

The Pythagorean Theorem

8th Grade

The relationship that only works in right triangles — and its converse.

In a right-angled triangle, the square on the hypotenuse equals the sum of the squares on the other two sides.

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

a=3, b=4

c = 5

$9 + 16 = 25$, and $\sqrt{25} = 5$.

a=5, c=13

b = 12

Finding a leg: $b^2 = 169 - 25$.

Is 6,8,10 right-angled?

yes

$36 + 64 = 100$. The converse works as a test.

Triples worth knowing

3-4-5, 5-12-13, 8-15-17

And any multiple of them.

THE COMMON MISTAKE

× $3 + 4 = 5$, so $a + b = c$

✓ $a^2 + b^2 = c^2$

It is a coincidence that 3-4-5 also adds up. Try 5-12-13 and it fails.

Only for right triangles. If there is no right angle, this theorem does not apply.