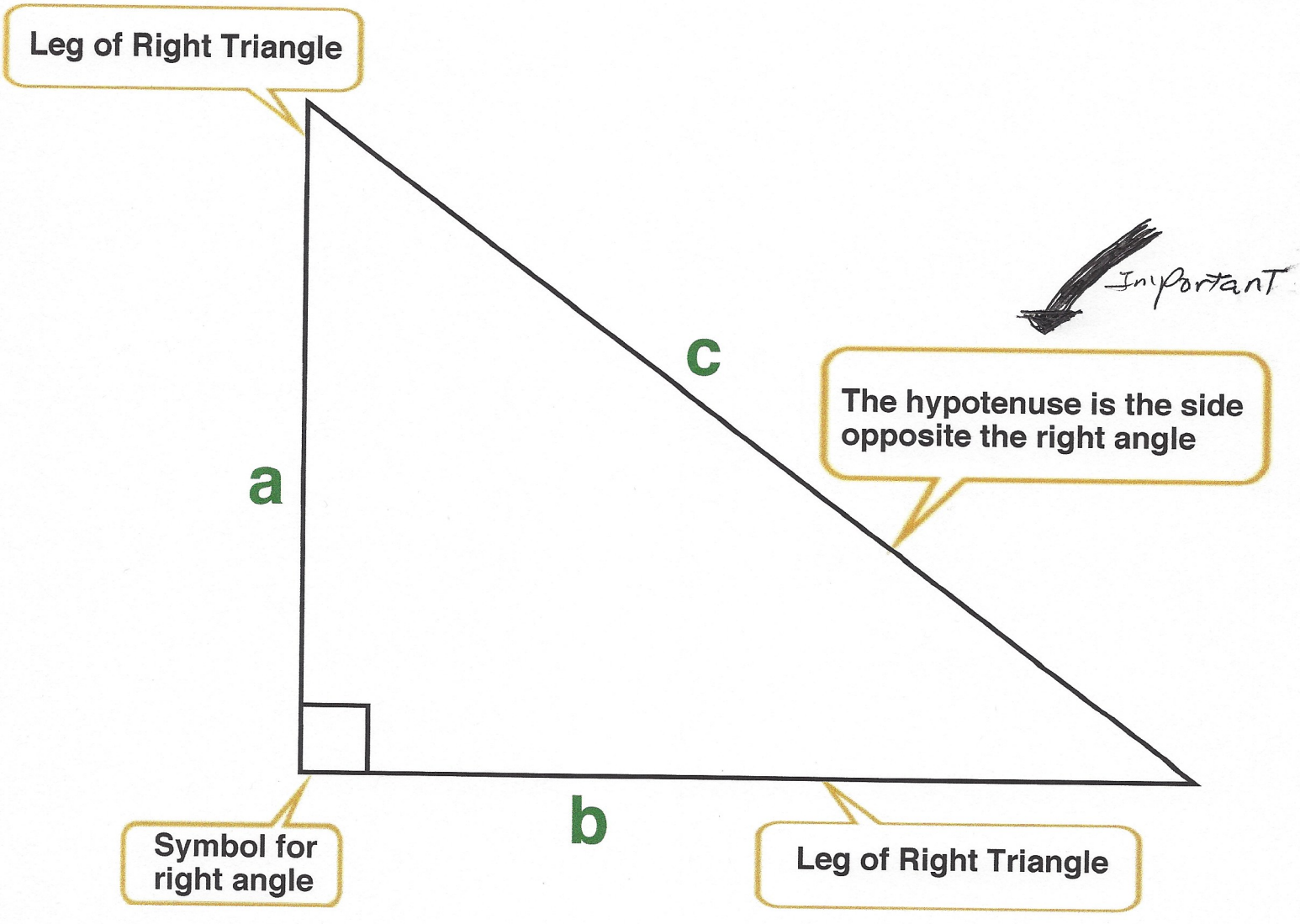
Pythagorean Theorem

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

$$a^2 + b^2 = c^2 \quad \text{OR} \quad c = \sqrt{a^2 + b^2}$$

Also $a^2 = c^2 - b^2$ OR $a = \sqrt{c^2 - b^2}$

