Name_____ Date _____

9.6 Solving Right Triangles

For use with Exploration 9.6

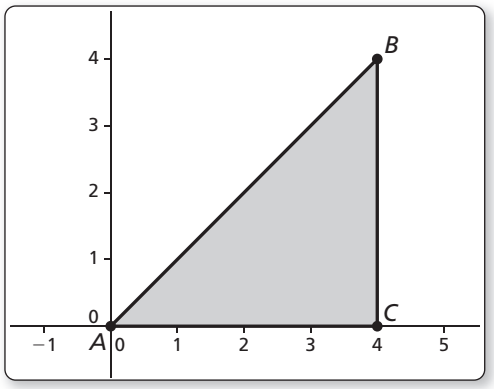
Essential Question When you know the lengths of the sides of a right triangle, how can you find the measures of the two acute angles?

1 EXPLORATION: Solving Special Right Triangles

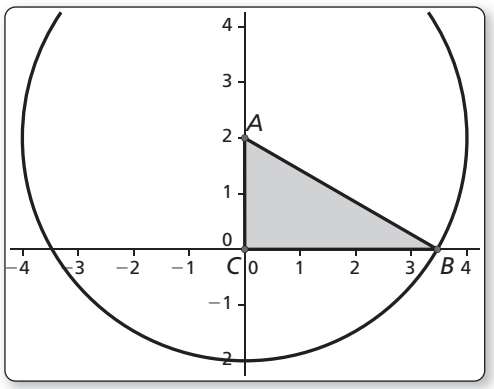
Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

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.

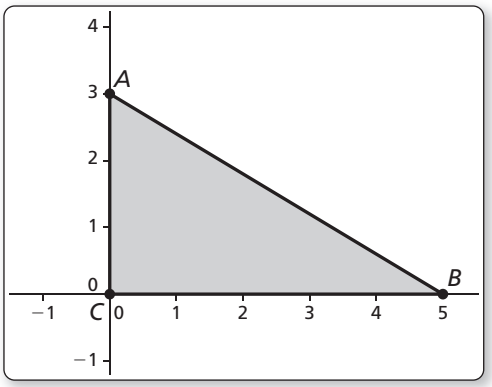


2 EXPLORATION: Solving Right Triangles

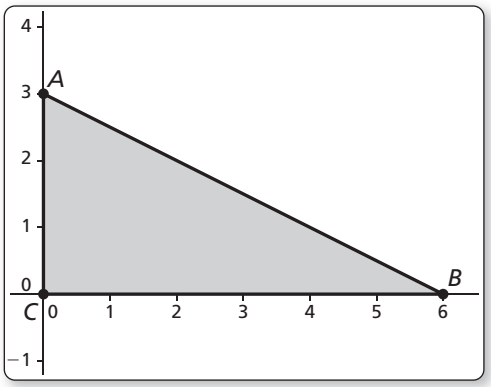
Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

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.



Communicate Your Answer

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

4. A ladder leaning against a building forms a right triangle with the building and the ground. The legs of the right triangle (in meters) form a 5-12-13 Pythagorean triple. Find the measures of the two acute angles to the nearest tenth of a degree.

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9.6 Notetaking with Vocabulary

For use after Lesson 9.6

In your own words, write the meaning of each vocabulary term.

inverse tangent

inverse sine

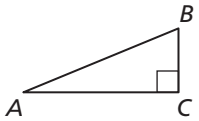
inverse cosine

solve a right triangle

Core Concepts

Inverse Trigonometric Ratios

Let $\angle A$ be an acute angle.



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

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

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

Notes:

Name _____ Date _____

9.6 Notetaking with Vocabulary (continued)

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.

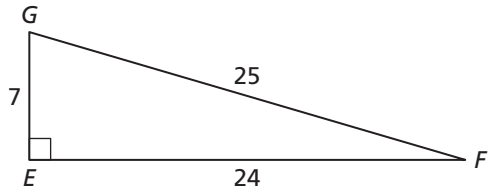
- two side lengths
- one side length and the measure of one acute angle

Notes:

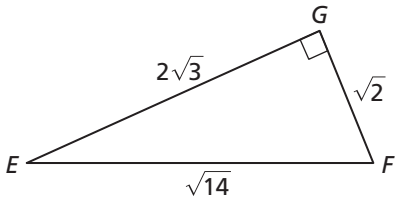
Extra Practice

In Exercises 1 and 2, determine which of the two acute angles has the given trigonometric ratio.

1. The cosine of the angle is $\frac{24}{25}$.



2. The sine of the angle is about 0.38.



In Exercises 3–6, let $\angle H$ be an acute angle. Use a calculator to approximate the measure of $\angle H$ to the nearest tenth of a degree.

3. $\sin H = 0.2$

4. $\tan H = 1$

5. $\cos H = 0.33$

6. $\sin H = 0.89$

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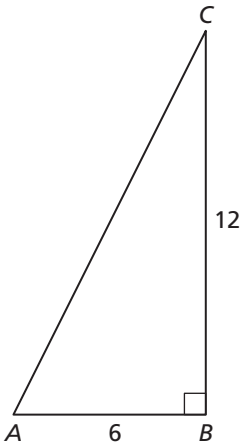
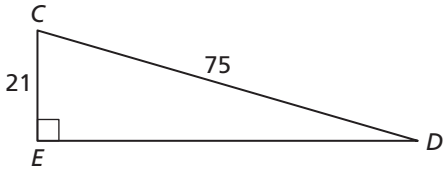
9.6 Notetaking with Vocabulary (continued)

In Exercises 7–10, solve the right triangle. Round decimal answers to the nearest tenth.

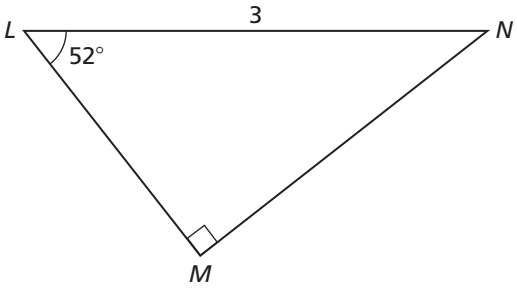
7.



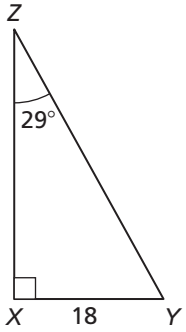
8.



9.



10.



11. A boat is pulled in by a winch on a dock 12 feet above the deck of the boat. When the winch is fully extended to 25 feet, what is the angle of elevation from the boat to the winch?