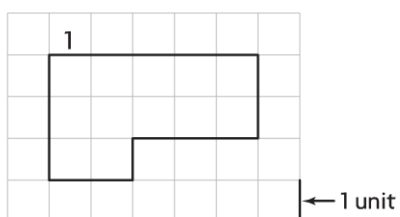


# Model Perimeter

**Perimeter** is the distance around a shape.

**Find the perimeter of the shape.**

**Step 1** Choose a unit to begin counting and label it 1.



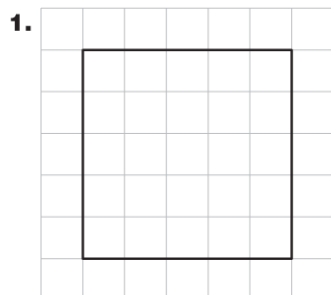
**Step 2** Count each unit around the shape to find the perimeter.

**16 units**

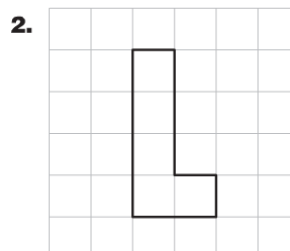


So, the perimeter of the shape is **16** units.

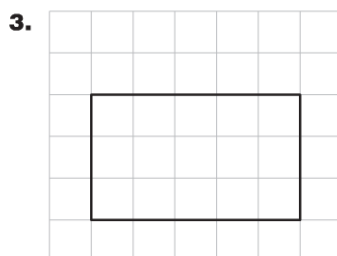
**Find the perimeter of the shape. Each unit is 1 centimeter.**



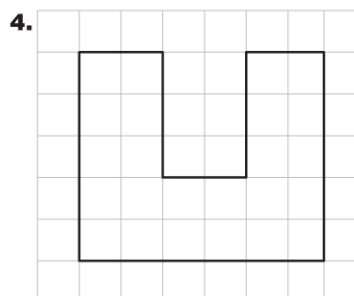
**20** centimeters



**12** centimeters



**16** centimeters



**28** centimeters

## Find Perimeter

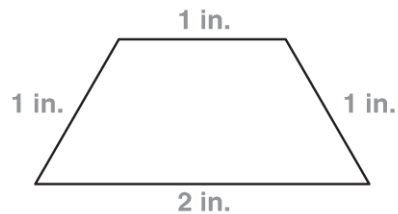
Kelsey wants to know the perimeter of the shape below.  
She can use an inch ruler to find the perimeter.

**Step 1** Choose one side of the shape to measure. Place the zero mark of the ruler on the end of the side. Measure to the nearest inch. Write the length.

**Step 2** Use the ruler to measure the other three sides. Write the lengths.

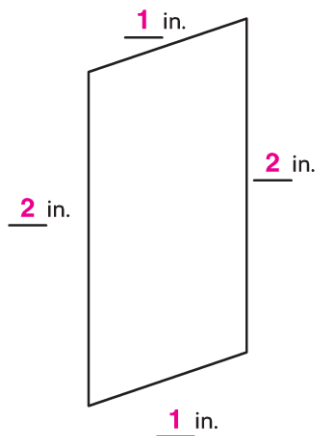
**Step 3** Add the lengths of all the sides.  
 $1 + 1 + 2 + 1 = 5$

So, the perimeter of the shape is **5** inches.



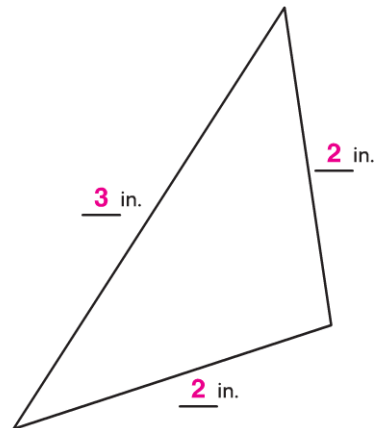
Use an inch ruler to find the perimeter.

1.



**6** inches

2.

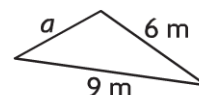


**7** inches

**Algebra • Find Unknown Side Lengths**

An unknown side length is a side that does not have its length labeled with a number. Instead the side is labeled with a symbol or letter, such as  $a$ .

