°59'	-60'	178°	2°59'	-60'	178°	1°59'	-60'	178°	19
20	6°59'	-60'	178°	5°59'	-60'	178°	4°59'	-60'	178°	3°59'	-60'	178°	2°59'	-60'	178°	1°59'	-60'	178°	0°59'	-60'	178°	20
21	5°59'	-60'	178°	4°59'	-60'	178°	3°59'	-60'	178°	2°59'	-60'	178°	1°59'	-60'	178°	0°59'	-60'	178°	0°01'	+60'	2°	21
22	4°59'	-60'	178°	3°59'	-60'	178°	2°59'	-60'	178°	1°59'	-60'	178°	0°59'	-60'	178°	0°01'	+60'	2°	1°01'	+60'	2°	22
23	3°59'	-60'	178°	2°59'	-60'	178°	1°59'	-60'	178°	0°59'	-60'	178°	0°01'	+60'	2°	1°01'	+60'	2°	2°01'	+60'	2°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

178° 182° LHA — Latitude SAME as DECLINATION — 178° 182° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

1° 359° LHA — Latitude CONTRARY to Declination — 1° 359° LHA

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	27°00'	-60'	179°	26°00'	-60'	179°	25°00'	-60'	179°	24°00'	-60'	179°	23°00'	-60'	179°	22°00'	-60'	179°	21°00'	-60'	179°	0
1	26°00'	-60'	179°	25°00'	-60'	179°	24°00'	-60'	179°	23°00'	-60'	179°	22°00'	-60'	179°	21°00'	-60'	179°	20°00'	-60'	179°	1
2	25°00'	-60'	179°	24°00'	-60'	179°	23°00'	-60'	179°	22°00'	-60'	179°	21°00'	-60'	179°	20°00'	-60'	179°	19°00'	-60'	179°	2
3	24°00'	-60'	179°	23°00'	-60'	179°	22°00'	-60'	179°	21°00'	-60'	179°	20°00'	-60'	179°	19°00'	-60'	179°	18°00'	-60'	179°	3
4	23°00'	-60'	179°	22°00'	-60'	179°	21°00'	-60'	179°	20°00'	-60'	179°	19°00'	-60'	179°	18°00'	-60'	179°	17°00'	-60'	179°	4
5	22°00'	-60'	179°	21°00'	-60'	179°	20°00'	-60'	179°	19°00'	-60'	179°	18°00'	-60'	179°	17°00'	-60'	179°	16°00'	-60'	179°	5
6	21°00'	-60'	179°	20°00'	-60'	179°	19°00'	-60'	179°	18°00'	-60'	179°	17°00'	-60'	179°	16°00'	-60'	179°	15°00'	-60'	179°	6
7	20°00'	-60'	179°	19°00'	-60'	179°	18°00'	-60'	179°	17°00'	-60'	179°	16°00'	-60'	179°	15°00'	-60'	179°	14°00'	-60'	179°	7
8	19°00'	-60'	179°	18°00'	-60'	179°	17°00'	-60'	179°	16°00'	-60'	179°	15°00'	-60'	179°	14°00'	-60'	179°	13°00'	-60'	179°	8
