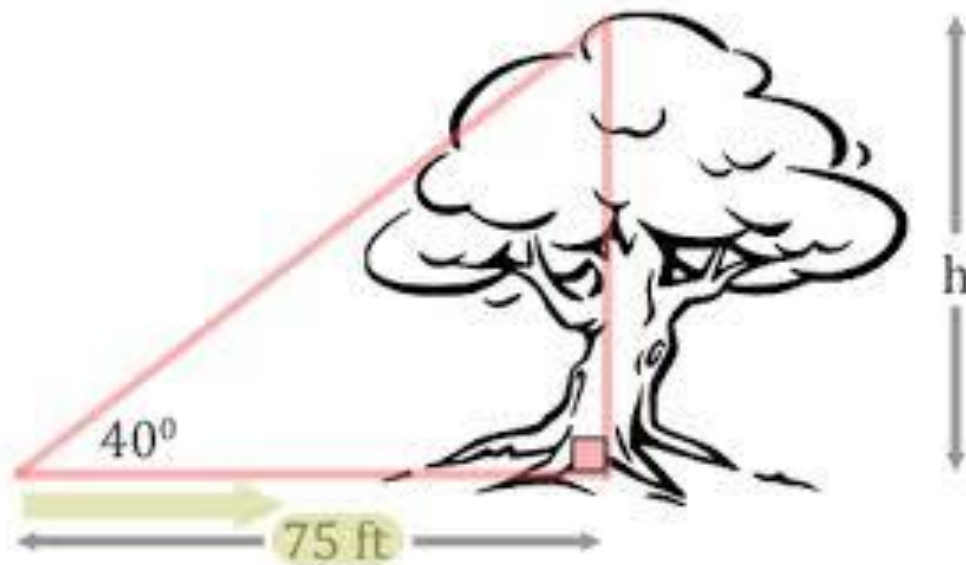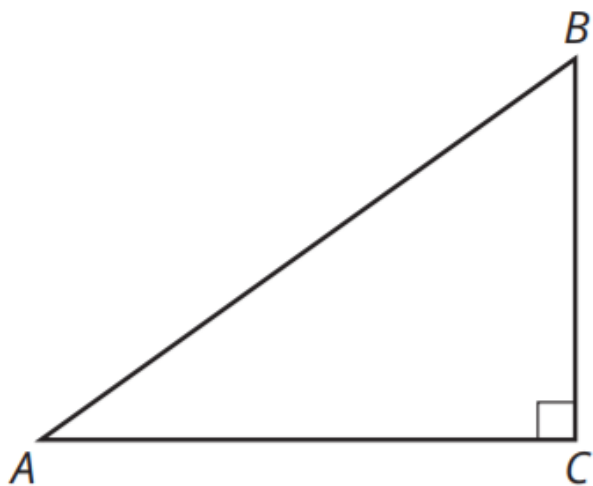# Determine the height of the tree.

40⁰

75 ft

h

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 reference angle to the length of the side that is opposite the reference angle. The expression "cot A" means "the cotangent of ∠A."

7. **Complete the ratio that represents the cotangent of ∠A.**

$$\cot A = \frac{\text{length of side adjacent to } \angle A}{\text{length of side opposite } \angle A} = \frac{\boxed{}}{\boxed{}}$$

The **inverse tangent** (or arctangent) of x is defined as the measure of an acute angle whose tangent is x. If you know the length of any two sides of a right triangle, it is possible to compute the measure of either acute angle by using the inverse tangent, or the $\tan^{-1}$ button on a graphing calculator.

In right triangle ABC, if $\tan A = x$, then $\tan^{-1} x = m\angle A$.
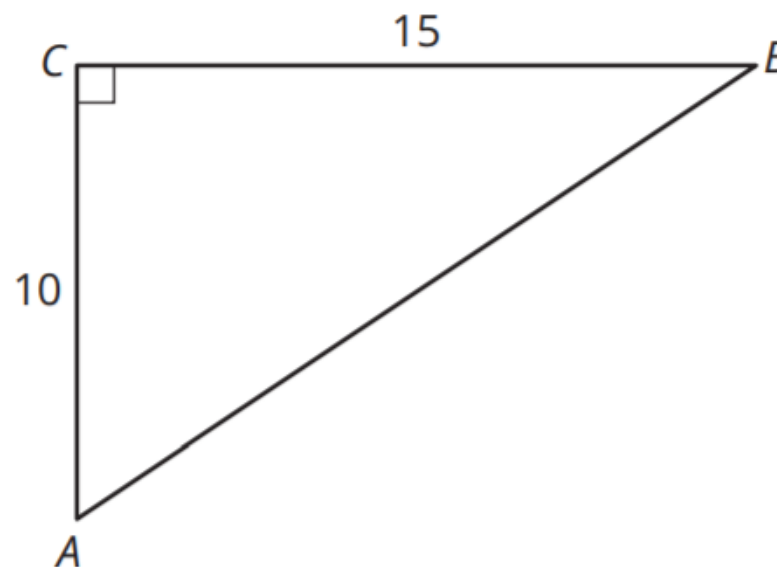
Worked Example

