

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

DECLINATION (0° - 14°) SAME NAME AS LATITUDE

| LHA | 0°    |    |    | 1°    |    |    | 2°    |    |    | 3°    |    |    | 4°    |    |    | 5°    |    |    | 6°    |    |    | 7°    |    |    | 8°    |    |       | 9°    |    |       | 10°   |    |       | 11°   |    |       | 12°   |    |       | 13°   |    |       | 14°   |    |     | LHA   |    |     |
|-----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|-------|-------|----|-------|-------|----|-------|-------|----|-------|-------|----|-------|-------|----|-------|-------|----|-----|-------|----|-----|
|     | Hc    | d  | Z  | Hc    | d  | Z  | Hc    | d  | Z  | Hc    | d  | Z  | Hc    | d  | Z  | Hc    | d  | Z  | Hc    | d  | Z  | Hc    | d  | Z  | Hc    | d  | Z     | Hc    | d  | Z     | Hc    | d  | Z     | Hc    | d  | Z     | Hc    | d  | Z     | Hc    | d  | Z     | Hc    | d  | Z   |       | Hc | d   |
| 70  | 18 21 | 25 | 98 | 18 46 | 24 | 97 | 19 10 | 24 | 96 | 19 34 | 23 | 95 | 19 57 | 24 | 94 | 20 21 | 23 | 93 | 20 44 | 22 | 92 | 21 06 | 23 | 91 | 21 29 | 22 | 90    | 21 51 | 21 | 89    | 22 12 | 21 | 88    | 22 33 | 21 | 87    | 22 54 | 21 | 86    | 23 15 | 20 | 85    | 23 35 | 19 | 84  | 239   |    |     |
| 71  | 17 26 | 25 | 98 | 17 51 | 24 | 97 | 18 15 | 24 | 96 | 18 39 | 23 | 95 | 19 02 | 24 | 94 | 19 26 | 23 | 93 | 19 49 | 22 | 92 | 20 11 | 22 | 91 | 20 33 | 22 | 90    | 20 55 | 22 | 89    | 21 17 | 21 | 88    | 21 38 | 21 | 87    | 21 59 | 21 | 86    | 22 20 | 20 | 85    | 22 40 | 20 | 84  | 289   |    |     |
| 72  | 16 32 | 24 | 97 | 16 56 | 24 | 96 | 17 20 | 24 | 95 | 17 44 | 23 | 94 | 18 07 | 23 | 93 | 18 30 | 23 | 92 | 18 53 | 23 | 91 | 19 16 | 22 | 90 | 19 38 | 22 | 89    | 20 00 | 22 | 88    | 20 22 | 21 | 87    | 20 43 | 21 | 86    | 21 04 | 21 | 85    | 21 25 | 20 | 84    | 21 45 | 20 | 83  | 288   |    |     |
| 73  | 15 37 | 24 | 97 | 16 01 | 24 | 96 | 16 25 | 24 | 95 | 16 49 | 23 | 94 | 17 12 | 23 | 93 | 17 35 | 23 | 92 | 17 58 | 23 | 91 | 18 21 | 22 | 90 | 18 43 | 22 | 89    | 19 05 | 22 | 88    | 19 27 | 21 | 87    | 19 48 | 21 | 86    | 20 09 | 21 | 85    | 20 30 | 20 | 84    | 20 50 | 20 | 83  | 287   |    |     |
| 74  | 14 42 | 24 | 96 | 15 06 | 24 | 95 | 15 30 | 24 | 94 | 15 54 | 23 | 93 | 16 17 | 23 | 92 | 16 40 | 23 | 91 | 17 03 | 22 | 90 | 17 25 | 23 | 89 | 17 48 | 22 | 88    | 18 10 | 22 | 87    | 18 32 | 21 | 86    | 18 53 | 21 | 85    | 19 14 | 21 | 84    | 19 35 | 20 | 83    | 19 55 | 20 | 82  | 286   |    |     |
| 75  | 13 47 | 24 | 96 | 14 11 | 24 | 95 | 14 35 | 23 | 94 | 14 58 | 24 | 93 | 15 22 | 23 | 92 | 15 45 | 23 | 91 | 16 08 | 22 | 90 | 16 30 | 23 | 89 | 16 53 | 22 | 88    | 17 15 | 21 | 87    | 17 36 | 22 | 86    | 17 58 | 21 | 85    | 18 19 | 21 | 84    | 18 40 | 20 | 83    | 19 00 | 21 | 82  | 285   |    |     |
