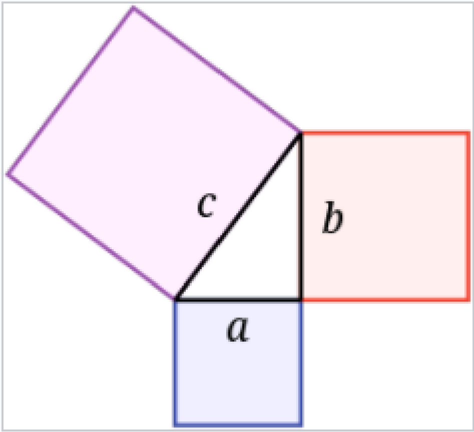
Pythagoras' Theorem

The Pythagorean theorem is a fundamental relation in geometry among the three sides of a right triangle. It states that the area of the square whose side is the hypotenuse (the side opposite the right angle) is equal to the sum of the areas of the squares on the other two sides.



Pythagorean theorem
The sum of the areas of the two squares on the legs (a and b) equals the area of the square on the hypotenuse (c).

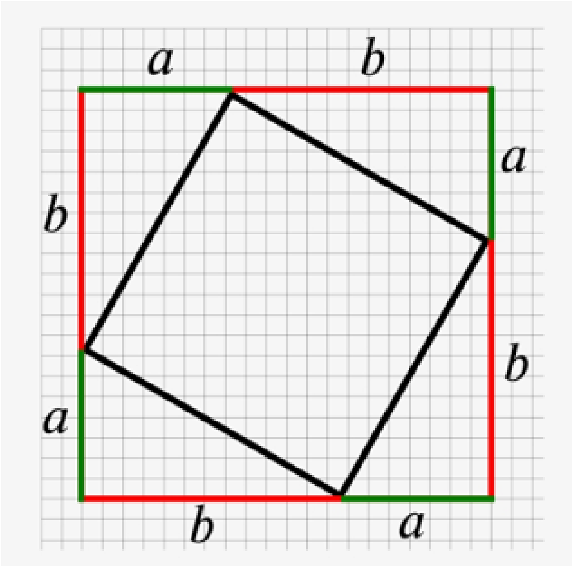
This theorem can be written as an equation relating the lengths of the sides a, b and c, often called the Pythagorean equation: $a^2 + b^2 = c^2$

There is debate whether the Pythagorean theorem was discovered once, or many times in many places, and the date of first discovery is uncertain, as is the date of the first proof.

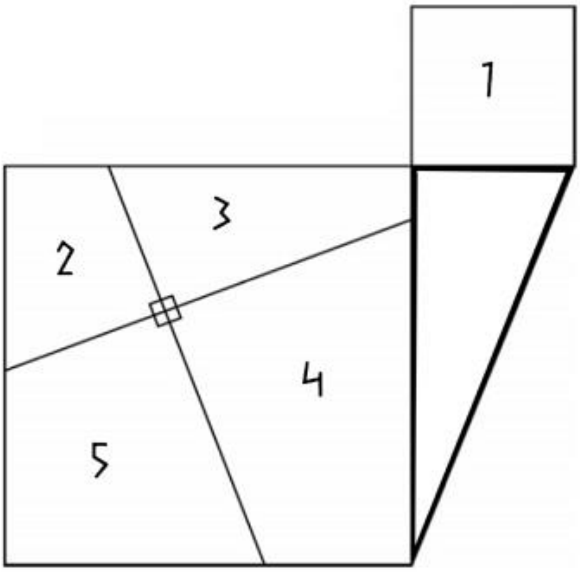
Historians of Mesopotamian mathematics have concluded that the Pythagorean rule was in widespread use during the Old Babylonian period (20th to 16th centuries BC), over a thousand years before Pythagoras was born!

Proving the theorem

You now get the chance to prove this famous theorem! To get you started, I am presenting you with a tilted squared inscribed within a larger square (on the right).



Can you use your imagination to prove the truth of this theorem with the help of this figure?



A Pythagorean Puzzle

Cut out (or crop out!) the shapes numbered 1–5. Can you rearrange them to fit together as a square (with the hypotenuse as one side)? How does this exercise help you verify Pythagoras' theorem?

Pythagorean Triples

A Pythagorean triple consists of three positive integers a, b and c, such that $a^2 + b^2 = c^2$. Such a triple is commonly written (a, b, c), and a well-known example is (3, 4, 5). (6, 8, 10) is also a Pythagorean triple but is not considered a **'primitive triple'** since (6, 8, 10) is a multiple of (3, 4, 5).

There are 16 primitive Pythagorean triples of numbers up to 100. How many of these can you find?