

# AST101: Longitude Exercise

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

Name \_\_\_\_\_

**Due December 4**  
**Worth two quizzes.**

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

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

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

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

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

5. 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  $0^\circ$  and  $180^\circ$  E or W.

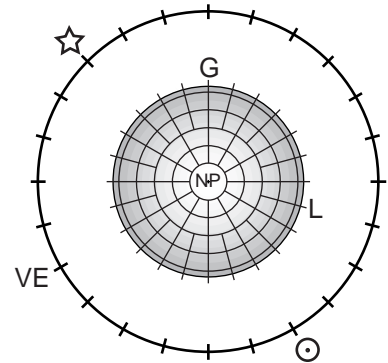
6. Using the diagram at right, what is the Local Sidereal Time (sidereal time at the local position)?

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

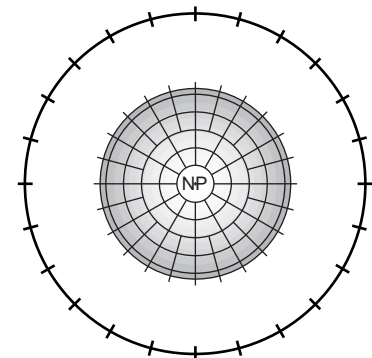
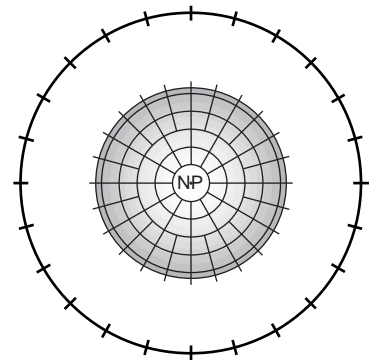
8. Using the diagram, what is the Right Ascension of the star?

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

10. Four hours later than the diagram, what is the Greenwich Sidereal Time (GST)?



*Use these blank diagrams for scratch, if needed.*



OVER

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Use these blank diagrams for scratch, if needed.

11. From the diagram on the previous page, what is the approximate date?

12. What is the longitude of a location where the LST is 3 hours and the GST is 11 hours? Answer must be between  $0^\circ$  and  $180^\circ$  E or W.

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

14. The star Pollux (RA=8h, Dec=+28°) is transiting at longitude  $60^\circ$ E. What is the GST? Your answer must be between 0h and 24h.

15. What is the LST at longitude  $90^\circ$ W if the GST is 3 hours? Your answer must be between 0h and 24h.

16. On March 21 the GMT is 12 noon. What is the LMT at longitude  $135^\circ$ W?

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

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

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

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