| 76  | 12 52 | 24 | 96 | 13 16 | 24 | 95 | 13 40 | 23 | 94 | 14 03 | 23 | 93 | 14 27 | 23 | 92 | 14 50 | 22 | 91 | 15 12 | 23 | 90 | 15 35 | 22 | 89 | 15 57 | 22 | 88    | 16 19 | 22 | 87    | 16 41 | 22 | 86    | 17 03 | 21 | 85    | 17 24 | 21 | 84    | 17 45 | 21 | 83    | 18 06 | 20 | 82  | 284   |    |     |
| 77  | 11 57 | 24 | 95 | 12 21 | 24 | 94 | 12 45 | 23 | 93 | 13 08 | 23 | 92 | 13 31 | 23 | 91 | 13 54 | 23 | 90 | 14 17 | 23 | 89 | 14 40 | 22 | 88 | 15 02 | 22 | 87    | 15 24 | 22 | 86    | 15 46 | 22 | 85    | 16 08 | 21 | 84    | 16 29 | 21 | 83    | 16 50 | 21 | 82    | 17 11 | 21 | 81  | 283   |    |     |
| 78  | 11 02 | 24 | 95 | 11 26 | 23 | 94 | 11 49 | 24 | 93 | 12 13 | 23 | 92 | 12 36 | 23 | 91 | 12 59 | 23 | 90 | 13 22 | 23 | 89 | 13 45 | 22 | 88 | 14 07 | 22 | 87    | 14 29 | 22 | 86    | 14 51 | 22 | 85    | 15 13 | 21 | 84    | 15 34 | 21 | 83    | 15 55 | 21 | 82    | 16 16 | 21 | 81  | 282   |    |     |
| 79  | 10 07 | 24 | 94 | 10 31 | 23 | 93 | 10 54 | 24 | 92 | 11 18 | 23 | 91 | 11 41 | 23 | 90 | 12 04 | 23 | 89 | 12 27 | 22 | 88 | 12 49 | 23 | 87 | 13 12 | 22 | 86    | 13 34 | 22 | 85    | 13 56 | 22 | 84    | 14 18 | 21 | 83    | 14 39 | 22 | 82    | 15 01 | 21 | 81    | 15 22 | 21 | 80  | 281   |    |     |
| 80  | 09 12 | 24 | 94 | 09 36 | 23 | 93 | 09 59 | 23 | 92 | 10 22 | 24 | 91 | 10 46 | 23 | 90 | 11 09 | 23 | 89 | 11 32 | 22 | 88 | 11 54 | 23 | 87 | 12 17 | 22 | 86    | 12 39 | 22 | 85    | 13 01 | 22 | 84    | 13 23 | 22 | 83    | 13 45 | 21 | 82    | 14 06 | 21 | 81    | 14 27 | 21 | 80  | 280   |    |     |
| 81  | 08 17 | 23 | 94 | 08 40 | 24 | 93 | 09 04 | 23 | 92 | 09 27 | 23 | 91 | 09 50 | 23 | 90 | 10 13 | 23 | 89 | 10 36 | 23 | 88 | 10 59 | 23 | 87 | 11 22 | 22 | 86    | 11 44 | 22 | 85    | 12 06 | 22 | 84    | 12 28 | 22 | 83    | 12 50 | 21 | 82    | 13 11 | 22 | 81    | 13 33 | 21 | 80  | 279   |    |     |
| 82  | 07 22 | 23 | 93 | 07 45 | 24 | 92 | 08 09 | 23 | 91 | 08 32 | 23 | 90 | 08 55 | 23 | 89 | 09 18 | 23 | 88 | 09 41 | 23 | 87 | 10 04 | 23 | 86 | 10 27 | 22 | 85    | 10 49 | 22 | 84    | 11 11 | 22 | 83    | 11 33 | 22 | 82    | 11 55 | 22 | 81    | 12 17 | 21 | 80    | 12 38 | 22 | 79  | 278   |    |     |
| 83  | 06 26 | 24 | 93 | 06 50 | 23 | 92 | 07 13 | 24 | 91 | 07 37 | 23 | 90 | 08 00 | 23 | 89 | 08 23 | 23 | 88 | 08 46 | 23 | 87 | 09 09 | 22 | 86 | 09 31 | 23 | 85    | 09 54 | 22 | 84    | 10 16 | 23 | 83    | 10 39 | 22 | 82    | 11 01 | 21 | 81    | 11 22 | 22 | 80    | 11 44 | 22 | 79  | 277   |    |     |
