

## Celestial Navigation

## Estimation of Sun GHA &amp; Dec.

Name: \_\_\_\_\_

1 ZT of 06 06 DR L  $20^{\circ} 47.0' N$   
 Observation 25-Jul  $\lambda 149^{\circ} 30.4' E$

7 ZT of 06 42 DR L  $21^{\circ} 11.2' S$   
 Observation 18-Aug  $\lambda 091^{\circ} 35.7' W$

|             |          |        |
|-------------|----------|--------|
| CT 07 59 26 | ZT 06 06 | 25-Jul |
| CE 6 48 s   | ZD _____ |        |
| GMT         | GMT      |        |

|             |          |        |
|-------------|----------|--------|
| CT 00 38 27 | ZT 06 42 | 18-Aug |
| CE 3 28 s   | ZD _____ |        |
| GMT         | GMT      |        |

GHA \_\_\_\_\_ Dec. \_\_\_\_\_

GHA \_\_\_\_\_ Dec. \_\_\_\_\_

2 ZT of 11 56 DR L  $29^{\circ} 51.1' N$   
 Observation 31-Oct  $\lambda 110^{\circ} 37.9' E$

8 ZT of 15 56 DR L  $24^{\circ} 29.0' S$   
 Observation 9-Sep  $\lambda 101^{\circ} 53.0' E$

|             |          |        |
|-------------|----------|--------|
| CT 04 56 49 | ZT 11 56 | 31-Oct |
| CE 0 37 f   | ZD _____ |        |
| GMT         | GMT      |        |

|             |          |       |
|-------------|----------|-------|
| CT 09 02 22 | ZT 15 56 | 9-Sep |
| CE 6 14 f   | ZD _____ |       |
| GMT         | GMT      |       |

GHA \_\_\_\_\_ Dec. \_\_\_\_\_

GHA \_\_\_\_\_ Dec. \_\_\_\_\_

3 ZT of 08 59 DR L  $20^{\circ} 21.6' S$   
 Observation 15-May  $\lambda 066^{\circ} 22.0' E$

9 ZT of 16 22 DR L  $23^{\circ} 19.0' S$   
 Observation 28-Oct  $\lambda 001^{\circ} 55.6' W$

|             |          |        |
|-------------|----------|--------|
| CT 04 58 40 | ZT 08 59 | 15-May |
| CE 0 22 s   | ZD _____ |        |
| GMT         | GMT      |        |

|             |          |        |
|-------------|----------|--------|
| CT 04 11 04 | ZT 16 22 | 28-Oct |
| CE 11 07 s  | ZD _____ |        |
| GMT         | GMT      |        |

GHA \_\_\_\_\_ Dec. \_\_\_\_\_

GHA \_\_\_\_\_ Dec. \_\_\_\_\_

4 ZT of 07 06 DR L  $29^{\circ} 53.6' S$   
 Observation 4-Nov  $\lambda 073^{\circ} 53.7' W$

10 ZT of 17 31 DR L  $24^{\circ} 40.4' N$   
 Observation 9-Apr  $\lambda 165^{\circ} 07.3' E$

|            |          |       |
|------------|----------|-------|
| CT #####   | ZT 07 06 | 4-Nov |
| CE 11 12 s | ZD _____ |       |
| GMT        | GMT      |       |

|             |          |       |
|-------------|----------|-------|
| CT 06 40 56 | ZT 17 31 | 9-Apr |
| CE 9 54 f   | ZD _____ |       |
| GMT         | GMT      |       |