**The perimeter of the shape is 20 meters.  
Find the length of side  $a$ .**



**Think:** There is only one unknown side length.

**Step 1** Add the *known* side lengths.

$$6 + 9 = 15$$

**Step 2** Subtract the sum of the known side lengths from the perimeter.

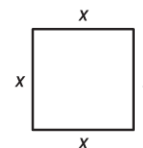
$$20 - 15 = 5$$

**Step 3** Add to check your work.

$$6 + 9 + 5 = 20 \checkmark$$

So, the unknown side length,  $a$ , is **5** meters.

**The perimeter of the square is 12 feet.  
What is the length of each side of the square?**



**Think:** A square has four sides of equal length.

**Step 1** Divide the perimeter by the number of sides.

$$12 \div 4 = 3$$

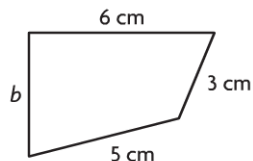
**Step 2** Multiply to check your work.

$$4 \times 3 = 12 \checkmark$$

So, the length of each side,  $x$ , is **3** feet.

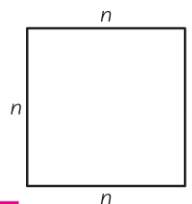
**Find the unknown side lengths.**

**1.** Perimeter = 18 centimeters



$$b = \underline{4} \text{ centimeters}$$

**2.** Perimeter = 20 yards

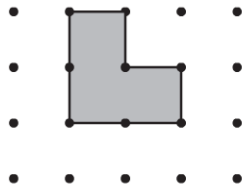


$$n = \underline{5} \text{ yards}$$

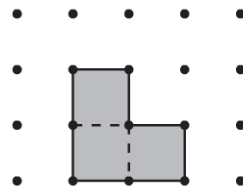
**Understand Area**

A unit square is a square with a side length of 1 unit. Area is the measure of the number of unit squares needed to cover a surface. A square unit is used to measure area.

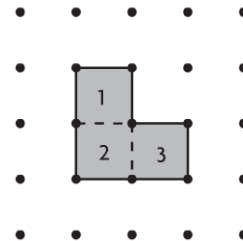
**What is the area of the shape?**



**Step 1** Draw lines to show each unit square in the shape.

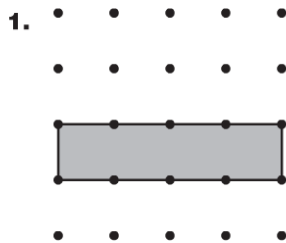


**Step 2** Count the number of unit squares to find the area.

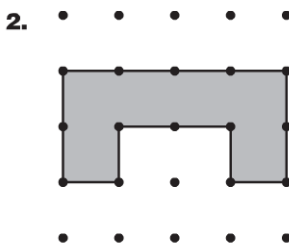


The area of the shape is **3** square units.

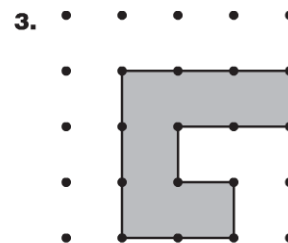
**Count to find the area of the shape.**



Area = **4** square units



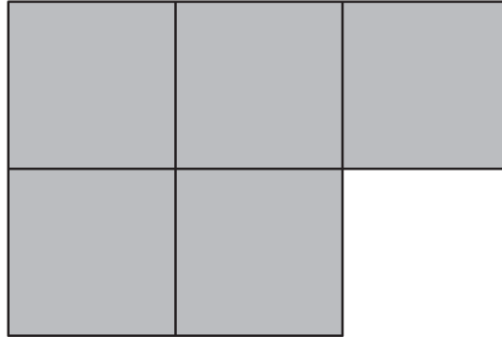
Area = **6** square units



Area = **6** square units

## Measure Area

Find the area of the shape. Each unit square is 1 square inch.



