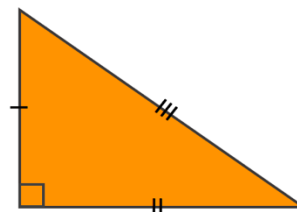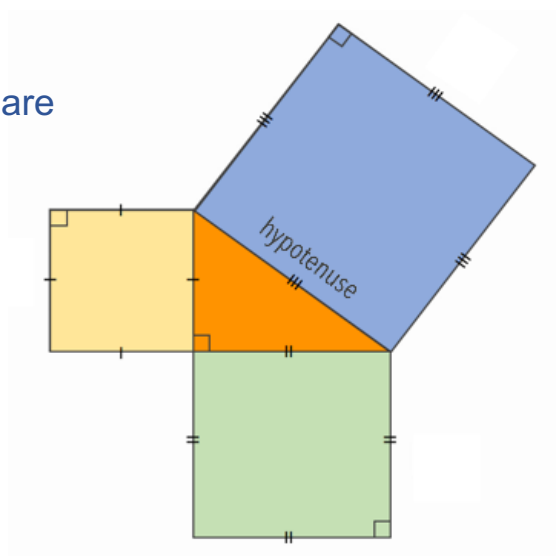# The Pythagorean Theorem

- How would I describe the properties of the triangle shown here?

Here is the same right triangle, with a square drawn on each side.

In a right triangle, the area of the square on the hypotenuse is equal to the sum of the areas of the squares on the legs.

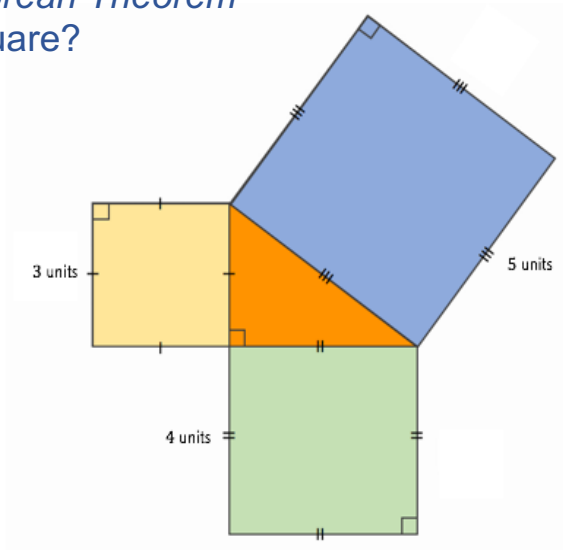This relationship is called the *Pythagorean Theorem.*

hypotenuse

- How would I use the diagram to explain the *Pythagorean Theorem?*

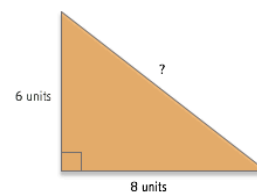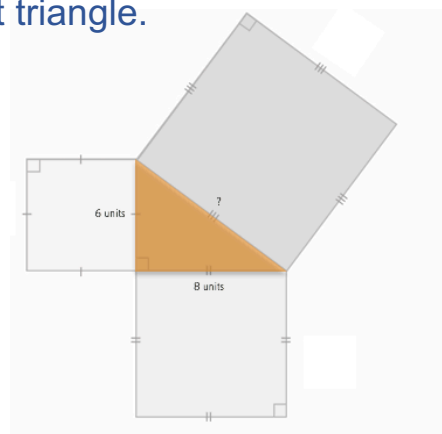- How would I use the areas of the squares to explain the *Pythagorean Theorem?*

25 square units

9 square units

16 square units
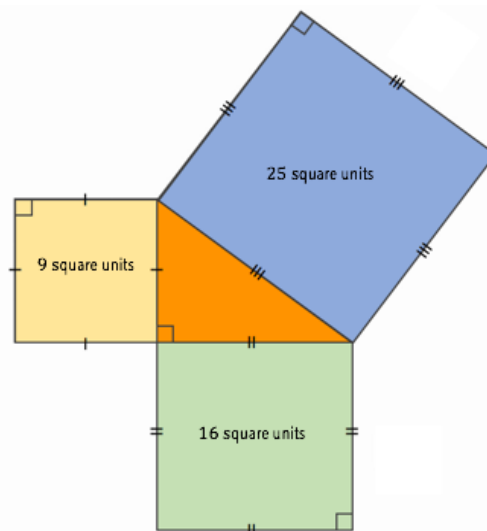
- How would I explain the *Pythagorean Theorem* given the side length of each square?

