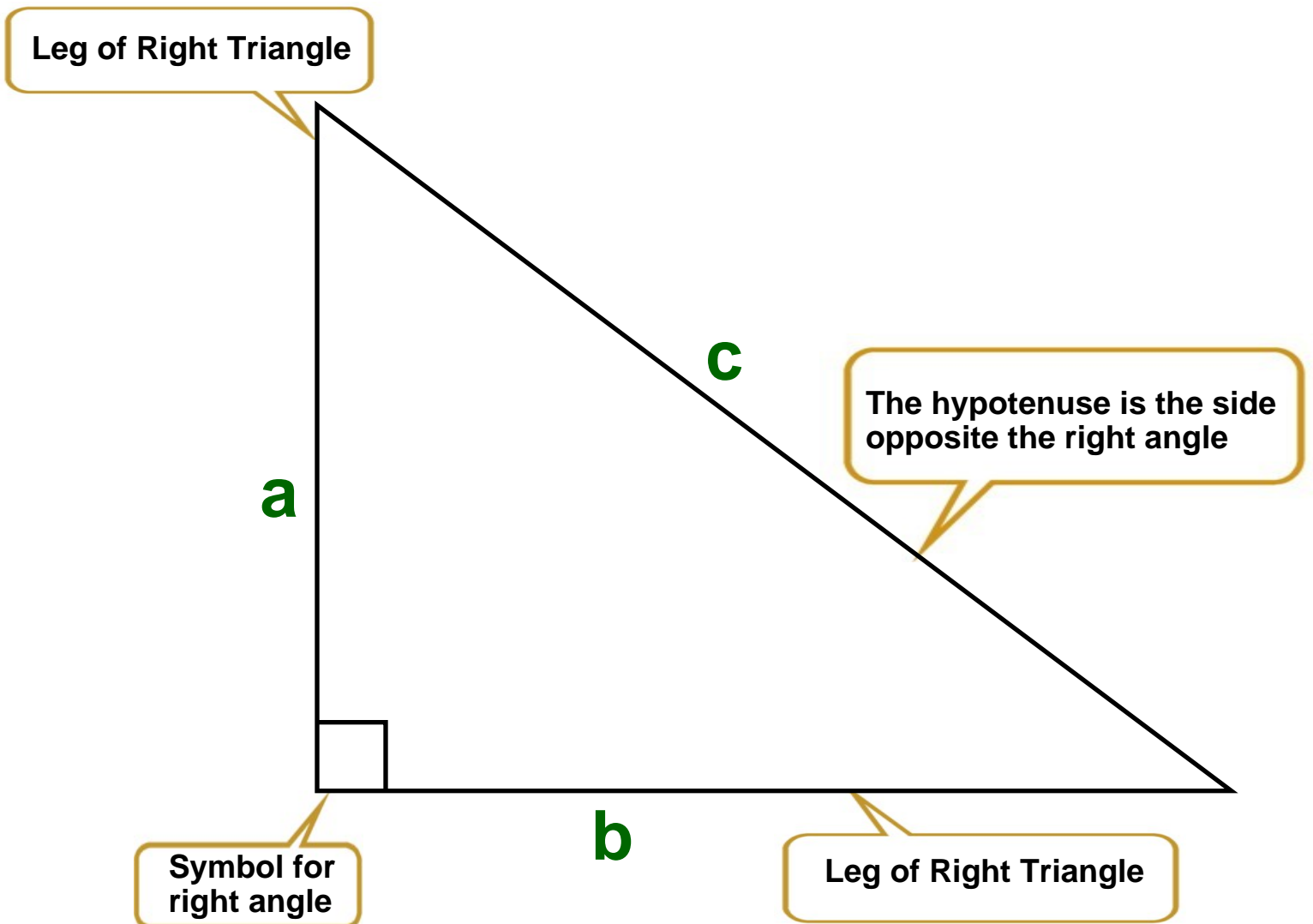


Pythagorean Theorem

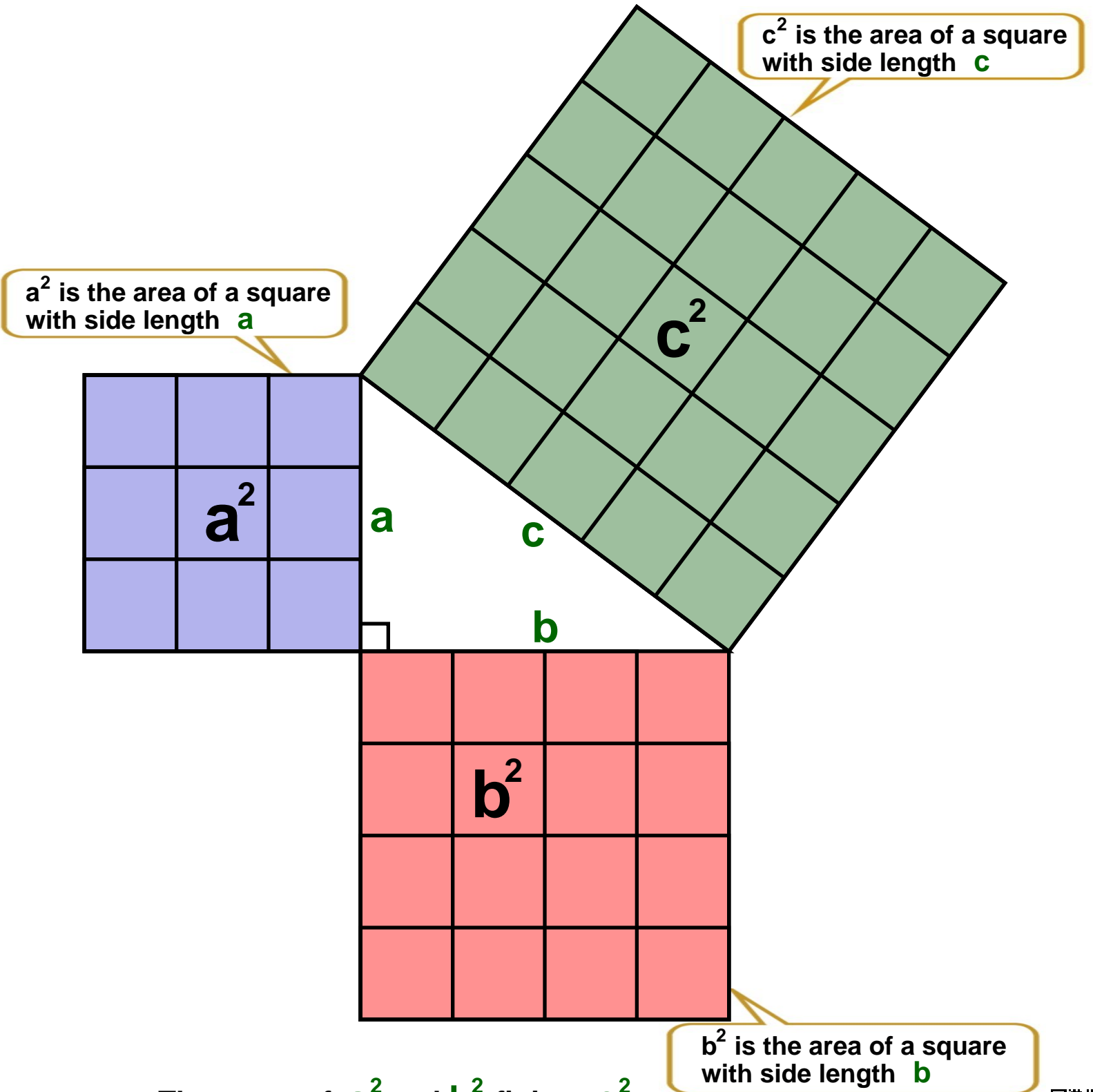
The Pythagorean Theorem describes the relationship between the lengths of the legs and the hypotenuse of a right triangle.

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



Pythagorean Theorem

The relationship $a^2 + b^2 = c^2$ can be shown visually.

