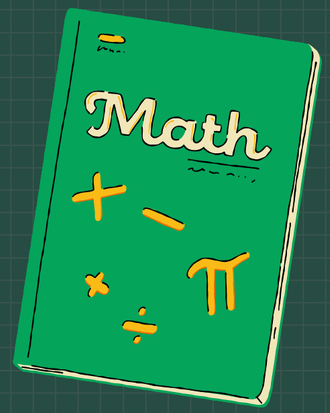
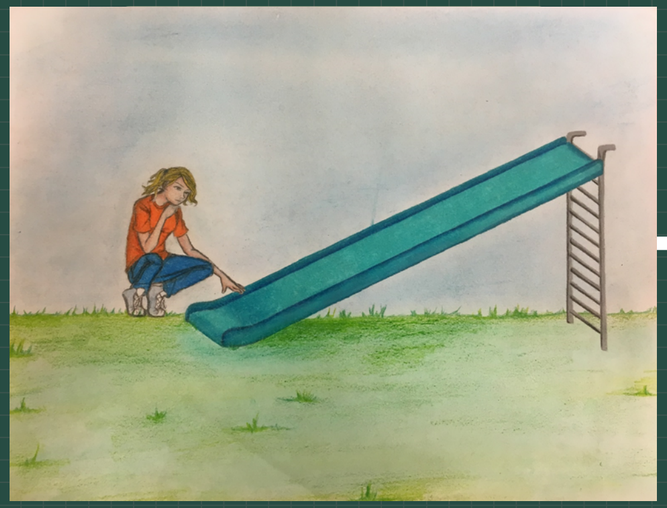
THE PYTHAGOREAN THEOREM PROJECT

Task: Create a real-world problem that can be solved using the Pythagorean theorem.

1. Draw a picture to describe your scenario – 10 points
2. Write a word problem for your scenario – 10 points
3. Write the Pythagorean theorem on your project – 10 points
4. Use the Pythagorean theorem to evaluate your word problem – 60 points
5. Decorate/color your final project – 10 points

EXAMPLE OF STUDENT WORK





Problem:

Annabeth Chase, daughter of Athena and a stellar architect, has decided to build a playground for the demigod children of New York (It's concealed by the mist, a magical barrier separating the mortal world from truth.). She has already planned out the area she needs for the ladder and the slide. She has already built the ladder, but she needs to figure out how long she should make the slide. The ladder is five feet tall, and she planned for the whole structure to be twelve feet long.