GHA \_\_\_\_\_ Dec. \_\_\_\_\_

GHA \_\_\_\_\_ Dec. \_\_\_\_\_

5 ZT of 06 40 DR L  $22^{\circ} 57.9' N$   
 Observation 2-Feb  $\lambda 125^{\circ} 29.6' E$

11 ZT of 12 01 DR L  $27^{\circ} 36.6' S$   
 Observation 22-Feb  $\lambda 027^{\circ} 53.6' E$

|             |          |       |
|-------------|----------|-------|
| CT 10 29 31 | ZT 06 40 | 2-Feb |
| CE 10 11 s  | ZD _____ |       |
| GMT         | GMT      |       |

|             |          |        |
|-------------|----------|--------|
| CT 10 03 07 | ZT 12 01 | 22-Feb |
| CE 2 19 f   | ZD _____ |        |
| GMT         | GMT      |        |

GHA \_\_\_\_\_ Dec. \_\_\_\_\_

GHA \_\_\_\_\_ Dec. \_\_\_\_\_

6 ZT of 11 15 DR L  $29^{\circ} 47.5' N$   
 Observation 18-Mar  $\lambda 060^{\circ} 32.5' E$

12 ZT of 08 34 DR L  $23^{\circ} 50.8' S$   
 Observation 6-Mar  $\lambda 062^{\circ} 38.3' W$

|             |          |        |
|-------------|----------|--------|
| CT 07 05 33 | ZT 11 15 | 18-Mar |
| CE 9 11 s   | ZD _____ |        |
| GMT         | GMT      |        |

|             |          |       |
|-------------|----------|-------|
| CT 00 34 45 | ZT 08 34 | 6-Mar |
| CE 0 36 f   | ZD _____ |       |
| GMT         | GMT      |       |