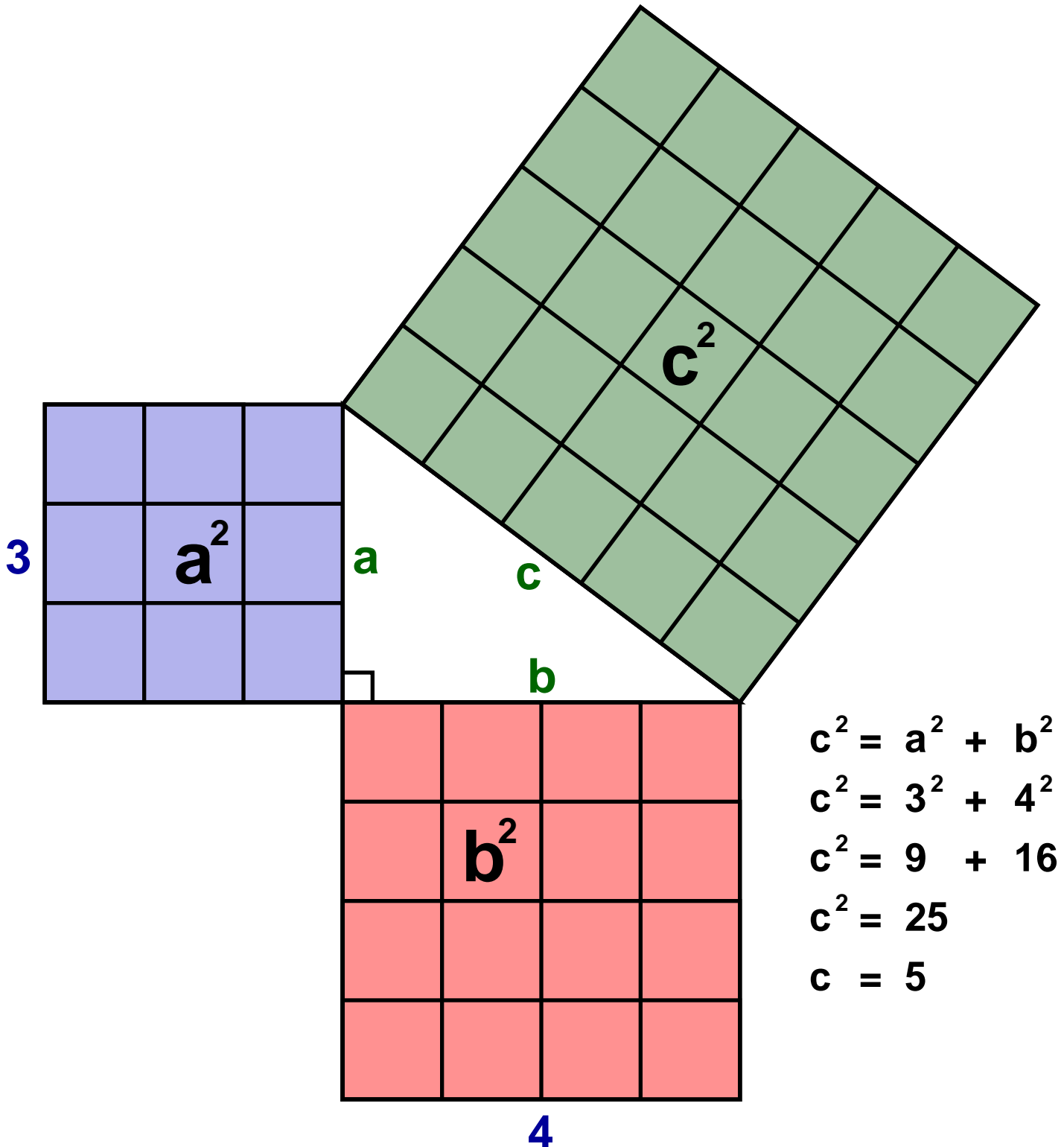


The areas of a^2 and b^2 fit into c^2



Pythagorean Theorem

Given the length of legs **a** and **b**, the length of the hypotenuse can be found using the formula $a^2 + b^2 = c^2$.



