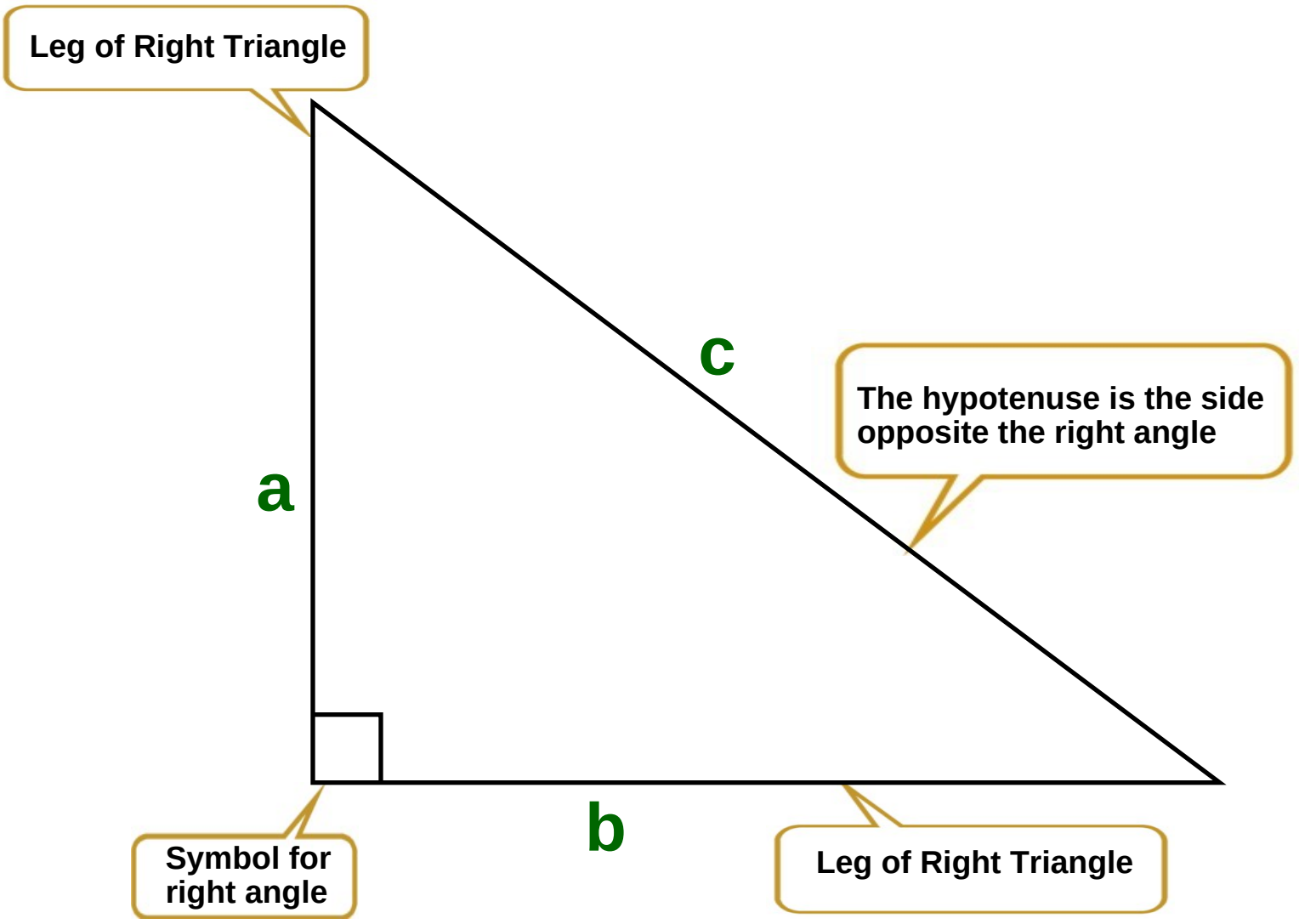
Pythagorean Theorem

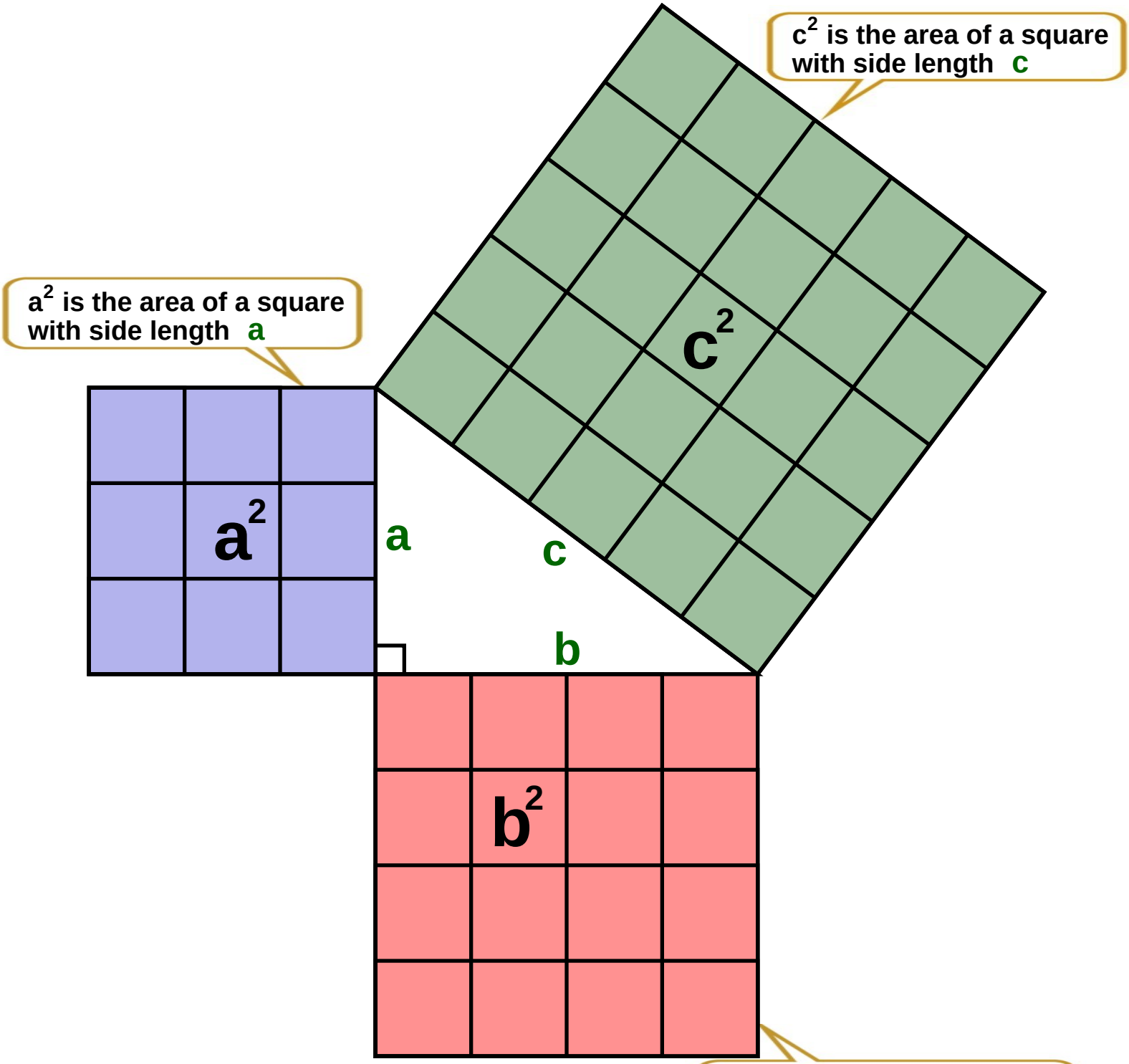
The Pythagorean Theorem describes the relationship between the lengths of the legs and the hypotenuse of a right triangle.