GHA \_\_\_\_\_ Dec. \_\_\_\_\_

GHA \_\_\_\_\_ Dec. \_\_\_\_\_

|   |   |   |                   |   |   |   |                 |                   |   |
|---|---|---|-------------------|---|---|---|-----------------|-------------------|---|
| 1 | ZT of<br>Observation                      | 06 06<br>25-Jul                               | DR L<br>$\lambda$ | $20^{\circ} 47.0' N$<br>$149^{\circ} 30.4' E$ | 7   | ZT of<br>Observation                          | 06 42<br>18-Aug | DR L<br>$\lambda$ | $21^{\circ} 11.2' S$<br>$091^{\circ} 35.7' W$ |
|   | CT 07 59 26<br>CE 6 48 s<br>GMT 20 06 14  | ZT 06 06<br>ZD - 10<br>GMT 20 06 24-Jul       |                   |   | CT 00 38 27<br>CE 3 28 s<br>GMT 12 41 55  | ZT 06 42<br>ZD + 6<br>GMT 12 42 18-Aug        |                 |                   |   |
|   | GHA <u>~ 120°</u>                         | Dec. <u>~N 20°</u>                            |                   |   | GHA <u>~ 0°</u>                           | Dec. <u>~N 12°</u>                            |                 |                   |   |
| 2 | ZT of<br>Observation                      | 11 56<br>31-Oct                               | DR L<br>$\lambda$ | $29^{\circ} 51.1' N$<br>$110^{\circ} 37.9' E$ | 8   | ZT of<br>Observation                          | 15 56<br>9-Sep  | DR L<br>$\lambda$ | $24^{\circ} 29.0' S$<br>$101^{\circ} 53.0' E$ |
|   | CT 04 56 49<br>CE 0 37 f<br>GMT 04 56 11  | ZT 11 56 31-Oct<br>ZD - 7<br>GMT 04 56 31-Oct |                   |   | CT 09 02 22<br>CE 6 14 f<br>GMT 08 56 08  | ZT 15 56 9-Sep<br>ZD - 7<br>GMT 08 56 9-Sep   |                 |                   |   |
|   | GHA <u>~ 240°</u>                         | Dec. <u>~S 11°</u>                            |                   |   | GHA <u>~ 300°</u>                         | Dec. <u>~0°</u>                               |                 |                   |   |
| 3 | ZT of<br>Observation                      | 08 59<br>15-May                               | DR L<br>$\lambda$ | $20^{\circ} 21.6' S$<br>$066^{\circ} 22.0' E$ | 9   | ZT of<br>Observation                          | 16 22<br>28-Oct | DR L<br>$\lambda$ | $23^{\circ} 19.0' S$<br>$001^{\circ} 55.6' W$ |
|   | CT 04 58 40<br>CE 0 22 s<br>GMT 04 59 02  | ZT 08 59 15-May<br>ZD - 4<br>GMT 04 59 15-May |                   |   | CT 04 11 04<br>CE 11 07 s<br>GMT 16 22 11 | ZT 16 22 28-Oct<br>ZD 0<br>GMT 16 22 28-Oct   |                 |                   |   |
|   | GHA <u>~ 240°</u>                         | Dec. <u>~N 20°</u>                            |                   |   | GHA <u>~ 60°</u>                          | Dec. <u>~S 11°</u>                            |                 |                   |   |
| 4 | ZT of<br>Observation                      | 07 06<br>4-Nov                                | DR L<br>$\lambda$ | $29^{\circ} 53.6' S$<br>$073^{\circ} 53.7' W$ | 10  | ZT of<br>Observation                          | 17 31<br>9-Apr  | DR L<br>$\lambda$ | $24^{\circ} 40.4' N$<br>$165^{\circ} 07.3' E$ |
|   | CT #####<br>CE 11 12 s<br>GMT 12 05 55    | ZT 07 06 4-Nov<br>ZD + 5<br>GMT 12 06 4-Nov   |                   |   | CT 06 40 56<br>CE 9 54 f<br>GMT 06 31 02  | ZT 17 31 9-Apr<br>ZD - 11<br>GMT 06 31 9-Apr  |                 |                   |   |
|   | GHA <u>~ 0°</u>                           | Dec. <u>~S 11°</u>                            |                   |   | GHA <u>~ 270°</u>                         | Dec. <u>~N 12°</u>                            |                 |                   |   |
| 5 | ZT of<br>Observation                      | 06 40<br>2-Feb                                | DR L<br>$\lambda$ | $22^{\circ} 57.9' N$<br>$125^{\circ} 29.6' E$ | 11  | ZT of<br>Observation                          | 12 01<br>22-Feb | DR L<br>$\lambda$ | $27^{\circ} 36.6' S$<br>$027^{\circ} 53.6' E$ |
|   | CT 10 29 31<br>CE 10 11 s<br>GMT 22 39 42 | ZT 06 40 2-Feb<br>ZD - 8<br>GMT 22 40 1-Feb   |                   |   | CT 10 03 07<br>CE 2 19 f<br>GMT 10 00 48  | ZT 12 01 22-Feb<br>ZD - 2<br>GMT 10 01 22-Feb |                 |                   |   |
|   | GHA <u>~ 150°</u>                         | Dec. <u>~S 20°</u>                            |                   |   | GHA <u>~ 330°</u>                         | Dec. <u>~S 10°</u>                            |                 |                   |   |
| 6 | ZT of<br>Observation                      | 11 15<br>18-Mar                               | DR L<br>$\lambda$ | $29^{\circ} 47.5' N$<br>$060^{\circ} 32.5' E$ | 12  | ZT of<br>Observation                          | 08 34<br>6-Mar  | DR L<br>$\lambda$ | $23^{\circ} 50.8' S$<br>$062^{\circ} 38.3' W$ |
|   | CT 07 05 33<br>CE 9 11 s<br>GMT 07 14 44  | ZT 11 15 18-Mar<br>ZD - 4<br>GMT 07 15 18-Mar |                   |   | CT 00 34 45<br>CE 0 36 f<br>GMT 12 34 08  | ZT 08 34 6-Mar<br>ZD + 4<br>GMT 12 34 6-Mar   |                 |                   |   |
|   | GHA <u>~ 285°</u>                         | Dec. <u>~0°</u>                               |                   |   | GHA <u>~ 0°</u>                           | Dec. <u>~0°</u>                               |                 |                   |   |