3.2 Exploring the Pythagorean Relationship

Focus on...

After this lesson, you will be able to...

- model the Pythagorean relationship
- describe how the Pythagorean relationship applies to right triangles

Right triangles are found in art, construction, and many other objects. The sail for this sailboat is a right triangle. What makes this shape so special? You will explore some important properties of right triangles in this lesson.

Explore the Math

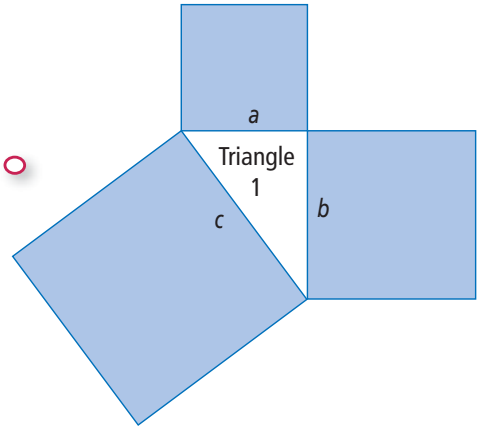
Materials

- centimetre grid paper
- scissors
- transparent tape
- protractor

What is a relationship that applies to right triangles?

1. From a piece of centimetre grid paper, cut out three squares with the following dimensions:
   6 cm × 6 cm 8 cm × 8 cm 10 cm × 10 cm

2. Arrange the squares to form Triangle 1 as shown. Tape the squares onto a sheet of paper. Label Triangle 1.

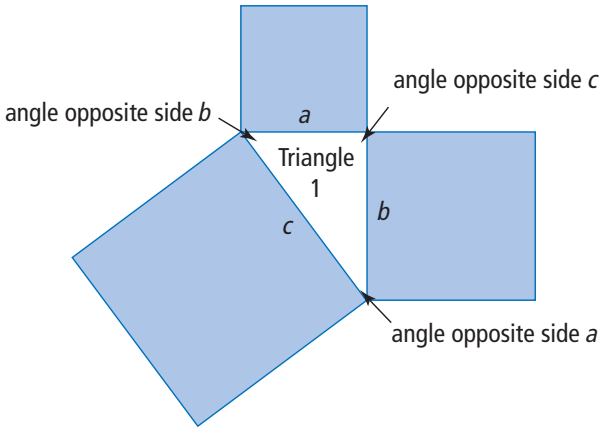


The length of side *a* is 6 cm, side *b* is 8 cm, and side *c* is 10 cm.

3. Copy the table below into your notebook.

	Side	Side Length (cm)	Angle Opposite the Side (°)	Area of Square (cm^2)	Right Triangle? (yes/no)
Triangle 1	*a*	6	37		
	b	8			
	c	10			
Triangle 2	*a*	5			
	b	7			
	c	10			
Triangle 3	*a*	5		25	
	b			144	
	c			169	

4. Measure the angle opposite each side of Triangle 1 with a protractor.



5. In your table, record the angle measures to the nearest degree.

6. Complete the rest of the table for Triangle 1.

7. Repeat the above steps for Triangles 2 and 3 in the table.

Reflect on Your Findings

8. a) Which triangles are right triangles? How do you know?

b) For each right triangle, write an addition statement showing the relationship between the areas of the three squares.

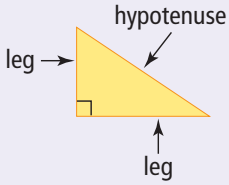
c) For each right triangle, describe in words the relationship between the side lengths of the triangle.

Literacy Link

Right Triangle

A *right triangle* has a right angle (90°). The right angle may be marked with a small square.

The two shorter sides that form the right angle are called the legs. The longest side is called the **hypotenuse**.



hypotenuse

- the longest side of a right triangle
- the side opposite the right angle