Consider $\triangle ABC$.

$$\tan A = \frac{15}{10}$$

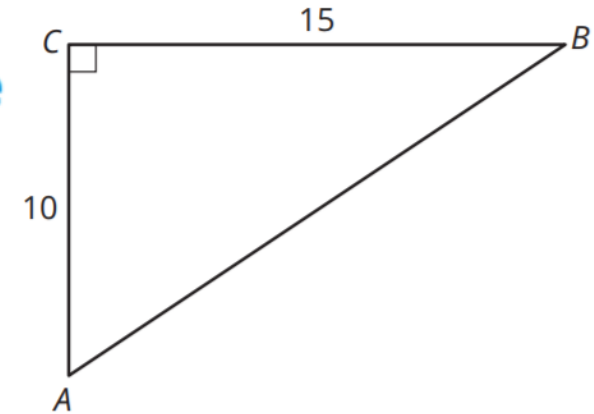You can use the inverse tangent to determine $m\angle A$.

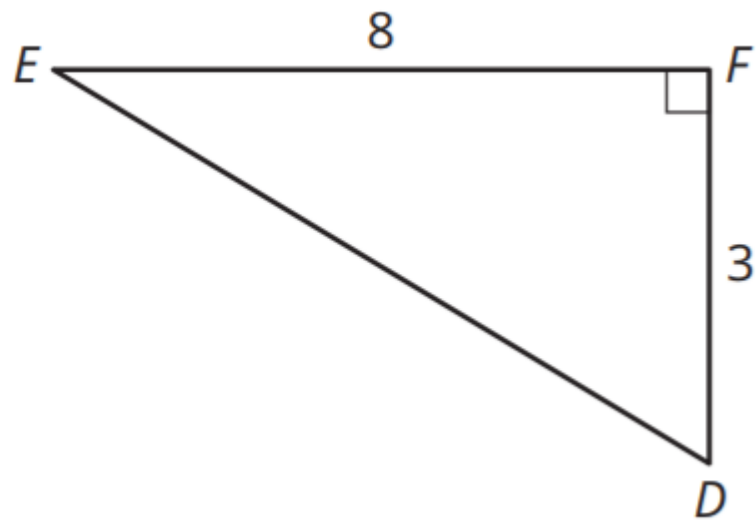$$\tan^{-1}(\tan A) = \tan^{-1}\left(\frac{15}{10}\right)$$

$$A \approx 56.31°$$
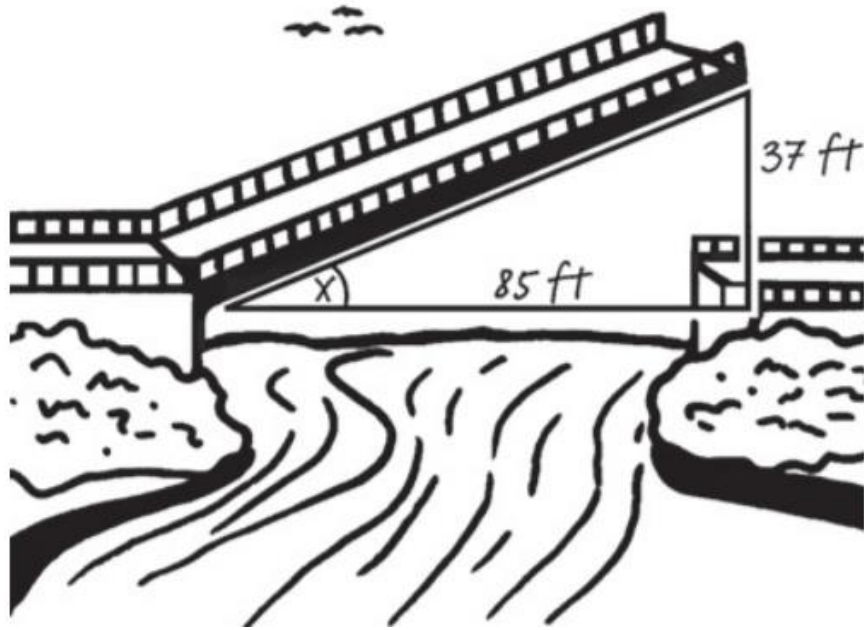
1. Consider △**ABC** from the worked example.

   a. Determine the ratio for tan **B**, and then use the inverse tangent to calculate m∠**B**.

   b. Add m∠**A** and m∠**B**. Does your sum make sense in terms of the angle measures of a triangle?

2. Calculate m∠E.

37 ft

85 ft

x)

3. Movable bridges are designed to open water ways for large boats and barges. When the bridge moves, all vehicle traffic stops. The maximum height of the open bridge deck of the movable bridge shown is 37 feet above the water surface. The waterway width is 85 feet. Calculate the angle measure formed by the movement of the bridge.

4. **A ski slope at Snowy Valley has these measurements. Determine the angle of elevation of the ski slope. Show your work.**

5022.8 ft

x

4689.2 ft