9	18°00'	-60'	179°	17°00'	-60'	179°	16°00'	-60'	179°	15°00'	-60'	179°	14°00'	-60'	179°	13°00'	-60'	179°	12°00'	-60'	179°	9
10	17°00'	-60'	179°	16°00'	-60'	179°	15°00'	-60'	179°	14°00'	-60'	179°	13°00'	-60'	179°	12°00'	-60'	179°	11°00'	-60'	179°	10
11	16°00'	-60'	179°	15°00'	-60'	179°	14°00'	-60'	179°	13°00'	-60'	179°	12°00'	-60'	179°	11°00'	-60'	179°	10°00'	-60'	179°	11
12	15°00'	-60'	179°	14°00'	-60'	179°	13°00'	-60'	179°	12°00'	-60'	179°	11°00'	-60'	179°	10°00'	-60'	179°	9°00'	-60'	179°	12
13	14°00'	-60'	179°	13°00'	-60'	179°	12°00'	-60'	179°	11°00'	-60'	179°	10°00'	-60'	179°	9°00'	-60'	179°	8°00'	-60'	179°	13
14	13°00'	-60'	179°	12°00'	-60'	179°	11°00'	-60'	179°	10°00'	-60'	179°	9°00'	-60'	179°	8°00'	-60'	179°	7°00'	-60'	179°	14
15	12°00'	-60'	179°	11°00'	-60'	179°	10°00'	-60'	179°	9°00'	-60'	179°	8°00'	-60'	179°	7°00'	-60'	179°	6°00'	-60'	179°	15
16	11°00'	-60'	179°	10°00'	-60'	179°	9°00'	-60'	179°	8°00'	-60'	179°	7°00'	-60'	179°	6°00'	-60'	179°	5°00'	-60'	179°	16
17	10°00'	-60'	179°	9°00'	-60'	179°	8°00'	-60'	179°	7°00'	-60'	179°	6°00'	-60'	179°	5°00'	-60'	179°	4°00'	-60'	179°	17
18	9°00'	-60'	179°	8°00'	-60'	179°	7°00'	-60'	179°	6°00'	-60'	179°	5°00'	-60'	179°	4°00'	-60'	179°	3°00'	-60'	179°	18
19	8°00'	-60'	179°	7°00'	-60'	179°	6°00'	-60'	179°	5°00'	-60'	179°	4°00'	-60'	179°	3°00'	-60'	179°	2°00'	-60'	179°	19
20	7°00'	-60'	179°	6°00'	-60'	179°	5°00'	-60'	179°	4°00'	-60'	179°	3°00'	-60'	179°	2°00'	-60'	179°	1°00'	-60'	179°	20
21	6°00'	-60'	179°	5°00'	-60'	179°	4°00'	-60'	179°	3°00'	-60'	179°	2°00'	-60'	179°	1°00'	-60'	179°	0°00'	+60'	1°	21
22	5°00'	-60'	179°	4°00'	-60'	179°	3°00'	-60'	179°	2°00'	-60'	179°	1°00'	-60'	179°	0°00'	+60'	1°	1°00'	+60'	1°	22
23	4°00'	-60'	179°	3°00'	-60'	179°	2°00'	-60'	179°	1°00'	-60'	179°	0°00'	+60'	1°	1°00'	+60'	1°	2°00'	+60'	1°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

