

Introduction to Reports Generated by Astronomy Lab 2

In all reports, times and dates are in standard time (not daylight savings time or summer time). Times are in 24 hour format.

Abbreviations used in reports:

|            |                      |
|------------|----------------------|
| AU         | Astronomical Units   |
| D          | Degrees              |
| DEC        | Declination          |
| DIST       | Distance             |
| DSO        | December Solstice    |
| E          | East                 |
| FM         | Full Moon            |
| FQ         | First Quarter Moon   |
| H          | Hours                |
| ILL FR,    |                      |
| ILLUM FRAC | Illuminated Fraction |
| JSO        | June Solstice        |
| KM         | Kilometers           |
| LE         | Lunar Eclipse        |
| LQ         | Last Quarter Moon    |
| M          | Minutes              |
| MEQ        | March Equinox        |
| MR         | Moon Rise            |
| MS         | Moon Set             |
| N          | North                |
| NM         | New Moon             |
| RA         | Right Ascension      |
| S          | South, Seconds       |
| SE         | Solar Eclipse        |
| SEQ        | September Equinox    |
| SR         | Sunrise              |
| SS         | Sunset               |
| UT         | Universal Time       |
| W          | West                 |
| ZHR        | Zenithal Hourly Rate |



February                      2013

| Sunday    | Monday    | Tuesday   | Wednesday | Thursday  | Friday    | Saturday  |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |           |           |           |           | 1         | 2         |
|           |           |           |           |           | SR: 7:35  | SR: 7:34  |
|           |           |           |           |           | SS: 17:44 | SS: 17:46 |
|           |           |           |           |           | MR: 23:57 | MR: None  |
|           |           |           |           |           | MS: 10:09 | MS: 10:45 |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 3         | 4         | 5         | 6         | 7         | 8         | 9         |
| SR: 7:33  | SR: 7:32  | SR: 7:31  | SR: 7:30  | SR: 7:29  | SR: 7:28  | SR: 7:27  |
| SS: 17:47 | SS: 17:48 | SS: 17:49 | SS: 17:51 | SS: 17:52 | SS: 17:53 | SS: 17:54 |
| MR: 1:05  | MR: 2:12  | MR: 3:17  | MR: 4:18  | MR: 5:12  | MR: 6:00  | MR: 6:41  |
| MS: 11:26 | MS: 12:14 | MS: 13:09 | MS: 14:12 | MS: 15:20 | MS: 16:30 | MS: 17:41 |
| LQ: 6:58  |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 10        | 11        | 12        | 13        | 14        | 15        | 16        |
| SR: 7:25  | SR: 7:24  | SR: 7:23  | SR: 7:22  | SR: 7:20  | SR: 7:19  | SR: 7:18  |
| SS: 17:55 | SS: 17:57 | SS: 17:58 | SS: 17:59 | SS: 18:00 | SS: 18:02 | SS: 18:03 |
| MR: 7:17  | MR: 7:51  | MR: 8:22  | MR: 8:53  | MR: 9:24  | MR: 9:57  | MR: 10:32 |
| MS: 18:51 | MS: 19:59 | MS: 21:04 | MS: 22:07 | MS: 23:09 | MS: None  | MS: 0:08  |
| NM: 0:23  |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 17        | 18        | 19        | 20        | 21        | 22        | 23        |
| SR: 7:16  | SR: 7:15  | SR: 7:14  | SR: 7:12  | SR: 7:11  | SR: 7:10  | SR: 7:08  |
| SS: 18:04 | SS: 18:05 | SS: 18:06 | SS: 18:07 | SS: 18:09 | SS: 18:10 | SS: 18:11 |
| MR: 11:11 | MR: 11:53 | MR: 12:40 | MR: 13:32 | MR: 14:27 | MR: 15:25 | MR: 16:25 |
| MS: 1:05  | MS: 1:59  | MS: 2:50  | MS: 3:37  | MS: 4:19  | MS: 4:58  | MS: 5:33  |
| FQ: 13:31 |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 24        | 25        | 26        | 27        | 28        |           |           |
| SR: 7:07  | SR: 7:05  | SR: 7:04  | SR: 7:02  | SR: 7:01  |           |           |
| SS: 18:12 | SS: 18:13 | SS: 18:14 | SS: 18:15 | SS: 18:17 |           |           |
| MR: 17:27 | MR: 18:31 | MR: 19:35 | MR: 20:41 | MR: 21:49 |           |           |
| MS: 6:06  | MS: 6:38  | MS: 7:08  | MS: 7:39  | MS: 8:12  |           |           |
|           | FM: 13:29 |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |

March                          2013

| Sunday    | Monday    | Tuesday   | Wednesday | Thursday  | Friday    | Saturday  |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |           |           |           |           | 1         | 2         |
|           |           |           |           |           | SR: 6:59  | SR: 6:58  |
|           |           |           |           |           | SS: 18:18 | SS: 18:19 |
|           |           |           |           |           | MR: 22:57 | MR: None  |
|           |           |           |           |           | MS: 8:48  | MS: 9:27  |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 3         | 4         | 5         | 6         | 7         | 8         | 9         |
| SR: 6:56  | SR: 6:55  | SR: 6:53  | SR: 6:51  | SR: 6:50  | SR: 6:48  | SR: 6:47  |
| SS: 18:20 | SS: 18:21 | SS: 18:22 | SS: 18:23 | SS: 18:24 | SS: 18:26 | SS: 18:27 |
| MR: 0:04  | MR: 1:09  | MR: 2:10  | MR: 3:05  | MR: 3:54  | MR: 4:36  | MR: 5:14  |
| MS: 10:13 | MS: 11:05 | MS: 12:04 | MS: 13:08 | MS: 14:15 | MS: 15:24 | MS: 16:33 |
|           | LQ: 14:55 |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 10        | 11        | 12        | 13        | 14        | 15        | 16        |
| SR: 6:45  | SR: 6:43  | SR: 6:42  | SR: 6:40  | SR: 6:39  | SR: 6:37  | SR: 6:35  |
| SS: 18:28 | SS: 18:29 | SS: 18:30 | SS: 18:31 | SS: 18:32 | SS: 18:33 | SS: 18:34 |
| MR: 5:48  | MR: 6:20  | MR: 6:51  | MR: 7:22  | MR: 7:55  | MR: 8:29  | MR: 9:07  |
| MS: 17:40 | MS: 18:46 | MS: 19:50 | MS: 20:53 | MS: 21:54 | MS: 22:52 | MS: 23:48 |
|           | NM: 12:54 |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 17        | 18        | 19        | 20        | 21        | 22        | 23        |
| SR: 6:34  | SR: 6:32  | SR: 6:30  | SR: 6:29  | SR: 6:27  | SR: 6:26  | SR: 6:24  |
| SS: 18:35 | SS: 18:36 | SS: 18:37 | SS: 18:38 | SS: 18:39 | SS: 18:40 | SS: 18:42 |
| MR: 9:48  | MR: 10:34 | MR: 11:23 | MR: 12:16 | MR: 13:12 | MR: 14:11 | MR: 15:12 |
| MS: None  | MS: 0:41  | MS: 1:29  | MS: 2:13  | MS: 2:53  | MS: 3:30  | MS: 4:03  |
|           |           | FQ: 10:28 |           |           |           |           |
|           |           |           | MEQ: 3:59 |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 24        | 25        | 26        | 27        | 28        | 29        | 30        |
| SR: 6:22  | SR: 6:21  | SR: 6:19  | SR: 6:17  | SR: 6:16  | SR: 6:14  | SR: 6:12  |
| SS: 18:43 | SS: 18:44 | SS: 18:45 | SS: 18:46 | SS: 18:47 | SS: 18:48 | SS: 18:49 |
| MR: 16:14 | MR: 17:19 | MR: 18:25 | MR: 19:33 | MR: 20:43 | MR: 21:53 | MR: 23:01 |
| MS: 4:35  | MS: 5:06  | MS: 5:38  | MS: 6:10  | MS: 6:46  | MS: 7:25  | MS: 8:10  |
|           |           |           | FM: 2:30  |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 31        |           |           |           |           |           |           |
| SR: 6:11  |           |           |           |           |           |           |
| SS: 18:50 |           |           |           |           |           |           |
| MR: None  |           |           |           |           |           |           |
| MS: 9:01  |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |

April                      2013

| Sunday    | Monday    | Tuesday   | Wednesday | Thursday  | Friday    | Saturday  |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|           | 1         | 2         | 3         | 4         | 5         | 6         |
|           | SR: 6:09  | SR: 6:07  | SR: 6:06  | SR: 6:04  | SR: 6:03  | SR: 6:01  |
|           | SS: 18:51 | SS: 18:52 | SS: 18:53 | SS: 18:54 | SS: 18:55 | SS: 18:56 |
|           | MR: 0:04  | MR: 1:01  | MR: 1:52  | MR: 2:35  | MR: 3:14  | MR: 3:48  |
|           | MS: 9:59  | MS: 11:02 | MS: 12:08 | MS: 13:15 | MS: 14:22 | MS: 15:28 |
|           |           | LQ: 21:39 |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 7         | 8         | 9         | 10        | 11        | 12        | 13        |
| SR: 5:59  | SR: 5:58  | SR: 5:56  | SR: 5:55  | SR: 5:53  | SR: 5:52  | SR: 5:50  |
| SS: 18:57 | SS: 18:58 | SS: 18:59 | SS: 19:00 | SS: 19:01 | SS: 19:02 | SS: 19:03 |
| MR: 4:20  | MR: 4:51  | MR: 5:22  | MR: 5:53  | MR: 6:27  | MR: 7:04  | MR: 7:44  |
| MS: 16:33 | MS: 17:37 | MS: 18:39 | MS: 19:40 | MS: 20:40 | MS: 21:37 | MS: 22:31 |
|           |           |           | NM: 2:39  |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 14        | 15        | 16        | 17        | 18        | 19        | 20        |
| SR: 5:48  | SR: 5:47  | SR: 5:45  | SR: 5:44  | SR: 5:42  | SR: 5:41  | SR: 5:40  |
| SS: 19:04 | SS: 19:05 | SS: 19:06 | SS: 19:08 | SS: 19:09 | SS: 19:10 | SS: 19:11 |
| MR: 8:28  | MR: 9:16  | MR: 10:07 | MR: 11:02 | MR: 11:58 | MR: 12:57 | MR: 13:58 |
| MS: 23:22 | MS: None  | MS: 0:07  | MS: 0:49  | MS: 1:26  | MS: 2:00  | MS: 2:33  |
|           |           |           |           | FQ: 5:33  |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 21        | 22        | 23        | 24        | 25        | 26        | 27        |
| SR: 5:38  | SR: 5:37  | SR: 5:35  | SR: 5:34  | SR: 5:32  | SR: 5:31  | SR: 5:30  |
| SS: 19:12 | SS: 19:13 | SS: 19:14 | SS: 19:15 | SS: 19:16 | SS: 19:17 | SS: 19:18 |
| MR: 15:00 | MR: 16:05 | MR: 17:12 | MR: 18:22 | MR: 19:33 | MR: 20:44 | MR: 21:52 |
| MS: 3:03  | MS: 3:34  | MS: 4:06  | MS: 4:40  | MS: 5:18  | MS: 6:02  | MS: 6:52  |
|           |           |           |           | FM: 13:00 |           |           |
|           |           |           |           | LE: 13:11 |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 28        | 29        | 30        |           |           |           |           |
| SR: 5:28  | SR: 5:27  | SR: 5:26  |           |           |           |           |
| SS: 19:19 | SS: 19:20 | SS: 19:21 |           |           |           |           |
| MR: 22:53 | MR: 23:48 | MR: None  |           |           |           |           |
| MS: 7:49  | MS: 8:52  | MS: 9:59  |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |



June                      2013

| Sunday   | Monday  | Tuesday   | Wednesday   | Thursday   | Friday   | Saturday   |
|--|---|---|---|--|--|--|
|  |   |   |   |  |  | 1<br> SR: 4:57 <br> SS: 19:51 <br> MR: 0:57 <br> MS: 13:22                 |
| 2<br> SR: 4:57 <br> SS: 19:51 <br> MR: 1:27 <br> MS: 14:25                 | 3<br> SR: 4:57 <br> SS: 19:52 <br> MR: 1:58 <br> MS: 15:25  | 4<br> SR: 4:56 <br> SS: 19:53 <br> MR: 2:29 <br> MS: 16:25  | 5<br> SR: 4:56 <br> SS: 19:53 <br> MR: 3:03 <br> MS: 17:23  | 6<br> SR: 4:56 <br> SS: 19:54 <br> MR: 3:40 <br> MS: 18:19                 | 7<br> SR: 4:56 <br> SS: 19:54 <br> MR: 4:21 <br> MS: 19:11   | 8<br> SR: 4:55 <br> SS: 19:55 <br> MR: 5:06 <br> MS: 20:00 <br> NM: 8:59   |
| 9<br> SR: 4:55 <br> SS: 19:56 <br> MR: 5:55 <br> MS: 20:45                 | 10<br> SR: 4:55 <br> SS: 19:56 <br> MR: 6:47 <br> MS: 21:25 | 11<br> SR: 4:55 <br> SS: 19:57 <br> MR: 7:42 <br> MS: 22:01 | 12<br> SR: 4:55 <br> SS: 19:57 <br> MR: 8:39 <br> MS: 22:34 | 13<br> SR: 4:55 <br> SS: 19:58 <br> MR: 9:36 <br> MS: 23:05                | 14<br> SR: 4:55 <br> SS: 19:58 <br> MR: 10:35 <br> MS: 23:34 | 15<br> SR: 4:55 <br> SS: 19:58 <br> MR: 11:35 <br> MS: None                |
| 16<br> SR: 4:55 <br> SS: 19:59 <br> MR: 12:36 <br> MS: 0:03 <br> FQ: 10:25 | 17<br> SR: 4:55 <br> SS: 19:59 <br> MR: 13:40 <br> MS: 0:34 | 18<br> SR: 4:55 <br> SS: 19:59 <br> MR: 14:47 <br> MS: 1:06 | 19<br> SR: 4:55 <br> SS: 20:00 <br> MR: 15:56 <br> MS: 1:43 | 20<br> SR: 4:55 <br> SS: 20:00 <br> MR: 17:06 <br> MS: 2:25 <br> JSO:21:59 | 21<br> SR: 4:56 <br> SS: 20:00 <br> MR: 18:14 <br> MS: 3:14  | 22<br> SR: 4:56 <br> SS: 20:00 <br> MR: 19:18 <br> MS: 4:12                |
| 23<br> SR: 4:56 <br> SS: 20:00 <br> MR: 20:16 <br> MS: 5:18 <br> FM: 4:34  | 24<br> SR: 4:56 <br> SS: 20:00 <br> MR: 21:05 <br> MS: 6:29 | 25<br> SR: 4:57 <br> SS: 20:00 <br> MR: 21:48 <br> MS: 7:42 | 26<br> SR: 4:57 <br> SS: 20:01 <br> MR: 22:25 <br> MS: 8:54 | 27<br> SR: 4:57 <br> SS: 20:01 <br> MR: 22:58 <br> MS: 10:04               | 28<br> SR: 4:58 <br> SS: 20:01 <br> MR: 23:30 <br> MS: 11:11 | 29<br> SR: 4:58 <br> SS: 20:00 <br> MR: None <br> MS: 12:16 <br> LQ: 21:55 |
| 30<br> SR: 4:59 <br> SS: 20:00 <br> MR: 0:01 <br> MS: 13:18                |   |   |   |  |  |  |

