

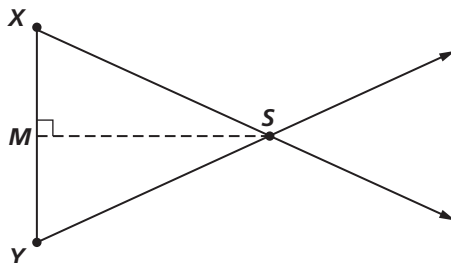
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# 10-3B Lesson Master

**Questions on SPUR Objectives**  
See Student Edition pages 724–727 for objectives.

**USES** Objective G

In 1-5, refer to the diagram below where  $\angle XSM$  is a parallax angle.



1. If the distance  $XY = 5$  meters and  $\angle XSM$  measures  $11^\circ$ , find the distance  $SM$ . \_\_\_\_\_
2. If  $S$  is known to be 17 meters from  $M$ , and the parallax angle  $\angle XSM$  measures  $42.3^\circ$ , how far is point  $X$  from point  $Y$ ? \_\_\_\_\_
3. If  $\angle XSY$  measures  $37^\circ$ , and the distance  $XM = 4$  meters, find the distance  $SM$ . \_\_\_\_\_
4. If  $\angle X$  measures  $60^\circ$ , and the distance  $XY = 5$  meters, find the distance  $SM$ . \_\_\_\_\_
5. Suppose points  $X$  and  $Y$  represent your two eyes, and  $S$  is an object held in front of you. Explain why the tangent of  $\angle XSM$  will get larger as the distance  $SM$  decreases.  
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6. An object has a parallax angle of  $5.3^\circ$  from two sites 3 miles apart.
  - a. How far away is the object? \_\_\_\_\_
  - b. If the observation sites are moved to 15 miles apart, and the distance to the object is measured as 16.17 miles, what is the new parallax angle? \_\_\_\_\_

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7. Damian lives in Chicago, IL, and Tyler lives in St. Louis, MO. The distance between their houses is approximately 467 km. They each sight the Hubble Space Telescope and determine that the parallax angle is about  $22^\circ$ . What was the altitude of the Hubble Space Telescope?

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In 8–11, use the following information.

- Parallax angles are measured from opposite sides of Earth's orbit.
- Earth's orbit around the sun is approximately a circle with diameter 186,000,000 miles.
- One light-year (the distance that light travels in one year) is approximately  $5.88 \cdot 10^{12}$  miles.

8. Both Alpha 61 Cygni and Beta 61 Cygni have a parallax angle of approximately  $(8.16 \cdot 10^{-5})^\circ$ . Estimate the distance to them, to the nearest tenth of a light-year.

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9. Both Alpha Procyon and Beta Procyon have a parallax angle of approximately  $(7.95 \cdot 10^{-5})^\circ$ . Estimate the distance to them, to the nearest tenth of a light-year.

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10. The star with the greatest magnitude is Sirius, at a distance of 8.6 light-years from Earth. Estimate its parallax angle. Give your answer in scientific notation.

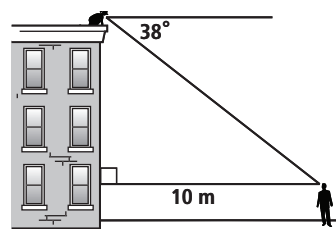
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11. Proxima Centauri, the star that is closest to the Sun, is a distance of 4.2 light-years from Earth. Estimate its parallax angle. Give your answer in scientific notation.

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**REVIEW** Lesson 10-1, Objective G

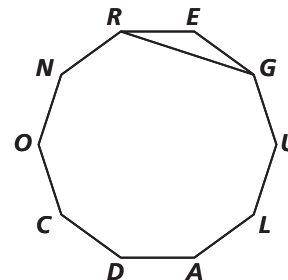
12. Refer to the diagram at the right. A person on top of a building finds there is a  $38^\circ$  angle between a horizontal line and her line of sight to the head of a man, who is 170 cm tall, standing on the sidewalk. If the man is 10 m from the building, how high off the ground is the line of sight of the woman on top of the building?



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13. *REGULADCON* is a regular decagon as shown at the right. If each side of the decagon measures 10 units, find the length of  $\overline{RG}$ .

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