**Think:** How many unit squares are needed to cover this flat surface?

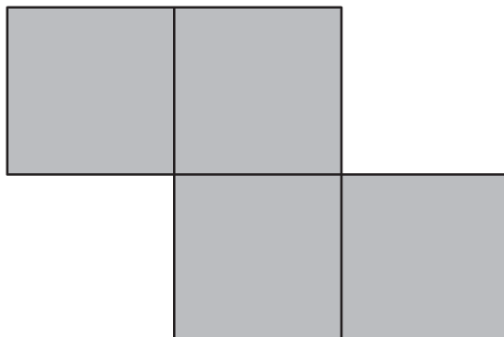
**Step 1** Use 1-inch square tiles. Cover the surface of the shape with the tiles. Make sure there are no gaps (space between the tiles). Do not overlap the tiles.

**Step 2** Count the tiles you used.  
5 tiles are needed to cover the shape.

So, the area of the shape is 5 square inches.

Count to find the area of the shape.  
Each square is 1 square inch.

1.



Area = 4 square inches

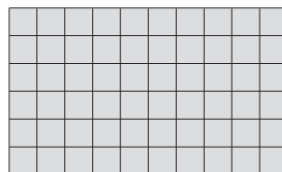
2.



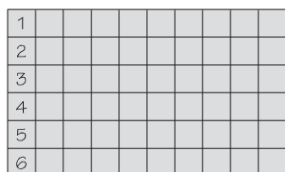
Area = 5 square inches

## Use Area Models

Use multiplication to find the area of the shape.  
Each unit square is 1 square meter.



**Step 1** Count the number of rows.  
There are **6** rows.



**Step 2** Count the number of unit squares in each row. There are **10** unit squares.



**Step 3** Multiply the number of rows by the number in each row to find the area.

number of rows  $\times$  number in each row = area

$$6 \times 10 = 60$$

So, the area of the shape is **60** square meters.

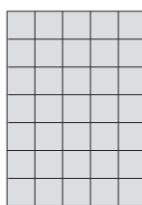
Find the area of the shape.  
Each unit square is 1 square meter.

1.



**27 square meters**

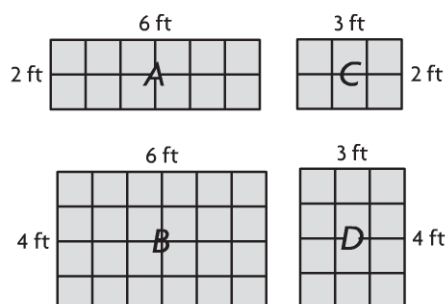
2.



**35 square meters**

**Problem Solving • Area of Rectangles**

Mrs. Wilson wants to plant a garden, so she drew plans for some sample gardens. She wants to know how the areas of the gardens are related. How will the areas of Gardens A and B change? How will the areas of Gardens C and D change?



Use the graphic organizer to help you solve the problem.

Read the Problem							
<b>What do I need to find?</b>  I need to know how the areas will change from A to B and from <u>C</u> to <u>D</u> .	<b>What information do I need to use?</b>  I need to use the <u>length</u> and <u>width</u> of each garden to find its area.	<b>How will I use the information?</b>  I will record the areas in a table. Then I will look for a pattern to see how the <u>areas</u> will change.					
Solve the Problem							
	Length	Width	Area		Length	Width	Area
Garden A	2 ft	6 ft	12 sq ft	Garden C	2 ft	3 ft	6 sq ft
Garden B	4 ft	6 ft	24 sq ft	Garden D	4 ft	3 ft	12 sq ft
From the table, I see that the lengths will be doubled and the widths will be the same. The areas in square feet will change from <u>12</u> to <u>24</u> and from <u>6</u> to <u>12</u> . So, the area will be <u>doubled</u> .							

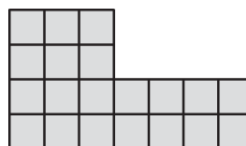
**Solve.**

- Mrs. Rios made a flower garden that is 8 feet long and 2 feet wide. She made a vegetable garden that is 4 feet long and 2 feet wide. How do the areas change?

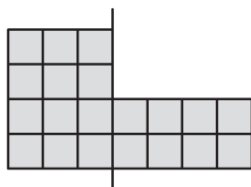
**The area of the flower garden is double the area of the vegetable garden.**

## Area of Combined Rectangles

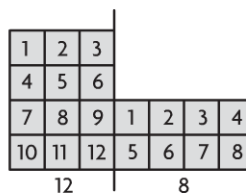
You can break apart a shape into rectangles to find the total area of the shape.