179° 181° LHA — Latitude SAME as DECLINATION — 179° 181° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

0° 360° LHA **Latitude CONTRARY to Declination** **0° 360° LHA**

	63			64			65			66			67			68			69			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	27°00'	-60'	180°	26°00'	-60'	180°	25°00'	-60'	180°	24°00'	-60'	180°	23°00'	-60'	180°	22°00'	-60'	180°	21°00'	-60'	180°	0
1	26°00'	-60'	180°	25°00'	-60'	180°	24°00'	-60'	180°	23°00'	-60'	180°	22°00'	-60'	180°	21°00'	-60'	180°	20°00'	-60'	180°	1
2	25°00'	-60'	180°	24°00'	-60'	180°	23°00'	-60'	180°	22°00'	-60'	180°	21°00'	-60'	180°	20°00'	-60'	180°	19°00'	-60'	180°	2
3	24°00'	-60'	180°	23°00'	-60'	180°	22°00'	-60'	180°	21°00'	-60'	180°	20°00'	-60'	180°	19°00'	-60'	180°	18°00'	-60'	180°	3
4	23°00'	-60'	180°	22°00'	-60'	180°	21°00'	-60'	180°	20°00'	-60'	180°	19°00'	-60'	180°	18°00'	-60'	180°	17°00'	-60'	180°	4
5	22°00'	-60'	180°	21°00'	-60'	180°	20°00'	-60'	180°	19°00'	-60'	180°	18°00'	-60'	180°	17°00'	-60'	180°	16°00'	-60'	180°	5
6	21°00'	-60'	180°	20°00'	-60'	180°	19°00'	-60'	180°	18°00'	-60'	180°	17°00'	-60'	180°	16°00'	-60'	180°	15°00'	-60'	180°	6
7	20°00'	-60'	180°	19°00'	-60'	180°	18°00'	-60'	180°	17°00'	-60'	180°	16°00'	-60'	180°	15°00'	-60'	180°	14°00'	-60'	180°	7
8	19°00'	-60'	180°	18°00'	-60'	180°	17°00'	-60'	180°	16°00'	-60'	180°	15°00'	-60'	180°	14°00'	-60'	180°	13°00'	-60'	180°	8
9	18°00'	-60'	180°	17°00'	-60'	180°	16°00'	-60'	180°	15°00'	-60'	180°	14°00'	-60'	180°	13°00'	-60'	180°	12°00'	-60'	180°	9
10	17°00'	-60'	180°	16°00'	-60'	180°	15°00'	-60'	180°	14°00'	-60'	180°	13°00'	-60'	180°	12°00'	-60'	180°	11°00'	-60'	180°	10
11	16°00'	-60'	180°	15°00'	-60'	180°	14°00'	-60'	180°	13°00'	-60'	180°	12°00'	-60'	180°	11°00'	-60'	180°	10°00'	-60'	180°	11
12	15°00'	-60'	180°	14°00'	-60'	180°	13°00'	-60'	180°	12°00'	-60'	180°	11°00'	-60'	180°	10°00'	-60'	180°	9°00'	-60'	180°	12
13	14°00'	-60'	180°	13°00'	-60'	180°	12°00'	-60'	180°	11°00'	-60'	180°	10°00'	-60'	180°	9°00'	-60'	180°	8°00'	-60'	180°	13
14	13°00'	-60'	180°	12°00'	-60'	180°	11°00'	-60'	180°	10°00'	-60'	180°	9°00'	-60'	180°	8°00'	-60'	180°	7°00'	-60'	180°	14
15	12°00'	-60'	180°	11°00'	-60'	180°	10°00'	-60'	180°	9°00'	-60'	180°	8°00'	-60'	180°	7°00'	-60'	180°	6°00'	-60'	180°	15
16	11°00'	-60'	180°	10°00'	-60'	180°	9°00'	-60'	180°	8°00'	-60'	180°	7°00'	-60'	180°	6°00'	-60'	180°	5°00'	-60'	180°	16
17	10°00'	-60'	180°	9°00'	-60'	180°	8°00'	-60'	180°	7°00'	-60'	180°	6°00'	-60'	180°	5°00'	-60'	180°	4°00'	-60'	180°	17
18	9°00'	-60'	180°	8°00'	-60'	180°	7°00'	-60'	180°	6°00'	-60'	180°	5°00'	-60'	180°	4°00'	-60'	180°	3°00'	-60'	180°	18
19	8°00'	-60'	180°	7°00'	-60'	180°	6°00'	-60'	180°	5°00'	-60'	180°	4°00'	-60'	180°	3°00'	-60'	180°	2°00'	-60'	180°	19
20	7°00'	-60'	180°	6°00'	-60'	180°	5°00'	-60'	180°	4°00'	-60'	180°	3°00'	-60'	180°	2°00'	-60'	180°	1°00'	-60'	180°	20
21	6°00'	-60'	180°	5°00'	-60'	180°	4°00'	-60'	180°	3°00'	-60'	180°	2°00'	-60'	180°	1°00'	-60'	180°	0°00'	-60'	180°	21
22	5°00'	-60'	180°	4°00'	-60'	180°	3°00'	-60'	180°	2°00'	-60'	180°	1°00'	-60'	180°	0°00'	+60'	0°	1°00'	+60'	0°	22
23	4°00'	-60'	180°	3°00'	-60'	180°	2°00'	-60'	180°	1°00'	-60'	180°	0°00'	+60'	0°	1°00'	+60'	0°	2°00'	+60'	0°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	63			64			65			66			67			68			69			