$b^2 = c^2 - b^2$ OR $b = \sqrt{c^2 - a^2}$



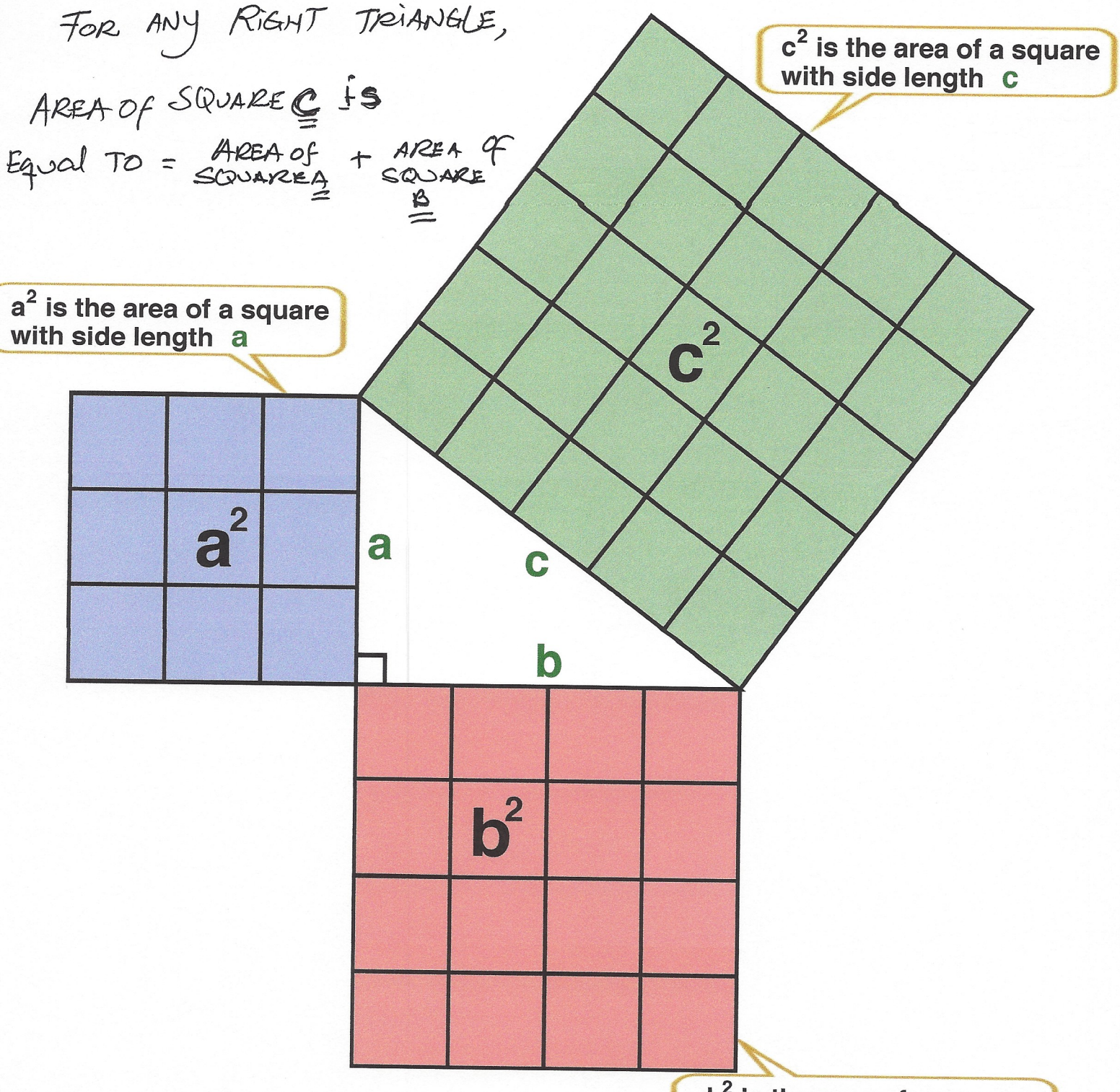
Pythagorean Theorem

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

FOR ANY RIGHT TRIANGLE,

AREA OF SQUARE C IS

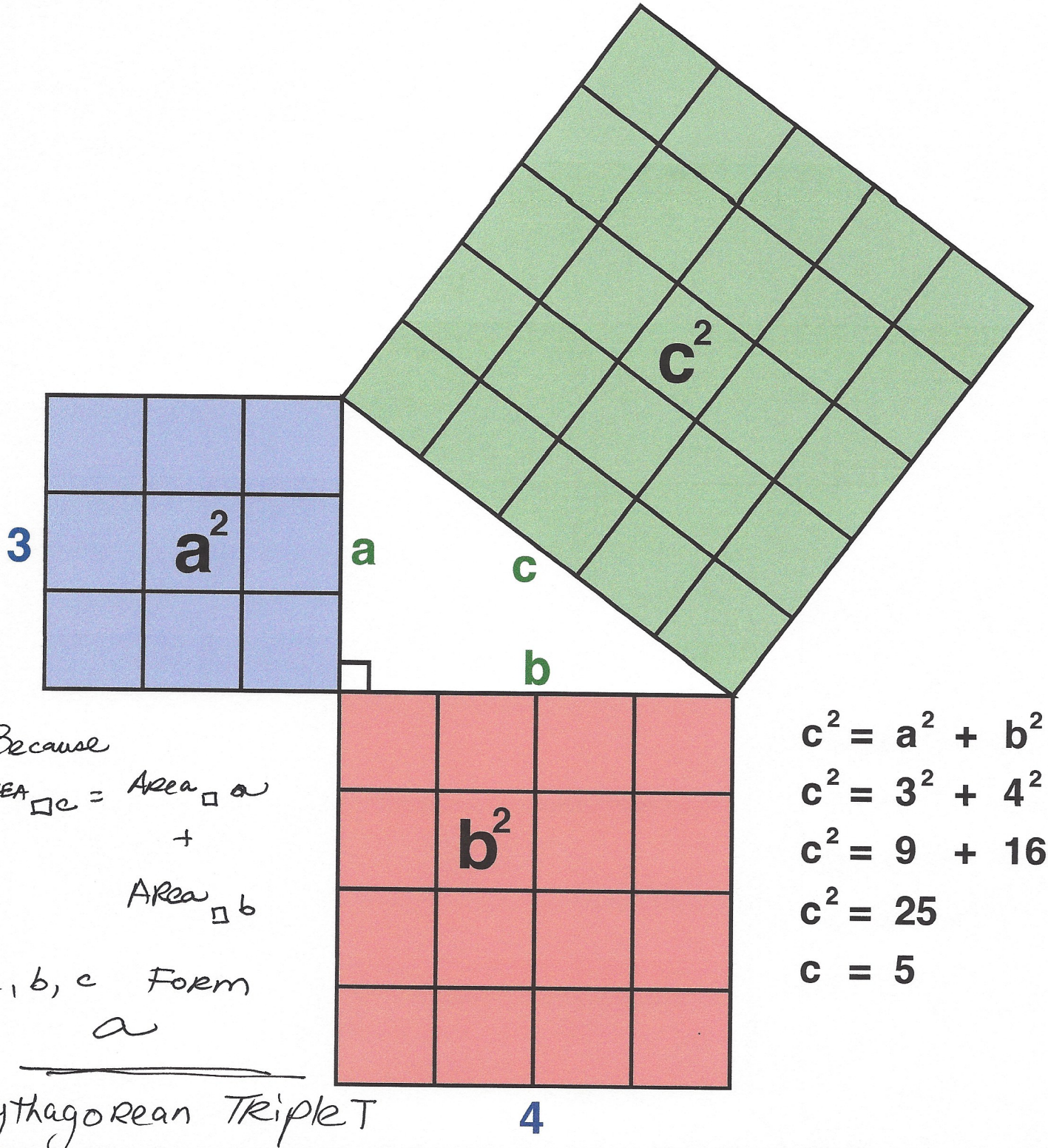