July                      2013

| Sunday    | Monday    | Tuesday   | Wednesday | Thursday  | Friday    | Saturday  |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|           | 1         | 2         | 3         | 4         | 5         | 6         |
|           | SR: 4:59  | SR: 5:00  | SR: 5:00  | SR: 5:01  | SR: 5:02  | SR: 5:02  |
|           | SS: 20:00 | SS: 20:00 | SS: 20:00 | SS: 20:00 | SS: 19:59 | SS: 19:59 |
|           | MR: 0:32  | MR: 1:06  | MR: 1:41  | MR: 2:21  | MR: 3:04  | MR: 3:52  |
|           | MS: 14:18 | MS: 15:17 | MS: 16:14 | MS: 17:07 | MS: 17:57 | MS: 18:44 |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 7         | 8         | 9         | 10        | 11        | 12        | 13        |
| SR: 5:03  | SR: 5:03  | SR: 5:04  | SR: 5:05  | SR: 5:05  | SR: 5:06  | SR: 5:07  |
| SS: 19:59 | SS: 19:58 | SS: 19:58 | SS: 19:58 | SS: 19:57 | SS: 19:57 | SS: 19:56 |
| MR: 4:43  | MR: 5:37  | MR: 6:33  | MR: 7:30  | MR: 8:29  | MR: 9:28  | MR: 10:28 |
| MS: 19:25 | MS: 20:03 | MS: 20:37 | MS: 21:09 | MS: 21:39 | MS: 22:08 | MS: 22:37 |
|           | NM: 0:16  |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 14        | 15        | 16        | 17        | 18        | 19        | 20        |
| SR: 5:08  | SR: 5:08  | SR: 5:09  | SR: 5:10  | SR: 5:11  | SR: 5:12  | SR: 5:13  |
| SS: 19:56 | SS: 19:55 | SS: 19:54 | SS: 19:54 | SS: 19:53 | SS: 19:52 | SS: 19:52 |
| MR: 11:30 | MR: 12:33 | MR: 13:39 | MR: 14:46 | MR: 15:54 | MR: 16:59 | MR: 17:59 |
| MS: 23:08 | MS: 23:41 | MS: None  | MS: 0:19  | MS: 1:04  | MS: 1:56  | MS: 2:56  |
|           | FQ: 20:20 |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 21        | 22        | 23        | 24        | 25        | 26        | 27        |
| SR: 5:13  | SR: 5:14  | SR: 5:15  | SR: 5:16  | SR: 5:17  | SR: 5:18  | SR: 5:19  |
| SS: 19:51 | SS: 19:50 | SS: 19:49 | SS: 19:48 | SS: 19:47 | SS: 19:47 | SS: 19:46 |
| MR: 18:52 | MR: 19:39 | MR: 20:19 | MR: 20:56 | MR: 21:29 | MR: 22:01 | MR: 22:34 |
| MS: 4:03  | MS: 5:16  | MS: 6:29  | MS: 7:42  | MS: 8:52  | MS: 10:00 | MS: 11:05 |
|           | FM: 11:17 |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 28        | 29        | 30        | 31        |           |           |           |
| SR: 5:20  | SR: 5:21  | SR: 5:21  | SR: 5:22  |           |           |           |
| SS: 19:45 | SS: 19:44 | SS: 19:43 | SS: 19:42 |           |           |           |
| MR: 23:07 | MR: 23:42 | MR: None  | MR: 0:20  |           |           |           |
| MS: 12:08 | MS: 13:08 | MS: 14:06 | MS: 15:01 |           |           |           |
|           | LQ: 10:45 |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |



August                      2013

| Sunday    | Monday    | Tuesday   | Wednesday | Thursday  | Friday    | Saturday  |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |           |           |           | 1         | 2         | 3         |
|           |           |           |           | SR: 5:23  | SR: 5:24  | SR: 5:25  |
|           |           |           |           | SS: 19:40 | SS: 19:39 | SS: 19:38 |
|           |           |           |           | MR: 1:02  | MR: 1:48  | MR: 2:38  |
|           |           |           |           | MS: 15:53 | MS: 16:41 | MS: 17:24 |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 4         | 5         | 6         | 7         | 8         | 9         | 10        |
| SR: 5:26  | SR: 5:27  | SR: 5:28  | SR: 5:29  | SR: 5:30  | SR: 5:31  | SR: 5:32  |
| SS: 19:37 | SS: 19:36 | SS: 19:35 | SS: 19:33 | SS: 19:32 | SS: 19:31 | SS: 19:30 |
| MR: 3:31  | MR: 4:27  | MR: 5:24  | MR: 6:22  | MR: 7:22  | MR: 8:22  | MR: 9:23  |
| MS: 18:03 | MS: 18:39 | MS: 19:12 | MS: 19:42 | MS: 20:12 | MS: 20:42 | MS: 21:12 |
|           |           | NM: 14:52 |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 11        | 12        | 13        | 14        | 15        | 16        | 17        |
| SR: 5:33  | SR: 5:34  | SR: 5:35  | SR: 5:36  | SR: 5:37  | SR: 5:38  | SR: 5:39  |
| SS: 19:28 | SS: 19:27 | SS: 19:26 | SS: 19:24 | SS: 19:23 | SS: 19:22 | SS: 19:20 |
| MR: 10:26 | MR: 11:30 | MR: 12:35 | MR: 13:41 | MR: 14:44 | MR: 15:45 | MR: 16:39 |
| MS: 21:44 | MS: 22:20 | MS: 23:01 | MS: 23:48 | MS: None  | MS: 0:43  | MS: 1:45  |
|           |           |           | FQ: 3:58  |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 18        | 19        | 20        | 21        | 22        | 23        | 24        |
| SR: 5:40  | SR: 5:41  | SR: 5:42  | SR: 5:43  | SR: 5:44  | SR: 5:45  | SR: 5:46  |
| SS: 19:19 | SS: 19:17 | SS: 19:16 | SS: 19:14 | SS: 19:13 | SS: 19:11 | SS: 19:10 |
| MR: 17:28 | MR: 18:11 | MR: 18:50 | MR: 19:25 | MR: 19:59 | MR: 20:32 | MR: 21:05 |
| MS: 2:53  | MS: 4:05  | MS: 5:17  | MS: 6:29  | MS: 7:39  | MS: 8:46  | MS: 9:52  |
|           |           | FM: 18:45 |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 25        | 26        | 27        | 28        | 29        | 30        | 31        |
| SR: 5:47  | SR: 5:48  | SR: 5:49  | SR: 5:50  | SR: 5:51  | SR: 5:52  | SR: 5:52  |
| SS: 19:08 | SS: 19:07 | SS: 19:05 | SS: 19:04 | SS: 19:02 | SS: 19:01 | SS: 18:59 |
| MR: 21:41 | MR: 22:19 | MR: 23:00 | MR: 23:44 | MR: None  | MR: 0:33  | MR: 1:24  |
| MS: 10:55 | MS: 11:55 | MS: 12:52 | MS: 13:46 | MS: 14:35 | MS: 15:20 | MS: 16:01 |
|           |           |           | LQ: 2:36  |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |

September      2013

| Sunday    | Monday    | Tuesday   | Wednesday | Thursday  | Friday    | Saturday  |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1         | 2         | 3         | 4         | 5         | 6         | 7         |
| SR: 5:53  | SR: 5:54  | SR: 5:55  | SR: 5:56  | SR: 5:57  | SR: 5:58  | SR: 5:59  |
| SS: 18:57 | SS: 18:56 | SS: 18:54 | SS: 18:53 | SS: 18:51 | SS: 18:49 | SS: 18:48 |
| MR: 2:19  | MR: 3:15  | MR: 4:13  | MR: 5:13  | MR: 6:13  | MR: 7:15  | MR: 8:18  |
| MS: 16:38 | MS: 17:12 | MS: 17:44 | MS: 18:14 | MS: 18:44 | MS: 19:15 | MS: 19:47 |
|           |           |           |           | NM: 4:36  |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 8         | 9         | 10        | 11        | 12        | 13        | 14        |
| SR: 6:00  | SR: 6:01  | SR: 6:02  | SR: 6:03  | SR: 6:04  | SR: 6:05  | SR: 6:06  |
| SS: 18:46 | SS: 18:44 | SS: 18:43 | SS: 18:41 | SS: 18:39 | SS: 18:38 | SS: 18:36 |
| MR: 9:23  | MR: 10:28 | MR: 11:33 | MR: 12:37 | MR: 13:37 | MR: 14:32 | MR: 15:21 |
| MS: 20:23 | MS: 21:02 | MS: 21:47 | MS: 22:39 | MS: 23:37 | MS: None  | MS: 0:41  |
|           |           |           |           | FQ: 10:10 |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 15        | 16        | 17        | 18        | 19        | 20        | 21        |
| SR: 6:07  | SR: 6:08  | SR: 6:09  | SR: 6:10  | SR: 6:11  | SR: 6:12  | SR: 6:13  |
| SS: 18:34 | SS: 18:33 | SS: 18:31 | SS: 18:29 | SS: 18:28 | SS: 18:26 | SS: 18:24 |
| MR: 16:05 | MR: 16:45 | MR: 17:21 | MR: 17:55 | MR: 18:28 | MR: 19:02 | MR: 19:37 |
| MS: 1:48  | MS: 2:58  | MS: 4:08  | MS: 5:18  | MS: 6:26  | MS: 7:32  | MS: 8:37  |
|           |           |           |           | FM: 4:13  |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 22        | 23        | 24        | 25        | 26        | 27        | 28        |
| SR: 6:14  | SR: 6:15  | SR: 6:16  | SR: 6:17  | SR: 6:18  | SR: 6:19  | SR: 6:20  |
| SS: 18:22 | SS: 18:21 | SS: 18:19 | SS: 18:17 | SS: 18:16 | SS: 18:14 | SS: 18:12 |
| MR: 20:14 | MR: 20:55 | MR: 21:38 | MR: 22:26 | MR: 23:16 | MR: None  | MR: 0:09  |
| MS: 9:40  | MS: 10:39 | MS: 11:35 | MS: 12:27 | MS: 13:14 | MS: 13:56 | MS: 14:35 |
|           |           |           |           | LQ: 20:56 |           |           |
| SEQ:13:38 |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 29        | 30        |           |           |           |           |           |
| SR: 6:21  | SR: 6:22  |           |           |           |           |           |
| SS: 18:11 | SS: 18:09 |           |           |           |           |           |
| MR: 1:05  | MR: 2:02  |           |           |           |           |           |
| MS: 15:10 | MS: 15:43 |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |

October                      2013

| Sunday    | Monday    | Tuesday   | Wednesday | Thursday  | Friday    | Saturday  |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |           | 1         | 2         | 3         | 4         | 5         |
|           |           | SR: 6:23  | SR: 6:24  | SR: 6:25  | SR: 6:26  | SR: 6:27  |
|           |           | SS: 18:08 | SS: 18:06 | SS: 18:04 | SS: 18:03 | SS: 18:01 |
|           |           | MR: 3:01  | MR: 4:01  | MR: 5:02  | MR: 6:06  | MR: 7:11  |
|           |           | MS: 16:14 | MS: 16:44 | MS: 17:15 | MS: 17:47 | MS: 18:22 |
|           |           |           |           |           | NM: 17:34 |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 6         | 7         | 8         | 9         | 10        | 11        | 12        |
| SR: 6:28  | SR: 6:29  | SR: 6:30  | SR: 6:31  | SR: 6:32  | SR: 6:33  | SR: 6:34  |
| SS: 17:59 | SS: 17:58 | SS: 17:56 | SS: 17:55 | SS: 17:53 | SS: 17:51 | SS: 17:50 |
| MR: 8:17  | MR: 9:24  | MR: 10:29 | MR: 11:31 | MR: 12:28 | MR: 13:19 | MR: 14:04 |
| MS: 19:01 | MS: 19:45 | MS: 20:35 | MS: 21:32 | MS: 22:34 | MS: 23:40 | MS: None  |
|           |           |           |           |           | FQ: 16:04 |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 13        | 14        | 15        | 16        | 17        | 18        | 19        |
| SR: 6:35  | SR: 6:36  | SR: 6:37  | SR: 6:38  | SR: 6:39  | SR: 6:41  | SR: 6:42  |
| SS: 17:48 | SS: 17:47 | SS: 17:45 | SS: 17:44 | SS: 17:42 | SS: 17:41 | SS: 17:39 |
| MR: 14:43 | MR: 15:20 | MR: 15:53 | MR: 16:26 | MR: 16:59 | MR: 17:33 | MR: 18:10 |
| MS: 0:48  | MS: 1:56  | MS: 3:04  | MS: 4:10  | MS: 5:16  | MS: 6:21  | MS: 7:24  |
|           |           |           |           |           | FM: 16:38 |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 20        | 21        | 22        | 23        | 24        | 25        | 26        |
| SR: 6:43  | SR: 6:44  | SR: 6:45  | SR: 6:46  | SR: 6:47  | SR: 6:48  | SR: 6:49  |
| SS: 17:38 | SS: 17:37 | SS: 17:35 | SS: 17:34 | SS: 17:32 | SS: 17:31 | SS: 17:30 |
| MR: 18:49 | MR: 19:32 | MR: 20:18 | MR: 21:07 | MR: 22:00 | MR: 22:54 | MR: 23:50 |
| MS: 8:25  | MS: 9:23  | MS: 10:17 | MS: 11:07 | MS: 11:51 | MS: 12:31 | MS: 13:08 |
|           |           |           |           |           |           | LQ: 16:42 |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 27        | 28        | 29        | 30        | 31        |           |           |
| SR: 6:51  | SR: 6:52  | SR: 6:53  | SR: 6:54  | SR: 6:55  |           |           |
| SS: 17:28 | SS: 17:27 | SS: 17:26 | SS: 17:25 | SS: 17:23 |           |           |
| MR: None  | MR: 0:47  | MR: 1:46  | MR: 2:46  | MR: 3:48  |           |           |
| MS: 13:41 | MS: 14:12 | MS: 14:42 | MS: 15:12 | MS: 15:44 |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |

November 2013

| Sunday    | Monday    | Tuesday   | Wednesday | Thursday  | Friday    | Saturday  |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |           |           |           |           | 1         | 2         |
|           |           |           |           |           | SR: 6:56  | SR: 6:57  |
|           |           |           |           |           | SS: 17:22 | SS: 17:21 |
|           |           |           |           |           | MR: 4:52  | MR: 5:59  |
|           |           |           |           |           | MS: 16:18 | MS: 16:55 |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 3         | 4         | 5         | 6         | 7         | 8         | 9         |
| SR: 6:59  | SR: 7:00  | SR: 7:01  | SR: 7:02  | SR: 7:03  | SR: 7:04  | SR: 7:06  |
| SS: 17:20 | SS: 17:19 | SS: 17:18 | SS: 17:17 | SS: 17:16 | SS: 17:15 | SS: 17:14 |
| MR: 7:07  | MR: 8:15  | MR: 9:21  | MR: 10:21 | MR: 11:16 | MR: 12:03 | MR: 12:45 |
| MS: 17:38 | MS: 18:27 | MS: 19:23 | MS: 20:25 | MS: 21:32 | MS: 22:40 | MS: 23:48 |
| NM: 5:50  |           |           |           |           |           | FQ: 22:59 |
| SE: 5:43  |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 10        | 11        | 12        | 13        | 14        | 15        | 16        |
| SR: 7:07  | SR: 7:08  | SR: 7:09  | SR: 7:10  | SR: 7:12  | SR: 7:13  | SR: 7:14  |
| SS: 17:13 | SS: 17:12 | SS: 17:11 | SS: 17:10 | SS: 17:09 | SS: 17:08 | SS: 17:07 |
| MR: 13:22 | MR: 13:55 | MR: 14:28 | MR: 15:00 | MR: 15:33 | MR: 16:08 | MR: 16:45 |
| MS: None  | MS: 0:56  | MS: 2:02  | MS: 3:06  | MS: 4:10  | MS: 5:13  | MS: 6:14  |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 17        | 18        | 19        | 20        | 21        | 22        | 23        |
| SR: 7:15  | SR: 7:16  | SR: 7:17  | SR: 7:18  | SR: 7:20  | SR: 7:21  | SR: 7:22  |
| SS: 17:07 | SS: 17:06 | SS: 17:05 | SS: 17:05 | SS: 17:04 | SS: 17:03 | SS: 17:03 |
| MR: 17:26 | MR: 18:11 | MR: 18:59 | MR: 19:51 | MR: 20:44 | MR: 21:40 | MR: 22:36 |
| MS: 7:13  | MS: 8:08  | MS: 9:00  | MS: 9:46  | MS: 10:28 | MS: 11:06 | MS: 11:40 |
| FM: 8:17  |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 24        | 25        | 26        | 27        | 28        | 29        | 30        |
| SR: 7:23  | SR: 7:24  | SR: 7:25  | SR: 7:26  | SR: 7:27  | SR: 7:28  | SR: 7:29  |
| SS: 17:02 | SS: 17:02 | SS: 17:01 | SS: 17:01 | SS: 17:01 | SS: 17:00 | SS: 17:00 |
| MR: 23:33 | MR: None  | MR: 0:31  | MR: 1:31  | MR: 2:33  | MR: 3:37  | MR: 4:44  |
| MS: 12:12 | MS: 12:42 | MS: 13:11 | MS: 13:41 | MS: 14:13 | MS: 14:47 | MS: 15:27 |
|           | LQ: 12:30 |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |

December                      2013

| Sunday    | Monday    | Tuesday   | Wednesday | Thursday  | Friday    | Saturday  |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1         | 2         | 3         | 4         | 5         | 6         | 7         |
| SR: 7:30  | SR: 7:31  | SR: 7:32  | SR: 7:33  | SR: 7:34  | SR: 7:35  | SR: 7:36  |
| SS: 17:00 | SS: 16:59 | SS: 16:59 | SS: 16:59 | SS: 16:59 | SS: 16:59 | SS: 16:59 |
| MR: 5:52  | MR: 7:00  | MR: 8:06  | MR: 9:05  | MR: 9:57  | MR: 10:43 | MR: 11:23 |
| MS: 16:13 | MS: 17:06 | MS: 18:08 | MS: 19:15 | MS: 20:25 | MS: 21:36 | MS: 22:46 |
|           | NM: 17:22 |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 8         | 9         | 10        | 11        | 12        | 13        | 14        |
| SR: 7:37  | SR: 7:38  | SR: 7:39  | SR: 7:39  | SR: 7:40  | SR: 7:41  | SR: 7:42  |
| SS: 16:59 | SS: 16:59 | SS: 16:59 | SS: 16:59 | SS: 16:59 | SS: 17:00 | SS: 17:00 |
| MR: 11:58 | MR: 12:31 | MR: 13:03 | MR: 13:36 | MR: 14:09 | MR: 14:45 | MR: 15:24 |
| MS: 23:54 | MS: None  | MS: 1:00  | MS: 2:03  | MS: 3:06  | MS: 4:06  | MS: 5:05  |
|           | FQ: 8:13  |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 15        | 16        | 17        | 18        | 19        | 20        | 21        |
| SR: 7:42  | SR: 7:43  | SR: 7:44  | SR: 7:44  | SR: 7:45  | SR: 7:45  | SR: 7:46  |
| SS: 17:00 | SS: 17:00 | SS: 17:01 | SS: 17:01 | SS: 17:02 | SS: 17:02 | SS: 17:03 |
| MR: 16:07 | MR: 16:54 | MR: 17:44 | MR: 18:37 | MR: 19:32 | MR: 20:27 | MR: 21:24 |
| MS: 6:01  | MS: 6:54  | MS: 7:43  | MS: 8:26  | MS: 9:06  | MS: 9:41  | MS: 10:14 |
|           |           | FM: 2:29  |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           | DSO:10:07 |
| 22        | 23        | 24        | 25        | 26        | 27        | 28        |
| SR: 7:46  | SR: 7:47  | SR: 7:47  | SR: 7:48  | SR: 7:48  | SR: 7:48  | SR: 7:49  |
| SS: 17:03 | SS: 17:04 | SS: 17:04 | SS: 17:05 | SS: 17:05 | SS: 17:06 | SS: 17:07 |
| MR: 22:21 | MR: 23:19 | MR: None  | MR: 0:18  | MR: 1:19  | MR: 2:23  | MR: 3:29  |
| MS: 10:44 | MS: 11:13 | MS: 11:42 | MS: 12:12 | MS: 12:44 | MS: 13:19 | MS: 14:01 |
|           |           |           | LQ: 6:50  |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
| 29        | 30        | 31        |           |           |           |           |
| SR: 7:49  | SR: 7:49  | SR: 7:49  |           |           |           |           |
| SS: 17:08 | SS: 17:08 | SS: 17:09 |           |           |           |           |
| MR: 4:36  | MR: 5:42  | MR: 6:45  |           |           |           |           |
| MS: 14:49 | MS: 15:45 | MS: 16:50 |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |
|           |           |           |           |           |           |           |

Midway, UT (JMC)      Latitude: 40°30'43" N    Longitude: 111°28'40" W  
Local Time = UT - 7.00 hours    Elevation: 1706 meters      Year 2013  
Page 14

Seasons Report for 2013

|                       |                |            |
|-----------------------|----------------|------------|
| MEQ: 3/20/2013 3:59   | Winter Length: | 88.99 days |
| JSO: 6/20/2013 21:59  | Spring Length: | 92.75 days |
| SEQ: 9/22/2013 13:38  | Summer Length: | 93.65 days |
| DSO: 12/21/2013 10:07 | Autumn Length: | 89.85 days |

Dates of Easter Report for 2013

3/31/2013

Lunar Eclipse Report for 2013

Lunar eclipse on 4/25/2013  
Moon rise: 19:33  
Moon set: 5:18  
Magnitude: 0.01  
Partial phase begins: 12:59  
Time of maximum eclipse: 13:11  
Partial phase ends: 13:24

Solar Eclipse Report for 2013

Solar eclipse on 5/ 9/2013  
Sun rise: 5:15  
Sun set: 19:30  
Time of maximum eclipse: 17:31  
Eclipse is annular  
Eclipse is visible in the southern hemisphere

Solar eclipse on 11/ 3/2013  
Sun rise: 6:59  
Sun set: 17:20  
Time of maximum eclipse: 5:43  
Eclipse is annular-total  
Eclipse is visible in the northern hemisphere

The time of maximum eclipse (above) does not necessarily specify when the eclipse will be maximal when viewed from the specified location.

Planet View Info Report for 1/ 1/2013 to 12/31/2013

Mercury

| Date       | Rise | Set   | RA        | Dec        | Elongation | Ill Fr | DIST(AU) |
|------------|------|-------|-----------|------------|------------|--------|----------|
| 1/ 1/2013  | 7:14 | 16:21 | 18h02m50s | -24°14'56" | 10°06'58"  | 0.964  | 1.40012  |
| 1/ 8/2013  | 7:35 | 16:42 | 18h50m58s | -24°22'53" | 6°26'22"   | 0.986  | 1.42850  |
| 1/15/2013  | 7:52 | 17:09 | 19h40m08s | -23°22'23" | 2°51'26"   | 0.997  | 1.43014  |
| 1/22/2013  | 8:04 | 17:41 | 20h29m42s | -21°08'54" | 3°12'01"   | 0.996  | 1.40266  |
| 1/29/2013  | 8:12 | 18:17 | 21h18m52s | -17°40'40" | 7°39'33"   | 0.970  | 1.34024  |
| 2/ 5/2013  | 8:13 | 18:54 | 22h06m08s | -13°03'33" | 12°39'21"  | 0.891  | 1.23349  |
| 2/12/2013  | 8:07 | 19:25 | 22h47m35s | -7°46'25"  | 16°54'50"  | 0.707  | 1.07526  |
| 2/19/2013  | 7:49 | 19:36 | 23h14m22s | -3°09'01"  | 17°50'46"  | 0.404  | 0.88200  |
| 2/26/2013  | 7:15 | 19:09 | 23h15m40s | -1°15'51"  | 12°11'28"  | 0.113  | 0.71179  |
| 3/ 5/2013  | 6:32 | 18:11 | 22h54m04s | -3°04'07"  | 3°45'54"   | 0.008  | 0.62695  |
| 3/12/2013  | 5:56 | 17:13 | 22h32m39s | -6°25'48"  | 14°22'54"  | 0.102  | 0.63789  |
| 3/19/2013  | 5:33 | 16:38 | 22h28m43s | -8°38'05"  | 22°52'09"  | 0.263  | 0.70870  |
| 3/26/2013  | 5:21 | 16:25 | 22h41m48s | -8°57'41"  | 26°55'45"  | 0.407  | 0.80408  |
| 4/ 2/2013  | 5:13 | 16:28 | 23h06m13s | -7°38'43"  | 27°48'09"  | 0.523  | 0.90595  |
| 4/ 9/2013  | 5:08 | 16:43 | 23h37m48s | -5°00'01"  | 26°28'48"  | 0.620  | 1.00707  |
| 4/16/2013  | 5:04 | 17:06 | 0h14m30s  | -1°15'56"  | 23°29'09"  | 0.709  | 1.10435  |
| 4/23/2013  | 5:02 | 17:36 | 0h55m44s  | 3°22'05"   | 19°01'27"  | 0.799  | 1.19470  |
| 4/30/2013  | 5:03 | 18:15 | 1h42m06s  | 8°41'44"   | 13°07'03"  | 0.893  | 1.27132  |
| 5/ 7/2013  | 5:08 | 19:02 | 2h34m47s  | 14°22'05"  | 5°46'38"   | 0.976  | 1.31927  |
| 5/14/2013  | 5:19 | 19:56 | 3h34m05s  | 19°40'57"  | 2°37'29"   | 0.994  | 1.31494  |
| 5/21/2013  | 5:38 | 20:46 | 4h36m30s  | 23°35'45"  | 10°55'29"  | 0.897  | 1.24364  |
| 5/28/2013  | 6:01 | 21:23 | 5h35m16s  | 25°26'32"  | 17°41'52"  | 0.728  | 1.12288  |
| 6/ 4/2013  | 6:23 | 21:42 | 6h25m03s  | 25°23'59"  | 22°12'05"  | 0.559  | 0.98504  |
| 6/11/2013  | 6:39 | 21:44 | 7h03m16s  | 24°03'31"  | 24°12'03"  | 0.412  | 0.85187  |
| 6/18/2013  | 6:44 | 21:29 | 7h28m14s  | 22°02'25"  | 23°25'55"  | 0.280  | 0.73437  |
| 6/25/2013  | 6:34 | 21:01 | 7h38m18s  | 19°55'43"  | 19°27'58"  | 0.158  | 0.64057  |
| 7/ 2/2013  | 6:06 | 20:19 | 7h32m51s  | 18°16'51"  | 12°12'10"  | 0.056  | 0.58075  |
| 7/ 9/2013  | 5:24 | 19:32 | 7h16m13s  | 17°33'14"  | 4°50'34"   | 0.009  | 0.56821  |
| 7/16/2013  | 4:40 | 18:52 | 7h00m06s  | 17°54'19"  | 10°27'35"  | 0.049  | 0.61349  |
| 7/23/2013  | 4:06 | 18:30 | 6h57m29s  | 19°02'25"  | 17°07'29"  | 0.176  | 0.71699  |
| 7/30/2013  | 3:52 | 18:27 | 7h14m42s  | 20°16'13"  | 19°37'25"  | 0.375  | 0.86820  |
| 8/ 6/2013  | 4:02 | 18:40 | 7h51m42s  | 20°38'40"  | 17°43'19"  | 0.624  | 1.04503  |
| 8/13/2013  | 4:33 | 18:58 | 8h43m23s  | 19°13'04"  | 12°19'25"  | 0.856  | 1.20884  |
| 8/20/2013  | 5:16 | 19:13 | 9h40m05s  | 15°44'21"  | 5°20'10"   | 0.979  | 1.31986  |
| 8/27/2013  | 6:00 | 19:20 | 10h33m45s | 10°52'59"  | 2°43'07"   | 0.996  | 1.36917  |
| 9/ 3/2013  | 6:40 | 19:20 | 11h21m54s | 5°28'33"   | 8°31'23"   | 0.964  | 1.37174  |
| 9/10/2013  | 7:14 | 19:17 | 12h05m13s | 0°02'23"   | 13°43'50"  | 0.918  | 1.34279  |
| 9/17/2013  | 7:44 | 19:11 | 12h44m55s | -5°08'32"  | 18°03'29"  | 0.866  | 1.29100  |
| 9/24/2013  | 8:09 | 19:03 | 13h21m50s | -9°53'37"  | 21°31'10"  | 0.807  | 1.22009  |
| 10/ 1/2013 | 8:31 | 18:55 | 13h56m10s | -14°03'44" | 24°02'08"  | 0.734  | 1.13097  |
| 10/ 8/2013 | 8:46 | 18:45 | 14h26m51s | -17°27'00" | 25°17'45"  | 0.636  | 1.02371  |
| 10/15/2013 | 8:49 | 18:31 | 14h50m37s | -19°43'25" | 24°29'38"  | 0.492  | 0.90053  |
| 10/22/2013 | 8:31 | 18:10 | 15h00m04s | -20°13'05" | 19°50'37"  | 0.283  | 0.77341  |
| 10/29/2013 | 7:35 | 17:35 | 14h45m08s | -17°47'38" | 8°44'03"   | 0.053  | 0.68173  |
| 11/ 5/2013 | 6:20 | 16:56 | 14h14m32s | -12°55'01" | 7°00'23"   | 0.040  | 0.69836  |
| 11/12/2013 | 5:37 | 16:30 | 14h04m35s | -10°23'25" | 17°17'13"  | 0.331  | 0.83961  |
| 11/19/2013 | 5:36 | 16:18 | 14h23m43s | -11°48'40" | 19°26'33"  | 0.631  | 1.02160  |
| 11/26/2013 | 5:55 | 16:14 | 14h58m08s | -15°00'57" | 17°31'05"  | 0.813  | 1.17922  |
| 12/ 3/2013 | 6:22 | 16:14 | 15h38m59s | -18°25'54" | 14°13'23"  | 0.908  | 1.29670  |
| 12/10/2013 | 6:51 | 16:20 | 16h23m02s | -21°22'13" | 10°34'02"  | 0.957  | 1.37691  |
| 12/17/2013 | 7:18 | 16:30 | 17h09m13s | -23°31'25" | 6°51'17"   | 0.984  | 1.42513  |
| 12/24/2013 | 7:43 | 16:46 | 17h57m05s | -24°42'55" | 3°15'13"   | 0.996  | 1.44480  |
| 12/31/2013 | 8:05 | 17:08 | 18h46m13s | -24°48'54" | 2°04'10"   | 0.998  | 1.43681  |

