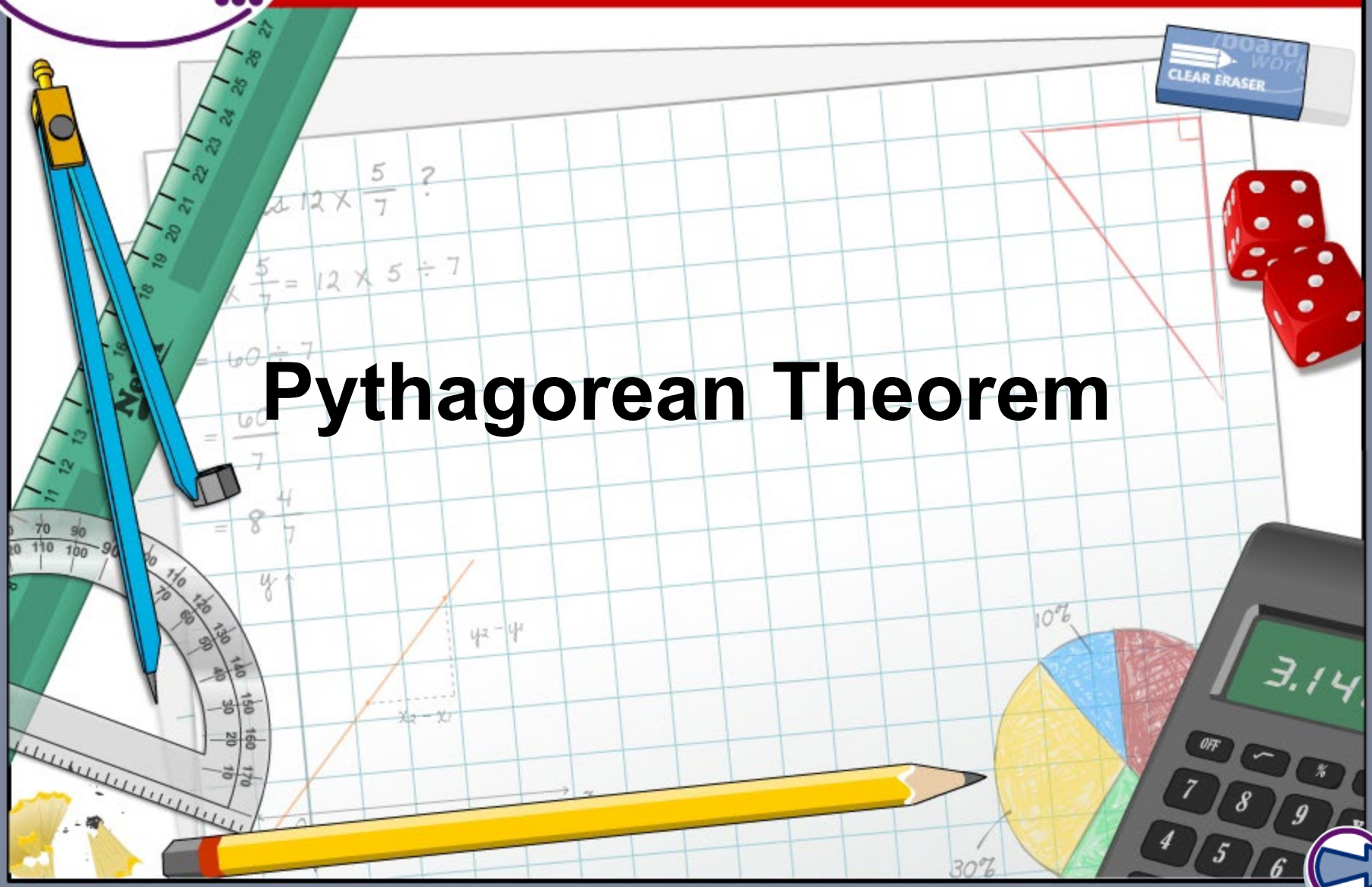


Pythagorean Theorem

Information

Common core icons

This icon indicates a slide where the Standards for Mathematical Practice are being developed. Details of these are given in the Notes field.

Slides containing examples of mathematical modeling are marked with this stamp.

