

8.1 Pythagorean Theorem

Warm-Up

Solve for x .

$$x + 5 = 8$$

$$x + 4^2 = 6^2$$

$$x^2 - 6 = 19$$

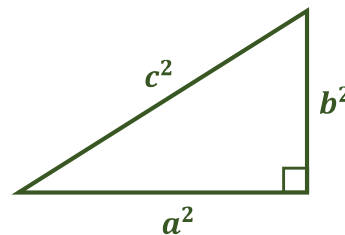
Main Topic Pythagorean Theorem

Pythagorean Theorem

Pythagorean Theorem is arguably one of the most popular formulas in Mathematics that was introduced by Pythagoras who was a Greek philosopher and mathematician.

Pythagorean Theorem states that the sum of the squares of the legs is equal to the square of the hypotenuse which is the longest side of the triangle. The legs are labeled a and b while the hypotenuse is c .

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



Pythagorean Triples are whole numbers that satisfy the theorem.

Use the formula to prove that the sides below form a right triangle.

$$3, 4, 5$$

$$6, 8, 10$$

$$5, 12, 13$$

Pythagorean Theorem Proof 1

- Label the sides of the smaller square with a .
- Label the sides of the larger square with b .
- Label the legs of the triangles with a and b .
- Label the hypotenuse of the triangles with c .
- Write the area of the smaller square in the middle of the shape.
- Write the area of the larger square in the middle of the shape.
- Take the squares out and set them aside.
- Rearrange the triangles in such a way that they form a third square in the middle.
- Label the sides of the third square.
- Write the area of the third square in the middle of the shape.
- Take the third square out and set it aside.
- Return the triangles back to their original position.

Write your observations about the relationship between the first two squares with the third square.

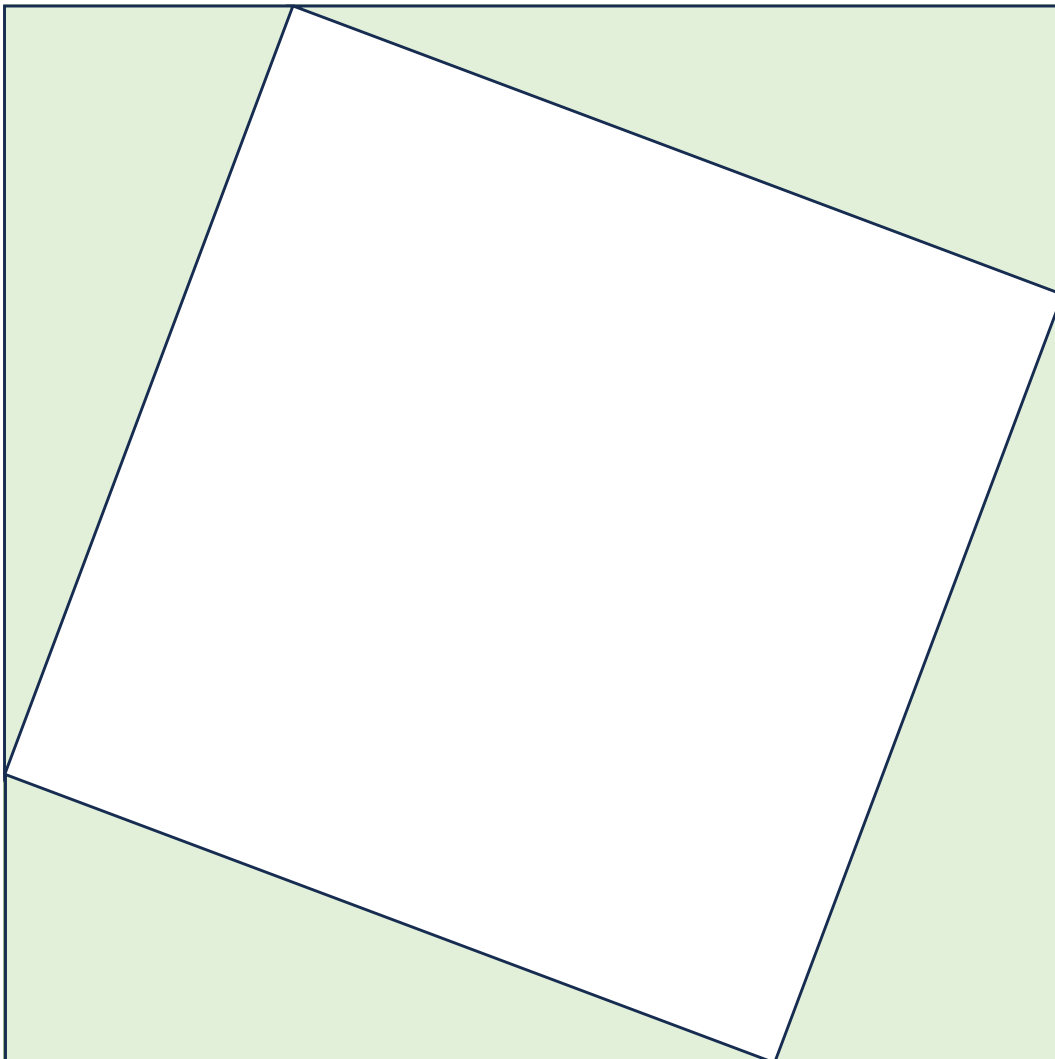
Pythagorean Theorem Proof 2

- Label each side of the shapes.
- Write the area in the middle of each shape.

