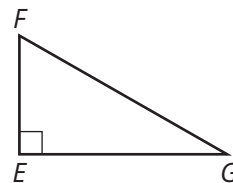


# Assignment

## Write

Match each description to its corresponding term for  $\triangle EFG$ .

- |  |                    |
|--|--------------------|
| 1. $\frac{EG}{EF}$ in relation to $\angle G$                       | a. tangent         |
| 2. $\frac{EF}{EG}$ relation to $\angle G$                          | b. cotangent       |
| 3. $\tan^{-1}\left(\frac{EF}{EG}\right)$ in relation to $\angle G$ | c. inverse tangent |



## Remember

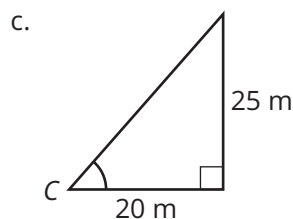
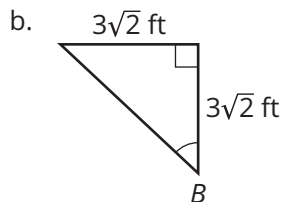
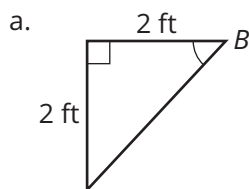
The tangent (tan) of an acute angle in a right triangle is the ratio of the length of the side that is opposite the angle to the length of the side that is adjacent to the angle.

The cotangent (cot) of an acute angle in a right triangle is the ratio of the length of the side that is adjacent to the angle to the length of the side that is opposite the angle.

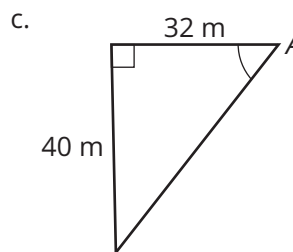
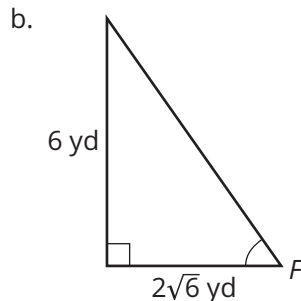
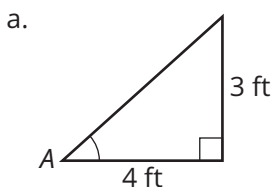
The inverse tangent (or arctangent) of  $x$  is the measure of an acute angle whose tangent is  $x$ .

## Practice

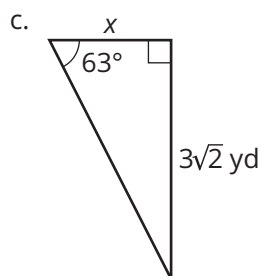
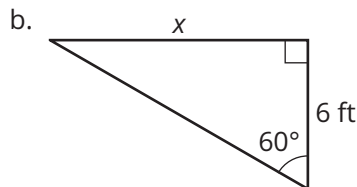
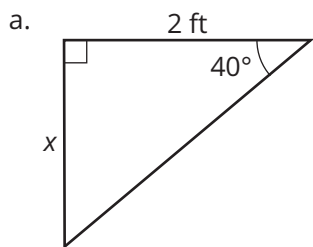
1. Calculate the tangent of the indicated angle in each triangle. Write your answers in simplest form.



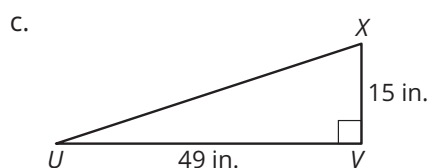
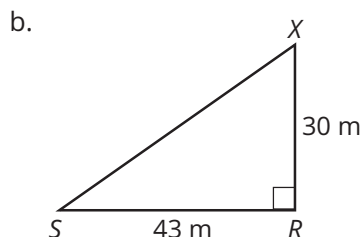
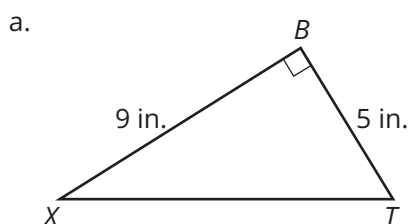
2. Calculate the cotangent of the indicated angle in each triangle. Write your answers in simplest form.