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



Pythagorean Theorem

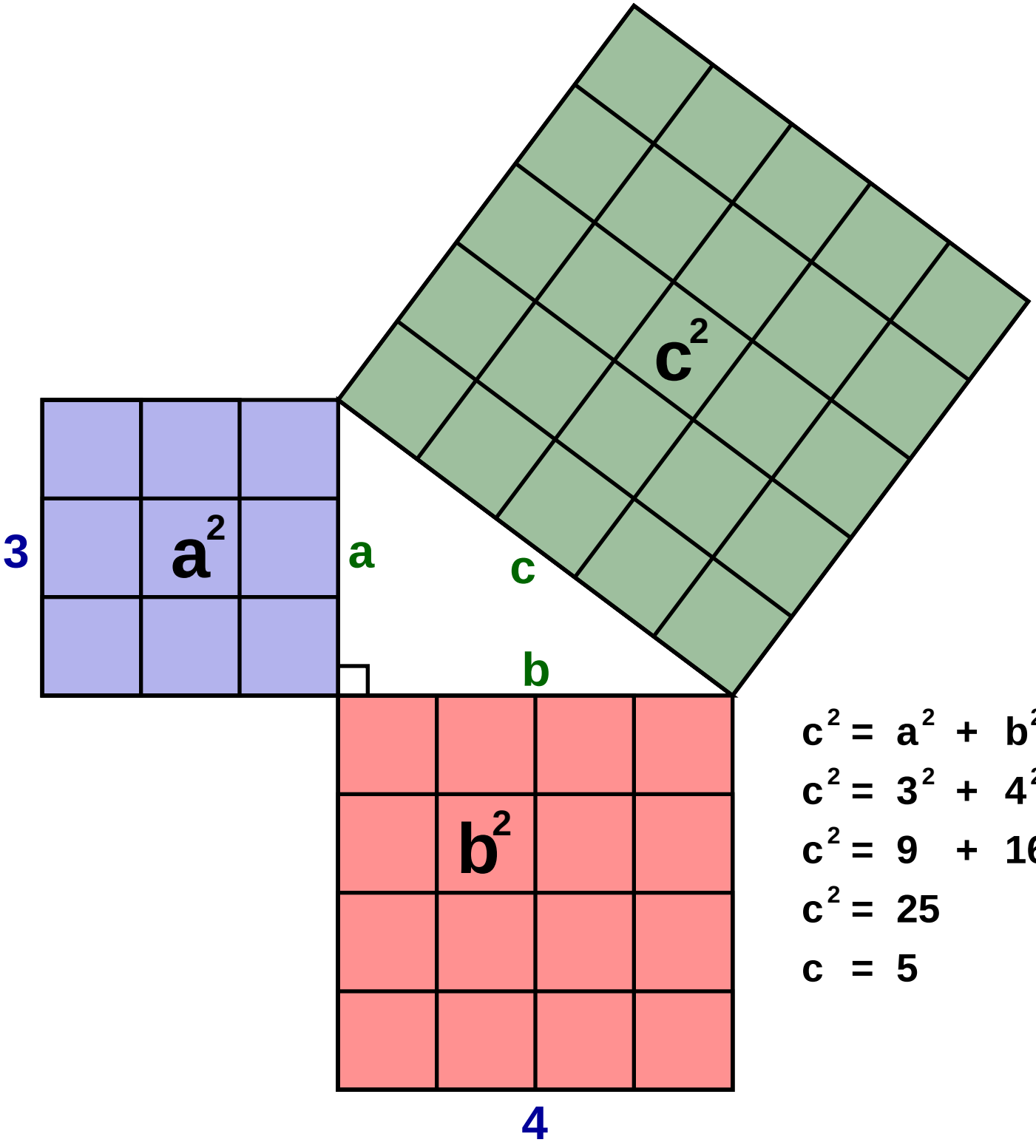
The relationship $a^2 + b^2 = c^2$ can be shown visually.