EQUAL TO = AREA OF SQUARE A + AREA OF SQUARE B



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



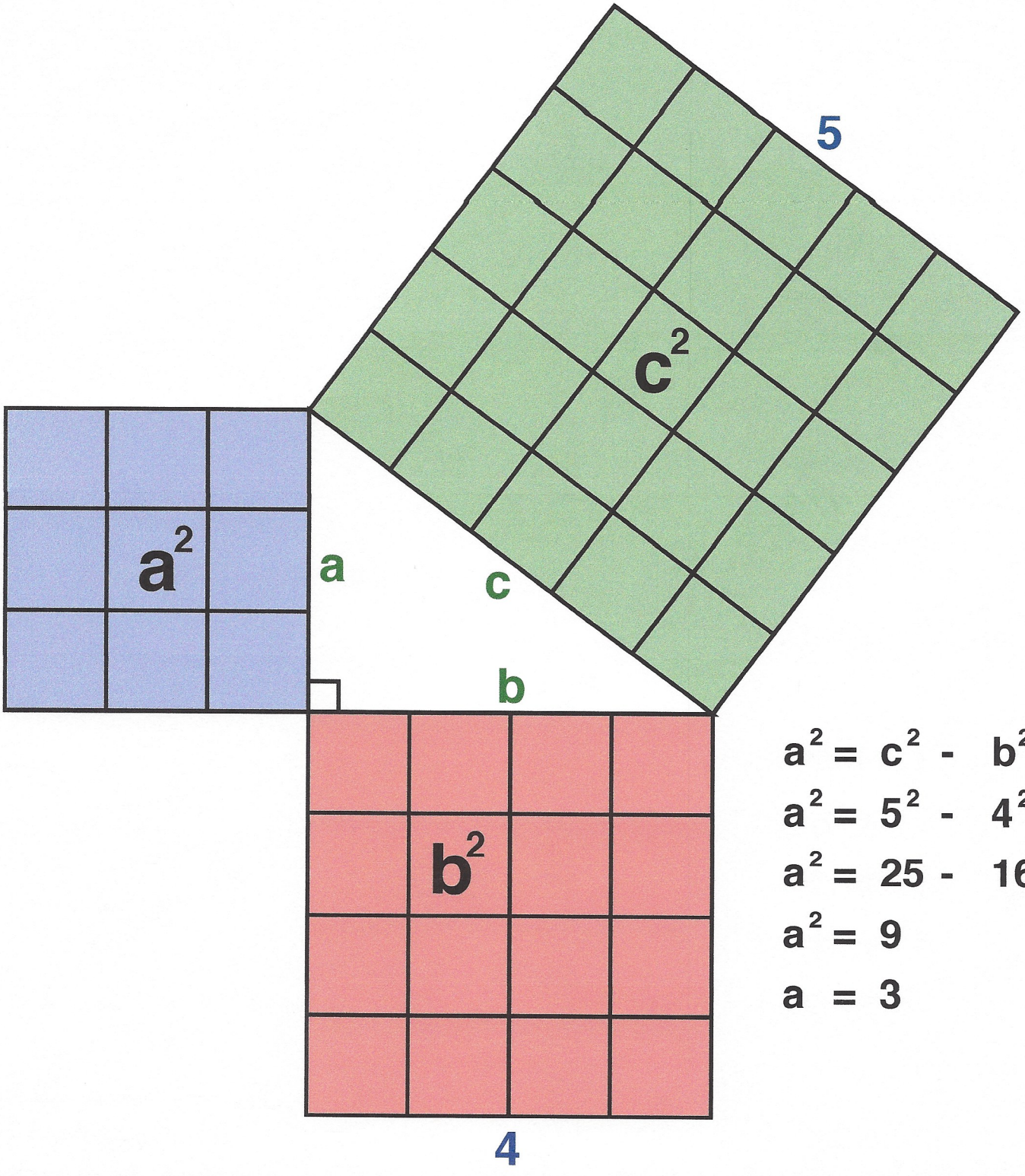
Because
$AREA_{\square c} = Area_{\square a} + Area_{\square b}$