3. Use a tangent ratio or a cotangent ratio to calculate the unknown length of each triangle. Round your answers to the nearest hundredth.

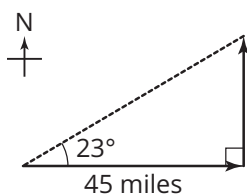


4. Calculate the measure of  $\angle X$  in each triangle. Round your answers to the nearest hundredth.

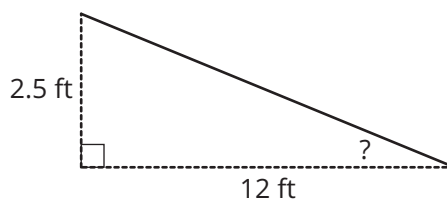


5. Solve each problem. Round your answers to the nearest hundredth.

a. A boat travels in the following path. How far north did it travel?

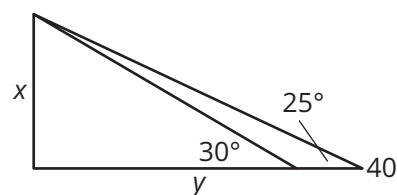


b. A moving truck is equipped with a ramp that extends from the back of the truck to the ground. When the ramp is fully extended, it touches the ground 12 feet from the back of the truck. The height of the ramp is 2.5 feet. Calculate the measure of the angle formed by the ramp and the ground.



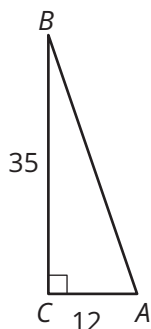
## Stretch

Bobby is standing near a lighthouse. He measured the angle formed from where he stood to the top of the lighthouse as  $30^\circ$ . Then he backed up 40 feet and measured the angle again as  $25^\circ$ . Solve for the height of the lighthouse.

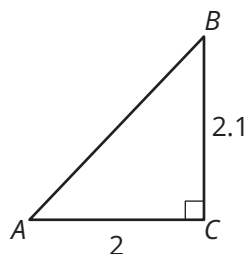


## Review

1. Determine the side length ratio  $\frac{\text{opposite}}{\text{hypotenuse}}$  using  $\angle A$  as the reference angle. Write your answer as a fraction in simplest form.

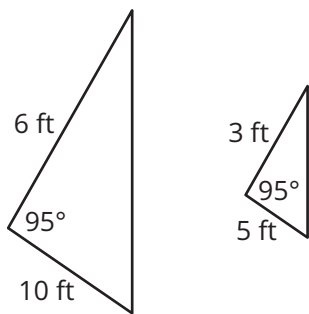


2. Determine the side length ratio  $\frac{\text{adjacent}}{\text{hypotenuse}}$  using  $\angle A$  as the reference angle. Write your answer as a fraction in simplest form.

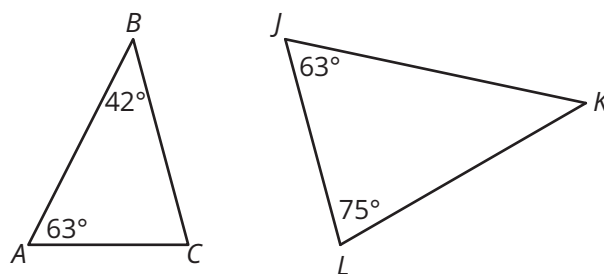


3. Determine whether the triangles in each pair are similar. Explain your reasoning.

a.



b.



4. Construct the lines tangent to Circle  $O$  from point  $P$ .