Venus

| Date       | Rise  | Set   | RA        | Dec        | Elongation | Ill Fr | DIST(AU) |
|------------|-------|-------|-----------|------------|------------|--------|----------|
| 1/ 1/2013  | 6:18  | 15:40 | 17h15m43s | -22°20'39" | 20°58'23"  | 0.937  | 1.55088  |
| 1/ 8/2013  | 6:31  | 15:48 | 17h53m38s | -23°01'23" | 19°20'01"  | 0.947  | 1.57567  |
| 1/15/2013  | 6:42  | 15:59 | 18h31m48s | -23°07'49" | 17°41'32"  | 0.956  | 1.59856  |
| 1/22/2013  | 6:50  | 16:12 | 19h09m52s | -22°39'30" | 16°02'50"  | 0.964  | 1.61957  |
| 1/29/2013  | 6:56  | 16:26 | 19h47m30s | -21°37'18" | 14°23'51"  | 0.971  | 1.63877  |
| 2/ 5/2013  | 6:59  | 16:42 | 20h24m27s | -20°03'13" | 12°44'38"  | 0.977  | 1.65617  |
| 2/12/2013  | 6:59  | 16:59 | 21h00m32s | -18°00'15" | 11°05'13"  | 0.983  | 1.67167  |
| 2/19/2013  | 6:57  | 17:16 | 21h35m40s | -15°32'07" | 9°25'31"   | 0.987  | 1.68522  |
| 2/26/2013  | 6:53  | 17:33 | 22h09m50s | -12°42'56" | 7°45'28"   | 0.992  | 1.69686  |
| 3/ 5/2013  | 6:47  | 17:50 | 22h43m10s | -9°36'55"  | 6°05'22"   | 0.995  | 1.70658  |
| 3/12/2013  | 6:41  | 18:06 | 23h15m49s | -6°18'19"  | 4°26'00"   | 0.997  | 1.71424  |
| 3/19/2013  | 6:33  | 18:23 | 23h47m58s | -2°51'27"  | 2°49'55"   | 0.999  | 1.71972  |
| 3/26/2013  | 6:25  | 18:39 | 0h19m51s  | 0°39'27"   | 1°31'41"   | 1.000  | 1.72301  |
| 4/ 2/2013  | 6:18  | 18:55 | 0h51m41s  | 4°10'17"   | 1°40'11"   | 1.000  | 1.72405  |
| 4/ 9/2013  | 6:10  | 19:12 | 1h23m45s  | 7°36'57"   | 3°05'31"   | 0.999  | 1.72274  |
| 4/16/2013  | 6:03  | 19:29 | 1h56m14s  | 10°55'15"  | 4°46'43"   | 0.997  | 1.71890  |
| 4/23/2013  | 5:58  | 19:46 | 2h29m21s  | 14°00'56"  | 6°32'35"   | 0.994  | 1.71247  |
| 4/30/2013  | 5:53  | 20:03 | 3h03m16s  | 16°49'44"  | 8°20'45"   | 0.990  | 1.70344  |
| 5/ 7/2013  | 5:51  | 20:20 | 3h38m03s  | 19°17'30"  | 10°10'17"  | 0.984  | 1.69173  |
| 5/14/2013  | 5:51  | 20:36 | 4h13m45s  | 21°20'06"  | 12°00'46"  | 0.978  | 1.67723  |
| 5/21/2013  | 5:53  | 20:52 | 4h50m16s  | 22°53'51"  | 13°52'02"  | 0.971  | 1.65990  |
| 5/28/2013  | 5:58  | 21:05 | 5h27m24s  | 23°55'40"  | 15°43'45"  | 0.962  | 1.63978  |
| 6/ 4/2013  | 6:06  | 21:17 | 6h04m55s  | 24°23'26"  | 17°35'31"  | 0.952  | 1.61692  |
| 6/11/2013  | 6:17  | 21:26 | 6h42m27s  | 24°16'07"  | 19°27'04"  | 0.941  | 1.59130  |
| 6/18/2013  | 6:30  | 21:32 | 7h19m40s  | 23°33'57"  | 21°18'16"  | 0.929  | 1.56293  |
| 6/25/2013  | 6:45  | 21:35 | 7h56m15s  | 22°18'26"  | 23°08'46"  | 0.916  | 1.53198  |
| 7/ 2/2013  | 7:00  | 21:35 | 8h31m57s  | 20°32'03"  | 24°58'09"  | 0.901  | 1.49858  |
| 7/ 9/2013  | 7:17  | 21:33 | 9h06m37s  | 18°18'03"  | 26°46'08"  | 0.886  | 1.46285  |
| 7/16/2013  | 7:33  | 21:28 | 9h40m14s  | 15°40'15"  | 28°32'33"  | 0.869  | 1.42484  |
| 7/23/2013  | 7:49  | 21:21 | 10h12m47s | 12°42'44"  | 30°17'05"  | 0.852  | 1.38475  |
| 7/30/2013  | 8:05  | 21:14 | 10h44m24s | 9°29'37"   | 31°59'17"  | 0.834  | 1.34281  |
| 8/ 6/2013  | 8:20  | 21:05 | 11h15m16s | 6°04'53"   | 33°38'49"  | 0.815  | 1.29918  |
| 8/13/2013  | 8:35  | 20:55 | 11h45m33s | 2°32'31"   | 35°15'30"  | 0.795  | 1.25393  |
| 8/20/2013  | 8:49  | 20:45 | 12h15m28s | -1°03'33"  | 36°49'00"  | 0.774  | 1.20722  |
| 8/27/2013  | 9:04  | 20:35 | 12h45m13s | -4°39'28"  | 38°18'46"  | 0.753  | 1.15929  |
| 9/ 3/2013  | 9:18  | 20:25 | 13h15m02s | -8°11'35"  | 39°44'18"  | 0.730  | 1.11028  |
| 9/10/2013  | 9:33  | 20:15 | 13h45m06s | -11°36'07" | 41°05'15"  | 0.707  | 1.06027  |
| 9/17/2013  | 9:48  | 20:07 | 14h15m34s | -14°49'11" | 42°21'03"  | 0.683  | 1.00935  |
| 9/24/2013  | 10:02 | 19:59 | 14h46m33s | -17°46'56" | 43°30'43"  | 0.658  | 0.95769  |
| 10/ 1/2013 | 10:17 | 19:53 | 15h18m05s | -20°25'39" | 44°33'12"  | 0.632  | 0.90546  |
| 10/ 8/2013 | 10:31 | 19:48 | 15h50m09s | -22°41'51" | 45°27'28"  | 0.604  | 0.85272  |
| 10/15/2013 | 10:43 | 19:45 | 16h22m34s | -24°32'16" | 46°12'00"  | 0.575  | 0.79953  |
| 10/22/2013 | 10:54 | 19:44 | 16h55m03s | -25°54'22" | 46°44'31"  | 0.544  | 0.74608  |
| 10/29/2013 | 11:02 | 19:45 | 17h27m11s | -26°46'36" | 47°02'07"  | 0.511  | 0.69258  |
| 11/ 5/2013 | 11:07 | 19:47 | 17h58m26s | -27°08'36" | 47°01'26"  | 0.475  | 0.63921  |
| 11/12/2013 | 11:08 | 19:50 | 18h28m09s | -27°01'22" | 46°37'43"  | 0.435  | 0.58615  |
| 11/19/2013 | 11:05 | 19:52 | 18h55m35s | -26°27'24" | 45°44'01"  | 0.392  | 0.53379  |
| 11/26/2013 | 10:57 | 19:53 | 19h19m50s | -25°30'30" | 44°11'07"  | 0.345  | 0.48267  |
| 12/ 3/2013 | 10:43 | 19:50 | 19h40m00s | -24°15'41" | 41°47'12"  | 0.291  | 0.43349  |
| 12/10/2013 | 10:24 | 19:43 | 19h54m56s | -22°48'54" | 38°16'24"  | 0.233  | 0.38716  |
| 12/17/2013 | 9:57  | 19:29 | 20h03m13s | -21°16'57" | 33°18'37"  | 0.169  | 0.34512  |
| 12/24/2013 | 9:23  | 19:06 | 20h03m34s | -19°46'32" | 26°34'17"  | 0.104  | 0.30950  |
| 12/31/2013 | 8:42  | 18:35 | 19h55m27s | -18°23'42" | 17°58'21"  | 0.047  | 0.28296  |



Mars

| Date       | Rise | Set   | RA        | Dec        | Elongation | Ill Fr | DIST(AU) |
|------------|------|-------|-----------|------------|------------|--------|----------|
| 1/ 1/2013  | 9:21 | 19:02 | 20h29m16s | -20°12'22" | 23°58'40"  | 0.979  | 2.22495  |
| 1/ 8/2013  | 9:10 | 19:03 | 20h51m50s | -18°46'43" | 22°21'11"  | 0.981  | 2.24137  |
| 1/15/2013  | 8:58 | 19:04 | 21h14m05s | -17°11'05" | 20°44'35"  | 0.984  | 2.25737  |
| 1/22/2013  | 8:46 | 19:05 | 21h35m57s | -15°26'36" | 19°08'57"  | 0.986  | 2.27296  |
| 1/29/2013  | 8:33 | 19:05 | 21h57m28s | -13°34'26" | 17°34'10"  | 0.988  | 2.28823  |
| 2/ 5/2013  | 8:19 | 19:06 | 22h18m39s | -11°35'45" | 15°59'59"  | 0.990  | 2.30322  |
| 2/12/2013  | 8:05 | 19:07 | 22h39m30s | -9°31'44"  | 14°26'17"  | 0.992  | 2.31789  |
| 2/19/2013  | 7:51 | 19:07 | 23h00m05s | -7°23'37"  | 12°53'06"  | 0.994  | 2.33217  |
| 2/26/2013  | 7:36 | 19:07 | 23h20m24s | -5°12'37"  | 11°20'22"  | 0.995  | 2.34609  |
| 3/ 5/2013  | 7:21 | 19:08 | 23h40m30s | -2°59'53"  | 9°47'51"   | 0.996  | 2.35968  |
| 3/12/2013  | 7:06 | 19:07 | 0h00m28s  | -0°46'30"  | 8°15'20"   | 0.997  | 2.37283  |
| 3/19/2013  | 6:50 | 19:07 | 0h20m18s  | 1°26'24"   | 6°42'49"   | 0.998  | 2.38542  |
| 3/26/2013  | 6:35 | 19:07 | 0h40m04s  | 3°37'44"   | 5°10'19"   | 0.999  | 2.39744  |
| 4/ 2/2013  | 6:20 | 19:06 | 0h59m49s  | 5°46'30"   | 3°37'41"   | 0.999  | 2.40887  |
| 4/ 9/2013  | 6:05 | 19:06 | 1h19m36s  | 7°51'47"   | 2°05'05"   | 1.000  | 2.41959  |
| 4/16/2013  | 5:50 | 19:05 | 1h39m26s  | 9°52'37"   | 0°37'12"   | 1.000  | 2.42944  |
| 4/23/2013  | 5:35 | 19:05 | 1h59m21s  | 11°48'06"  | 1°10'31"   | 1.000  | 2.43834  |
| 4/30/2013  | 5:21 | 19:04 | 2h19m24s  | 13°37'24"  | 2°43'51"   | 1.000  | 2.44627  |
| 5/ 7/2013  | 5:07 | 19:03 | 2h39m35s  | 15°19'45"  | 4°20'05"   | 0.999  | 2.45308  |
| 5/14/2013  | 4:54 | 19:01 | 2h59m55s  | 16°54'27"  | 5°57'58"   | 0.999  | 2.45860  |
| 5/21/2013  | 4:41 | 19:00 | 3h20m25s  | 18°20'45"  | 7°37'15"   | 0.998  | 2.46271  |
| 5/28/2013  | 4:29 | 18:58 | 3h41m03s  | 19°38'06"  | 9°18'02"   | 0.997  | 2.46538  |
| 6/ 4/2013  | 4:18 | 18:56 | 4h01m49s  | 20°46'00"  | 11°00'33"  | 0.996  | 2.46648  |
| 6/11/2013  | 4:07 | 18:53 | 4h22m42s  | 21°44'01"  | 12°45'01"  | 0.994  | 2.46582  |
| 6/18/2013  | 3:57 | 18:50 | 4h43m39s  | 22°31'48"  | 14°31'25"  | 0.993  | 2.46327  |
| 6/25/2013  | 3:48 | 18:46 | 5h04m37s  | 23°09'08"  | 16°19'50"  | 0.991  | 2.45879  |
| 7/ 2/2013  | 3:39 | 18:41 | 5h25m35s  | 23°35'56"  | 18°10'33"  | 0.989  | 2.45229  |
| 7/ 9/2013  | 3:31 | 18:35 | 5h46m29s  | 23°52'11"  | 20°03'47"  | 0.987  | 2.44357  |
| 7/16/2013  | 3:24 | 18:29 | 6h07m16s  | 23°58'00"  | 21°59'37"  | 0.984  | 2.43251  |
| 7/23/2013  | 3:17 | 18:22 | 6h27m51s  | 23°53'37"  | 23°58'02"  | 0.982  | 2.41908  |
| 7/30/2013  | 3:11 | 18:13 | 6h48m14s  | 23°39'22"  | 25°59'17"  | 0.979  | 2.40322  |
| 8/ 6/2013  | 3:05 | 18:04 | 7h08m21s  | 23°15'39"  | 28°03'40"  | 0.976  | 2.38477  |
| 8/13/2013  | 3:00 | 17:53 | 7h28m09s  | 22°43'01"  | 30°11'16"  | 0.973  | 2.36360  |
| 8/20/2013  | 2:55 | 17:42 | 7h47m36s  | 22°02'01"  | 32°22'04"  | 0.970  | 2.33972  |
| 8/27/2013  | 2:50 | 17:30 | 8h06m41s  | 21°13'16"  | 34°36'14"  | 0.966  | 2.31311  |
| 9/ 3/2013  | 2:45 | 17:17 | 8h25m24s  | 20°17'24"  | 36°54'05"  | 0.963  | 2.28366  |
| 9/10/2013  | 2:40 | 17:04 | 8h43m43s  | 19°15'08"  | 39°15'48"  | 0.959  | 2.25126  |
| 9/17/2013  | 2:35 | 16:49 | 9h01m37s  | 18°07'11"  | 41°41'20"  | 0.955  | 2.21597  |
| 9/24/2013  | 2:29 | 16:34 | 9h19m08s  | 16°54'15"  | 44°10'48"  | 0.951  | 2.17783  |
| 10/ 1/2013 | 2:24 | 16:19 | 9h36m15s  | 15°37'00"  | 46°44'31"  | 0.947  | 2.13677  |
| 10/ 8/2013 | 2:18 | 16:03 | 9h52m59s  | 14°16'11"  | 49°22'45"  | 0.943  | 2.09276  |
| 10/15/2013 | 2:12 | 15:46 | 10h09m20s | 12°52'31"  | 52°05'31"  | 0.938  | 2.04590  |
| 10/22/2013 | 2:06 | 15:30 | 10h25m18s | 11°26'39"  | 54°52'52"  | 0.934  | 1.99630  |
| 10/29/2013 | 1:59 | 15:12 | 10h40m56s | 9°59'15"   | 57°45'10"  | 0.930  | 1.94400  |
| 11/ 5/2013 | 1:52 | 14:55 | 10h56m12s | 8°31'01"   | 60°42'49"  | 0.926  | 1.88901  |
| 11/12/2013 | 1:44 | 14:37 | 11h11m06s | 7°02'38"   | 63°45'58"  | 0.922  | 1.83152  |
| 11/19/2013 | 1:36 | 14:19 | 11h25m40s | 5°34'45"   | 66°54'43"  | 0.918  | 1.77173  |
| 11/26/2013 | 1:28 | 14:00 | 11h39m52s | 4°07'57"   | 70°09'33"  | 0.914  | 1.70978  |
| 12/ 3/2013 | 1:19 | 13:42 | 11h53m41s | 2°42'54"   | 73°31'08"  | 0.911  | 1.64578  |
| 12/10/2013 | 1:09 | 13:23 | 12h07m07s | 1°20'20"   | 76°59'58"  | 0.908  | 1.57999  |
| 12/17/2013 | 0:59 | 13:04 | 12h20m06s | 0°00'50"   | 80°36'27"  | 0.906  | 1.51275  |
| 12/24/2013 | 0:49 | 12:44 | 12h32m37s | -1°15'00"  | 84°21'23"  | 0.905  | 1.44430  |
| 12/31/2013 | 0:37 | 12:24 | 12h44m35s | -2°26'29"  | 88°16'03"  | 0.904  | 1.37488  |