180° 180° LHA **Latitude SAME as DECLINATION** **180° 180° LHA**

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**2**
3	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	**3**
4	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	**4**
5	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	**5**
6	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	6	**6**
7	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	7	7	7	7	7	7	**7**
8	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7	8	8	8	8	**8**
9	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4	4	5	5	5	5	5	5	5	6	6	6	6	6	6	6	7	7	7	7	7	8	8	8	8	8	8	8	8	9	9	9	9	**9**
10	0	0	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6	6	6	6	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	9	9	10	10	10	10	**10**
11	0	0	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6	6	6	7	7	7	7	7	8	8	8	8	8	9	9	9	9	9	9	10	10	10	10	10	10	11	11	11	**11**
12	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6	6	7	7	7	7	7	8	8	8	8	8	9	9	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	**12**
13	0	0	1	1	1	1	2	2	2	2	2	3	3	3	3	3	4	4	4	4	5	5	5	5	5	6	6	6	6	7	7	7	7	7	8	8	8	8	8	9	9	9	9	10	10	10	10	10	11	11	11	11	11	12	12	12	12	13	13	13	**13**
14	0	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	4	5	5	5	5	6	6	6	6	7	7	7	7	7	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	**14**
15	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6	6	7	7	7	7	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	**15**
16	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	5	5	5	5	6	6	6	6	7	7	7	7	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	13	13	13	13	14	14	14	15	15	15	15	16	16	16	**16**
17	0	1	1	1	1	2	2	2	3	3	3	3	4	4	4	5	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	9	10	10	10	11	11	11	12	12	12	12	13	13	13	14	14	14	14	15	15	15	16	16	16	16	17	17	17	**17**
18	0	1	1	1	2	2	2	2	3	3	3	4	4	4	5	5	5	5	6	6	6	7	7	7	8	8	8	8	9	9	9	10	10	10	11	11	11	12	12	12	13	13	13	14	14	14	14	15	15	15	16	16	16	17	17	17	17	18	18	**18**
19	0	1	1	1	2	2	2	3	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	10	11	11	11	12	12	12	13	13	13	14	14	14	15	15	15	16	16	16	16	17	17	17	18	18	18	19	19	**19**
20	0	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11	11	12	12	12	13	13	13	14	14	14	15	15	15	16	16	16	17	17	17	18	18	18	19	19	19	20	20	**20**
21	0	1	1	1	2	2	2	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	11	11	11	12	12	12	13	13	13	14	14	14	15	15	15	16	16	16	17	17	18	18	18	19	19	19	20	20	20	21	21	**21**
22	0	1	1	1	2	2	3	3	3	4	4	4	5	5	6	6	6	7	7	7	8	8	8	9	9	10	10	10	11	11	11	12	12	12	13	13	14	14	14	15	15	15	16	16	17	17	17	18	18	18	19	19	19	20	20	21	21	21	22	22	**22**
23	0	1	1	2	2	2	3	3	3	4	4	5	5	5	6	6	7	7	7	8	8	8	9	9	10	10	10	11	11	12	12	12	13	13	13	14	14	15	15	15	16	16	16	17	17	18	18	18	19	19	20	20	20	21	21	21	22	22	23	23	**23**
24	0	1	1	2	2	2	3	3	4	4	4	5	5	6	6	6	7	7	8	8	8	9	9	10	10	10	11	11	12	12	12	13	13	14	14	14	15	15	16	16	16	17	17	18	18	18	19	19	20	20	20	21	21	22	22	22	23	23	24	24	**24**
25	0	1	1	2	2	3	3	3	4	4	5	5	5	6	6	7	7	8	8	8	9	9	10	10	10	11	11	12	12	13	13	13	14	14	15	15	15	16	16	17	17	18	18	18	19	19	20	20	20	21	21	22	22	23	23	24	24	25	25	**25**
26	0	1	1	2	2	3	3	3	4	4	5	5	6	6	7	7	7	8	8	9	9	10	10	10	11	11	12	12	13	13	13	14	14	15	15	16	16	16	17	17	18	18	19	19	20	20	20	21	21	22	22	23	23	23	24	24	25	25	26	**26**
27	0	1	1	2	2	3	3	4	4	5	5	5	6	6	7	7	8	8	9	9	9	10	10	11	11	12	12	13	13	14	14	14	15	15	16	16	17	17	18	18	18	19	19	20	20	21	21	22	22	23	23	23	24	24	25	25	26	26	27	**27**
28	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	14	15	15	16	16	17	17	18	18	19	19	20	20	21	21	21	22	22	23	23	24	24	25	25	26	26	27	27	28	**28**
29	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	15	16	16	17	17	18	18	19	19	20	20	21	21	22	22	23	23	24	24	25	25	26	26	27	27	28	28	29	**29**
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