This icon indicates an opportunity for discussion or group work.

The **Standards for Mathematical Practice** outlined in the Common Core State Standards for Mathematics describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

They are:

1) Make sense of problems and persevere in solving them.

2) Reason abstractly and quantitatively.

3) Construct viable arguments and critique the reasoning of others.

4) Model with mathematics.

5) Use appropriate tools strategically.

6) Attend to precision.

7) Look for and make use of structure.

8) Look for and express regularity in repeated reasoning.

This icon indicates that the slide contains activities created in Flash. These activities are not editable.

This icon indicates teacher's notes in the Notes field.

History of the Pythagorean Theorem

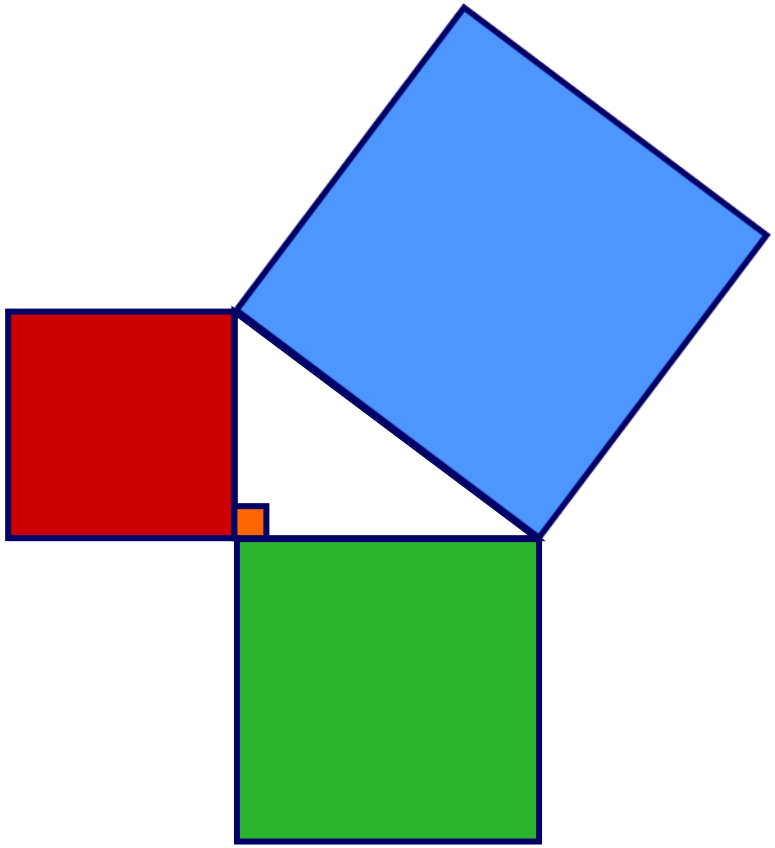
The **Pythagorean Theorem** concerns the relationship between the sides of a right triangle.

The theorem is named after the Greek mathematician and philosopher, Pythagoras of Samos.

Although the theorem is named after Pythagoras, the result was known to many ancient civilizations, including the Babylonians, Egyptians and Chinese, at least 1,000 years before Pythagoras was born.