Jupiter

| Date       | Rise  | Set   | RA       | Dec       | Elongation | Ill Fr | DIST(AU) |
|------------|-------|-------|----------|-----------|------------|--------|----------|
| 1/ 1/2013  | 14:44 | 5:24  | 4h24m20s | 20°54'00" | 146°59'41" | 0.997  | 4.21161  |
| 1/ 8/2013  | 14:14 | 4:54  | 4h21m49s | 20°49'43" | 139°16'13" | 0.996  | 4.28085  |
| 1/15/2013  | 13:45 | 4:24  | 4h19m55s | 20°46'52" | 131°41'33" | 0.995  | 4.36129  |
| 1/22/2013  | 13:16 | 3:56  | 4h18m42s | 20°45'35" | 124°16'59" | 0.994  | 4.45131  |
| 1/29/2013  | 12:48 | 3:28  | 4h18m11s | 20°45'59" | 117°03'07" | 0.992  | 4.54920  |
| 2/ 5/2013  | 12:21 | 3:01  | 4h18m22s | 20°48'05" | 109°59'55" | 0.992  | 4.65334  |
| 2/12/2013  | 11:54 | 2:34  | 4h19m15s | 20°51'49" | 103°07'23" | 0.991  | 4.76212  |
| 2/19/2013  | 11:28 | 2:09  | 4h20m48s | 20°57'06" | 96°25'37"  | 0.991  | 4.87386  |
| 2/26/2013  | 11:02 | 1:44  | 4h23m00s | 21°03'45" | 89°54'22"  | 0.990  | 4.98695  |
| 3/ 5/2013  | 10:37 | 1:20  | 4h25m48s | 21°11'34" | 83°32'55"  | 0.991  | 5.10003  |
| 3/12/2013  | 10:12 | 0:56  | 4h29m10s | 21°20'22" | 77°20'38"  | 0.991  | 5.21180  |
| 3/19/2013  | 9:48  | 0:33  | 4h33m02s | 21°29'55" | 71°17'09"  | 0.991  | 5.32098  |
| 3/26/2013  | 9:24  | 0:11  | 4h37m24s | 21°39'58" | 65°22'01"  | 0.992  | 5.42640  |
| 4/ 2/2013  | 9:00  | 23:46 | 4h42m10s | 21°50'17" | 59°34'24"  | 0.993  | 5.52713  |
| 4/ 9/2013  | 8:37  | 23:24 | 4h47m20s | 22°00'41" | 53°53'31"  | 0.994  | 5.62233  |
| 4/16/2013  | 8:15  | 23:03 | 4h52m51s | 22°10'56" | 48°18'52"  | 0.995  | 5.71113  |
| 4/23/2013  | 7:52  | 22:42 | 4h58m40s | 22°20'52" | 42°50'03"  | 0.995  | 5.79280  |
| 4/30/2013  | 7:30  | 22:21 | 5h04m45s | 22°30'16" | 37°26'19"  | 0.996  | 5.86682  |
| 5/ 7/2013  | 7:08  | 22:00 | 5h11m03s | 22°39'01" | 32°06'54"  | 0.997  | 5.93270  |
| 5/14/2013  | 6:47  | 21:40 | 5h17m34s | 22°46'58" | 26°51'14"  | 0.998  | 5.98995  |
| 5/21/2013  | 6:25  | 21:20 | 5h24m13s | 22°54'01" | 21°38'58"  | 0.999  | 6.03816  |
| 5/28/2013  | 6:04  | 20:59 | 5h31m01s | 23°00'02" | 16°29'32"  | 0.999  | 6.07713  |
| 6/ 4/2013  | 5:43  | 20:39 | 5h37m54s | 23°04'59" | 11°22'08"  | 1.000  | 6.10668  |
| 6/11/2013  | 5:22  | 20:19 | 5h44m51s | 23°08'47" | 6°16'14"   | 1.000  | 6.12657  |
| 6/18/2013  | 5:01  | 19:58 | 5h51m50s | 23°11'25" | 1°12'21"   | 1.000  | 6.13667  |
| 6/25/2013  | 4:41  | 19:38 | 5h58m49s | 23°12'51" | 3°53'42"   | 1.000  | 6.13702  |
| 7/ 2/2013  | 4:20  | 19:17 | 6h05m47s | 23°13'07" | 8°58'00"   | 1.000  | 6.12769  |
| 7/ 9/2013  | 3:59  | 18:56 | 6h12m41s | 23°12'13" | 14°03'19"  | 0.999  | 6.10866  |
| 7/16/2013  | 3:39  | 18:36 | 6h19m30s | 23°10'12" | 19°09'55"  | 0.999  | 6.08006  |
| 7/23/2013  | 3:18  | 18:14 | 6h26m12s | 23°07'09" | 24°18'14"  | 0.998  | 6.04215  |
| 7/30/2013  | 2:57  | 17:53 | 6h32m45s | 23°03'08" | 29°28'59"  | 0.998  | 5.99524  |
| 8/ 6/2013  | 2:37  | 17:31 | 6h39m07s | 22°58'16" | 34°42'57"  | 0.997  | 5.93955  |
| 8/13/2013  | 2:16  | 17:10 | 6h45m16s | 22°52'39" | 40°00'38"  | 0.996  | 5.87546  |
| 8/20/2013  | 1:54  | 16:48 | 6h51m11s | 22°46'27" | 45°22'28"  | 0.995  | 5.80352  |
| 8/27/2013  | 1:33  | 16:25 | 6h56m48s | 22°39'49" | 50°49'11"  | 0.994  | 5.72429  |
| 9/ 3/2013  | 1:11  | 16:02 | 7h02m06s | 22°32'55" | 56°21'39"  | 0.993  | 5.63831  |
| 9/10/2013  | 0:49  | 15:39 | 7h07m02s | 22°25'56" | 62°00'32"  | 0.992  | 5.54628  |
| 9/17/2013  | 0:27  | 15:16 | 7h11m34s | 22°19'05" | 67°46'16"  | 0.992  | 5.44908  |
| 9/24/2013  | 0:03  | 14:52 | 7h15m39s | 22°12'35" | 73°39'31"  | 0.991  | 5.34765  |
| 10/ 1/2013 | 23:37 | 14:27 | 7h19m15s | 22°06'37" | 79°41'15"  | 0.991  | 5.24291  |
| 10/ 8/2013 | 23:12 | 14:02 | 7h22m19s | 22°01'25" | 85°52'10"  | 0.991  | 5.13598  |
| 10/15/2013 | 22:47 | 13:37 | 7h24m49s | 21°57'11" | 92°12'38"  | 0.991  | 5.02817  |
| 10/22/2013 | 22:22 | 13:11 | 7h26m42s | 21°54'07" | 98°43'08"  | 0.991  | 4.92086  |
| 10/29/2013 | 21:56 | 12:44 | 7h27m57s | 21°52'20" | 105°24'24" | 0.991  | 4.81540  |
| 11/ 5/2013 | 21:29 | 12:17 | 7h28m31s | 21°52'00" | 112°16'55" | 0.992  | 4.71333  |
| 11/12/2013 | 21:01 | 11:50 | 7h28m24s | 21°53'09" | 119°20'37" | 0.993  | 4.61637  |
| 11/19/2013 | 20:32 | 11:22 | 7h27m34s | 21°55'48" | 126°35'17" | 0.994  | 4.52620  |
| 11/26/2013 | 20:03 | 10:53 | 7h26m05s | 21°59'52" | 134°00'46" | 0.995  | 4.44439  |
| 12/ 3/2013 | 19:32 | 10:23 | 7h23m56s | 22°05'12" | 141°36'41" | 0.996  | 4.37260  |
| 12/10/2013 | 19:02 | 9:54  | 7h21m11s | 22°11'37" | 149°21'48" | 0.998  | 4.31244  |
| 12/17/2013 | 18:30 | 9:23  | 7h17m56s | 22°18'48" | 157°14'28" | 0.999  | 4.26529  |
| 12/24/2013 | 17:59 | 8:53  | 7h14m17s | 22°26'26" | 165°13'09" | 0.999  | 4.23218  |
| 12/31/2013 | 17:27 | 8:22  | 7h10m22s | 22°34'13" | 173°16'05" | 1.000  | 4.21398  |

Saturn

| Date       | Rise  | Set   | RA        | Dec        | Elongation | Ill Fr | DIST(AU) |
|------------|-------|-------|-----------|------------|------------|--------|----------|
| 1/ 1/2013  | 2:54  | 13:31 | 14h31m57s | -12°28'25" | 61°07'52"  | 0.998  | 10.24558 |
| 1/ 8/2013  | 2:29  | 13:05 | 14h33m57s | -12°36'40" | 67°45'00"  | 0.998  | 10.14060 |
| 1/15/2013  | 2:03  | 12:39 | 14h35m43s | -12°43'30" | 74°26'15"  | 0.998  | 10.03045 |
| 1/22/2013  | 1:37  | 12:12 | 14h37m11s | -12°48'49" | 81°11'28"  | 0.998  | 9.91665  |
| 1/29/2013  | 1:11  | 11:46 | 14h38m21s | -12°52'38" | 88°00'35"  | 0.997  | 9.80081  |
| 2/ 5/2013  | 0:45  | 11:19 | 14h39m12s | -12°54'53" | 94°53'52"  | 0.997  | 9.68446  |
| 2/12/2013  | 0:18  | 10:52 | 14h39m43s | -12°55'34" | 101°51'23" | 0.998  | 9.56927  |
| 2/19/2013  | 23:46 | 10:24 | 14h39m55s | -12°54'42" | 108°52'49" | 0.998  | 9.45703  |
| 2/26/2013  | 23:18 | 9:57  | 14h39m46s | -12°52'19" | 115°57'49" | 0.998  | 9.34951  |
| 3/ 5/2013  | 22:50 | 9:29  | 14h39m18s | -12°48'28" | 123°06'20" | 0.998  | 9.24829  |
| 3/12/2013  | 22:22 | 9:01  | 14h38m31s | -12°43'15" | 130°18'14" | 0.999  | 9.15499  |
| 3/19/2013  | 21:52 | 8:33  | 14h37m27s | -12°36'46" | 137°32'51" | 0.999  | 9.07125  |
| 3/26/2013  | 21:23 | 8:05  | 14h36m06s | -12°29'10" | 144°49'23" | 0.999  | 8.99847  |
| 4/ 2/2013  | 20:53 | 7:36  | 14h34m32s | -12°20'39" | 152°07'11" | 0.999  | 8.93779  |
| 4/ 9/2013  | 20:24 | 7:07  | 14h32m46s | -12°11'22" | 159°25'16" | 1.000  | 8.89025  |
| 4/16/2013  | 19:54 | 6:38  | 14h30m51s | -12°01'35" | 166°40'55" | 1.000  | 8.85674  |
| 4/23/2013  | 19:23 | 6:09  | 14h28m51s | -11°51'33" | 173°42'24" | 1.000  | 8.83780  |
| 4/30/2013  | 18:53 | 5:40  | 14h26m48s | -11°41'29" | 176°51'14" | 1.000  | 8.83365  |
| 5/ 7/2013  | 18:23 | 5:11  | 14h24m45s | -11°31'41" | 170°39'09" | 1.000  | 8.84431  |
| 5/14/2013  | 17:53 | 4:43  | 14h22m46s | -11°22'22" | 163°33'03" | 1.000  | 8.86965  |
| 5/21/2013  | 17:23 | 4:14  | 14h20m53s | -11°13'48" | 156°23'45" | 1.000  | 8.890913 |
| 5/28/2013  | 16:54 | 3:45  | 14h19m10s | -11°06'13" | 149°16'15" | 0.999  | 8.96193  |
| 6/ 4/2013  | 16:24 | 3:16  | 14h17m39s | -10°59'46" | 142°11'48" | 0.999  | 9.02716  |
| 6/11/2013  | 15:55 | 2:48  | 14h16m21s | -10°54'39" | 135°11'10" | 0.999  | 9.10378  |
| 6/18/2013  | 15:26 | 2:19  | 14h15m18s | -10°50'59" | 128°15'03" | 0.998  | 9.19048  |
| 6/25/2013  | 14:58 | 1:51  | 14h14m33s | -10°48'53" | 121°23'47" | 0.998  | 9.28581  |
| 7/ 2/2013  | 14:30 | 1:23  | 14h14m04s | -10°48'21" | 114°37'11" | 0.998  | 9.38834  |
| 7/ 9/2013  | 14:03 | 0:56  | 14h13m54s | -10°49'28" | 107°55'09" | 0.998  | 9.49665  |
| 7/16/2013  | 13:35 | 0:28  | 14h14m03s | -10°52'11" | 101°17'50" | 0.997  | 9.60914  |
| 7/23/2013  | 13:09 | 0:01  | 14h14m30s | -10°56'30" | 94°45'10"  | 0.997  | 9.72419  |
| 7/30/2013  | 12:42 | 23:30 | 14h15m15s | -11°02'20" | 88°16'42"  | 0.997  | 9.84035  |
| 8/ 6/2013  | 12:16 | 23:03 | 14h16m17s | -11°09'37" | 81°51'55"  | 0.997  | 9.95618  |
| 8/13/2013  | 11:51 | 22:36 | 14h17m37s | -11°18'16" | 75°30'41"  | 0.998  | 10.07019 |
| 8/20/2013  | 11:25 | 22:10 | 14h19m13s | -11°28'10" | 69°12'48"  | 0.998  | 10.18093 |
| 8/27/2013  | 11:00 | 21:43 | 14h21m04s | -11°39'11" | 62°57'45"  | 0.998  | 10.28716 |
| 9/ 3/2013  | 10:36 | 21:17 | 14h23m09s | -11°51'14" | 56°44'53"  | 0.998  | 10.38769 |
| 9/10/2013  | 10:11 | 20:51 | 14h25m27s | -12°04'09" | 50°33'55"  | 0.998  | 10.48133 |
| 9/17/2013  | 9:47  | 20:25 | 14h27m57s | -12°17'48" | 44°24'42"  | 0.999  | 10.56694 |
| 9/24/2013  | 9:23  | 20:00 | 14h30m38s | -12°32'04" | 38°16'46"  | 0.999  | 10.64363 |
| 10/ 1/2013 | 8:59  | 19:34 | 14h33m28s | -12°46'48" | 32°09'33"  | 0.999  | 10.71061 |
| 10/ 8/2013 | 8:36  | 19:09 | 14h36m27s | -13°01'53" | 26°02'50"  | 1.000  | 10.76703 |
| 10/15/2013 | 8:12  | 18:43 | 14h39m32s | -13°17'10" | 19°56'44"  | 1.000  | 10.81221 |
| 10/22/2013 | 7:49  | 18:18 | 14h42m43s | -13°32'31" | 13°51'46"  | 1.000  | 10.84570 |
| 10/29/2013 | 7:25  | 17:53 | 14h45m57s | -13°47'48" | 7°50'38"   | 1.000  | 10.86713 |
| 11/ 5/2013 | 7:02  | 17:28 | 14h49m15s | -14°02'55" | 2°31'49"   | 1.000  | 10.87614 |
| 11/12/2013 | 6:39  | 17:03 | 14h52m33s | -14°17'43" | 5°15'08"   | 1.000  | 10.87254 |
| 11/19/2013 | 6:15  | 16:37 | 14h55m50s | -14°32'06" | 11°13'25"  | 1.000  | 10.85641 |
| 11/26/2013 | 5:52  | 16:12 | 14h59m06s | -14°45'57" | 17°23'59"  | 1.000  | 10.82790 |
| 12/ 3/2013 | 5:28  | 15:47 | 15h02m17s | -14°59'10" | 23°39'11"  | 1.000  | 10.78721 |
| 12/10/2013 | 5:05  | 15:22 | 15h05m24s | -15°11'39" | 29°57'39"  | 0.999  | 10.73472 |
| 12/17/2013 | 4:41  | 14:57 | 15h08m23s | -15°23'18" | 36°18'58"  | 0.999  | 10.67107 |
| 12/24/2013 | 4:17  | 14:31 | 15h11m14s | -15°34'03" | 42°43'18"  | 0.999  | 10.59701 |
| 12/31/2013 | 3:52  | 14:06 | 15h13m55s | -15°43'49" | 49°10'57"  | 0.999  | 10.51329 |