Area of the outer square

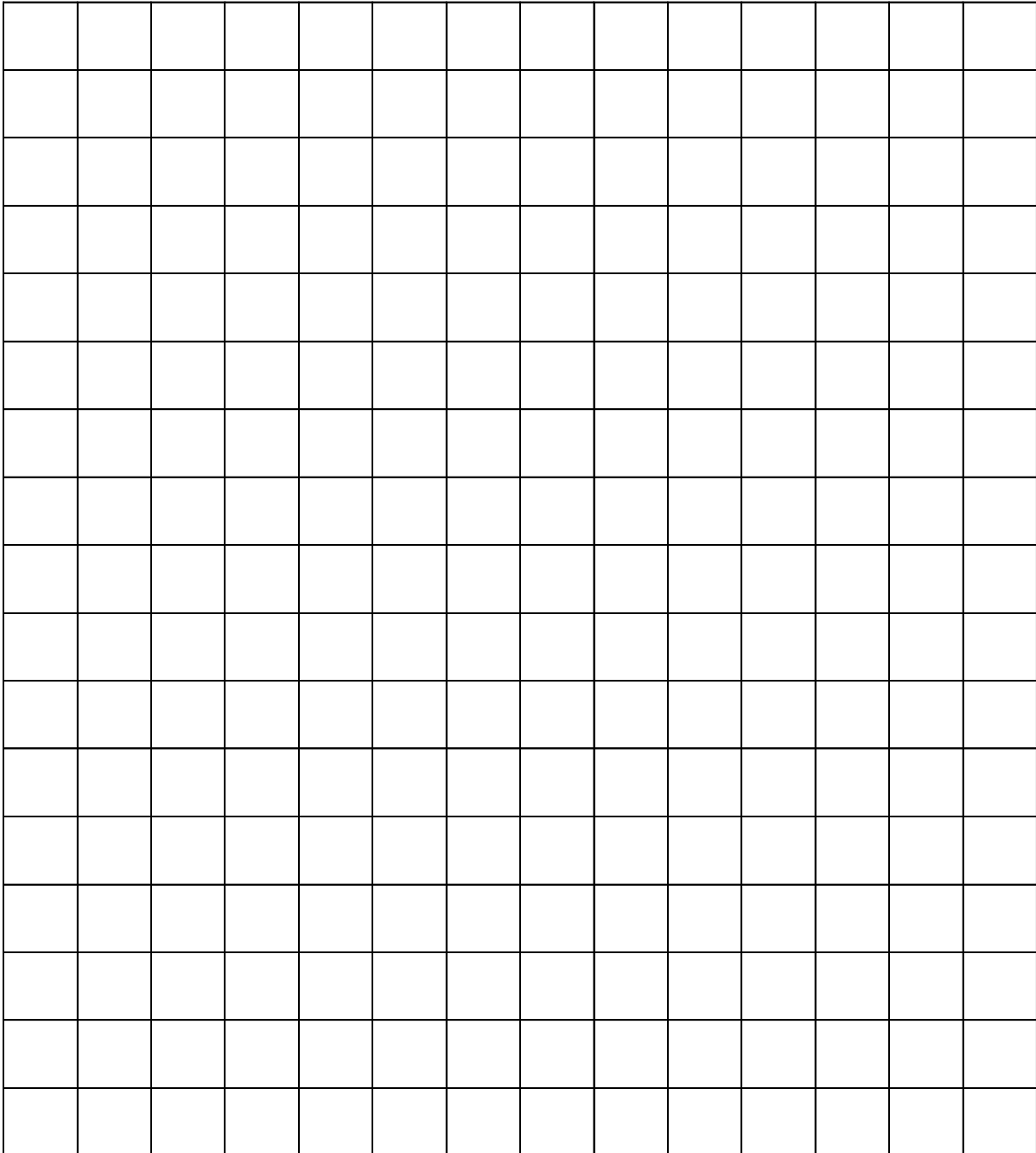
Total area of the shapes

- Equate the area of the outer square with the total area of the shapes.



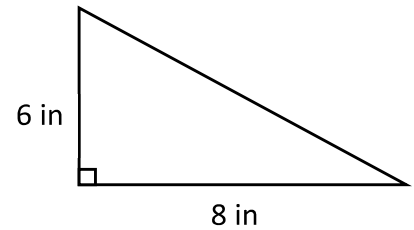
Pythagorean Theorem Proof 3

- Draw at least two right triangles with different sizes.
- Use a ruler to measure the length of each side.
- Use Pythagorean Theorem to prove that the triangles you constructed are right triangles.



Finding the length of the 3rd side.

- Label sides a, b, and c.
- Plug in 6 and 8 to the formula.
- Solve the length of the 3rd side.

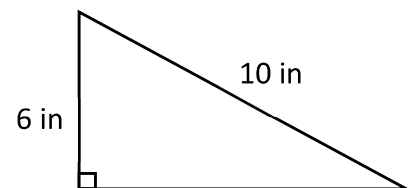


Checkpoint

Use the space below to verify the sides of the right triangle.

Finding the length of the 3rd side.

- Label sides a, b, and c.
- Plug in 6 and 10 to the formula.
- Solve the length of the 3rd side.



Checkpoint

Use the space below to verify the sides of the right triangle.

Find the perimeter and area of the triangles.

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End-of-Course Prep