The Pythagorean Theorem

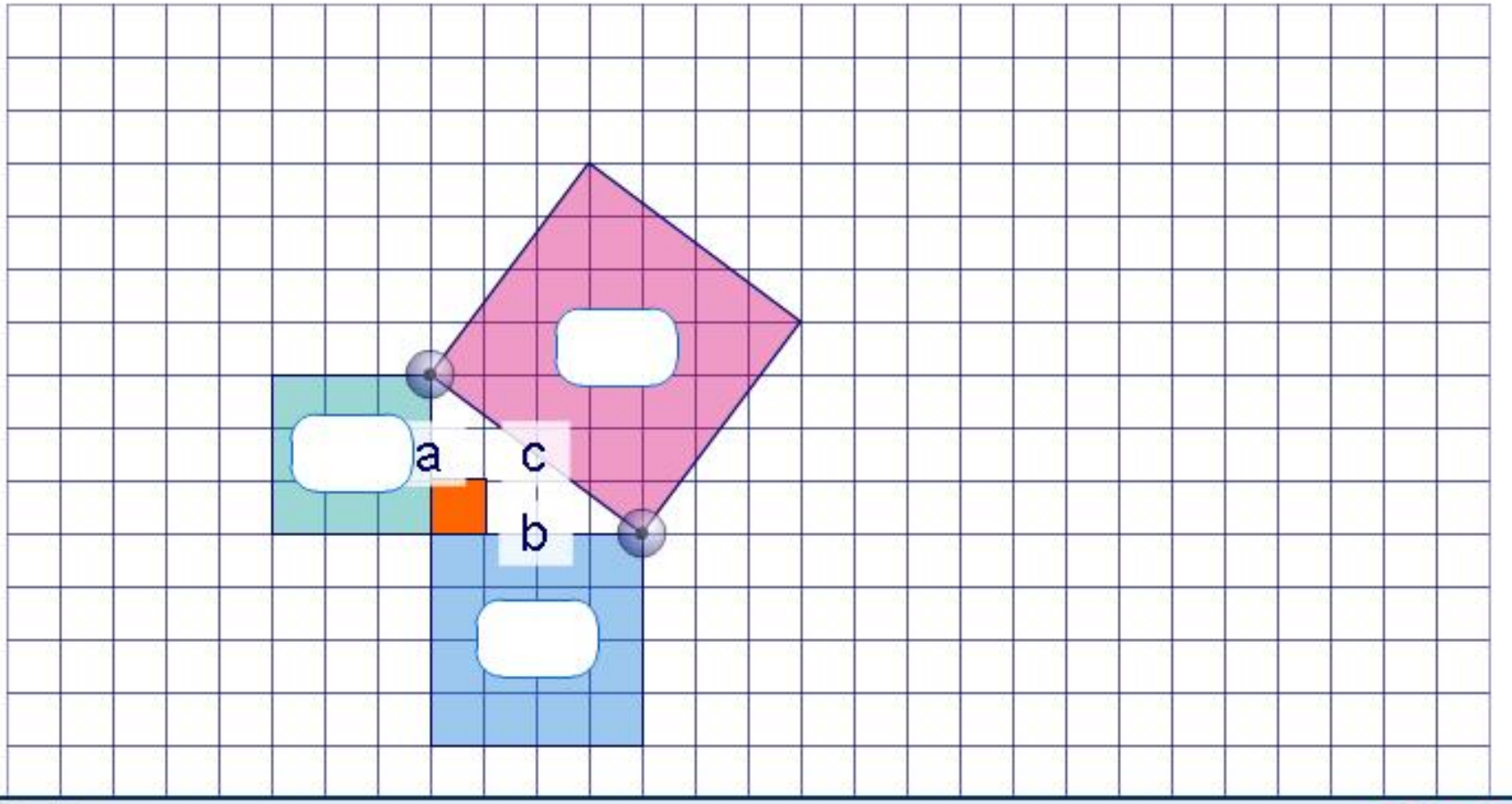
The Pythagorean Theorem states that the square formed on the **hypotenuse** of a right triangle…



…has the same area as the sum of the areas of the squares formed on the two **legs**.