Uranus

| Date       | Rise  | Set   | RA       | Dec      | Elongation | Ill Fr | DIST(AU) |
|------------|-------|-------|----------|----------|------------|--------|----------|
| 1/ 1/2013  | 11:51 | 0:07  | 0h18m36s | 1°14'38" | 84°01'30"  | 0.999  | 20.13794 |
| 1/ 8/2013  | 11:24 | 23:37 | 0h19m04s | 1°18'00" | 77°01'22"  | 0.999  | 20.25697 |
| 1/15/2013  | 10:57 | 23:10 | 0h19m41s | 1°22'18" | 70°03'36"  | 0.999  | 20.37278 |
| 1/22/2013  | 10:30 | 22:44 | 0h20m27s | 1°27'29" | 63°08'35"  | 1.000  | 20.48362 |
| 1/29/2013  | 10:03 | 22:17 | 0h21m20s | 1°33'28" | 56°16'23"  | 1.000  | 20.58797 |
| 2/ 5/2013  | 9:36  | 21:51 | 0h22m20s | 1°40'12" | 49°26'47"  | 1.000  | 20.68447 |
| 2/12/2013  | 9:09  | 21:25 | 0h23m27s | 1°47'36" | 42°39'42"  | 1.000  | 20.77180 |
| 2/19/2013  | 8:42  | 20:59 | 0h24m40s | 1°55'35" | 35°55'19"  | 1.000  | 20.84876 |
| 2/26/2013  | 8:15  | 20:34 | 0h25m57s | 2°04'03" | 29°13'43"  | 1.000  | 20.91439 |
| 3/ 5/2013  | 7:49  | 20:08 | 0h27m18s | 2°12'54" | 22°34'35"  | 1.000  | 20.96798 |
| 3/12/2013  | 7:22  | 19:42 | 0h28m42s | 2°22'03" | 15°57'42"  | 1.000  | 21.00886 |
| 3/19/2013  | 6:55  | 19:17 | 0h30m09s | 2°31'25" | 9°23'19"   | 1.000  | 21.03650 |
| 3/26/2013  | 6:29  | 18:51 | 0h31m36s | 2°40'52" | 2°53'46"   | 1.000  | 21.05067 |
| 4/ 2/2013  | 6:02  | 18:26 | 0h33m05s | 2°50'20" | 3°45'34"   | 1.000  | 21.05135 |
| 4/ 9/2013  | 5:36  | 18:00 | 0h34m32s | 2°59'44" | 10°12'58"  | 1.000  | 21.03856 |
| 4/16/2013  | 5:09  | 17:35 | 0h35m59s | 3°08'56" | 16°40'56"  | 1.000  | 21.01245 |
| 4/23/2013  | 4:42  | 17:09 | 0h37m23s | 3°17'52" | 23°08'01"  | 1.000  | 20.97348 |
| 4/30/2013  | 4:16  | 16:43 | 0h38m45s | 3°26'28" | 29°34'23"  | 1.000  | 20.92226 |
| 5/ 7/2013  | 3:49  | 16:18 | 0h40m02s | 3°34'37" | 36°00'33"  | 1.000  | 20.85941 |
| 5/14/2013  | 3:22  | 15:52 | 0h41m16s | 3°42'15" | 42°26'45"  | 1.000  | 20.78568 |
| 5/21/2013  | 2:55  | 15:26 | 0h42m24s | 3°49'18" | 48°53'03"  | 1.000  | 20.70209 |
| 5/28/2013  | 2:29  | 15:00 | 0h43m26s | 3°55'42" | 55°19'44"  | 1.000  | 20.60977 |
| 6/ 4/2013  | 2:02  | 14:33 | 0h44m21s | 4°01'23" | 61°47'23"  | 1.000  | 20.50982 |
| 6/11/2013  | 1:35  | 14:07 | 0h45m09s | 4°06'17" | 68°16'21"  | 0.999  | 20.40345 |
| 6/18/2013  | 1:08  | 13:40 | 0h45m50s | 4°10'22" | 74°46'42"  | 0.999  | 20.29210 |
| 6/25/2013  | 0:40  | 13:13 | 0h46m23s | 4°13'36" | 81°18'36"  | 0.999  | 20.17727 |
| 7/ 2/2013  | 0:13  | 12:46 | 0h46m47s | 4°15'56" | 87°52'34"  | 0.999  | 20.06036 |
| 7/ 9/2013  | 23:42 | 12:19 | 0h47m03s | 4°17'21" | 94°29'00"  | 0.999  | 19.94289 |
| 7/16/2013  | 23:14 | 11:52 | 0h47m10s | 4°17'50" | 101°07'53" | 0.999  | 19.82651 |
| 7/23/2013  | 22:47 | 11:24 | 0h47m08s | 4°17'24" | 107°49'14" | 0.999  | 19.71286 |
| 7/30/2013  | 22:19 | 10:56 | 0h46m57s | 4°16'04" | 114°33'23" | 0.999  | 19.60346 |
| 8/ 6/2013  | 21:51 | 10:28 | 0h46m38s | 4°13'51" | 121°20'40" | 1.000  | 19.49984 |
| 8/13/2013  | 21:24 | 10:00 | 0h46m11s | 4°10'46" | 128°10'59" | 1.000  | 19.40359 |
| 8/20/2013  | 20:56 | 9:32  | 0h45m36s | 4°06'56" | 135°04'06" | 1.000  | 19.31621 |
| 8/27/2013  | 20:28 | 9:03  | 0h44m55s | 4°02'22" | 142°00'06" | 1.000  | 19.23897 |
| 9/ 3/2013  | 20:00 | 8:35  | 0h44m07s | 3°57'11" | 148°59'09" | 1.000  | 19.17305 |
| 9/10/2013  | 19:32 | 8:06  | 0h43m14s | 3°51'28" | 156°01'02" | 1.000  | 19.11964 |
| 9/17/2013  | 19:04 | 7:37  | 0h42m17s | 3°45'21" | 163°05'11" | 1.000  | 19.07965 |
| 9/24/2013  | 18:35 | 7:08  | 0h41m17s | 3°38'56" | 170°11'09" | 1.000  | 19.05373 |
| 10/ 1/2013 | 18:07 | 6:39  | 0h40m15s | 3°32'21" | 177°15'45" | 1.000  | 19.04234 |
| 10/ 8/2013 | 17:39 | 6:10  | 0h39m12s | 3°25'44" | 175°24'03" | 1.000  | 19.04585 |
| 10/15/2013 | 17:11 | 5:41  | 0h38m10s | 3°19'15" | 168°14'03" | 1.000  | 19.06428 |
| 10/22/2013 | 16:43 | 5:13  | 0h37m10s | 3°13'01" | 161°01'33" | 1.000  | 19.09732 |
| 10/29/2013 | 16:15 | 4:44  | 0h36m14s | 3°07'09" | 153°47'57" | 1.000  | 19.14451 |
| 11/ 5/2013 | 15:47 | 4:15  | 0h35m22s | 3°01'48" | 146°33'44" | 1.000  | 19.20523 |
| 11/12/2013 | 15:19 | 3:47  | 0h34m36s | 2°57'05" | 139°19'38" | 1.000  | 19.27852 |
| 11/19/2013 | 14:51 | 3:18  | 0h33m57s | 2°53'06" | 132°06'07" | 1.000  | 19.36316 |
| 11/26/2013 | 14:23 | 2:50  | 0h33m25s | 2°49'56" | 124°53'21" | 1.000  | 19.45781 |
| 12/ 3/2013 | 13:55 | 2:22  | 0h33m01s | 2°47'39" | 117°41'31" | 1.000  | 19.56108 |
| 12/10/2013 | 13:27 | 1:54  | 0h32m46s | 2°46'19" | 110°31'08" | 0.999  | 19.67131 |
| 12/17/2013 | 13:00 | 1:26  | 0h32m39s | 2°45'58" | 103°22'41" | 0.999  | 19.78669 |
| 12/24/2013 | 12:32 | 0:59  | 0h32m43s | 2°46'37" | 96°16'15"  | 0.999  | 19.90547 |
| 12/31/2013 | 12:05 | 0:32  | 0h32m55s | 2°48'16" | 89°11'49"  | 0.999  | 20.02593 |

Neptune

| Date       | Rise  | Set   | RA        | Dec        | Elongation | Ill Fr | DIST(AU) |
|------------|-------|-------|-----------|------------|------------|--------|----------|
| 1/ 1/2013  | 10:31 | 21:14 | 22h13m21s | -11°39'32" | 50°20'57"  | 1.000  | 30.60880 |
| 1/ 8/2013  | 10:04 | 20:48 | 22h14m06s | -11°35'18" | 43°24'47"  | 1.000  | 30.69742 |
| 1/15/2013  | 9:37  | 20:21 | 22h14m56s | -11°30'40" | 36°29'43"  | 1.000  | 30.77555 |
| 1/22/2013  | 9:10  | 19:55 | 22h15m49s | -11°25'43" | 29°36'05"  | 1.000  | 30.84203 |
| 1/29/2013  | 8:43  | 19:28 | 22h16m44s | -11°20'29" | 22°44'00"  | 1.000  | 30.89603 |
| 2/ 5/2013  | 8:16  | 19:02 | 22h17m42s | -11°15'03" | 15°53'16"  | 1.000  | 30.93690 |
| 2/12/2013  | 7:49  | 18:36 | 22h18m42s | -11°09'28" | 9°04'04"   | 1.000  | 30.96404 |
| 2/19/2013  | 7:22  | 18:10 | 22h19m42s | -11°03'48" | 2°19'25"   | 1.000  | 30.97707 |
| 2/26/2013  | 6:55  | 17:44 | 22h20m43s | -10°58'07" | 4°34'47"   | 1.000  | 30.97596 |
| 3/ 5/2013  | 6:29  | 17:17 | 22h21m43s | -10°52'29" | 11°18'53"  | 1.000  | 30.96083 |
| 3/12/2013  | 6:02  | 16:51 | 22h22m43s | -10°46'57" | 18°03'05"  | 1.000  | 30.93188 |
| 3/19/2013  | 5:35  | 16:25 | 22h23m40s | -10°41'35" | 24°46'22"  | 1.000  | 30.88951 |
| 3/26/2013  | 5:08  | 15:59 | 22h24m35s | -10°36'28" | 31°28'33"  | 1.000  | 30.83445 |
| 4/ 2/2013  | 4:41  | 15:32 | 22h25m27s | -10°31'38" | 38°09'52"  | 1.000  | 30.76753 |
| 4/ 9/2013  | 4:14  | 15:06 | 22h26m15s | -10°27'09" | 44°50'39"  | 1.000  | 30.68962 |
| 4/16/2013  | 3:47  | 14:39 | 22h27m00s | -10°23'03" | 51°30'57"  | 1.000  | 30.60179 |
| 4/23/2013  | 3:20  | 14:13 | 22h27m40s | -10°19'24" | 58°10'41"  | 1.000  | 30.50533 |
| 4/30/2013  | 2:53  | 13:46 | 22h28m15s | -10°16'14" | 64°50'05"  | 1.000  | 30.40161 |
| 5/ 7/2013  | 2:26  | 13:19 | 22h28m44s | -10°13'35" | 71°29'36"  | 1.000  | 30.29194 |
| 5/14/2013  | 1:58  | 12:52 | 22h29m08s | -10°11'29" | 78°09'23"  | 1.000  | 30.17782 |
| 5/21/2013  | 1:31  | 12:25 | 22h29m27s | -10°09'57" | 84°49'20"  | 1.000  | 30.06088 |
| 5/28/2013  | 1:04  | 11:58 | 22h29m39s | -10°09'00" | 91°29'37"  | 1.000  | 29.94275 |
| 6/ 4/2013  | 0:36  | 11:30 | 22h29m45s | -10°08'38" | 98°10'40"  | 1.000  | 29.82494 |
| 6/11/2013  | 0:09  | 11:03 | 22h29m45s | -10°08'51" | 104°52'43" | 1.000  | 29.70906 |
| 6/18/2013  | 23:37 | 10:35 | 22h29m39s | -10°09'40" | 111°35'37" | 1.000  | 29.59683 |
| 6/25/2013  | 23:09 | 10:07 | 22h29m28s | -10°11'01" | 118°19'26" | 1.000  | 29.48981 |
| 7/ 2/2013  | 22:42 | 9:39  | 22h29m11s | -10°12'54" | 125°04'31" | 1.000  | 29.38941 |
| 7/ 9/2013  | 22:14 | 9:11  | 22h28m48s | -10°15'18" | 131°51'04" | 1.000  | 29.29708 |
| 7/16/2013  | 21:46 | 8:43  | 22h28m21s | -10°18'08" | 138°38'58" | 1.000  | 29.21424 |
| 7/23/2013  | 21:18 | 8:15  | 22h27m50s | -10°21'22" | 145°28'03" | 1.000  | 29.14211 |
| 7/30/2013  | 20:50 | 7:46  | 22h27m14s | -10°24'57" | 152°18'33" | 1.000  | 29.08167 |
| 8/ 6/2013  | 20:22 | 7:18  | 22h26m36s | -10°28'49" | 159°10'39" | 1.000  | 29.03386 |
| 8/13/2013  | 19:55 | 6:50  | 22h25m55s | -10°32'53" | 166°04'02" | 1.000  | 28.99952 |
| 8/20/2013  | 19:27 | 6:21  | 22h25m13s | -10°37'05" | 172°57'57" | 1.000  | 28.97919 |
| 8/27/2013  | 18:59 | 5:53  | 22h24m29s | -10°41'20" | 179°18'36" | 1.000  | 28.97314 |
| 9/ 3/2013  | 18:31 | 5:24  | 22h23m46s | -10°45'34" | 173°04'11" | 1.000  | 28.98156 |
| 9/10/2013  | 18:03 | 4:56  | 22h23m03s | -10°49'42" | 166°06'22" | 1.000  | 29.00447 |
| 9/17/2013  | 17:35 | 4:27  | 22h22m22s | -10°53'39" | 159°06'59" | 1.000  | 29.04156 |
| 9/24/2013  | 17:07 | 3:59  | 22h21m43s | -10°57'21" | 152°06'38" | 1.000  | 29.09223 |
| 10/ 1/2013 | 16:39 | 3:30  | 22h21m07s | -11°00'44" | 145°05'18" | 1.000  | 29.15582 |
| 10/ 8/2013 | 16:11 | 3:02  | 22h20m35s | -11°03'44" | 138°03'09" | 1.000  | 29.23151 |
| 10/15/2013 | 15:43 | 2:34  | 22h20m08s | -11°06'16" | 131°00'38" | 1.000  | 29.31812 |
| 10/22/2013 | 15:15 | 2:06  | 22h19m46s | -11°08'20" | 123°57'57" | 1.000  | 29.41432 |
| 10/29/2013 | 14:48 | 1:38  | 22h19m29s | -11°09'51" | 116°54'58" | 1.000  | 29.51873 |
| 11/ 5/2013 | 14:20 | 1:10  | 22h19m18s | -11°10'49" | 109°51'48" | 1.000  | 29.62987 |
| 11/12/2013 | 13:52 | 0:43  | 22h19m13s | -11°11'11" | 102°48'51" | 1.000  | 29.74600 |
| 11/19/2013 | 13:25 | 0:15  | 22h19m14s | -11°10'56" | 95°46'22"  | 1.000  | 29.86533 |
| 11/26/2013 | 12:57 | 23:44 | 22h19m22s | -11°10'06" | 88°44'18"  | 1.000  | 29.98615 |
| 12/ 3/2013 | 12:30 | 23:17 | 22h19m36s | -11°08'39" | 81°42'37"  | 1.000  | 30.10670 |
| 12/10/2013 | 12:03 | 22:50 | 22h19m57s | -11°06'36" | 74°41'40"  | 1.000  | 30.22514 |
| 12/17/2013 | 11:36 | 22:23 | 22h20m23s | -11°03'59" | 67°41'46"  | 1.000  | 30.33966 |
| 12/24/2013 | 11:08 | 21:56 | 22h20m56s | -11°00'50" | 60°42'52"  | 1.000  | 30.44867 |
| 12/31/2013 | 10:41 | 21:30 | 22h21m34s | -10°57'11" | 53°44'52"  | 1.000  | 30.55062 |