Use of Pythagorean Therom

$5^2 + 12^2 = c^2$

$25 + 144 = c^2$

$169 = c^2$

$\sqrt{169} = \sqrt{c^2}$

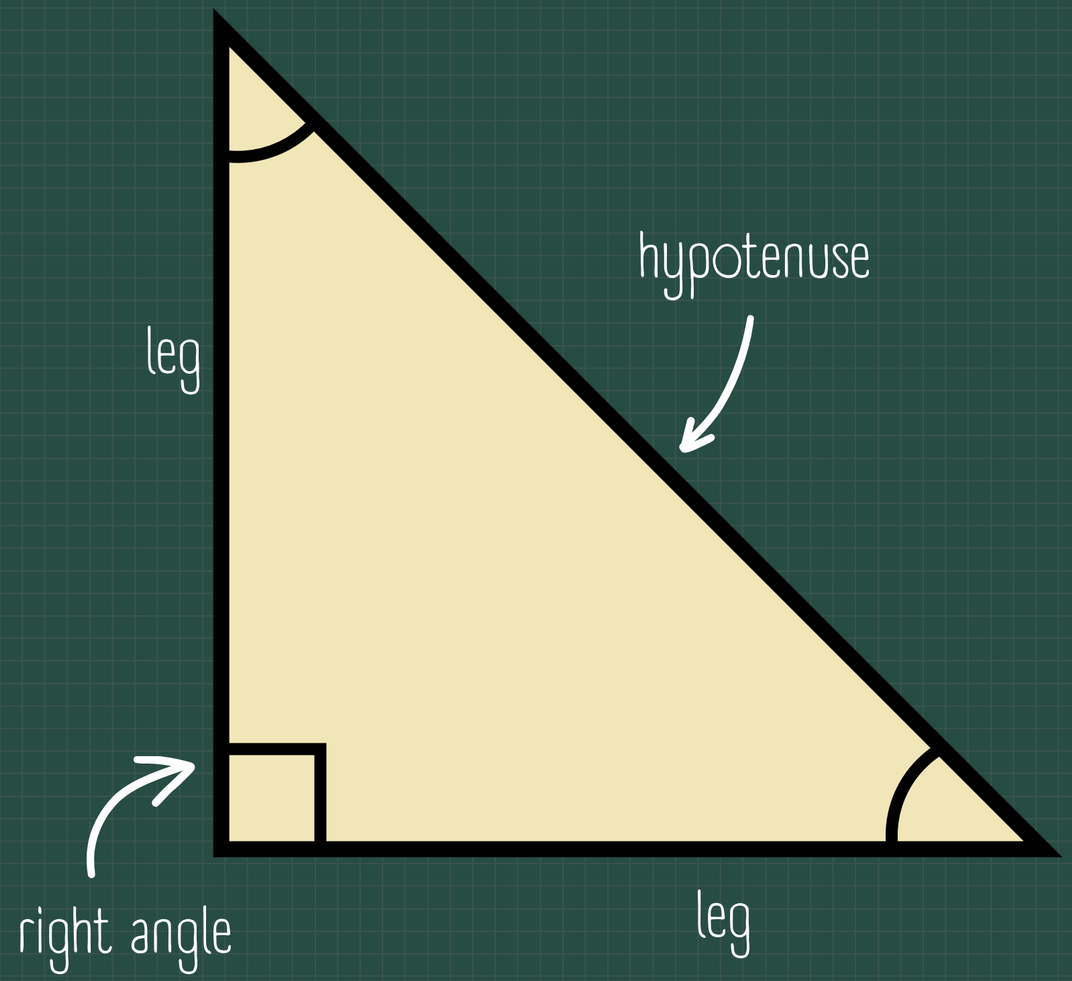
$13 = c$

Answer:

Annabeth needs to build a slide that is 13 feet long.

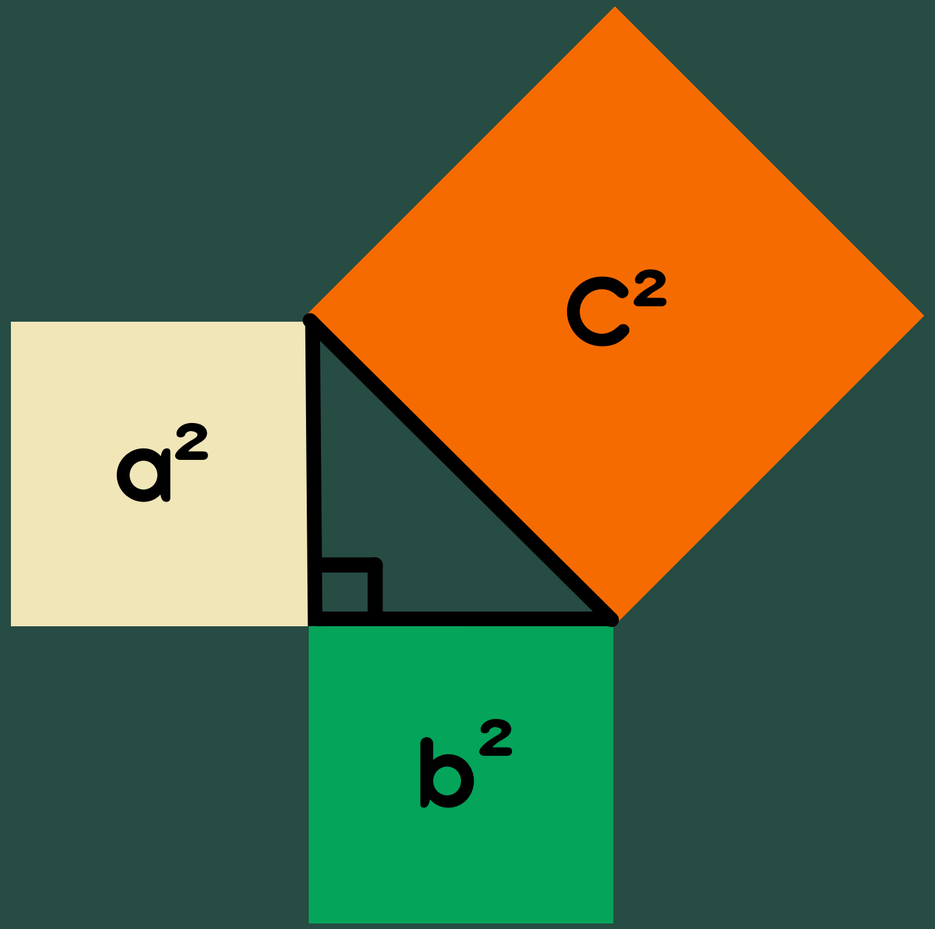
Unit 6

THE PYTHAGOREAN THEOREM



WHAT IS A RIGHT ANGLE?