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



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

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

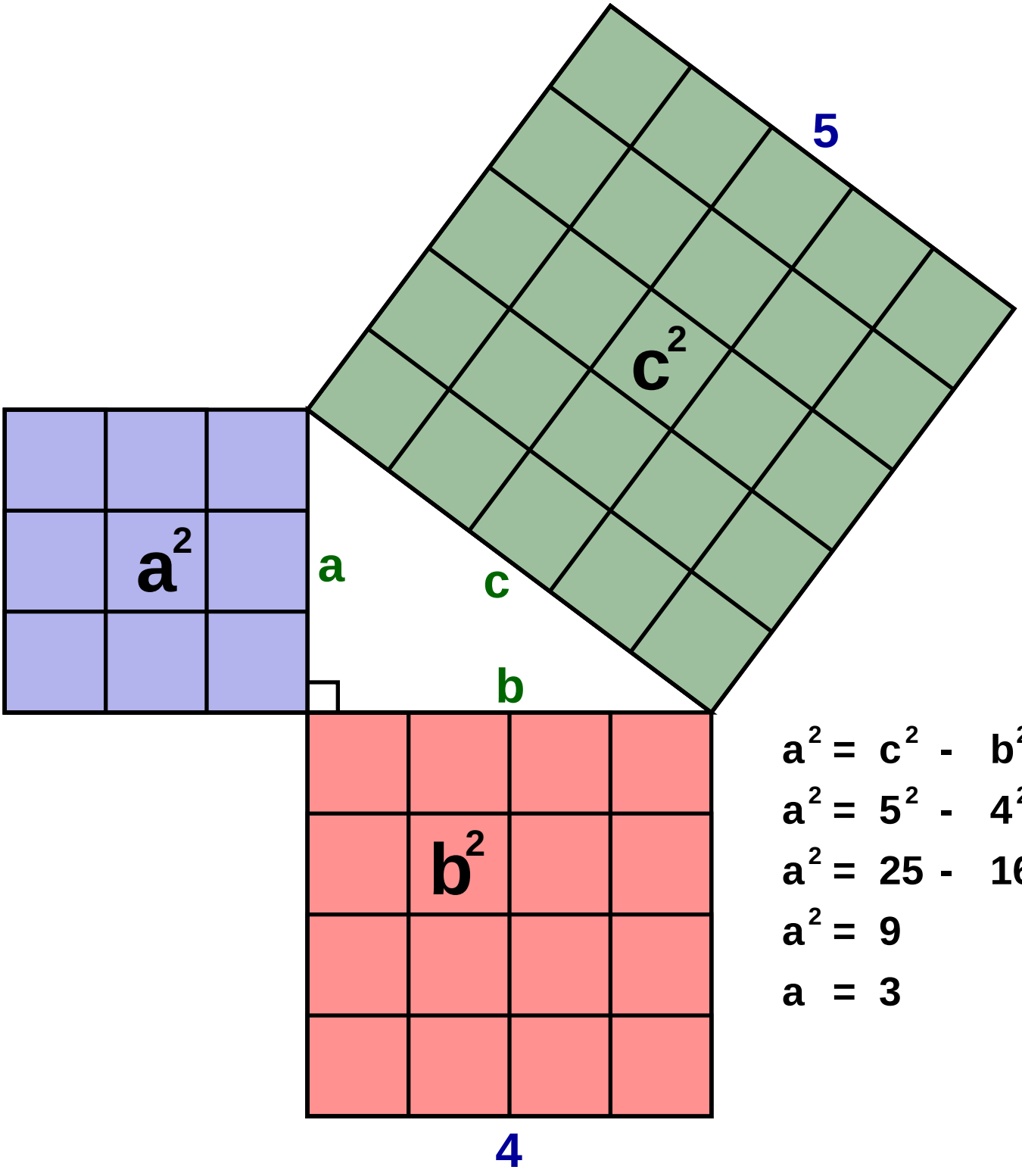
$c^2 = 9 + 16$

$c^2 = 25$

$c = 5$

Pythagorean Theorem

Given the length of one leg and the length of the hypotenuse, the length of the other leg can be found using the formula $a^2 = c^2 - b^2$.