Pluto

| Date       | Rise  | Set   | RA        | Dec        | Elongation | Ill Fr | DIST(AU) |
|------------|-------|-------|-----------|------------|------------|--------|----------|
| 1/ 1/2013  | 7:28  | 17:10 | 18h39m35s | -19°47'16" | 3°36'46"   | 1.000  | 33.34175 |
| 1/ 8/2013  | 7:02  | 16:44 | 18h40m38s | -19°46'51" | 8°55'48"   | 1.000  | 33.33557 |
| 1/15/2013  | 6:35  | 16:17 | 18h41m40s | -19°46'20" | 15°32'03"  | 1.000  | 33.31514 |
| 1/22/2013  | 6:09  | 15:51 | 18h42m41s | -19°45'45" | 22°18'31"  | 1.000  | 33.28083 |
| 1/29/2013  | 5:42  | 15:24 | 18h43m39s | -19°45'06" | 29°07'55"  | 1.000  | 33.23328 |
| 2/ 5/2013  | 5:15  | 14:58 | 18h44m34s | -19°44'24" | 35°58'41"  | 1.000  | 33.17320 |
| 2/12/2013  | 4:49  | 14:31 | 18h45m26s | -19°43'41" | 42°50'14"  | 1.000  | 33.10144 |
| 2/19/2013  | 4:22  | 14:04 | 18h46m13s | -19°42'58" | 49°42'01"  | 1.000  | 33.01913 |
| 2/26/2013  | 3:55  | 13:38 | 18h46m55s | -19°42'17" | 56°33'42"  | 1.000  | 32.92757 |
| 3/ 5/2013  | 3:28  | 13:11 | 18h47m33s | -19°41'37" | 63°25'25"  | 1.000  | 32.82814 |
| 3/12/2013  | 3:01  | 12:44 | 18h48m05s | -19°41'02" | 70°17'16"  | 1.000  | 32.72224 |
| 3/19/2013  | 2:34  | 12:17 | 18h48m30s | -19°40'31" | 77°09'01"  | 1.000  | 32.61147 |
| 3/26/2013  | 2:07  | 11:49 | 18h48m50s | -19°40'07" | 84°00'27"  | 1.000  | 32.49758 |
| 4/ 2/2013  | 1:39  | 11:22 | 18h49m03s | -19°39'49" | 90°51'43"  | 1.000  | 32.38221 |
| 4/ 9/2013  | 1:12  | 10:55 | 18h49m10s | -19°39'39" | 97°43'02"  | 1.000  | 32.26700 |
| 4/16/2013  | 0:44  | 10:27 | 18h49m10s | -19°39'37" | 104°34'16" | 1.000  | 32.15371 |
| 4/23/2013  | 0:17  | 10:00 | 18h49m04s | -19°39'45" | 111°25'10" | 1.000  | 32.04408 |
| 4/30/2013  | 23:45 | 9:32  | 18h48m52s | -19°40'01" | 118°15'49" | 1.000  | 31.93970 |
| 5/ 7/2013  | 23:17 | 9:04  | 18h48m34s | -19°40'27" | 125°06'26" | 1.000  | 31.84204 |
| 5/14/2013  | 22:49 | 8:36  | 18h48m10s | -19°41'02" | 131°56'57" | 1.000  | 31.75260 |
| 5/21/2013  | 22:21 | 8:08  | 18h47m42s | -19°41'46" | 138°47'01" | 1.000  | 31.67279 |
| 5/28/2013  | 21:53 | 7:40  | 18h47m09s | -19°42'40" | 145°36'28" | 1.000  | 31.60375 |
| 6/ 4/2013  | 21:25 | 7:12  | 18h46m33s | -19°43'41" | 152°25'14" | 1.000  | 31.54646 |
| 6/11/2013  | 20:57 | 6:43  | 18h45m53s | -19°44'51" | 159°12'39" | 1.000  | 31.50185 |
| 6/18/2013  | 20:29 | 6:15  | 18h45m11s | -19°46'07" | 165°56'16" | 1.000  | 31.47067 |
| 6/25/2013  | 20:01 | 5:47  | 18h44m27s | -19°47'30" | 172°26'10" | 1.000  | 31.45336 |
| 7/ 2/2013  | 19:33 | 5:18  | 18h43m43s | -19°48'58" | 176°46'19" | 1.000  | 31.45017 |
| 7/ 9/2013  | 19:05 | 4:50  | 18h42m59s | -19°50'31" | 172°25'25" | 1.000  | 31.46126 |
| 7/16/2013  | 18:36 | 4:22  | 18h42m15s | -19°52'07" | 165°55'28" | 1.000  | 31.48658 |
| 7/23/2013  | 18:08 | 3:53  | 18h41m33s | -19°53'46" | 159°12'22" | 1.000  | 31.52575 |
| 7/30/2013  | 17:40 | 3:25  | 18h40m53s | -19°55'26" | 152°25'44" | 1.000  | 31.57822 |
| 8/ 6/2013  | 17:12 | 2:57  | 18h40m17s | -19°57'07" | 145°37'30" | 1.000  | 31.64338 |
| 8/13/2013  | 16:44 | 2:29  | 18h39m44s | -19°58'48" | 138°48'35" | 1.000  | 31.72038 |
| 8/20/2013  | 16:17 | 2:01  | 18h39m16s | -20°00'28" | 131°59'30" | 1.000  | 31.80811 |
| 8/27/2013  | 15:49 | 1:32  | 18h38m52s | -20°02'05" | 125°10'17" | 1.000  | 31.90534 |
| 9/ 3/2013  | 15:21 | 1:05  | 18h38m35s | -20°03'40" | 118°20'43" | 1.000  | 32.01083 |
| 9/10/2013  | 14:53 | 0:37  | 18h38m22s | -20°05'11" | 111°30'58" | 1.000  | 32.12316 |
| 9/17/2013  | 14:26 | 0:09  | 18h38m16s | -20°06'37" | 104°41'16" | 1.000  | 32.24069 |
| 9/24/2013  | 13:58 | 23:38 | 18h38m17s | -20°07'58" | 97°51'34"  | 1.000  | 32.36180 |
| 10/ 1/2013 | 13:31 | 23:10 | 18h38m23s | -20°09'13" | 91°01'35"  | 1.000  | 32.48492 |
| 10/ 8/2013 | 13:04 | 22:43 | 18h38m37s | -20°10'21" | 84°11'18"  | 1.000  | 32.60835 |
| 10/15/2013 | 12:37 | 22:15 | 18h38m56s | -20°11'23" | 77°20'59"  | 1.000  | 32.73029 |
| 10/22/2013 | 12:10 | 21:48 | 18h39m22s | -20°12'16" | 70°30'38"  | 1.000  | 32.84907 |
| 10/29/2013 | 11:43 | 21:21 | 18h39m53s | -20°13'02" | 63°40'00"  | 1.000  | 32.96313 |
| 11/ 5/2013 | 11:16 | 20:54 | 18h40m31s | -20°13'39" | 56°49'00"  | 1.000  | 33.07089 |
| 11/12/2013 | 10:49 | 20:27 | 18h41m13s | -20°14'07" | 49°57'55"  | 1.000  | 33.17077 |
| 11/19/2013 | 10:23 | 20:01 | 18h42m00s | -20°14'27" | 43°06'55"  | 1.000  | 33.26141 |
| 11/26/2013 | 9:56  | 19:34 | 18h42m51s | -20°14'37" | 36°15'53"  | 1.000  | 33.34164 |
| 12/ 3/2013 | 9:29  | 19:07 | 18h43m46s | -20°14'39" | 29°24'51"  | 1.000  | 33.41035 |
| 12/10/2013 | 9:03  | 18:41 | 18h44m44s | -20°14'33" | 22°34'30"  | 1.000  | 33.46650 |
| 12/17/2013 | 8:36  | 18:14 | 18h45m45s | -20°14'19" | 15°46'11"  | 1.000  | 33.50936 |
| 12/24/2013 | 8:10  | 17:48 | 18h46m47s | -20°13'57" | 9°04'22"   | 1.000  | 33.53847 |
| 12/31/2013 | 7:43  | 17:21 | 18h47m49s | -20°13'28" | 3°15'33"   | 1.000  | 33.55341 |

Midway, UT (JMC)      Latitude: 40°30'43" N    Longitude: 111°28'40" W  
Local Time = UT - 7.00 hours    Elevation: 1706 meters      Year 2013  
Page 23

Planet Apsides Report for 2013

Earth

|           |            |                    |         |
|-----------|------------|--------------------|---------|
| 1/ 3/2013 | Perihelion | Distance from Sun: | 0.98 AU |
| 7/ 4/2013 | Aphelion   | Distance from Sun: | 1.02 AU |

Mercury

|            |            |                    |         |
|------------|------------|--------------------|---------|
| 2/16/2013  | Perihelion | Distance from Sun: | 0.31 AU |
| 5/15/2013  | Perihelion | Distance from Sun: | 0.31 AU |
| 8/11/2013  | Perihelion | Distance from Sun: | 0.31 AU |
| 11/ 7/2013 | Perihelion | Distance from Sun: | 0.31 AU |
| 1/ 3/2013  | Aphelion   | Distance from Sun: | 0.47 AU |
| 4/ 1/2013  | Aphelion   | Distance from Sun: | 0.47 AU |
| 6/28/2013  | Aphelion   | Distance from Sun: | 0.47 AU |
| 9/24/2013  | Aphelion   | Distance from Sun: | 0.47 AU |
| 12/21/2013 | Aphelion   | Distance from Sun: | 0.47 AU |

Venus

|            |            |                    |         |
|------------|------------|--------------------|---------|
| 6/13/2013  | Perihelion | Distance from Sun: | 0.72 AU |
| 2/20/2013  | Aphelion   | Distance from Sun: | 0.73 AU |
| 10/ 3/2013 | Aphelion   | Distance from Sun: | 0.73 AU |

Mars

|           |            |                    |         |
|-----------|------------|--------------------|---------|
| 1/24/2013 | Perihelion | Distance from Sun: | 1.38 AU |
|-----------|------------|--------------------|---------|

Jupiter

No Apsis

Saturn

No Apsis

Midway, UT (JMC)      Latitude: 40°30'43" N    Longitude: 111°28'40" W  
Local Time = UT - 7.00 hours    Elevation: 1706 meters      Year 2013  
Page 24

Planet Conjunction/Opposition Report for 1/ 1/2013 to 12/31/2013

Mercury

| Date       | Hour | Event                              |
|------------|------|------------------------------------|
| 1/18/2013  | 2    | Superior Conjunction               |
| 3/ 4/2013  | 17   | Inferior Conjunction               |
| 5/11/2013  | 17   | Superior Conjunction (Occultation) |
| 7/ 9/2013  | 17   | Inferior Conjunction               |
| 8/24/2013  | 17   | Superior Conjunction               |
| 11/ 1/2013 | 17   | Inferior Conjunction               |
| 12/28/2013 | 23   | Superior Conjunction               |

Venus

| Date      | Hour | Event                |
|-----------|------|----------------------|
| 3/28/2013 | 17   | Superior Conjunction |

Mars

| Date      | Hour | Event       |
|-----------|------|-------------|
| 4/17/2013 | 18   | Conjunction |

Jupiter

| Date      | Hour | Event                     |
|-----------|------|---------------------------|
| 6/19/2013 | 17   | Conjunction (Occultation) |

Saturn

| Date       | Hour | Event       |
|------------|------|-------------|
| 11/ 6/2013 | 17   | Conjunction |
| 4/28/2013  | 4    | Opposition  |

Uranus

| Date       | Hour | Event       |
|------------|------|-------------|
| 3/28/2013  | 18   | Conjunction |
| 10/ 3/2013 | 17   | Opposition  |

Neptune

| Date      | Hour | Event       |
|-----------|------|-------------|
| 2/21/2013 | 0    | Conjunction |
| 8/26/2013 | 19   | Opposition  |

Pluto

| Date      | Hour | Event      |
|-----------|------|------------|
| 7/ 1/2013 | 17   | Opposition |



Midway, UT (JMC)      Latitude: 40°30'43" N    Longitude: 111°28'40" W  
Local Time = UT - 7.00 hours    Elevation: 1706 meters      Year 2013  
Page 25

Planet Data Report

| Planet  | Mean Dist<br>From Sun<br>(AU) | Period of<br>Revolution | Inclination | Equatorial<br>Diameter<br>(km) |
|---------|-------------------------------|-------------------------|-------------|--------------------------------|
| Mercury | 0.39                          | 88 days                 | 7°          | 4880                           |
| Venus   | 0.72                          | 224.7 days              | 3.4°        | 12100                          |
| Earth   | 1.00                          | 365.24 days             | 0°          | 12756                          |
| Mars    | 1.52                          | 687 days                | 1.9°        | 6794                           |
| Jupiter | 5.20                          | 11.86 years             | 1.3°        | 143200                         |
| Saturn  | 9.54                          | 29.46 years             | 2.5°        | 120000                         |
| Uranus  | 19.18                         | 84 years                | 0.8°        | 52290                          |
| Neptune | 30.06                         | 165 years               | 1.8°        | 50450                          |
| Pluto   | 39.44                         | 248 years               | 17.2°       | 2200-2300                      |

Midway, UT (JMC)      Latitude: 40°30'43" N    Longitude: 111°28'40" W  
Local Time = UT - 7.00 hours    Elevation: 1706 meters      Year 2013  
Page 26