| 84  | 05 31 | 24 | 92 | 05 55 | 23 | 91 | 06 18 | 24 | 90 | 06 42 | 23 | 89 | 07 05 | 23 | 88 | 07 28 | 23 | 87 | 07 51 | 23 | 86 | 08 14 | 22 | 85 | 08 36 | 23 | 84    | 08 59 | 22 | 83    | 09 21 | 23 | 82    | 09 44 | 22 | 81    | 10 06 | 22 | 80    | 10 28 | 22 | 79    | 10 50 | 21 | 78  | 276   |    |     |
| 85  | 04 36 | 24 | 92 | 05 00 | 23 | 91 | 05 23 | 23 | 90 | 05 46 | 24 | 89 | 06 10 | 23 | 88 | 06 33 | 23 | 87 | 06 56 | 23 | 86 | 07 19 | 22 | 85 | 07 41 | 23 | 84    | 08 04 | 23 | 83    | 08 27 | 22 | 82    | 08 49 | 22 | 81    | 09 11 | 22 | 80    | 09 34 | 22 | 79    | 09 56 | 21 | 78  | 275   |    |     |
| 86  | 03 41 | 23 | 92 | 04 04 | 24 | 91 | 04 28 | 23 | 90 | 04 51 | 23 | 89 | 05 14 | 24 | 88 | 05 38 | 23 | 87 | 06 01 | 23 | 86 | 06 24 | 22 | 85 | 06 46 | 23 | 84    | 07 09 | 23 | 83    | 07 32 | 22 | 82    | 07 54 | 23 | 81    | 08 17 | 22 | 80    | 08 39 | 22 | 79    | 09 01 | 22 | 78  | 274   |    |     |
| 87  | 02 46 | 23 | 91 | 03 09 | 24 | 90 | 03 33 | 23 | 89 | 03 56 | 23 | 88 | 04 19 | 23 | 87 | 04 42 | 24 | 86 | 05 06 | 23 | 85 | 05 29 | 23 | 84 | 05 52 | 22 | 83    | 06 14 | 23 | 82    | 06 37 | 23 | 81    | 07 00 | 22 | 80    | 07 22 | 23 | 79    | 07 45 | 22 | 78    | 08 07 | 22 | 77  | 273   |    |     |
| 88  | 01 50 | 24 | 91 | 02 14 | 23 | 90 | 02 37 | 24 | 89 | 03 01 | 23 | 88 | 03 24 | 23 | 87 | 03 47 | 23 | 86 | 04 10 | 24 | 85 | 04 34 | 23 | 84 | 04 57 | 23 | 83    | 05 20 | 23 | 82    | 05 43 | 22 | 81    | 06 05 | 23 | 80    | 06 28 | 23 | 79    | 06 51 | 22 | 78    | 07 13 | 23 | 77  | 272   |    |     |
| 89  | 00 55 | 24 | 90 | 01 19 | 23 | 89 | 01 42 | 23 | 88 | 02 05 | 24 | 87 | 02 29 | 23 | 86 | 03 02 | 23 | 85 | 03 15 | 24 | 84 | 03 39 | 23 | 83 | 04 02 | 23 | 82    | 04 25 | 23 | 81    | 04 48 | 23 | 80    | 05 11 | 23 | 79    | 05 34 | 23 | 78    | 06 19 | 23 | 77    | 06 19 | 23 | 76  | 271   |    |     |
| 90  | 00 00 | 23 | 90 | 00 23 | 24 | 89 | 00 47 | 23 | 88 | 01 10 | 24 | 87 | 01 34 | 23 | 86 | 01 57 | 23 | 85 | 02 20 | 24 | 84 | 02 44 | 23 | 83 | 03 07 | 23 | 82    | 03 30 | 23 | 81    | 03 53 | 24 | 80    | 04 17 | 23 | 79    | 04 40 | 23 | 78    | 05 03 | 22 | 77    | 05 25 | 23 | 76  | 270   |    |     |
| 91  | -0 55 | 24 | 90 | -0 32 | 24 | 89 | -0 08 | 23 | 88 | 00 15 | 24 | 87 | 00 39 | 23 | 86 | 01 02 | 23 | 85 | 01 25 | 24 | 84 | 01 49 | 23 | 83 | 02 12 | 24 | 82    | 02 36 | 23 | 81    | 02 59 | 23 | 80    | 03 22 | 23 | 79    | 03 45 | 24 | 78    | 04 09 | 23 | 77    | 04 32 | 23 | 76  | 269   |    |     |
| 92  | -1 50 | 23 | 89 | -1 27 | 24 | 88 | -1 03 | 23 | 87 | -0 40 | 24 | 86 | -0 16 | 23 | 85 | 00 07 | 24 | 85 | 00 31 | 23 | 84 | 00 54 | 24 | 83 | 01 18 | 23 | 82    | 01 41 | 24 | 81    | 02 05 | 23 | 80    | 02 28 | 23 | 79    | 02 51 | 24 | 78    | 03 15 | 23 | 77    | 03 38 | 23 | 76  | 268   |    |     |