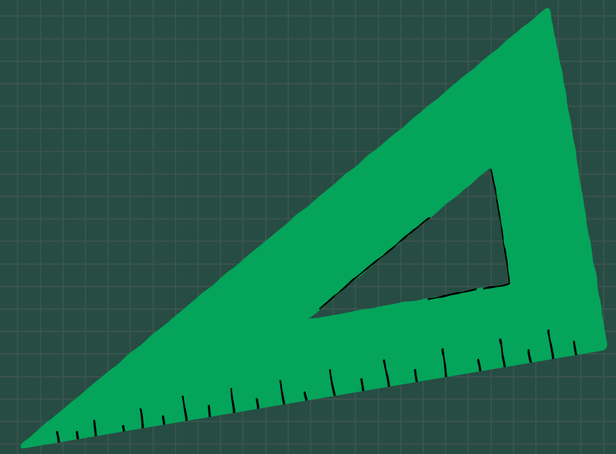
A right triangle is a type of triangle that has one angle equal to 90 degrees. The side opposite of the right angle is called hypotenuse. The other two sides, which form the right angle, are called the legs of the triangle.



In a right triangle, the Pythagorean theorem applies, stating that the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the other two sides. This relationship is fundamental in solving problems involving right triangles.

THE PYTHAGOREAN THEOREM

It is a fundamental principle in geometry that relates to the sides of a right triangle. It states that in a right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the other two sides. It can be written as:



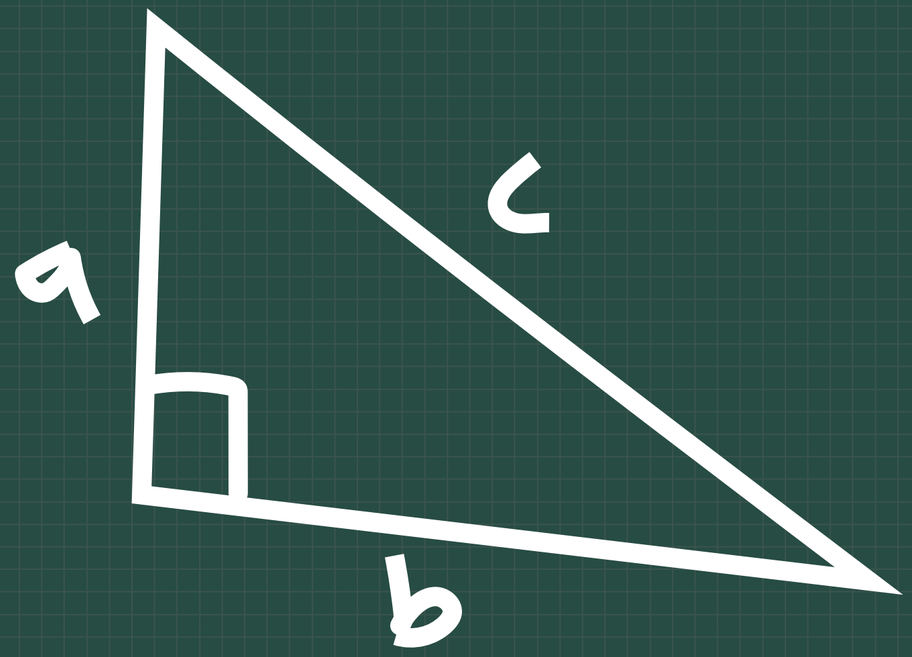
$$a^2 + b^2 = c^2$$

WHO DISCOVERED THIS THEOREM?

Pythagoras was an ancient Greek philosopher and mathematician, born around 570 BCE on the island of Samos in the eastern Aegean Sea. Pythagoras founded a religious and philosophical school in Croton (now Crotone) in southern Italy, known as the Pythagorean school. Pythagoras and his followers made significant contributions to mathematics, including discoveries in geometry, arithmetic, and number theory.