3 units

5 units

4 units

The *Pythagorean Theorem* can be used to calculate a missing side length on a right triangle.

6 units

?

8 units

6 units

?

8 units

- How would I use the diagrams to explain how I calculate the missing length on the right triangle?
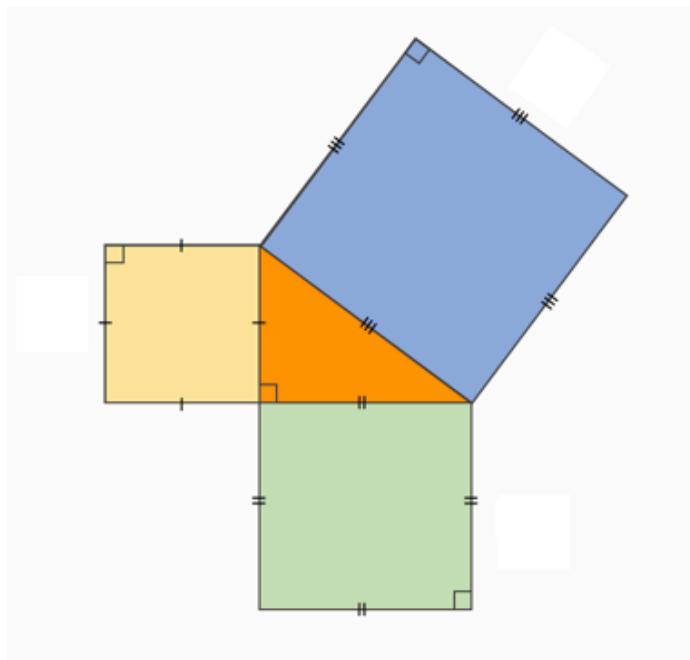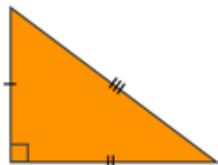
In the previous problem, the area of the square on the hypotenuse was 100.

- How would I explain why the side length of the square on the hypotenuse is equal to 10?
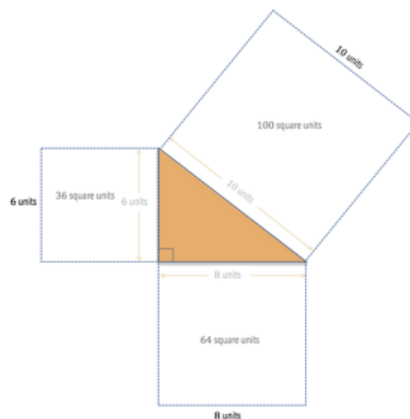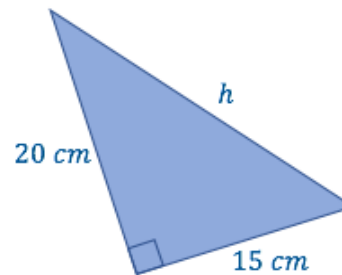

The equation $a^2 + b^2 = c^2$ can also be used to calculate a missing length on a right triangle.

- How would I explain the equation $a^2 + b^2 = c^2$ using the diagrams below?

I'll use the equation $a^2 + b^2 = c^2$ to calculate the missing length h on the right triangle.

- How would I explain substituting the values, shown on the right triangle, into the equation $a^2 + b^2 = c^2$?

- How would I explain and demonstrate performing the math shown on the right side of my equation?

$$c^2 = a^2 + b^2$$
$$h^2 = 20^2 + 15^2$$

- How would I explain and demonstrate completing my solution… $h^2 = 625$?

$$c^2 = a^2 + b^2$$
$$h^2 = 20^2 + 15^2$$
$$= 400 + 225$$
$$h^2 = 625$$

Which statements do I feel confident explaining and demonstrating?

Which statements do I <u>not</u> feel confident explaining and demonstrating?

✓ I can <u>describe</u> the properties of a right triangle

✓ I can <u>identify</u> the hypotenuse and the legs on a right triangle

✓ I can <u>explain</u> the Pythagorean Theorem as a relationship that is true for all right triangles

✓ I can <u>Illustrate</u> the Pythagorean Theorem as a relationship that is true for all right triangles

✓ I can <u>explain</u> how the equation $a^2 + b^2 = c^2$ represents the Pythagorean Theorem

✓ I can <u>explain</u> and <u>demonstrate</u> using the equation $a^2 + b^2 = c^2$ to calculate an unknown length on a right triangle