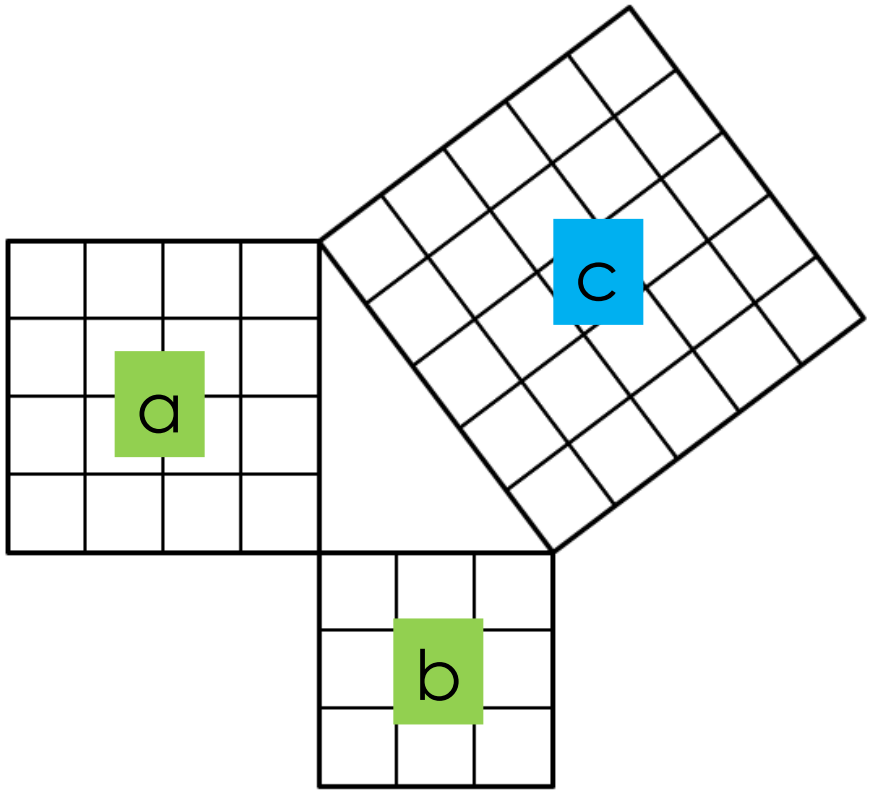
Pythagorean Theorem study notes

The History: Pythagoras was a Greek mathematician and philosopher who discovered the Pythagorean Theorem. Pythagoras recognizes the theory as a relationship between the sides of a right triangle.

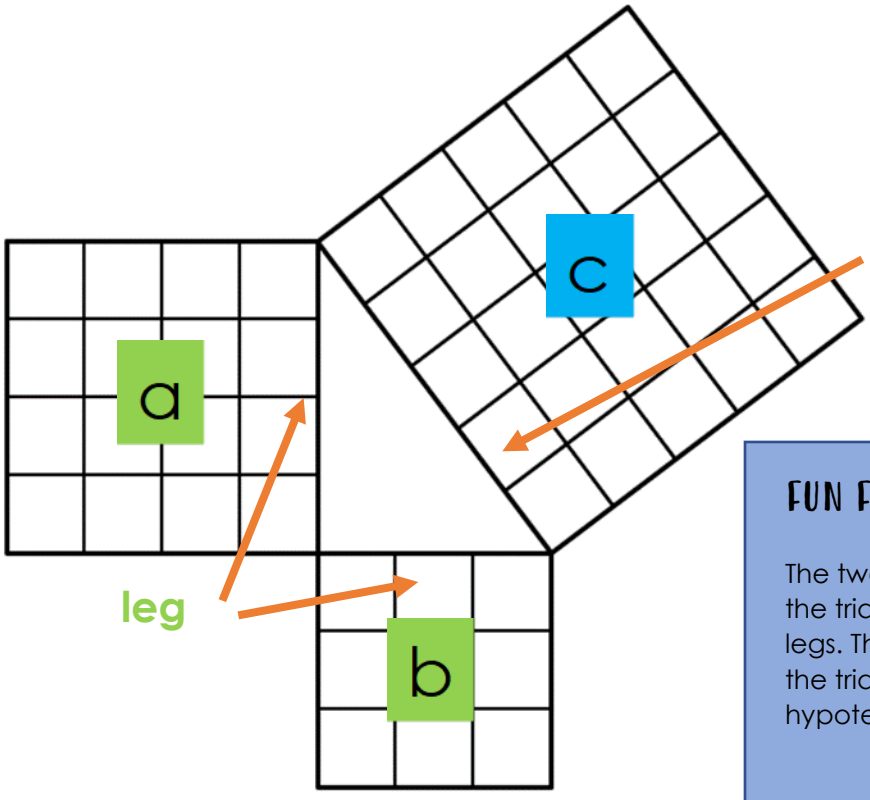
The theory states that the sum of the squares of the legs of a right triangle equals the square of the length of the hypotenuse.

According to the Pythagorean theorem the sum of the two green squares is equal to the area of the blue square.



Let's test this out...