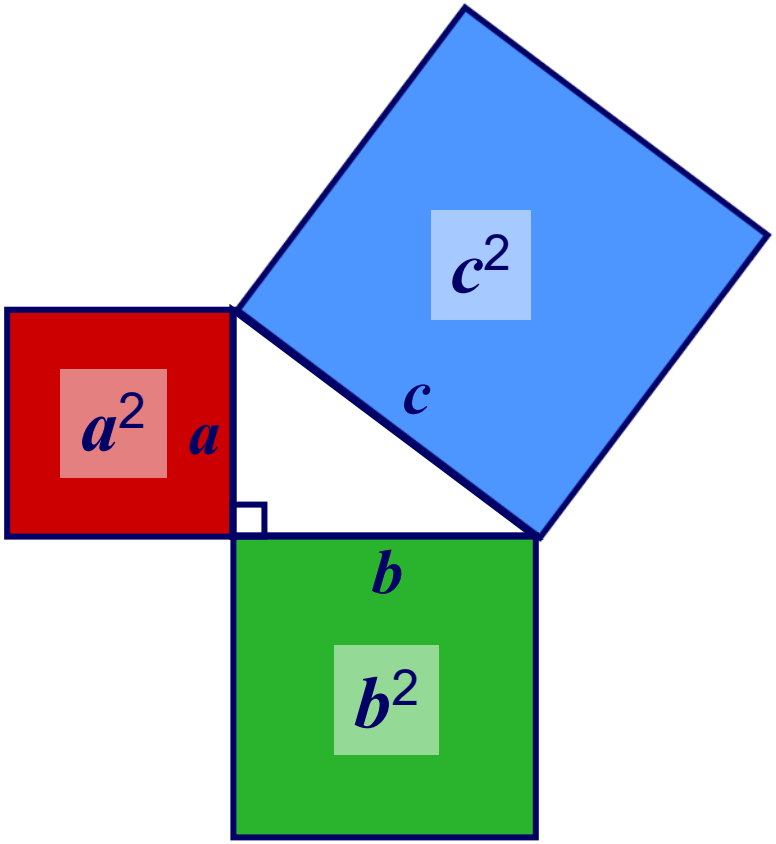
Showing the Pythagorean Theorem

Adjust the vertices of the triangle and calculate the area of the squares.



The Pythagorean Theorem

Label the two legs and hypotenuse of a right triangle a, b and c.



The area of the largest square is $c \times c$ or c^2.

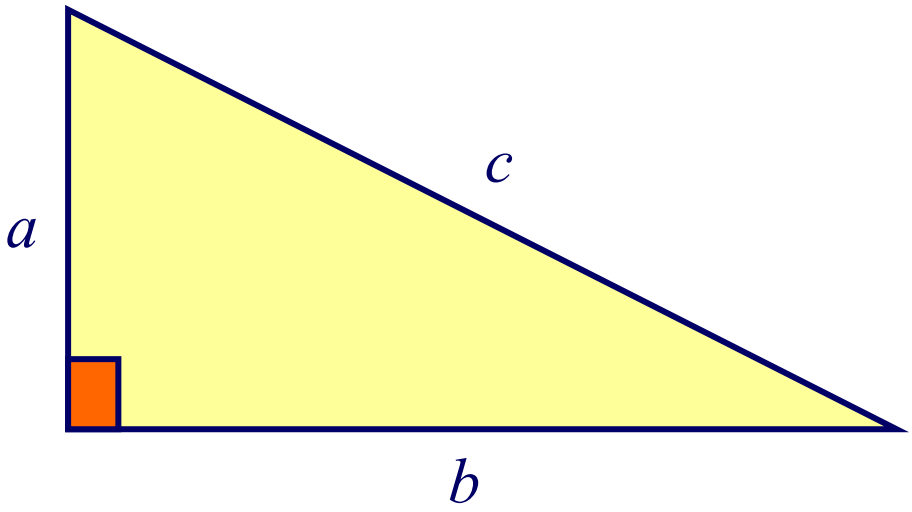
The areas of the smaller squares are a^2 and b^2.

The Pythagorean Theorem can be written as:

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

The Pythagorean Theorem

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

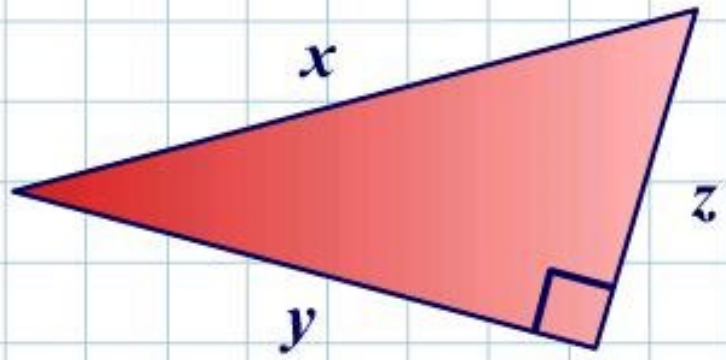


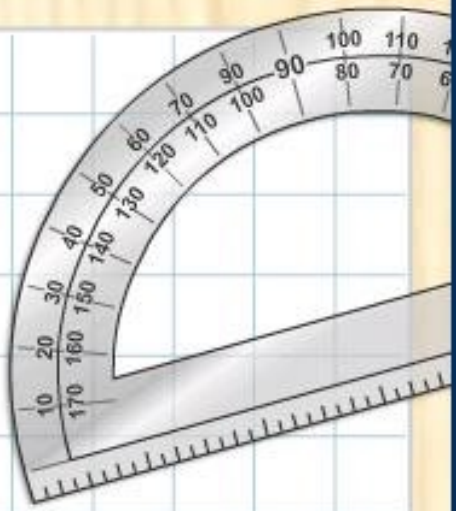
The Pythagorean Theorem is used to:

- check whether a triangle is a right triangle given the lengths of all the sides, and
- find the length of a missing side in a right triangle given the lengths of the other two sides.

Figure out the correct equation

Which equation is correct for this triangle?





$x^2 = y^2 + z^2$

$y^2 = x^2 + z^2$

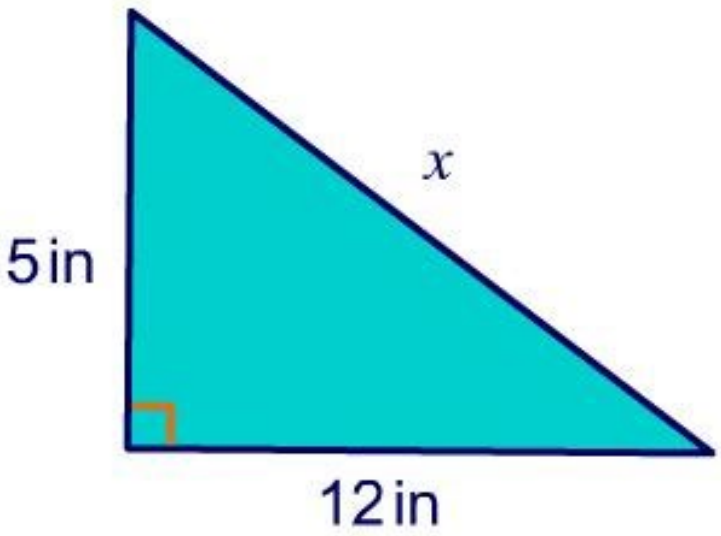
$z^2 = x^2 + y^2$

Calculating the hypotenuse

Use the Pythagorean Theorem and press on the answer.

Question 1:

Calculate x.



Press the "=" button to show the calculations step by step.

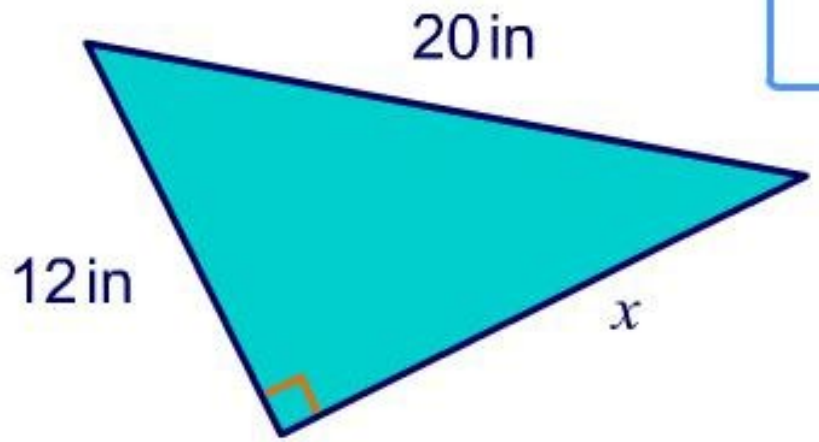
12 in	13 in
14 in	15 in

Calculating the shorter sides

Use the Pythagorean Theorem and press on the answer.

Question 1:

Calculate x.



Press the "=" button to show the calculations step by step.

15 in	16 in
17 in	18 in

Distance between two points

We can also use the Pythagorean Theorem to find the distance between two points on a coordinate plane.

Press **start** to begin.

start