Pythagoras' Theorem: Finding Hidden Lengths

KS3 Ages 11-14 ⏰ 3 min read

What is Pythagoras' Theorem?

Pythagoras' theorem is a mathematical rule about **right-angled triangles** — triangles with one angle that is exactly **90 degrees**. It tells us the relationship between the three sides of these special triangles.

The rule is simple: if you take the two shorter sides (called the **legs**) and square them, then add them together, you get the same answer as if you square the longest side (called the **hypotenuse**). Mathematicians write it as: **$a^2 + b^2 = c^2$**, where **a** and **b** are the shorter sides and **c** is the longest side.

Think of it like building a staircase: if you know how far across you're going (one leg) and how high you're climbing (the other leg), you can work out the length of the ramp you'd need to go directly from bottom to top (the hypotenuse).

Who Was Pythagoras?

Pythagoras was an ancient **Greek mathematician** who lived around **2,500 years ago**. Although the theorem is named after him, people in other ancient civilizations actually knew about this pattern even earlier. However, Pythagoras proved it was always true, which made him famous.

When Do You Use It?

You use **Pythagoras' theorem** whenever you need to find a missing side length in a right-angled triangle. Builders use it to check that corners are truly square. Engineers use it when designing ramps or bridges. Even video game developers use it to calculate distances between characters on a screen!

Think of it like a treasure map: if you know the coordinates of two locations, you can use Pythagoras to figure out exactly how far apart they are.

A Real Example

Imagine you have a right-angled triangle where one side is **3 cm** and another is **4 cm**. Using the theorem: **$3^2 + 4^2 = 9 + 16 = 25$**, so **$c^2 = 25$**, which means **$c = 5$ cm**. The longest side is **5 cm**. This **3-4-5 triangle** is so common that builders memorize it!

Pythagoras' theorem proves that maths isn't just about numbers in a textbook — it's a tool for solving real-world problems every single day.