PRACTICE & PROBLEM SOLVING

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Practice Tutorial

Additional Exercises Available Online

UNDERSTAND

17. Construct Arguments Yama said you can find any side length or angle measure of a right triangle if you know at least 1 side length and 1 non-right angle measure, or 2 side lengths. Is Yama correct? Explain your reasoning.

18. Look for Relationships The sine of an acute angle must be greater than 0 and less than 1. Explain why.

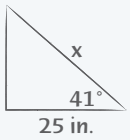
19. Error Analysis Describe and correct the error a student made in solving for the length of the hypotenuse in the triangle shown.

$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\sin 41 = \frac{25}{x}$$

$$0.66 \approx \frac{25}{x}$$

$$\frac{25}{0.66} \approx 38 \text{ in.}$$

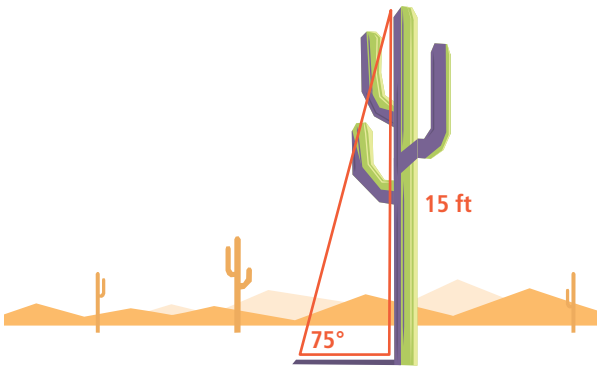


✗

20. Construct Arguments Show that the reciprocal identity $\sec\theta = \frac{1}{\cos\theta}$ is true.

21. Generalize Knowing all three angle measures of a right triangle does not determine the exact side lengths. However, knowing all three side lengths of a right triangle does determine the exact angle measures. Explain why.

22. Reason The sun shines at a 75° angle to the ground. How long is the shadow cast by a 15 ft tall cactus? Round to the nearest foot.

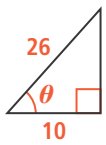


PRACTICE

Write the six trigonometric ratios for θ.

SEE EXAMPLE 1

23.



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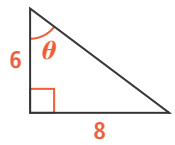


What are the trigonometric ratios of θ in a right triangle with the given value?

SEE EXAMPLE 2

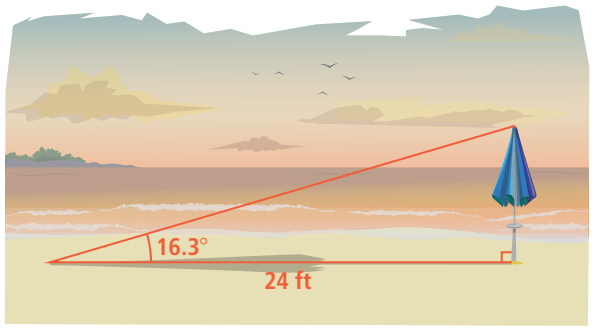
25. $\cos\theta = \frac{4}{5}$

26. $\cot\theta = \frac{12}{16}$

27. $\csc\theta = \frac{17}{15}$

28. $\sec\theta = \frac{52}{20}$

29. A closed umbrella casts a shadow when the sun shines at a 16.3° angle to the ground. How tall is the top of the umbrella to the nearest foot? SEE EXAMPLE 3



What are the sine and cosine ratios for the special triangles described? SEE EXAMPLE 4

