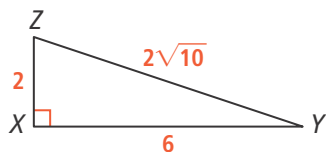




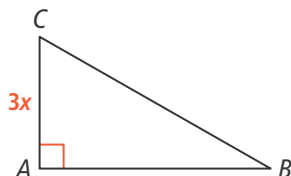
UNDERSTAND

16. **Error Analysis** Jacinta's teacher asks her to find the tangent of $\angle Y$. What is her error?

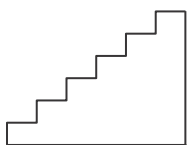


$$\begin{aligned}\tan Y &= \frac{XY}{XZ} \\ \tan Y &= \frac{6}{2} \\ \tan Y &= 3\end{aligned}$$

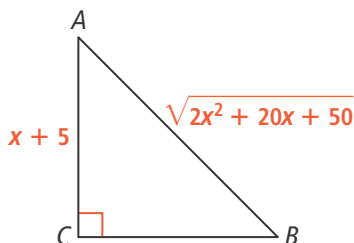
17. **Make Sense and Persevere** If $\sin B = 0.5$ in the triangle shown, what is an expression for AB ?



18. **Reason** Every tread of a staircase is 8 in. deep, and every riser is 6 in. high. How would you find the angle the staircase makes with the floor? Explain.

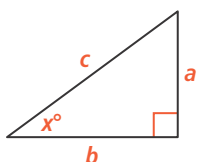


19. **Mathematical Connections** Find the values.



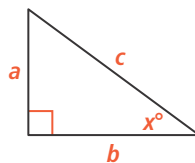
- a. $\sin B$ b. $m\angle B$

20. **Higher Order Thinking** Why are the sine and cosine ratios of x° never greater than one? Use the triangle below to explain your reasoning.



PRACTICE

For Exercises 21–23, write each ratio. SEE EXAMPLE 1



21. $\sin x^\circ$ 22. $\cos x^\circ$ 23. $\tan x^\circ$

For Exercises 24–29, find each value. SEE EXAMPLE 2



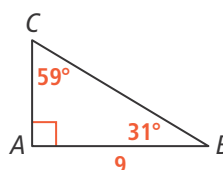
24. $\sin x^\circ$ 25. $\cos x^\circ$ 26. $\tan x^\circ$
27. $\sin y^\circ$ 28. $\cos y^\circ$ 29. $\tan y^\circ$

For Exercises 30–35, find each value. SEE EXAMPLE 3

30. $\sin 30^\circ$ 31. $\cos 60^\circ$ 32. $\sin 45^\circ$
33. $\tan 45^\circ$ 34. $\cos 30^\circ$ 35. $\tan 60^\circ$
36. Write an expression for $\cos 68^\circ$ using sine.
37. Write an expression for $\sin 44^\circ$ using cosine.

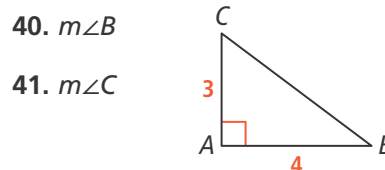
For Exercises 38 and 39, find each length.

