AST101: Longitude Exercise

For full credit for your answers, be sure to include proper units, as well as E, W, a.m., p.m. where appropriate.

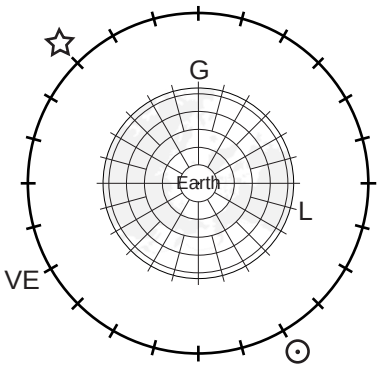
1. The star Regulus (RA=10h, Dec=+12°) transited three hours ago. What is the Local Sidereal Time (LST)?

13h ***(RA on meridian is 3 hours later that Regulus RA)***

2. Using the diagram at right, what is the Local Sidereal Time (sidereal time at the local position)?

9h ***(VE = 0h, RA increases ccw)***

G = Greenwich
VE = vernal equinox
⊙ = sun (mean)
☆ = star
L = local position (you)



3. Using the diagram, what is the Greenwich Sidereal Time (GST)?

16h

4. Using the diagram, what is the Right Ascension of the star?

19h

5. Using the diagram, what is the Local Mean Solar Time (LMT)? Remember to use a.m. or p.m.

3 pm ***(Sun is 3 hours past noon position)***

6. Using the diagram, what is the Greenwich Mean Solar Time (GMT)?

10 pm

7. From the diagram, what is your longitude (local position)? Be sure to indicate East or West.

105°W ***(L is 7h west (cw) of Greenwich)***

8. Four hours later than the time represented on the diagram, what is the Right Ascension of the star?

19h ***(Remember, RA of object does not change with time)***

9. Four hours later than the diagram, what is the GST?

20h ***(4h later than question 3)***

10. From the diagram, what is the approximate date?

June 21 ***(RA of sun is 6h on summer solstice)***

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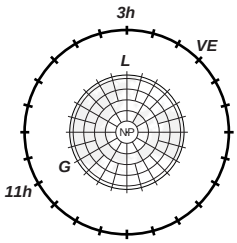
11. What is the longitude of a location where the LST is 3 hours and the GST is 11 hours?

120°W

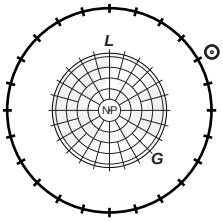
(L is 8h earlier than (west of) Greenwich. See diagram -->)



12. What is the longitude of a location where the LMT is 4 p.m. and the GMT is 7 a.m.?

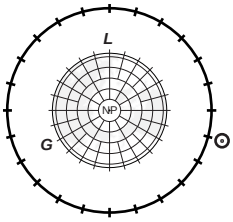
135°E

(L is 9h later than (east of) Greenwich. See diagram -->)



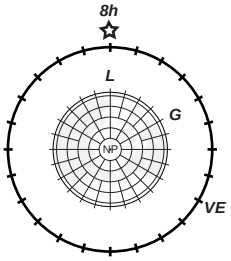
13. What is the longitude of a location where the LMT is 7 p.m. and the GMT is 3 a.m.? Answer must be between 0° and 180° E or W.

120°W



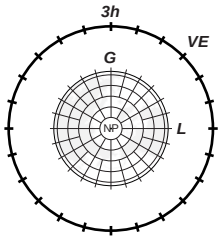
14. The star Pollux (RA=8h, Dec=+28°) is transiting at longitude 60°E. What is the GST?

4h



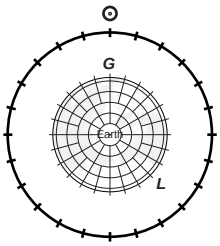
15. What is the LST at longtude 90°W if the GST is 3 hours? Your answer must be between 0h and 24h.

21h



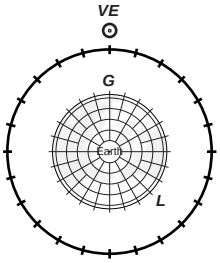
16. On March 21 the GMT is 12 noon. What is the LMT at longitude 135°W?

3 am ***(Date is irrelevant)***



17. For the same circumstances as question 16, what is the LST?

15h ***(Sun's RA on March 21 = 0h = VE)***

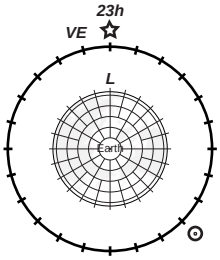


18. On October 21, what time (LMT) does the sun transit for longitude 90°E?

12 noon ***(Date and longitude irrelevant)***

19. On October 21, what time (LMT) does the star Fomalhaut (RA=23h, Dec=-30°) transit for longitude 90°E?

9 pm ***(Sun's RA on Oct 21 is 14h, long. is irrelevant)***



20. The longitude of a location is 45°E, the date is December 21, and the LMT is noon. What is the GST?

15h ***(Sun's RA on Dec 21 is 18h)***