U6 HW 1 Worksheet

13-1 Exercises

California Standards
Review of GE19.0; 19.0, 22.0

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Homework Help Online
KEYWORD: MB7 13-1
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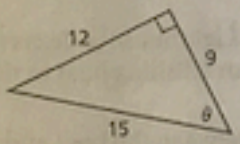
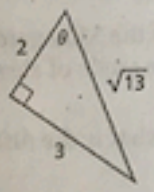
GUIDED PRACTICE

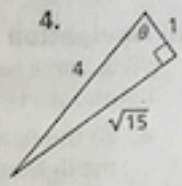
1. **Vocabulary** The ratio of the length of the opposite leg to the length of the adjacent leg of an acute angle of a right triangle is the ? of the angle. (*tangent* or *cotangent*)

SEE EXAMPLE 1 p. 929

Find the value of the sine, cosine, and tangent functions for θ.

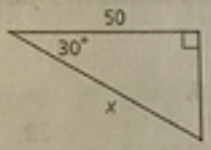
2. 

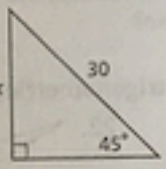
3. 

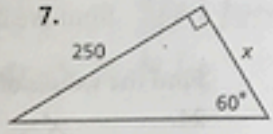
4. 

SEE EXAMPLE 2 p. 930

Use a trigonometric function to find the value of x.

5. 

6. 

7. 

SEE EXAMPLE 3 p. 930

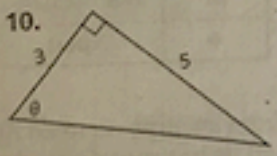
8. **Engineering** An escalator in a mall must lift customers to a height of 22 ft. If the angle between the escalator stairs and the ground floor will be 30°, what will be the length ℓ of the escalator?

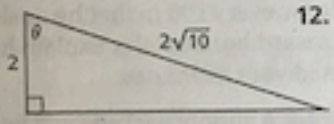
SEE EXAMPLE 4 p. 931

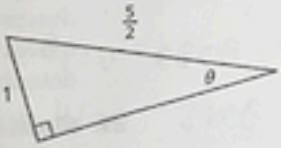
9. **Recreation** The pilot of a hot-air balloon measures the angle of depression to a landing spot to be 20.5°. If the pilot's altitude is 90 m, what is the horizontal distance between the balloon and the landing spot? Round to the nearest meter.

SEE EXAMPLE 5 p. 932

Find the values of the six trigonometric functions for θ.

10. 

11. 

12. 

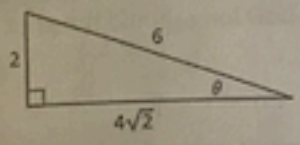
PRACTICE AND PROBLEM SOLVING

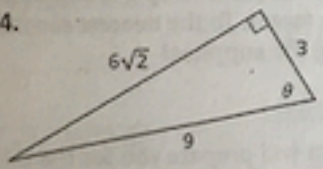
Independent Practice

For Exercises	See Example
13–15	1
16–18	2
19	3
20	4
21–23	5

Extra Practice
Skills Practice p. S28
Application Practice p. S44

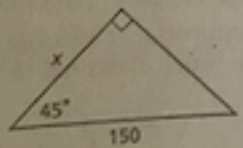
Find the value of the sine, cosine, and tangent functions for θ.

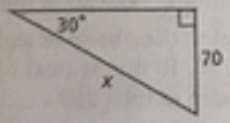
13. 

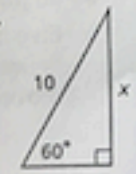
14. 

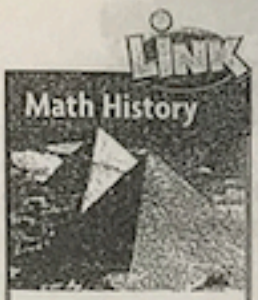
15. 

Use a trigonometric function to find the value of x.

16. 

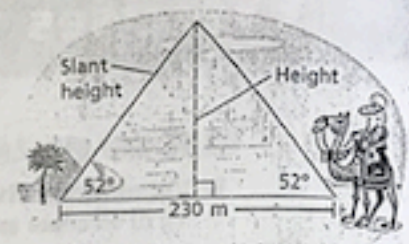
17. 

18. 



Thales of Miletus (624–547 B.C.E.) was a Greek mathematician reputed to have measured the height of the Egyptian pyramids by using the lengths of shadows and indirect measurement.

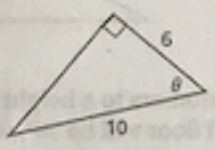
19. **History** Today, the Great Pyramid in Egypt is not as tall as when it was originally built. The square base of the pyramid has a side length of 230 m, and the sides of the pyramid meet the base at an angle of 52°.



   a. What was the original height of the pyramid to the nearest meter?
   b. What was the original slant height of the pyramid to the nearest meter?

20. **Navigation** The top of the Matagorda Island Lighthouse in Texas is about 90 ft above sea level. The angle of elevation from a fishing boat to the top of the lighthouse is 10°.
   a. To the nearest foot, what is the distance d between the boat and the base of the lighthouse?
   b. **What if...?** After the boat drifts for half an hour, the angle of elevation has decreased to 4.5°. To the nearest foot, how much farther has the boat moved from the lighthouse?

Find the values of the six trigonometric functions for θ.

21.


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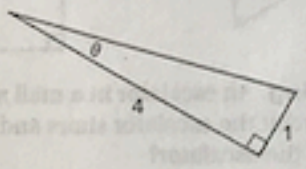

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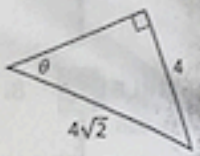

24. **Estimation** One factor that determines a ski slope's difficulty is the slope angle. The table shows the typical slope angles for the most common difficulty categories. For each category, estimate how many meters a skier descends for every 100 m that he or she moves forward horizontally. Explain how you determined your estimates.

Slope Ratings		
Symbol	Difficulty	Slope Angle
●	Beginner	5° to 10°
■	Intermediate	10° to 20°
◆	Expert	20° to 35°

25. **Multi-Step** A supply package will be dropped from an airplane to an Arctic research station. The plane's altitude is 2000 ft, and its horizontal speed is 235 ft/s. The angle of depression to the target is 14°.
   a. To the nearest foot, what is the plane's horizontal distance from the target?
   b. The plane needs to drop the supplies when it is a horizontal distance of 500 ft from the target. To the nearest second, how long should the pilot wait before dropping the supplies?

CONCEPT CONNECTION

26. This problem will prepare you for the Concept Connection on page 956.

An observer on a sea cliff with a height of 12 m spots an otter through a pair of binoculars at an angle of depression of 5.7°.
   a. To the nearest meter, how far is the otter from the base of the cliff?
   b. Five minutes later, the observer sights the same otter at an angle of depression of 7.6°. To the nearest meter, how much closer has the otter moved to the base of the cliff?