30. A 45°-45°-90° triangle with a leg of 9

31. A 30°-60°-90° triangle with a hypotenuse of 14, when $\theta = 30°$

What is the cofunction identity for the given trigonometric ratio? SEE EXAMPLE 5

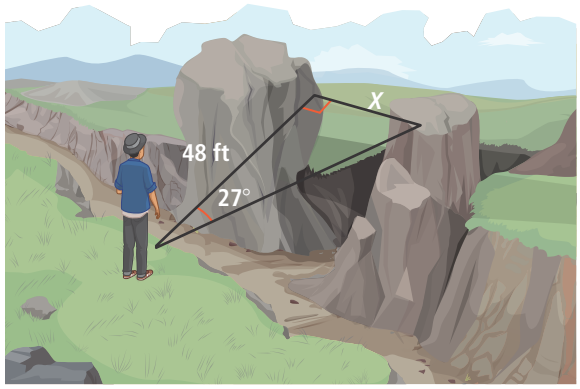
32. secant

33. cosine

PRACTICE & PROBLEM SOLVING

APPLY

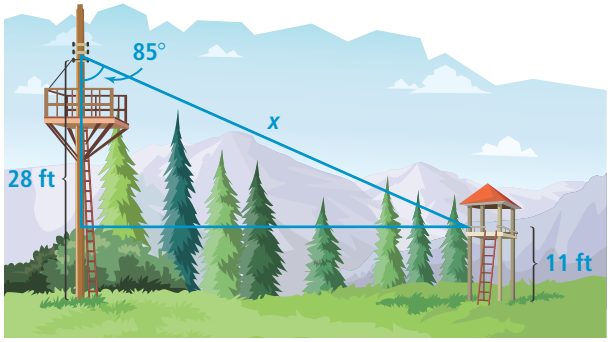
34. Make Sense and Persevere Roshaun sees two rock formations on the other side of a canyon from where he is hiking. One is directly across the canyon, and the other is across at an angle of 27°. How far apart are the two rock formations? Round your answer to the nearest tenth.



35. Reason The Health and Safety Authority uses a "1 in 4" rule for judging whether a ladder is angled enough to be safe (1 unit out for every 4 units up). The angle measure that is the maximum angle for safety is 75°. Use a trigonometric ratio to determine whether the "1 in 4" rule is adequate for safety.

36. Model With Mathematics An inflatable figure is a decoration on Gabriella's lawn. A rope 42 in. long secures the top of the figure to the ground at an angle of 80°. About how tall is the figure?

37. Make Sense and Persevere A zip line starts 28 feet in the air and ends 11 feet in the air. The zip line drops at an angle of 85°. How long is the zip line cable when completely taut (no rider)? Round your answer to the nearest whole number.



ASSESSMENT PRACTICE

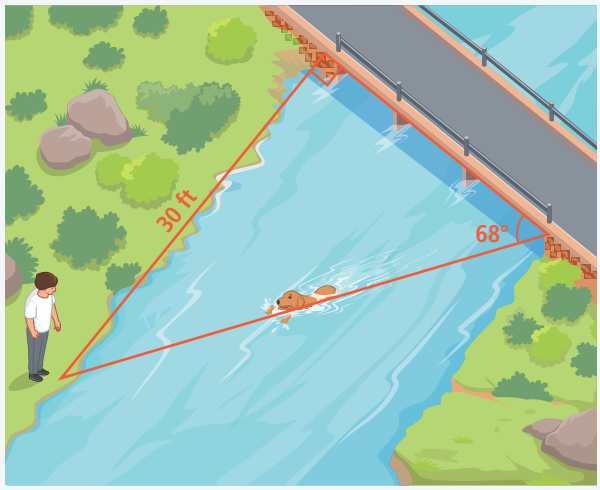
38. Match each trigonometric ratio in the left column with its reciprocal expression in the right column.

I. $\sin\theta$	A. $\frac{1}{\cos\theta}$
II. $\sec\theta$	B. $\frac{1}{\sin\theta}$
III. $\tan\theta$	C. $\frac{1}{\cot\theta}$
IV. $\cos\theta$	D. $\frac{1}{\sec\theta}$
V. $\csc\theta$	E. $\frac{1}{\tan\theta}$
VI. $\cot\theta$	F. $\frac{1}{\csc\theta}$

39. SAT/ACT Which of the following is true?

Ⓐ $\sin\theta = \csc(90° - \theta)$
Ⓑ $\sec\theta = \cos(90° - \theta)$
Ⓒ $\tan\theta = \cos(90° - \theta)$
Ⓓ $\sec\theta = \sin(90° - \theta)$
Ⓔ $\tan\theta = \cot(90° - \theta)$

40. Performance Task Simon's dog jumped into a stream at a 68° angle from the corner of a bridge. Simon crossed the bridge and walked downstream to meet the dog.



Part A How long is the bridge, in feet?

Part B How many feet did the dog swim?