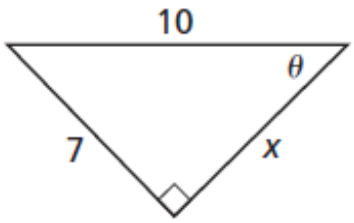
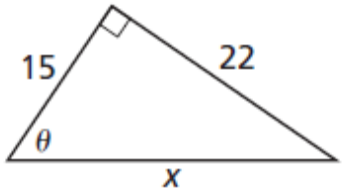
Find the value of *x*. Then find the value of sin θ , cos θ , and tan θ for the triangle.

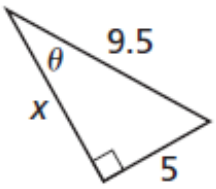
1.



2.



3.



Decide whether you can use the given information to prove $\triangle ABC \cong \triangle XYZ$. Explain your reasoning.

1. $\angle A \cong \angle X$, $\angle Z \cong \angle C$, $\overline{BC}$ $\overline{YZ}$

2. $\angle Y \cong \angle B$, $\angle A \cong \angle X$, $\angle Z \cong \angle C$

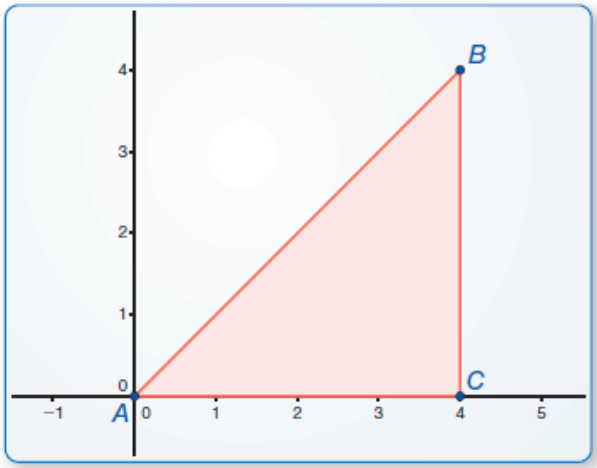
3. $\overline{CA} \perp \overline{AB}, \overline{ZX} \perp \overline{XY}, \overline{CB} \cong \overline{ZY}, \overline{YX} \cong \overline{BA}$

Essential Question

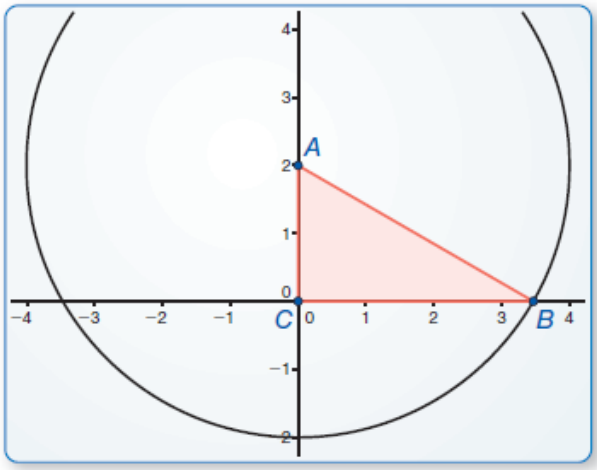
When you know the lengths of the sides of a right triangle, how can you find the measures of the two acute angles?

Work with a partner. Use the figures to find the values of the sine and cosine of $\angle A$ and $\angle B$. Use these values to find the measures of $\angle A$ and $\angle B$. Use dynamic geometry software to verify your answers.

a.

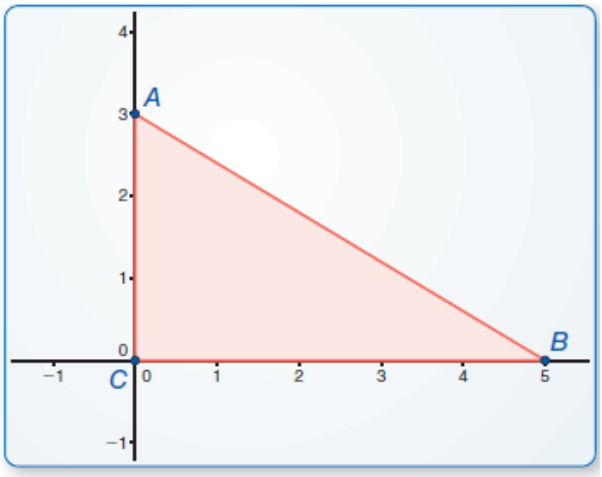


b.

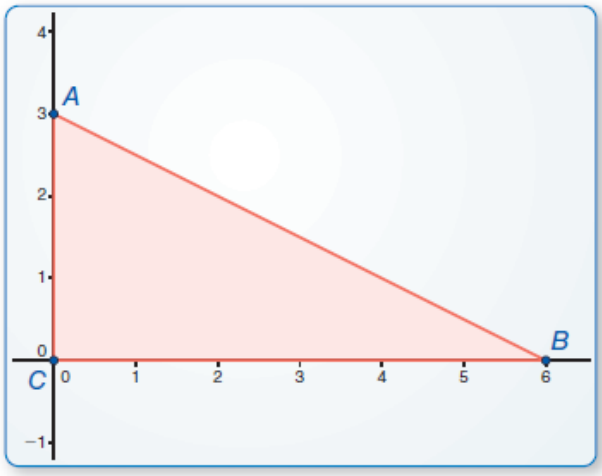


Work with a partner. You can use a calculator to find the measure of an angle when you know the value of the sine, cosine, or tangent of the angle. Use the inverse sine, inverse cosine, or inverse tangent feature of your calculator to approximate the measures of $\angle A$ and $\angle B$ to the nearest tenth of a degree. Then use dynamic geometry software to verify your answers.