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

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

$$c^2 = 9 + 16$$

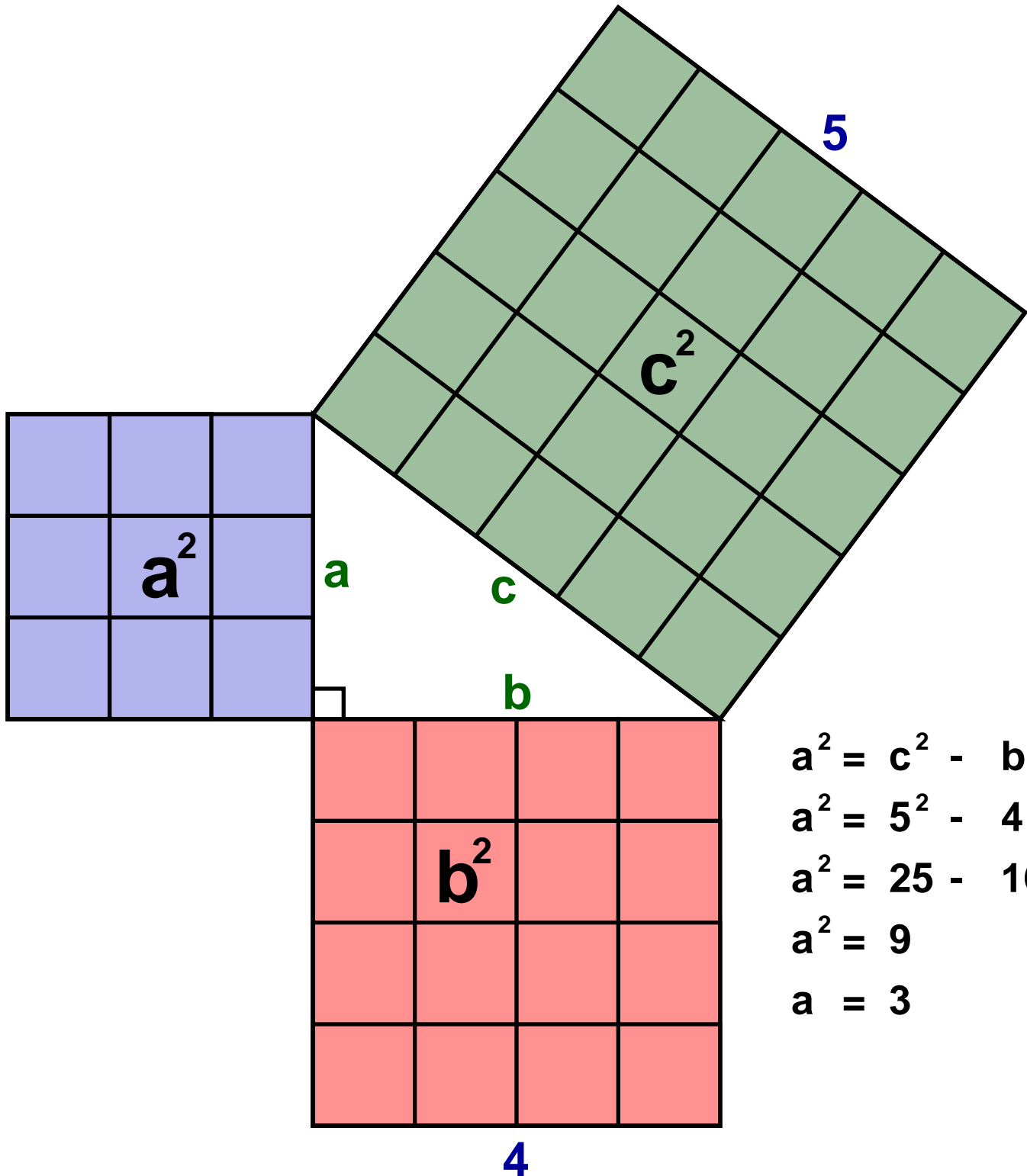
$$c^2 = 25$$

$$c = 5$$



Pythagorean Theorem

Given the length of legs **a** and **b**, the length of the hypotenuse can be found using the formula $a^2 + b^2 = c^2$.