a, b, c Form a Pythagorean Triplet

$c^2 = a^2 + b^2$
$c^2 = 3^2 + 4^2$
$c^2 = 9 + 16$
$c^2 = 25$
$c = 5$

Pythagorean Theorem

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



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

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

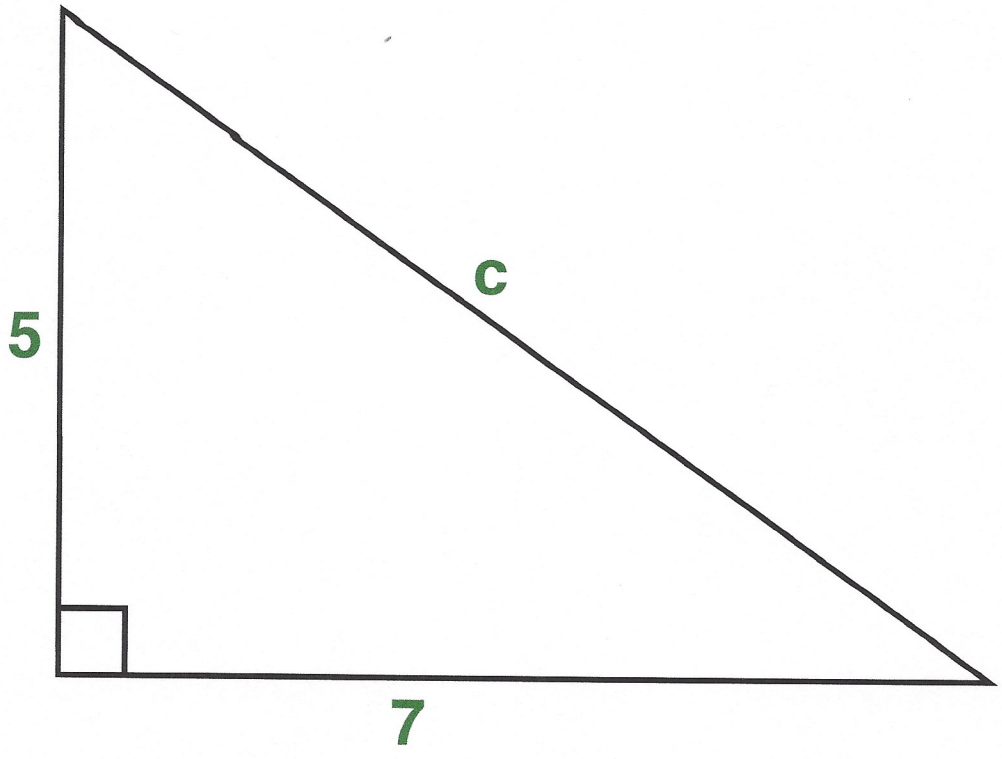
$a^2 = 25 - 16$

$a^2 = 9$

$a = 3$

Pythagorean Theorem

The Pythagorean Theorem will work for any right triangle.



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