

# 11.4 The Pythagorean Theorem

TEKS a.1, a.6;  
8.7.C

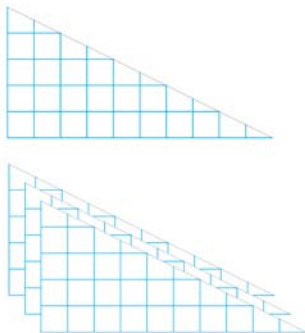
**MATERIALS** • graph paper • scissors

**QUESTION** How are the lengths of the sides of a right triangle related to each other?

**EXPLORE** Examine the relationship among the lengths of the sides of a right triangle

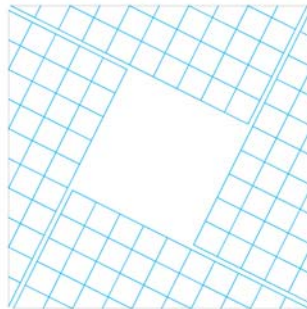
**STEP 1** Make right triangles

Cut a right triangle out of graph paper. Make three copies of it.



**STEP 2** Arrange as a square

Arrange the right triangles to form a square within a square, as shown.

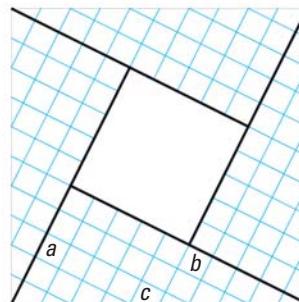


**DRAW CONCLUSIONS** Use your observations to complete these exercises

- How are the areas of the triangles and inner square related to the area of the outer square?

In Exercises 2–4, let  $a$ ,  $b$ , and  $c$  be the lengths of the sides of a right triangle with  $a < b < c$ , as shown. Write an expression for the area of the figure described below.

- One of the right triangles in terms of  $a$  and  $b$
- The outer square in terms of  $c$
- The inner square in terms of  $a$  and  $b$



- Use the relationship you determined in Exercise 1 and your results from Exercises 2–4 to write an equation that relates  $a$ ,  $b$ , and  $c$ . Simplify the equation.

- REASONING** The triangle shown is a right triangle. Find the value of  $x$ . Explain how you found your answer.

