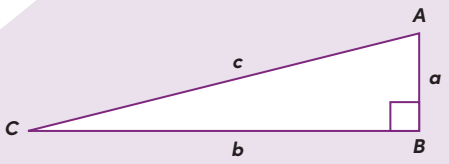
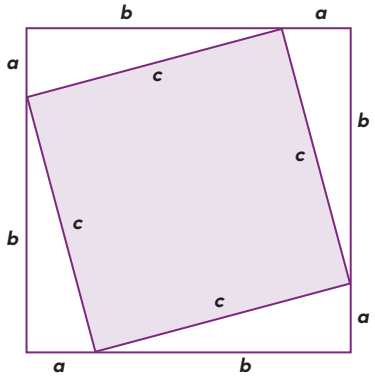
Name _____ Date Answer Key

PROVING THE PYTHAGOREAN THEOREM

Triangle *ABC* is a right triangle with side lengths *a*, *b*, and *c*. Follow the directions below to prove that $a^2 + b^2 = c^2$.



Each large square below is made up of 4 copies of triangle *ABC* and one or two squares. The large squares are congruent because they both have side lengths of $a + b$, and the triangles in each large square are congruent. Answer each question below to write the area of the large square in two different ways.



1 What is the area of the square with side lengths of *c*? Write your answer using an exponent.

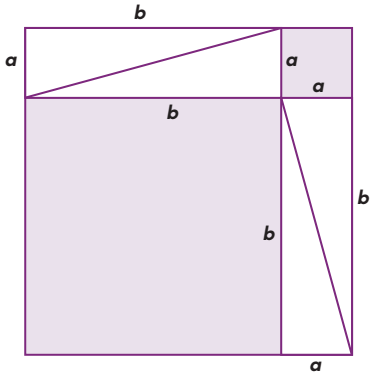
c^2

2 What is the area of each triangle?

$\frac{1}{2}ab$

3 Write the area of this large square by adding the areas of all the shapes inside the square. Simplify your answer.

$c^2 + 2ab$



1 What is the area of the square with side lengths of *a*? Write your answer using an exponent.

a^2

2 What is the area of the square with side lengths of *b*? Write your answer using an exponent.

b^2

3 What is the area of each rectangle formed by two triangles?

ab

4 Write the area of this large square by adding the areas of all the shapes inside the square. Simplify your answer.

$a^2 + b^2 + 2ab$

Since the large squares are congruent, set their areas equal to each other. Then solve for c^2.

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

★You've used given information and your prior knowledge to form a mathematical argument that shows that if triangle *ABC* is a right triangle, then $a^2 + b^2 = c^2$. So, you've written a proof of the Pythagorean theorem!