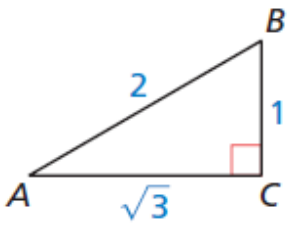
a.



b.



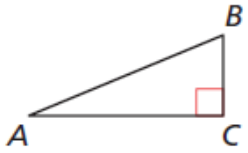
Determine which of the two acute angles has a cosine of 0.5.



Core Concept

Inverse Trigonometric Ratios

Let $\angle A$ be an acute angle.



Inverse Tangent If $\tan A = x$, then $\tan^{-1} x = m\angle A$. $\tan^{-1} \frac{BC}{AC} = m\angle A$

Inverse Sine If $\sin A = y$, then $\sin^{-1} y = m\angle A$. $\sin^{-1} \frac{BC}{AB} = m\angle A$

Inverse Cosine If $\cos A = z$, then $\cos^{-1} z = m\angle A$. $\cos^{-1} \frac{AC}{AB} = m\angle A$

Let $\angle A$, $\angle B$, and $\angle C$ be acute angles. Use a calculator to approximate the measures of $\angle A$, $\angle B$, and $\angle C$ to the nearest tenth of a degree.

a. $\tan A = 0.75$

b. $\sin B = 0.87$

c. $\cos C = 0.15$

Determine which of the two acute angles has the given trigonometric ratio.

1. The sine of the angle is $\frac{12}{13}$.

2. The tangent of the angle is $\frac{5}{12}$.

Let $\angle G$, $\angle H$, and $\angle K$ be acute angles. Use a calculator to approximate the measures of $\angle G$, $\angle H$, and $\angle K$ to the nearest tenth of a degree.

3. $\tan G = 0.43$ **4.** $\sin H = 0.68$ **5.** $\cos K = 0.94$

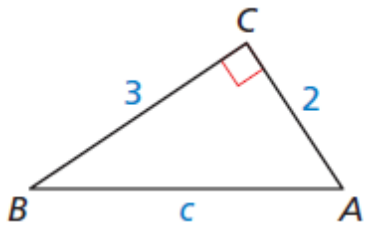
Core Concept

Solving a Right Triangle

To **solve a right triangle** means to find all unknown side lengths and angle measures. You can solve a right triangle when you know either of the following.

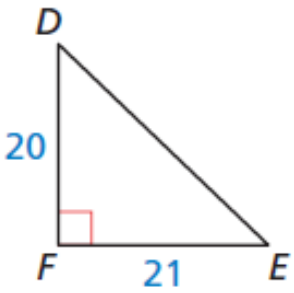
- two side lengths
- one side length and the measure of one acute angle

Solve the right triangle. Round decimal answers to the nearest tenth.

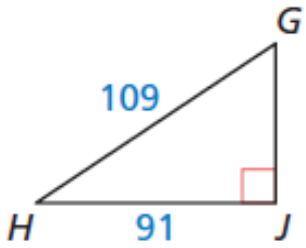


Solve the right triangle. Round decimal answers to the nearest tenth.

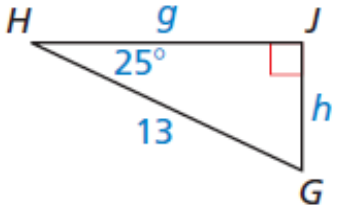
6.



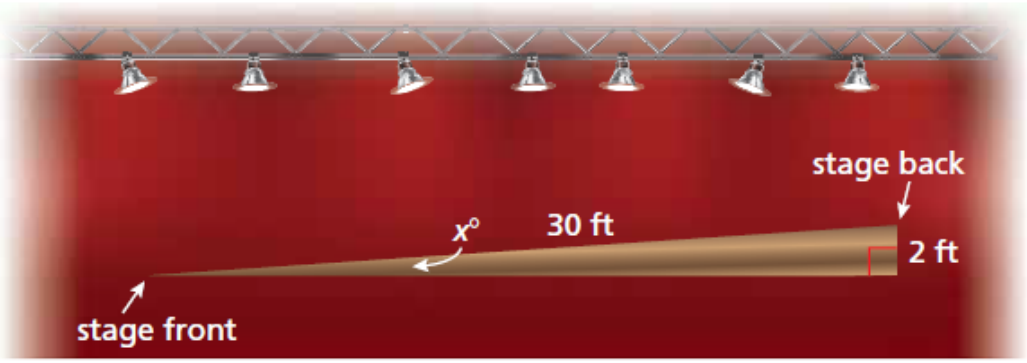
7.



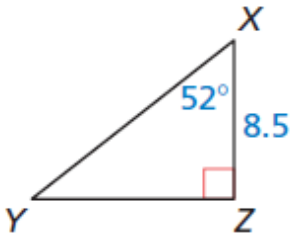
Solve the right triangle. Round decimal answers to the nearest tenth.



Your school is building a *raked stage*. The stage will be 30 feet long from front to back, with a total rise of 2 feet. You want the rake (angle of elevation) to be 5° or less for safety. Is the raked stage within your desired range?



8. Solve the right triangle. Round decimal answers to the nearest tenth.



9. WHAT IF? In Example 5, suppose another raked stage is 20 feet long from front to back with a total rise of 2 feet. Is the raked stage within your desired range?

Exit Ticket: A right triangle has legs of 8 centimeters and 13 centimeters. Solve the triangle completely