Edgenuity

Warm-Up | Finding the Hypotenuse in Right Triangles

Lesson Question

Lesson Goals

Find the hypotenuse of a right triangle.

- **Use** the _____ theorem to solve for the unknown value.
- **Evaluate** square roots of _____ squares.
- **Recognize** that non-perfect square roots can be approximated.

Words to Know

Write the letter of the definition next to the matching word as you work through the lesson. You may use the glossary to help you.

_____	leg	A. the side of a right triangle that is opposite the right angle; always the longest side
_____	right triangle	B. a number that is the result of squaring a natural, or whole, number
_____	hypotenuse	C. in a right triangle, either of the two sides forming the right angle
_____	perfect square	D. a triangle having an interior angle measuring 90 degrees

Warm-Up | Finding the Hypotenuse in Right Triangles

Perfect Square Numbers

- A number that can be produced by multiplying an integer by [ ] is known as a **perfect square**.
- For example, the number 9 can be produced by multiplying the positive integer 3 by itself: $(3 \times 3) = 9$.
- The number 12, however, cannot be produced this way, so it is not a [ ] square.

Are the following numbers perfect squares?

- $4 = (2 \times 2) =$ [ ]
- $25 =$ ([ ] $\times$ [ ]) $= 5^2$
- $50 =$ not a perfect square

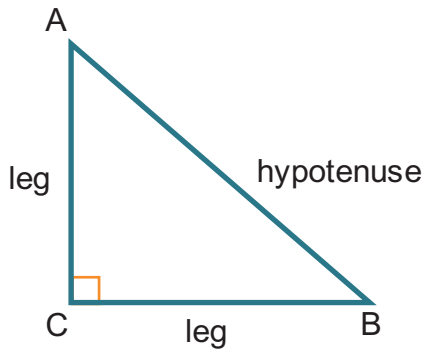
Instruction | Finding the Hypotenuse in Right Triangles

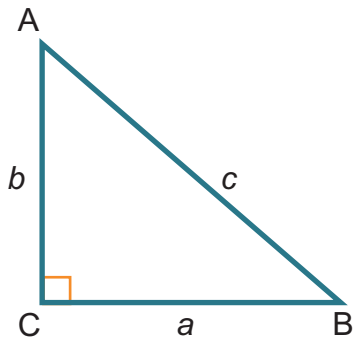
Slide 2

Longest Side of a Right Triangle

A **right triangle** is a triangle that contains one right angle. The sides that make up the right angle are the **legs,** and the side [ ] the right angle is the **hypotenuse**. The hypotenuse is always the [ ] side of a right triangle.

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





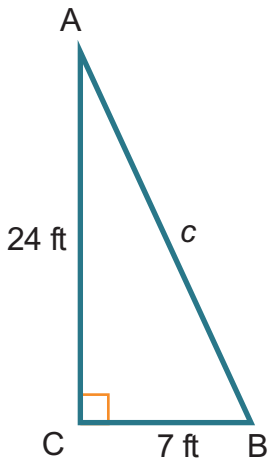
Instruction | Finding the Hypotenuse in Right Triangles

Slide 2

Using the Pythagorean Theorem to Find the Hypotenuse

EXAMPLE

Use the Pythagorean theorem to find the length of the hypotenuse, c.



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

$7^2 + 24^2 = c^2$

$\square + 576 = c^2$

$\square = c^2$

$\sqrt{625} = \sqrt{c^2}$

$\pm 25 = c$

$c = \square$ ft

Distance is always positive.

Instruction | Finding the Hypotenuse in Right Triangles

Slide 4

The Pythagorean Theorem and Distance

REAL-WORLD CONNECTION

To get to the local coffee shop, Van left his house, walked 3 blocks south, and then walked 4 blocks west.

When he got to the coffee shop, Van realized he could take a more direct route home. How many blocks will Van have to walk to get home from the coffee shop if he takes the most direct route?

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

$$3^2 + 4^2 = c^2$$

$$\square + 16 = c^2$$

$$\square = c^2$$

$$\pm\sqrt{25} = c$$

$$\square = c$$

5 blocks

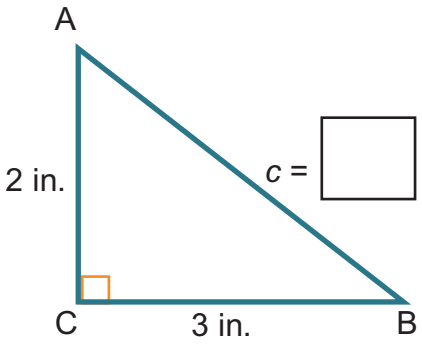
Instruction | Finding the Hypotenuse in Right Triangles

Slide 7

Finding the Length of a Non-Perfect Hypotenuse

EXAMPLE

Use the Pythagorean theorem to find the length of the hypotenuse, *c*.



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

$$3^2 + \square = c^2$$

$$\square + 4 = c^2$$

$$\square = c^2$$

$$\pm\sqrt{13} = c$$

$$\sqrt{13} = c$$

Slide 10

Finding the Length of a Ladder

REAL-WORLD CONNECTION

Robert wants to hang a picture above his entertainment center. How long must a ladder be to reach a height of 13 feet if the bottom of the ladder is placed 3 feet from the base of the wall?

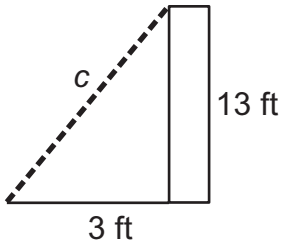
$$a^2 + b^2 = c^2$$

$$3^2 + 13^2 = c^2$$

$$9 + \square = c^2$$

$$\sqrt{178} = \sqrt{c^2}$$

$$\sqrt{178} = c$$



Use a calculator to give an approximate number for the length.

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

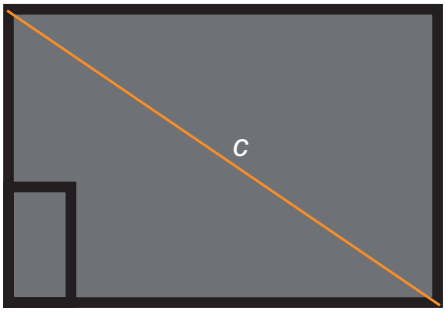
Instruction | Finding the Hypotenuse in Right Triangles

Slide 12

Right Triangles and Measures

REAL-WORLD CONNECTION

Jenna is shopping for a new computer monitor. If she knows the measurements of the sides of the monitor, how can she figure out the diagonal measurement?



The diagonal split the rectangle into 2 right triangles.

Use the [ ] theorem.

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

$\square + 14^2 = c^2$

$121 + \square = c^2$

$317 = c^2$

$\sqrt{317} = \sqrt{c^2}$

$\sqrt{317} = c$

$c \approx \square$ in.

Summary

Finding the Hypotenuse in Right Triangles

Lesson Question	How can you find the length of the hypotenuse of a right triangle?

Answer

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