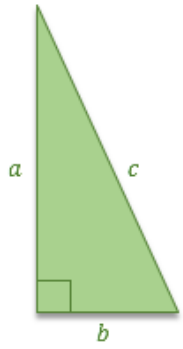
The Pythagorean Theorem…with a difference

The equation $a^2 + b^2 = c^2$ describes a relationship that is true for all right triangles. This relationship is called the **Pythagorean Theorem.**

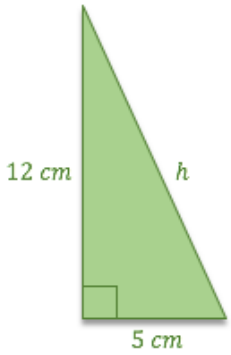
- How does the equation $a^2 + b^2 = c^2$ explain the **Pythagorean Theorem**?



I can also use the equation $a^2 + b^2 = c^2$ to solve for an unknown side length on a right triangle. I'll review my solution steps for using the equation $a^2 + b^2 = c^2$ to calculate an unknown length.

- How would I explain or describe the problem I'm being asked to solve?

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



I've substituted the values shown on my right triangle into the equation. Next, I'll review how I solve the equation.

- How would I explain the math I'm performing at this step in my solution?

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

$$12^2 + 5^2 = h^2$$

- Why does my solution require that I square the lengths of the sides of my right triangle?

- Why do I add the values in my equation at this step in my solution?

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

$$12^2 + 5^2 = h^2$$

$$144 + 25 = h^2$$

- How would I explain the math I'm performing to complete my solution?

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

$$12^2 + 5^2 = h^2$$

$$144 + 25 = h^2$$

$$169 = h^2$$

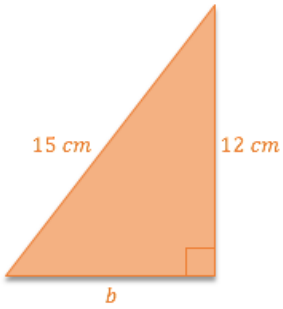
$$\sqrt{169} = h$$

$$13 = h$$

I'll compare my right triangle from the previous problem to another example.

- How might my description of both problems be the same?
- How are the problems different?

- How would I explain and demonstrate my substitution step for this problem?

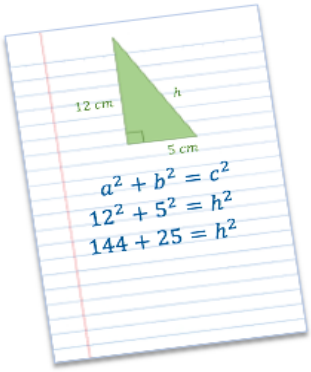


- How would I compare my substitution step to the previous problem?

- How is the math I'm performing at this step the same as my previous problem?

$$a^2 + b^2 = c^2$$
$$12^2 + b^2 = 15^2$$

My solution in the previous problem required an addition calculation.



In my new problem, the calculation required at this step is different.

- How would I explain this difference?

$$a^2 + b^2 = c^2$$
$$12^2 + b^2 = 15^2$$
$$144 + b^2 = 225$$

- How would I explain and demonstrate isolating the term b^2 using subtraction?

- Why does my solution path for this problem involve a subtraction calculation?

$$a^2 + b^2 = c^2$$
$$12^2 + b^2 = 15^2$$
$$144 + b^2 = 225$$
$$-144 \qquad -144$$

- How will I use the area of a square to calculate the side length of the square?

$$a^2 + b^2 = c^2$$
$$12^2 + b^2 = 15^2$$
$$144 + b^2 = 225$$
$$-144 \qquad -144$$
$$b^2 = 81$$

The Pythagorean Theorem… *with a difference*

Which statements do I feel confident explaining and demonstrating?
Which statements do I not feel confident explaining and demonstrating?