Moon Apsides Report for 1/ 1/2013 to 12/31/2013

| Date       | Hour | Apsis   | Distance (km) | Diameter |
|------------|------|---------|---------------|----------|
| 1/10/2013  | 3    | Perigee | 360048        | 0.5531°  |
| 1/22/2013  | 4    | Apogee  | 405320        | 0.4914°  |
| 2/ 7/2013  | 5    | Perigee | 365313        | 0.5452°  |
| 2/19/2013  | 0    | Apogee  | 404490        | 0.4924°  |
| 3/ 5/2013  | 17   | Perigee | 369976        | 0.5383°  |
| 3/18/2013  | 20   | Apogee  | 404258        | 0.4926°  |
| 3/30/2013  | 21   | Perigee | 367498        | 0.5419°  |
| 4/15/2013  | 15   | Apogee  | 404863        | 0.4919°  |
| 4/27/2013  | 13   | Perigee | 362263        | 0.5498°  |
| 5/13/2013  | 7    | Apogee  | 405853        | 0.4907°  |
| 5/25/2013  | 19   | Perigee | 358387        | 0.5557°  |
| 6/ 9/2013  | 15   | Apogee  | 406485        | 0.4899°  |
| 6/23/2013  | 4    | Perigee | 357013        | 0.5578°  |
| 7/ 6/2013  | 17   | Apogee  | 406474        | 0.4900°  |
| 7/21/2013  | 13   | Perigee | 358420        | 0.5557°  |
| 8/ 3/2013  | 2    | Apogee  | 405850        | 0.4907°  |
| 8/18/2013  | 18   | Perigee | 362271        | 0.5497°  |
| 8/30/2013  | 17   | Apogee  | 404887        | 0.4919°  |
| 9/15/2013  | 9    | Perigee | 367388        | 0.5421°  |
| 9/27/2013  | 11   | Apogee  | 404308        | 0.4926°  |
| 10/10/2013 | 16   | Perigee | 369822        | 0.5385°  |
| 10/25/2013 | 7    | Apogee  | 404584        | 0.4923°  |
| 11/ 6/2013 | 2    | Perigee | 365350        | 0.5451°  |
| 11/22/2013 | 3    | Apogee  | 405473        | 0.4912°  |
| 12/ 4/2013 | 3    | Perigee | 360063        | 0.5531°  |
| 12/19/2013 | 17   | Apogee  | 406276        | 0.4902°  |

Midway, UT (JMC)      Latitude: 40°30'43" N    Longitude: 111°28'40" W  
Local Time = UT - 7.00 hours    Elevation: 1706 meters      Year 2013  
Page 27

Moon Nodes Report for 1/ 1/2013 to 12/31/2013

| Date       | Time  | Node       | Illuminated Fraction |
|------------|-------|------------|----------------------|
| 1/ 7/2013  | 16:49 | Ascending  | 0.23                 |
| 1/20/2013  | 18:18 | Descending | 0.67                 |
| 2/ 3/2013  | 19:13 | Ascending  | 0.48                 |
| 2/16/2013  | 19:56 | Descending | 0.40                 |
| 3/ 2/2013  | 19:29 | Ascending  | 0.73                 |
| 3/15/2013  | 23:14 | Descending | 0.17                 |
| 3/29/2013  | 22:54 | Ascending  | 0.92                 |
| 4/12/2013  | 5:11  | Descending | 0.03                 |
| 4/26/2013  | 7:06  | Ascending  | 1.00                 |
| 5/ 9/2013  | 12:11 | Descending | 0.00                 |
| 5/23/2013  | 17:39 | Ascending  | 0.97                 |
| 6/ 5/2013  | 17:58 | Descending | 0.08                 |
| 6/20/2013  | 2:50  | Ascending  | 0.84                 |
| 7/ 2/2013  | 21:14 | Descending | 0.24                 |
| 7/17/2013  | 7:58  | Ascending  | 0.63                 |
| 7/29/2013  | 22:49 | Descending | 0.48                 |
| 8/13/2013  | 9:19  | Ascending  | 0.38                 |
| 8/26/2013  | 1:18  | Descending | 0.72                 |
| 9/ 9/2013  | 10:28 | Ascending  | 0.17                 |
| 9/22/2013  | 6:47  | Descending | 0.91                 |
| 10/ 6/2013 | 15:07 | Ascending  | 0.03                 |
| 10/19/2013 | 14:46 | Descending | 1.00                 |
| 11/ 2/2013 | 23:51 | Ascending  | 0.00                 |
| 11/15/2013 | 22:29 | Descending | 0.97                 |
| 11/30/2013 | 9:59  | Ascending  | 0.09                 |
| 12/13/2013 | 3:09  | Descending | 0.84                 |
| 12/27/2013 | 17:20 | Ascending  | 0.28                 |

Meteor Showers Report for 1/ 1/2013 to 12/31/2013

| Date       | Meteor Shower      | ZHR | RA     | DEC  | Illum. Frac. | Longitude |
|------------|--------------------|-----|--------|------|--------------|-----------|
| 1/ 3/2013  | Quadrantids        | 80  | 15h28m | 50°  | 0.66         | 284°      |
| 4/11/2013  | Virginids          | 5   | 14h04m | -9°  | 0.02         | 22°       |
| 4/21/2013  | Lyrids             | 12  | 18h08m | 32°  | 0.80         | 32°       |
| 4/27/2013  | alpha-Scorpiids    | 5   | 16h32m | -24° | 0.95         | 38°       |
| 5/ 5/2013  | eta-Aquarids       | 35  | 22h20m | -1°  | 0.18         | 45°       |
| 5/12/2013  | alpha-Scorpiids    | 5   | 16h04m | -24° | 0.07         | 52°       |
| 6/ 9/2013  | Ophiuchids         | 5   | 17h56m | -23° | 0.01         | 79°       |
| 6/19/2013  | Ophiuchids         | 5   | 17h20m | -20° | 0.81         | 89°       |
| 7/ 7/2013  | Capricornids       | 5   |        |      | 0.00         | 106°      |
| 7/15/2013  | Capricornids       | 5   | 20h44m | -15° | 0.46         | 113°      |
| 7/20/2013  | alpha-Cygnids      | 5   | 21h00m | 48°  | 0.94         | 118°      |
| 7/25/2013  | Capricornids       | 5   | 21h00m | -15° | 0.88         | 123°      |
| 7/28/2013  | delta-Aquarids     | 20  | 22h36m | -17° | 0.60         | 126°      |
| 7/30/2013  | Piscis Australids  | 5   | 22h40m | -30° | 0.41         | 128°      |
| 8/ 1/2013  | alpha-Capricornids | 5   | 20h36m | -10° | 0.23         | 130°      |
| 8/ 5/2013  | iota-Aquarids      | 8   | 22h10m | -15° | 0.02         | 134°      |
| 8/12/2013  | Perseids           | 75  | 3h04m  | 58°  | 0.31         | 140°      |
| 8/20/2013  | alpha-Cygnids      | 5   | 21h00m | 48°  | 1.00         | 148°      |
| 9/ 8/2013  | Piscids            | 10  | 0h36m  | 7°   | 0.11         | 166°      |
| 9/20/2013  | Piscids            | 5   | 0h24m  | 0°   | 0.98         | 178°      |
| 10/12/2013 | Piscids            | ??  | 1h44m  | 14°  | 0.59         | 200°      |
| 10/21/2013 | Orionids           | 25  | 6h24m  | 15°  | 0.92         | 209°      |
| 11/ 2/2013 | Taurids            | 8   | 3h44m  | 14°  | 0.01         | 221°      |
| 11/17/2013 | Leonids            | 10  | 10h08m | 22°  | 1.00         | 236°      |
| 12/ 8/2013 | Puppids-Velids     | 15  | 9h00m  | -48° | 0.40         | 257°      |
| 12/13/2013 | Geminids           | 75  | 7h28m  | 32°  | 0.88         | 262°      |
| 12/22/2013 | Ursids             | 5   | 14h28m | 78°  | 0.77         | 271°      |
| 12/25/2013 | Puppids-Velids     | 15  | 9h20m  | -65° | 0.49         | 274°      |

Twilight Report for 1/ 1/2013 to 12/31/2013

| Date       | Sun  |       | Astronomical |       | Nautical |       | Civil |       |
|------------|------|-------|--------------|-------|----------|-------|-------|-------|
|            | Rise | Set   | Begin        | End   | Begin    | End   | Begin | End   |
| 1/ 1/2013  | 7:49 | 17:10 | 6:07         | 18:53 | 6:40     | 18:20 | 7:14  | 17:46 |
| 1/ 8/2013  | 7:49 | 17:17 | 6:07         | 18:59 | 6:40     | 18:26 | 7:14  | 17:52 |
| 1/15/2013  | 7:47 | 17:24 | 6:06         | 19:05 | 6:39     | 18:33 | 7:12  | 17:59 |
| 1/22/2013  | 7:43 | 17:32 | 6:04         | 19:12 | 6:36     | 18:40 | 7:09  | 18:07 |
| 1/29/2013  | 7:38 | 17:41 | 5:59         | 19:19 | 6:31     | 18:47 | 7:04  | 18:15 |
| 2/ 5/2013  | 7:31 | 17:49 | 5:54         | 19:27 | 6:26     | 18:55 | 6:58  | 18:23 |
| 2/12/2013  | 7:23 | 17:58 | 5:47         | 19:34 | 6:18     | 19:03 | 6:50  | 18:31 |
| 2/19/2013  | 7:14 | 18:06 | 5:38         | 19:42 | 6:10     | 19:10 | 6:42  | 18:38 |
| 2/26/2013  | 7:04 | 18:14 | 5:29         | 19:49 | 6:00     | 19:18 | 6:32  | 18:46 |
| 3/ 5/2013  | 6:53 | 18:22 | 5:18         | 19:57 | 5:50     | 19:25 | 6:21  | 18:54 |
| 3/12/2013  | 6:42 | 18:30 | 5:07         | 20:05 | 5:39     | 19:33 | 6:10  | 19:01 |
| 3/19/2013  | 6:30 | 18:37 | 4:55         | 20:13 | 5:27     | 19:41 | 5:59  | 19:09 |
| 3/26/2013  | 6:19 | 18:45 | 4:42         | 20:21 | 5:15     | 19:48 | 5:47  | 19:16 |
| 4/ 2/2013  | 6:07 | 18:52 | 4:29         | 20:30 | 5:03     | 19:56 | 5:36  | 19:24 |
| 4/ 9/2013  | 5:56 | 18:59 | 4:16         | 20:39 | 4:51     | 20:05 | 5:24  | 19:32 |
| 4/16/2013  | 5:45 | 19:06 | 4:03         | 20:49 | 4:39     | 20:13 | 5:13  | 19:39 |
| 4/23/2013  | 5:35 | 19:14 | 3:50         | 20:59 | 4:27     | 20:22 | 5:02  | 19:47 |
| 4/30/2013  | 5:26 | 19:21 | 3:37         | 21:10 | 4:16     | 20:31 | 4:52  | 19:55 |
| 5/ 7/2013  | 5:17 | 19:28 | 3:25         | 21:20 | 4:05     | 20:40 | 4:42  | 20:03 |
| 5/14/2013  | 5:10 | 19:35 | 3:14         | 21:31 | 3:56     | 20:49 | 4:34  | 20:11 |
| 5/21/2013  | 5:04 | 19:42 | 3:04         | 21:42 | 3:48     | 20:57 | 4:28  | 20:18 |
| 5/28/2013  | 4:59 | 19:48 | 2:56         | 21:51 | 3:42     | 21:05 | 4:22  | 20:25 |
| 6/ 4/2013  | 4:56 | 19:53 | 2:49         | 21:59 | 3:37     | 21:12 | 4:19  | 20:30 |
| 6/11/2013  | 4:55 | 19:57 | 2:46         | 22:06 | 3:35     | 21:17 | 4:17  | 20:35 |
| 6/18/2013  | 4:55 | 19:59 | 2:45         | 22:10 | 3:35     | 21:20 | 4:17  | 20:38 |
| 6/25/2013  | 4:57 | 20:00 | 2:47         | 22:11 | 3:36     | 21:21 | 4:18  | 20:39 |
| 7/ 2/2013  | 5:00 | 20:00 | 2:51         | 22:09 | 3:40     | 21:20 | 4:22  | 20:38 |
| 7/ 9/2013  | 5:04 | 19:58 | 2:58         | 22:04 | 3:45     | 21:17 | 4:26  | 20:36 |
| 7/16/2013  | 5:09 | 19:54 | 3:06         | 21:57 | 3:52     | 21:12 | 4:32  | 20:31 |
| 7/23/2013  | 5:15 | 19:49 | 3:16         | 21:48 | 4:00     | 21:05 | 4:39  | 20:25 |
| 7/30/2013  | 5:21 | 19:43 | 3:26         | 21:38 | 4:08     | 20:56 | 4:46  | 20:18 |
| 8/ 6/2013  | 5:28 | 19:35 | 3:37         | 21:26 | 4:17     | 20:46 | 4:53  | 20:09 |
| 8/13/2013  | 5:35 | 19:26 | 3:47         | 21:14 | 4:25     | 20:35 | 5:01  | 20:00 |
| 8/20/2013  | 5:42 | 19:16 | 3:57         | 21:01 | 4:34     | 20:24 | 5:08  | 19:49 |
| 8/27/2013  | 5:49 | 19:05 | 4:06         | 20:47 | 4:42     | 20:12 | 5:16  | 19:38 |
| 9/ 3/2013  | 5:55 | 18:54 | 4:16         | 20:34 | 4:50     | 19:59 | 5:23  | 19:26 |
| 9/10/2013  | 6:02 | 18:43 | 4:24         | 20:21 | 4:58     | 19:47 | 5:30  | 19:15 |
| 9/17/2013  | 6:09 | 18:31 | 4:32         | 20:07 | 5:05     | 19:35 | 5:37  | 19:03 |
| 9/24/2013  | 6:16 | 18:19 | 4:40         | 19:55 | 5:12     | 19:22 | 5:44  | 18:51 |
| 10/ 1/2013 | 6:23 | 18:08 | 4:48         | 19:42 | 5:20     | 19:11 | 5:51  | 18:39 |
| 10/ 8/2013 | 6:30 | 17:56 | 4:55         | 19:31 | 5:27     | 18:59 | 5:58  | 18:28 |
| 10/15/2013 | 6:37 | 17:45 | 5:02         | 19:20 | 5:34     | 18:49 | 6:05  | 18:17 |
| 10/22/2013 | 6:45 | 17:35 | 5:09         | 19:11 | 5:41     | 18:39 | 6:13  | 18:07 |
| 10/29/2013 | 6:53 | 17:26 | 5:17         | 19:02 | 5:48     | 18:31 | 6:20  | 17:59 |
| 11/ 5/2013 | 7:01 | 17:18 | 5:24         | 18:55 | 5:55     | 18:23 | 6:28  | 17:51 |
| 11/12/2013 | 7:09 | 17:11 | 5:31         | 18:49 | 6:03     | 18:17 | 6:35  | 17:44 |
| 11/19/2013 | 7:17 | 17:05 | 5:38         | 18:45 | 6:10     | 18:13 | 6:43  | 17:40 |
| 11/26/2013 | 7:25 | 17:01 | 5:44         | 18:42 | 6:17     | 18:10 | 6:50  | 17:36 |
| 12/ 3/2013 | 7:32 | 16:59 | 5:50         | 18:41 | 6:23     | 18:08 | 6:57  | 17:35 |
| 12/10/2013 | 7:39 | 16:59 | 5:56         | 18:42 | 6:29     | 18:09 | 7:03  | 17:35 |
| 12/17/2013 | 7:44 | 17:01 | 6:00         | 18:44 | 6:34     | 18:11 | 7:08  | 17:37 |
| 12/24/2013 | 7:47 | 17:04 | 6:04         | 18:47 | 6:37     | 18:14 | 7:11  | 17:40 |
| 12/31/2013 | 7:49 | 17:09 | 6:06         | 18:52 | 6:39     | 18:19 | 7:14  | 17:45 |