Edgenuity

Warm-Up | Unknown Leg Lengths in Right Triangles

Lesson Question

Lesson Goals

Use the Pythagorean theorem.

Find the unknown leg length in a _____ triangle.

Apply the _____ theorem to real-world scenarios.

Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you

	the side of a right triangle that is opposite the right angle; always the longest side
	the theorem stating that the sum of the squares of the lengths of the legs in a right triangle is equal to the square of the length of the hypotenuse
	to take the place of; to replace
	in a right triangle, either of the two sides forming the right angle

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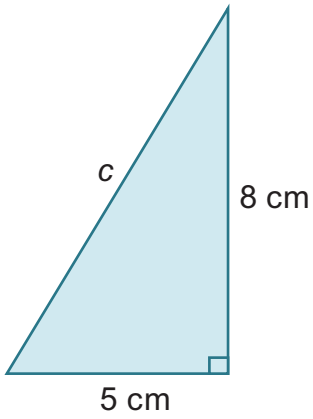
Finding the Length of the Hypotenuse

Determine the length of the **hypotenuse** of this right triangle.

Pythagorean theorem: $a^2 + b^2 =$ ☐



$a^2 + b^2 = c^2$

☐ $+ 5^2 = c^2$

$64 +$ ☐ $= c^2$

☐ $= c^2$

$\sqrt{89} = \sqrt{c^2}$

☐ cm $= c$

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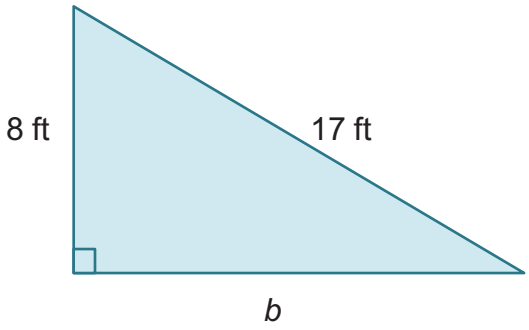
Slide 2

Apply the Pythagorean Theorem

An unknown **leg** of a right triangle can be found using the Pythagorean theorem.

Pythagorean theorem: $a^2 + b^2 = c^2$



$$a^2 + b^2 = c^2$$

$$\square + b^2 = \square$$

$$\square + b^2 = \square$$

$$b^2 = 289 - 64$$

$$b^2 = \square$$

$$\sqrt{b^2} = \sqrt{225}$$

$$b = \square \text{ ft}$$

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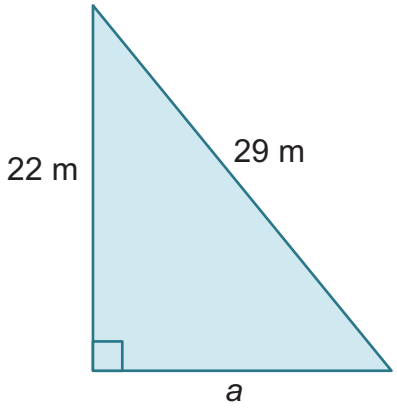
Solve for the Unknown Leg Length

Apply the Pythagorean theorem to find the unknown leg length.

Pythagorean theorem: $a^2 + b^2 = c^2$



$$a^2 + b^2 = c^2$$

$$a^2 + \square = \square$$

$$a^2 + \square = 841$$

$$a^2 = \square - 484$$

$$a^2 = \square$$

$$\sqrt{a^2} = \sqrt{357}$$

$$a = \square \text{ m}$$

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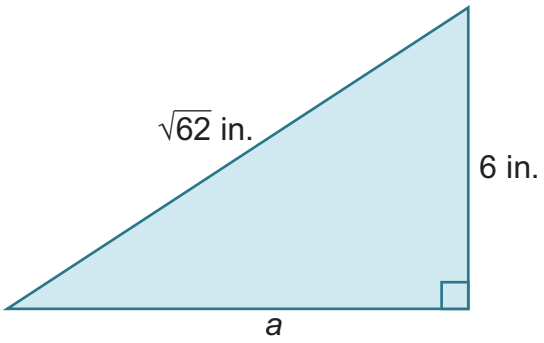
Finding a Leg Length

Find the value of unknown leg length.



$$a^2 + b^2 = c^2$$

$$a^2 + \square = \left(\square\right)^2$$

$$a^2 + \square = \square$$

$$a^2 = \square$$

$$\sqrt{a^2} = \sqrt{26}$$

$$a = \sqrt{26} \text{ in.}$$

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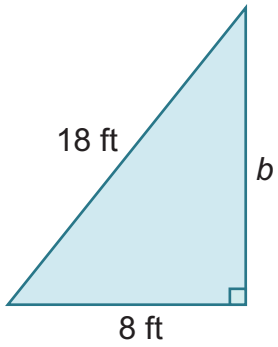
Solve a Real-World Problem

PROCEDURE

An 18-foot ladder is leaning against a wall. The distance on the ground from the ladder to the wall is 8 feet. How high up is the ladder on the wall?

Steps for solving real-world problems:

1. Create a diagram.



2. Determine variable values. $a = 8$ ft, $b = ?$, $c =$ ☐ ft

3. **Substitute** into the Pythagorean theorem.

$$a^2 + b^2 = c^2$$

$$\square + b^2 = \square$$

Finding the Unknown Measure

4. Solve for the variable.

$$8^2 + b^2 = 18^2$$

$$64 + b^2 = \square$$

$$-64 \quad -64$$

$$b^2 = 260$$

$$\sqrt{b^2} = \sqrt{260}$$

$$b = \square$$

$$b \approx \square \text{ ft}$$

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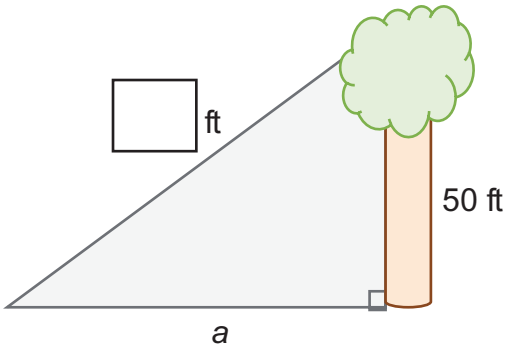
Right Triangle Leg Length

A tree is 50 feet tall. At one point during the day, the tree casts a shadow on the ground. The distance from the top of the tree to the furthest tip of the shadow is 80 feet. What is the length of the shadow? Round to the nearest hundredth.



$a^2 + b^2 = c^2$

$a^2 + \square = \square$

$a^2 + 2500 = \square$

$a^2 = \square$

$\sqrt{a^2} = \sqrt{3900}$

$a = \square$

$a \approx \square$ feet

Summary

Unknown Leg Lengths in Right Triangles

Lesson Question	How do you find the length of an unknown leg in a right triangle?

Answer

Use this space to write any questions or thoughts about this lesson.