| 93  | -2 46 | 24 | 88 | -2 22 | 23 | 87 | -1 59 | 24 | 86 | -1 35 | 23 | 85 | -1 12 | 24 | 84 | -0 48 | 24 | 83 | -0 24 | 23 | 82 | 00 01 | 24 | 81 | 00 23 | 24 | 80    | 00 47 | 23 | 79    | 01 10 | 24 | 78    | 01 34 | 23 | 77    | 01 57 | 24 | 76    | 02 21 | 23 | 75    | 02 44 | 24 | 74  | 267   |    |     |
| 94  | -3 41 | 24 | 87 | -3 17 | 23 | 86 | -2 54 | 24 | 85 | -2 30 | 23 | 84 | -2 07 | 24 | 83 | -1 43 | 24 | 82 | -1 19 | 24 | 81 | -0 55 | 23 | 80 | -0 28 | 24 | 79    | -0 08 | 24 | 78    | 00 16 | 24 | 77    | 00 40 | 23 | 76    | 01 03 | 24 | 75    | 01 27 | 24 | 74    | 01 51 | 23 | 73  | 266   |    |     |
| 95  | -4 36 | 23 | 86 | -4 13 | 24 | 85 | -3 49 | 24 | 84 | -3 25 | 23 | 83 | -3 02 | 24 | 82 | -2 38 | 24 | 81 | -2 14 | 24 | 80 | -1 50 | 24 | 79 | -1 26 | 24 | 78    | -1 02 | 24 | 77    | -0 38 | 24 | 76    | -0 14 | 23 | 75    | 00 09 | 24 | 74    | 00 33 | 24 | 73    | 00 57 | 24 | 72  | 265   |    |     |
| 96  | -5 31 | 23 | 85 | -5 08 | 24 | 84 | -4 44 | 24 | 83 | -4 20 | 24 | 82 | -3 56 | 23 | 81 | -3 33 | 24 | 80 | -3 09 | 24 | 79 | -2 45 | 24 | 78 | -2 21 | 24 | 77    | -1 57 | 24 | 76    | -1 33 | 25 | 75    | -1 08 | 24 | 74    | -0 44 | 24 | 73    | -0 20 | 24 | 72    | 00 04 | 24 | 71  | 00 24 | 75 | 264 |
| 97  | -6 26 | 23 | 84 | -6 03 | 24 | 83 | -5 39 | 24 | 82 | -5 15 | 24 | 81 | -4 51 | 24 | 80 | -4 27 | 24 | 79 | -4 03 | 24 | 78 | -3 39 | 24 | 77 | -3 15 | 24 | 76    | -2 51 | 24 | 75    | -2 27 | 25 | 74    | -2 02 | 24 | 73    | -1 38 | 24 | 72    | -1 14 | 25 | 71    | -0 49 | 24 | 70  | 263   |    |     |
| 98  | -6 34 | 24 | 85 | -6 10 | 24 | 84 | -5 46 | 24 | 83 | -5 22 | 24 | 82 | -4 58 | 24 | 81 | -4 34 | 25 | 80 | -4 09 | 24 | 79 | -3 45 | 24 | 78 | -3 21 | 25 | 77    | -2 56 | 24 | 76    | -2 32 | 25 | 75    | -2 06 | 24 | 74    | -1 42 | 25 | 73    | -1 14 | 25 | 72    | -0 42 | 24 | 71  | 262   |    |     |
| 99  | -6 41 | 24 | 83 | -6 17 | 24 | 82 | -5 53 | 25 | 81 | -5 28 | 24 | 80 | -5 04 | 25 | 79 | -4 39 | 25 | 78 | -4 14 | 24 | 77 | -3 50 | 25 | 76 | -3 25 | 75 | -3 00 | 25    | 74 | -2 35 | 25    | 73 | -2 05 | 25    | 72 | -1 35 | 25    | 71 | -1 05 | 25    | 70 | -0 75 | 25    | 69 | 261 |       |    |     |
| 100 | -6 22 | 24 | 80 | -5 58 | 25 | 79 | -5 33 | 25 | 78 | -5 08 | 25 | 77 | -4 43 | 25 | 76 | -4 18 | 25 | 75 | -3 53 | 25 | 74 | -3 28 | 25 | 73 | -3 03 | 25 | 72    | -2 33 | 25 | 71    | -2 08 | 25 | 70    | -1 43 | 25 | 69    | -1 18 | 25 | 68    | -0 93 | 25 | 67    | -0 63 | 25 | 66  | 260   |    |     |
| 101 | -6 27 | 25 | 77 | -6 02 | 25 |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |     |       |    |     |