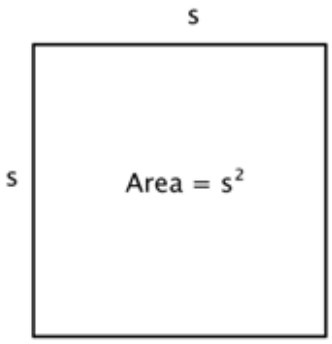
Basically we are being asked to find the area of both of the green squares together, then compare it to the area of the blue square. According to Pythagorean Theorem, they should be the same.



FUN FACT

The two shorter sides of the triangle are called legs. The longest side of the triangle is the hypotenuse.

WAIT. HOW DO I CALCULATE AREA AGAIN??



OH RIGHT . . .

So.. square a has side lengths of 4 units by 4 units 4. I know that 4^2 is 16.

Square b has side lengths of 3 units by 3 units. I know 3^2 is 9. So…

If I combine the areas of both green squares, I will get this equation: 16 + 9 = 25

Square c has side lengths of 5 units by 5 units. I know the area will be 25, because 5^2 is 25.

UM, HOW IS THIS PYTHAGOREAN THEOREM?

Good question, you just did it! Well, let's see how to represent it the way Pythagoras Intended.

When we find the area of a square, as we did with square a , instead of simply writing 4 x 4 = 16, we can use use exponents as we have learned and represent it with $4^2 = 16$.

To be able to remember this for the future, we will use a special code.

Area of square A = a^2

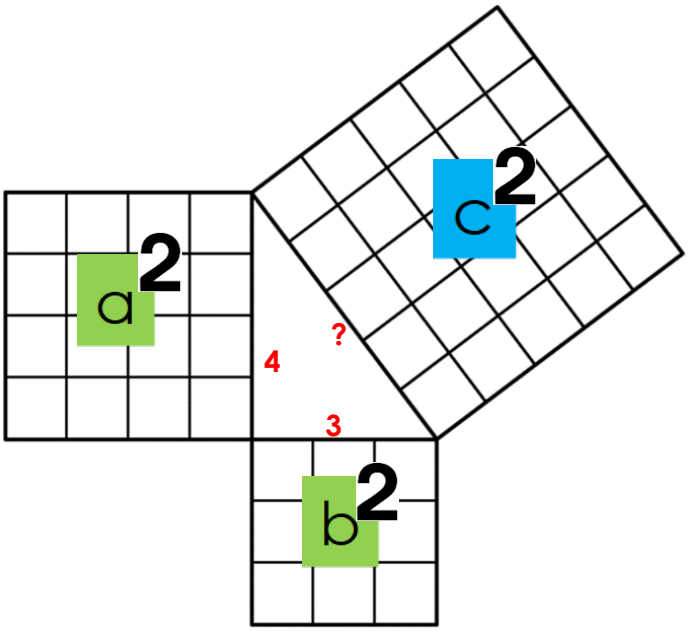
Area of square B = b^2

Area of Square C = c^2

Therefore, in algebraic terms,

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

We already did the work, we just need to put it in the equation!



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

$4^2 + 3^2 = c^2$ ← Substitute for the known variables.

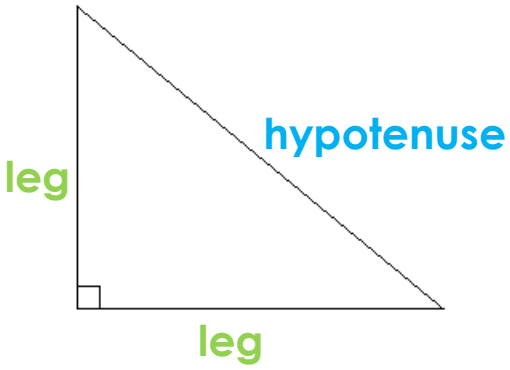
$16 + 9 = c^2$

$\sqrt{25} = \sqrt{c}$ ← Calculate the square root of both sides.

$5 = c$

The length of the hypotenuse is 5 cm.

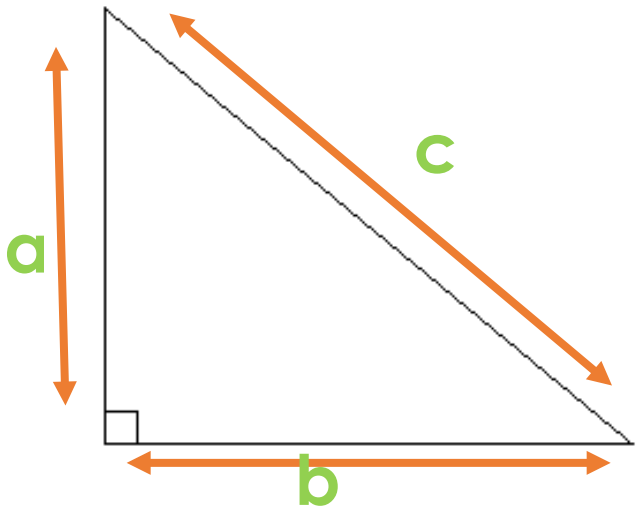
RECAP:



Equation for calculating the hypotenuse:

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

THE THEORY STATES THAT THE SUM OF THE SQUARES OF THE LEGS OF A RIGHT TRIANGLE EQUALS THE SQUARE OF THE LENGTH OF THE HYPOTENUSE.



Instead of 4 x 4 = 16

Write $4^2 = 16$