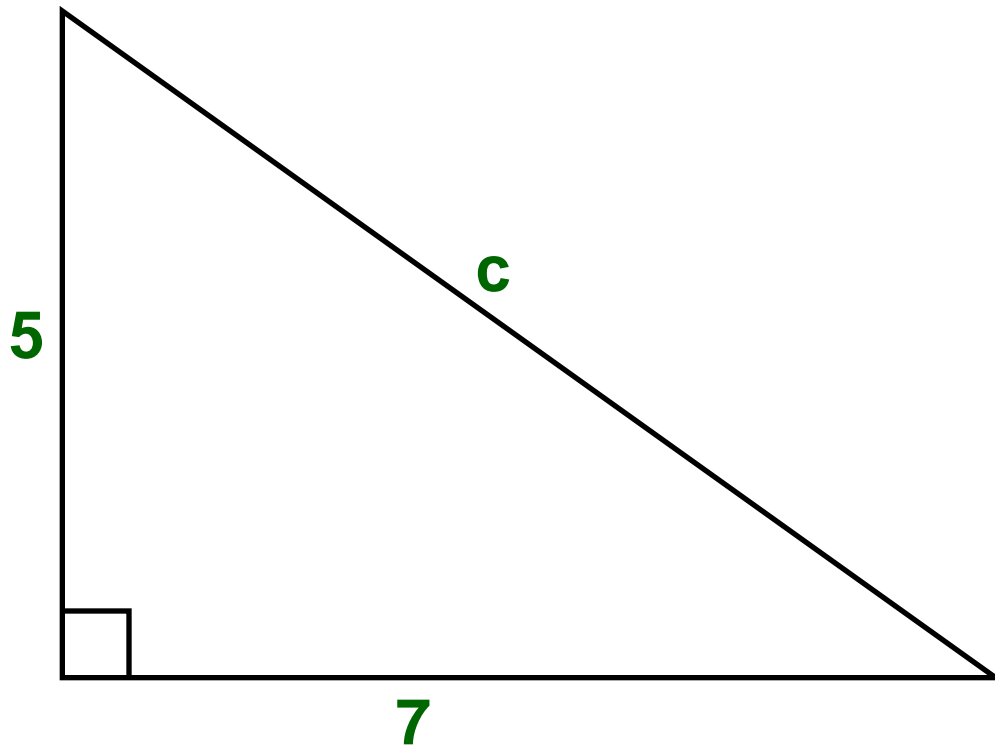


$$\begin{aligned} a^2 &= c^2 - b^2 \\ a^2 &= 5^2 - 4^2 \\ a^2 &= 25 - 16 \\ a^2 &= 9 \\ a &= 3 \end{aligned}$$



Pythagorean Theorem

The Pythagorean Theorem will work for any right triangle.



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

$$c^2 = 5^2 + 7^2$$

$$c^2 = 25 + 49$$

$$c^2 = 74$$

$$c = \sqrt{74}$$

$$c \approx 8.6023$$



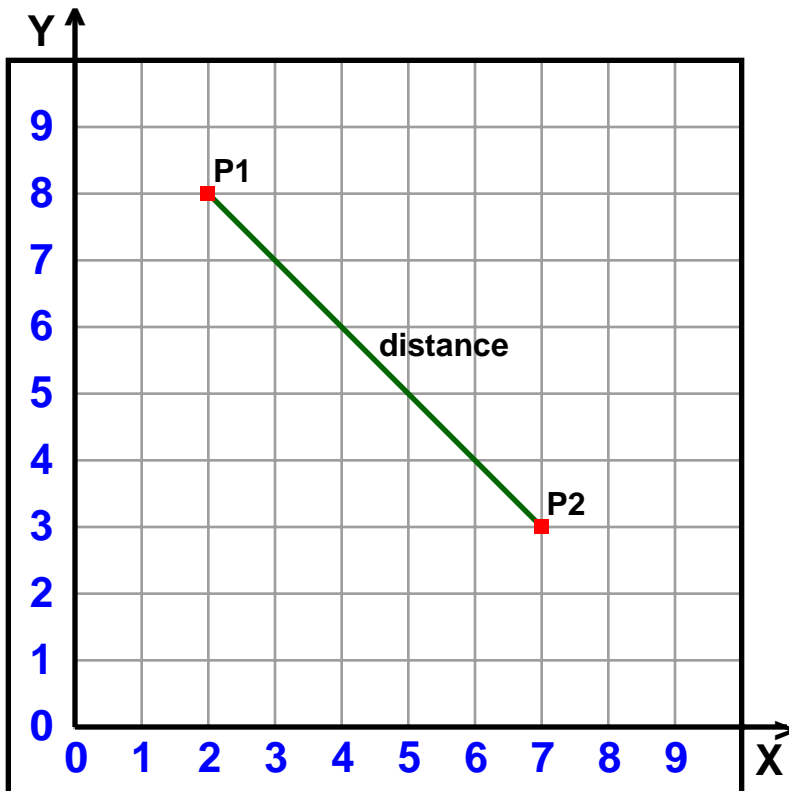
Pythagorean Theorem

The Distance Formula is a variant of the Pythagorean Theorem.

You may calculate the distance between two points using the the Distance Formula.

The Distance Formula : Given the two points P1 (x_1, y_1) and P2 (x_2, y_2),
the distance between these points is given by the formula:

$$\text{distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$



$$P_1 = (x_1, y_1) \quad P_2 = (x_2, y_2)$$

$$P_1 = (2, 8) \quad P_2 = (7, 3)$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(7 - 2)^2 + (3 - 8)^2}$$

$$d = \sqrt{(5)^2 + (-5)^2}$$

$$d = \sqrt{25 + 25}$$

$$d = \sqrt{50}$$

$$d \approx 7.0711$$