SEE EXAMPLE 4

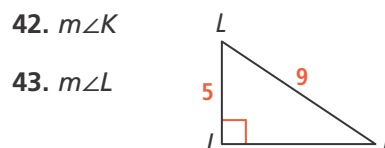


38. AC 39. BC

For Exercises 40–43, find the angle measures in each triangle. SEE EXAMPLE 5



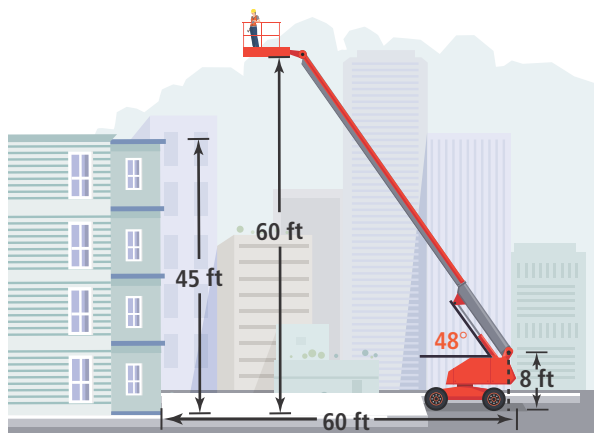
40. $m\angle B$
41. $m\angle C$



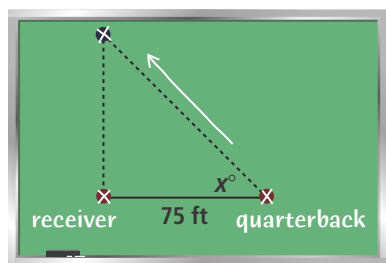
42. $m\angle K$
43. $m\angle L$

APPLY

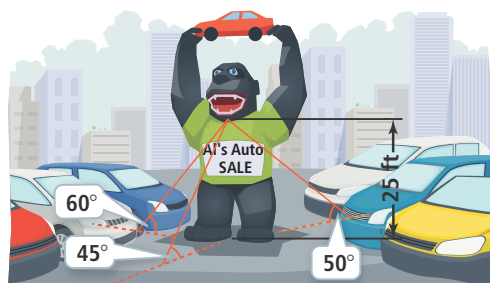
- 44. Make Sense and Persevere** Workers need to make repairs on a building. A boom lift has maximum height of 60 ft at an angle of 48° . If the bottom of the boom is 60 ft from the building, can the boom reach the top of the building? Explain.



- 45. Model With Mathematics** A coach draws up a play so a quarterback throws the football at the same time a receiver runs straight down the field. Suppose the quarterback throws the football at a speed of 20 ft/s and the receiver runs at a speed of 12 ft/s. At what angle x° to the horizontal line must the quarterback throw the football in order for the receiver to catch it? Explain.

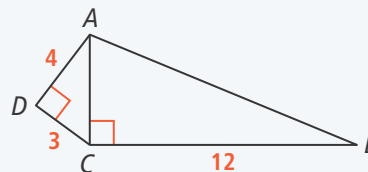


- 46. Use Structure** Kelsey puts up an inflatable gorilla to advertise a sale. She realizes that she needs to secure the figure with rope. She estimates she needs to attach three pieces at the angles shown. How much rope does Kelsey need? Round to the nearest foot.



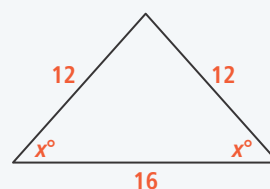
ASSESSMENT PRACTICE

- 47.** Match each expression to a trigonometric ratio.



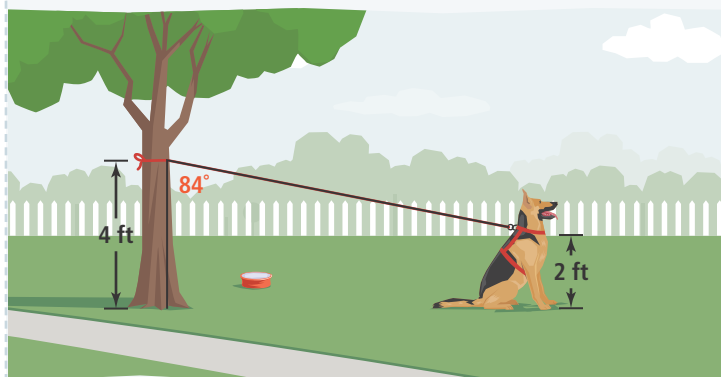
- | | |
|------------------------|--------------------|
| I. $\cos \angle ACD$ | A. $\frac{12}{13}$ |
| II. $\tan \angle ABC$ | B. $\frac{4}{5}$ |
| III. $\sin \angle BAC$ | C. $\frac{3}{5}$ |
| IV. $\cos \angle CAD$ | D. $\frac{5}{12}$ |

- 48. SAT/ACT** What is the value of $\cos x^\circ$?



- (A) $\frac{\sqrt{5}}{2}$ (B) $\frac{3}{2}$ (C) $\frac{\sqrt{5}}{3}$ (D) $\frac{2}{3}$

- 49. Performance Task** Jacy anchors a retractable leash to a tree and attaches the leash to her dog's collar. When the dog fully extends the leash, the angle between the leash and the tree is 84° .



Part A If her neighbor's yard is 18 feet away from the tree, can Jacy's dog get into her neighbor's yard? If so, how far into the yard can the dog go? Round to nearest tenth of a foot.

Part B If Jacy wants to make sure her dog cannot get within 1 foot of her neighbor's yard, how high up the tree must she anchor the leash? Round to the nearest tenth of a foot.