$a^2 = c^2 - b^2$

$a^2 = 5^2 - 4^2$

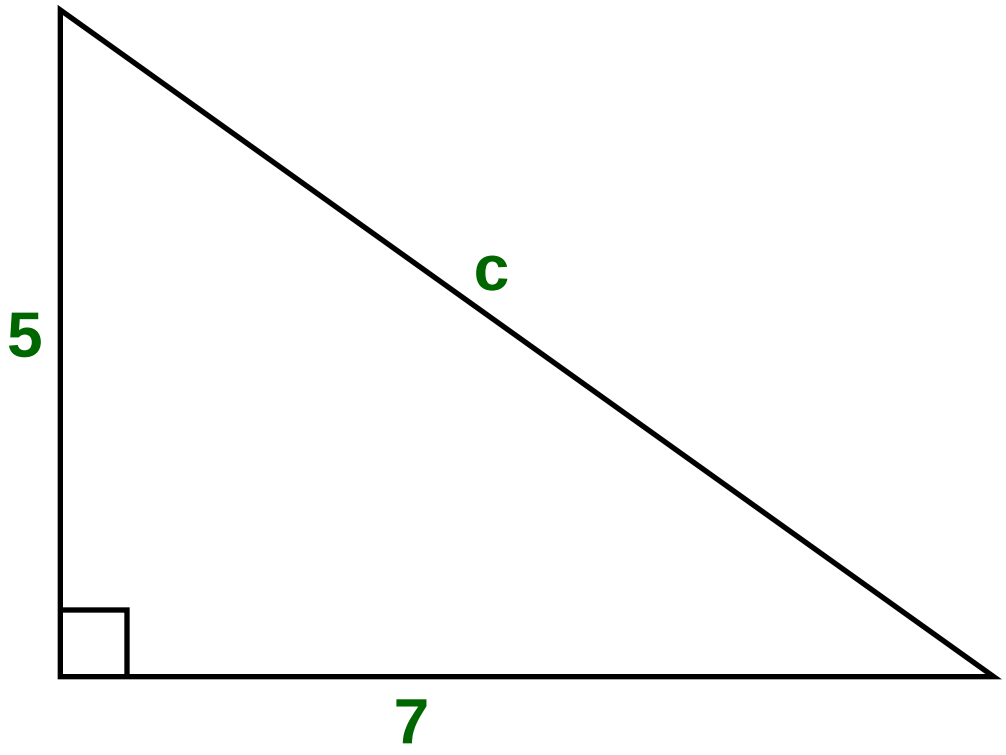
$a^2 = 25 - 16$

$a^2 = 9$

$a = 3$

Pythagorean Theorem

The Pythagorean Theorem will work for any right triangle.



$$c^2 = a^2 + b^2$$
$$c^2 = 5^2 + 7^2$$
$$c^2 = 25 + 49$$
$$c^2 = 74$$
$$c = \sqrt{74}$$
$$c \approx 8.6023$$

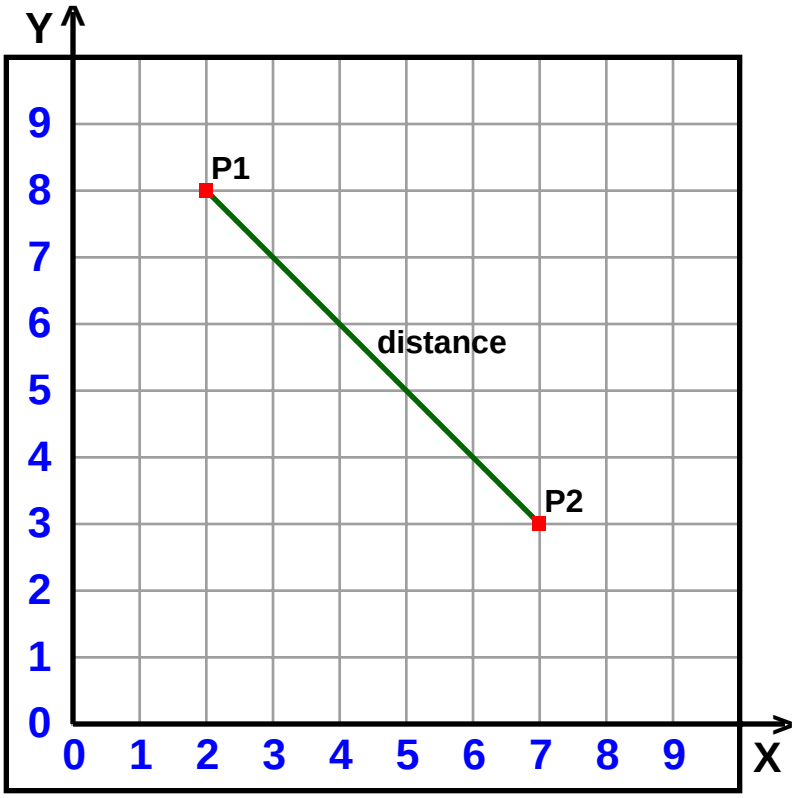
Pythagorean Theorem

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:

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



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

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

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

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

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

$d = \sqrt{25 + 25}$

$d = \sqrt{50}$

$d \simeq 7.0711$