**Step 1** Draw a line to break apart the shape into two rectangles.



**Step 2** Count the number of unit squares in each rectangle.



**Step 3** Add the number of unit squares in each rectangle to find the total area.

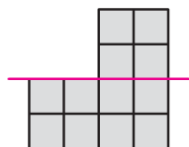
$$12 + 8 = 20 \text{ unit squares}$$

So, the area of the shape is **20** square units.

Draw a line to break apart the shape into rectangles.

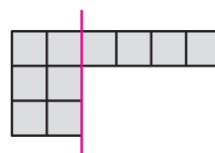
Find the area of the shape. **Possible lines are shown.**

1.



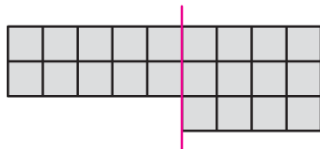
**12 square units**

2.



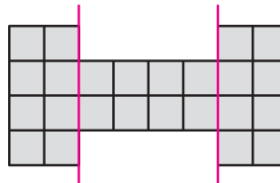
**10 square units**

3.



**22 square units**

4.

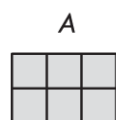


**24 square units**



**Same Perimeter, Different Areas**

You can use perimeter and area to compare rectangles.

**Compare the perimeters of Rectangle A and Rectangle B.**

Find the number of units around each rectangle.

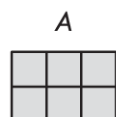
Rectangle A:  $3 + 2 + 3 + 2 = 10$  units

Rectangle B:  $4 + 1 + 4 + 1 = 10$  units



Compare:  $10$  units =  $10$  units

So, Rectangle A has the same perimeter as Rectangle B.

**Compare the areas of Rectangle A and Rectangle B.**

Find the number of unit squares needed to cover each rectangle.

Rectangle A:  $2$  rows of  $3 = 2 \times 3$ , or  $6$  square units

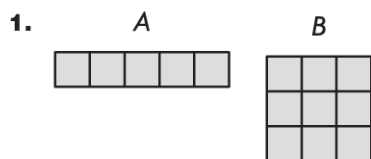
Rectangle B:  $1$  row of  $4 = 1 \times 4$ , or  $4$  square units



Compare:  $6$  square units  $>$   $4$  square units

So, Rectangle A has a greater area than Rectangle B.

**Find the perimeter and the area. Tell which rectangle has a greater area.**



A: Perimeter = 12 units;  
Area = 5 square units

B: Perimeter = 12 units;  
Area = 9 square units

Rectangle B has a greater area.



A: Perimeter = 10 units;  
Area = 6 square units

B: Perimeter = 10 units;  
Area = 4 square units

Rectangle A has a greater area.

## Same Area, Different Perimeters

**Find the perimeter and area of Rectangles A and B.  
Tell which rectangle has a greater perimeter.**

**Step 1** Find the area of each rectangle. You can multiply the number of unit squares in each row by the number of rows.

Rectangle A:  $2 \times 6 = 12$  square units

Rectangle B:  $3 \times 4 = 12$  square units



A



B

**Step 2** Find the perimeter of each rectangle. You can add the sides.

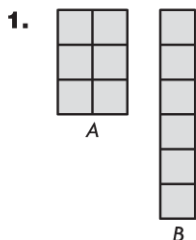
Rectangle A:  $6 + 2 + 6 + 2 = 16$  units

Rectangle B:  $4 + 3 + 4 + 3 = 14$  units

**Step 3** Compare the perimeters.  $16$  units  $>$   $14$  units.

So, Rectangle **A** has a greater perimeter.

**Find the perimeter and the area. Tell which rectangle has a greater perimeter.**



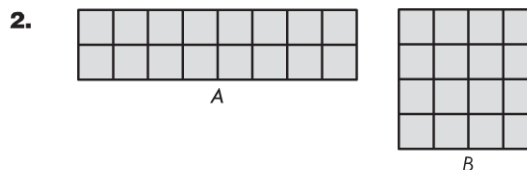
A: Area = 6 square units;

Perimeter = 10 units

B: Area = 6 square units;

Perimeter = 14 units

Rectangle **B** has a greater perimeter.



A: Area = 16 square units;

Perimeter = 20 units

B: Area = 16 square units;

Perimeter = 16 units

Rectangle **A** has a greater perimeter.