EXAMPLE 1

Find the missing value:



$a = 5$ $b = 12$ $c = ?$

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

$$5^2 + 12^2 = c^2$$

$$25 + 144 = c^2$$

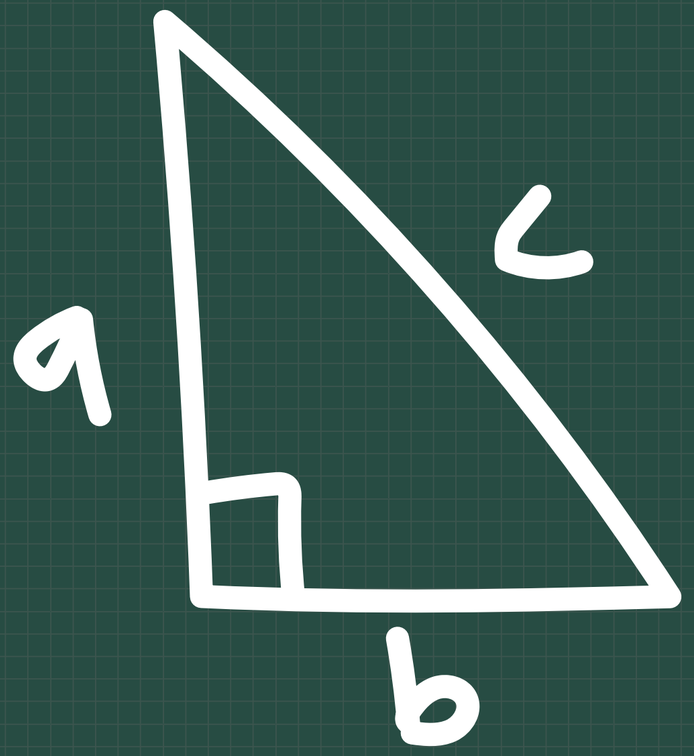
$169 = c^2$ or $c^2 = 169$

$$c = \sqrt{169}$$

Answer: $c = 13$

EXAMPLE 2

Find the missing value:



$a = 9$ $b = ?$ $c = 15$

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

$$9^2 + b^2 = 15^2$$

$$81 + b^2 = 225$$

$$b^2 = 225 - 81$$

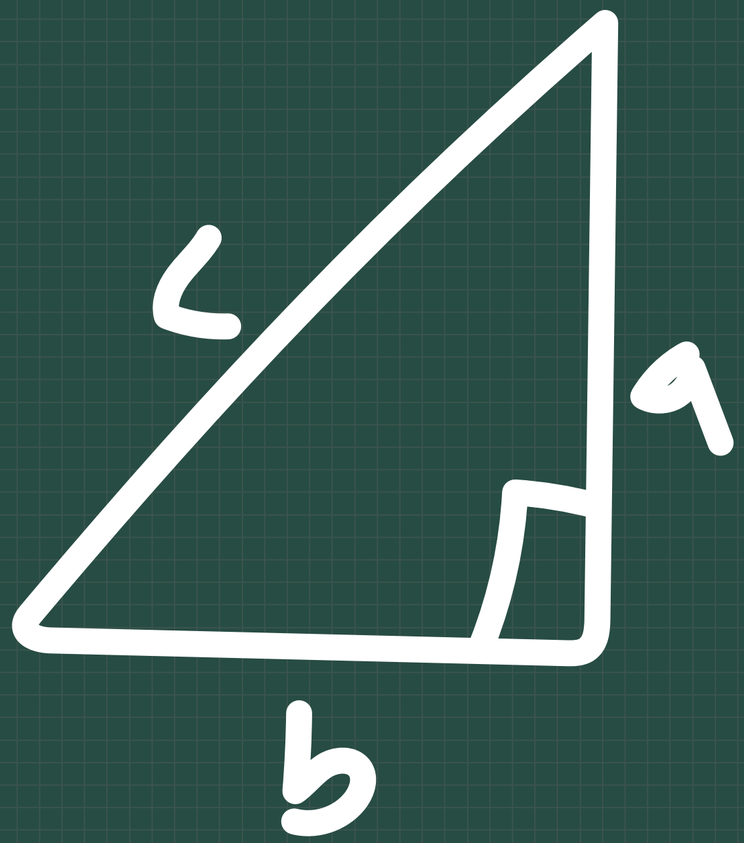
$144 = b^2$ or $b^2 = 144$

$$b = \sqrt{144}$$

Answer: $b = 12$

EXAMPLE 3

Find the missing value:



a = ? b = 6 c = 10

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

$a^2 + 6^2 = 10^2$

$a^2 + 36 = 100$

$a^2 = 100 - 36$

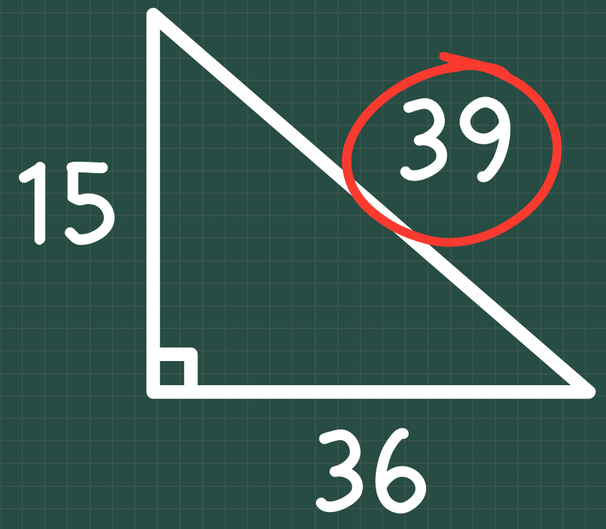
$640 = a^2$ or $a^2 = 64$

$a = \sqrt{64}$

Answer: a = 8

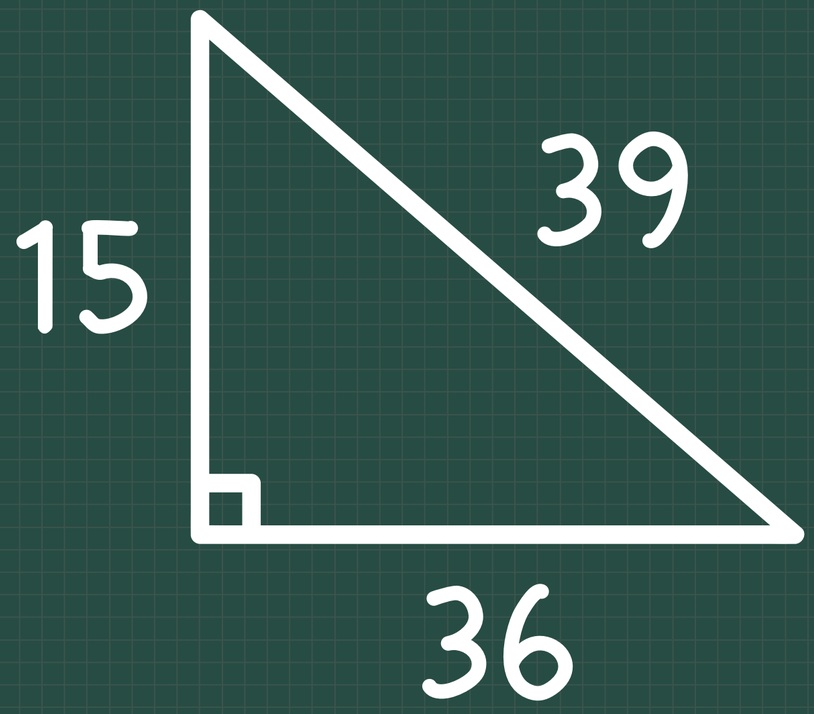
CONVERSE OF THE PYTHAGOREAN THEOREM

If the square of the length of the longest side of a triangle is equal to the sum of the squares of the other two sides, then the triangle is a right triangle.



First, we determine which side would be the hypotenuse. Then, we use the values into the Pythagorean Theorem.

LET'S TRY!

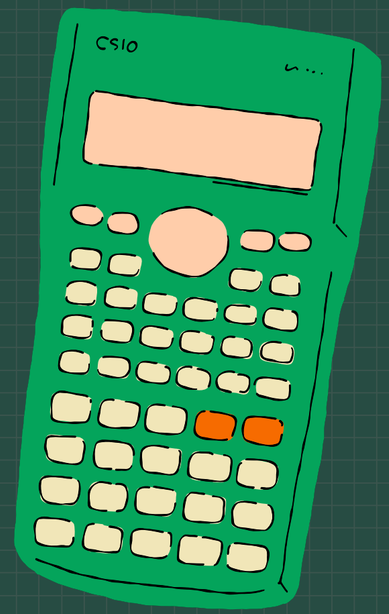


$a^2 + b^2 = c^2$

$15^2 + 36^2 = 39^2$

$225 + 1296 = 1521$

$1521 = 1521$



IT'S A RIGHT TRIANGLE!