Name _____

Use Area Models

Essential Question Why can you multiply to find the area of a rectangle?

Unlock the Problem Real World

Cristina has a garden that is shaped like the rectangle below. Each unit square represents 1 square meter. What is the area of her garden?
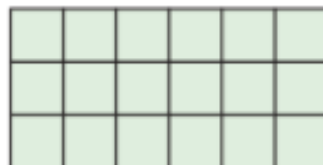
• Circle the shape of the garden.

One Way Count unit squares.

Count the number of unit squares in all.

There are _____ unit squares.

So, the area is _____ square meters.
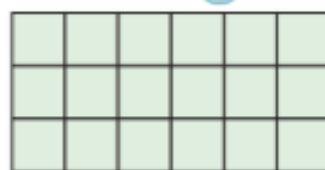
Other Ways

A Use repeated addition.

Count the number of rows. Count the number of unit squares in each row.

_____ rows of _____ = ▨

Write an addition equation.

So, the area is _____ square meters.

_____ unit squares

_____ unit squares

_____ unit squares

_____ + _____ + _____ = _____

B Use multiplication.

Count the number of rows. Count the number of unit squares in each row.

_____ rows of _____ = ▨

This rectangle is like an array. How do you find the total number of squares in an array?

_____

Write a multiplication equation.
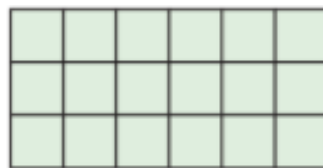
So, the area is _____ square meters.

_____ unit squares in each row

_____ rows

_____ × _____ = _____

Math Talk MATHEMATICAL PRACTICES ❶

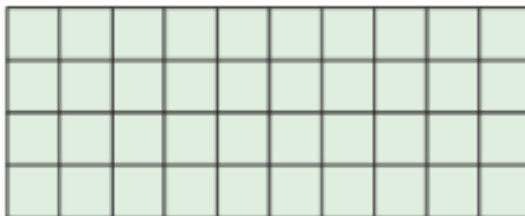**Analyze** Can you use all 3 methods mentioned to find the area of all figures?

3rd Grade Math CH11

Try This!

Find the area of the figure.
Each unit square is 1 square foot.

Think: There are 4 rows of 10 unit squares.

_____ × _____ = _____

So, the area is _____ square feet.

Share and Show MATH BOARD

1. Look at the figure.

_____ rows of _____ = ▢

Add. _____ + _____ + _____ = _____

Multiply. _____ × _____ = _____

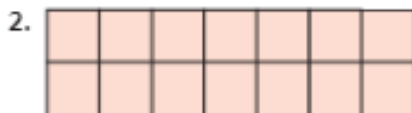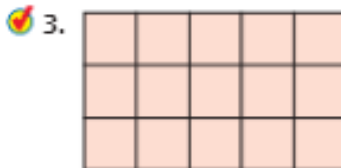What is the area of the figure?

_____ square units
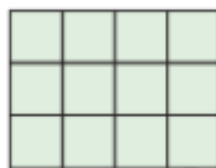
Math Talk MATHEMATICAL PRACTICES 6
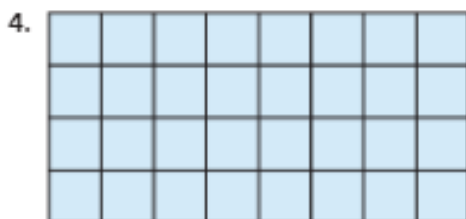
Compare Which method do you prefer using?

Find the area of the figure.
Each unit square is 1 square foot.

2.

3.

_____   _____

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

4.

5.

_____   _____

3rd Grade Math CH11

Name _____

On Your Own

Find the area of the figure.
Each unit square is 1 square foot.

6.

7.

_____   _____

Find the area of the figure.
Each unit square is 1 square meter.
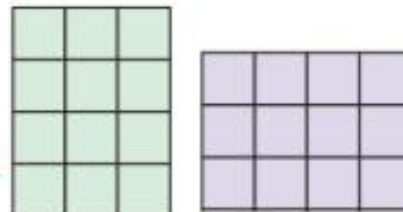
8.

9.

_____   _____
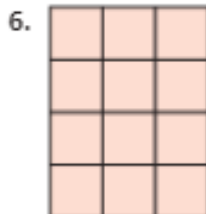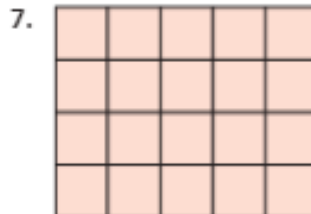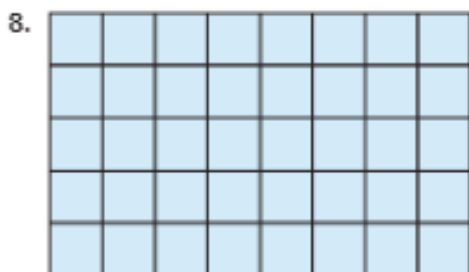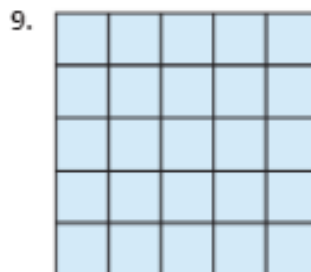
10. **Use Diagrams** Draw and shade three rectangles with an area of 24 square units. Then write an addition or multiplication equation for each.

_____

_____

3rd Grade Math CH11
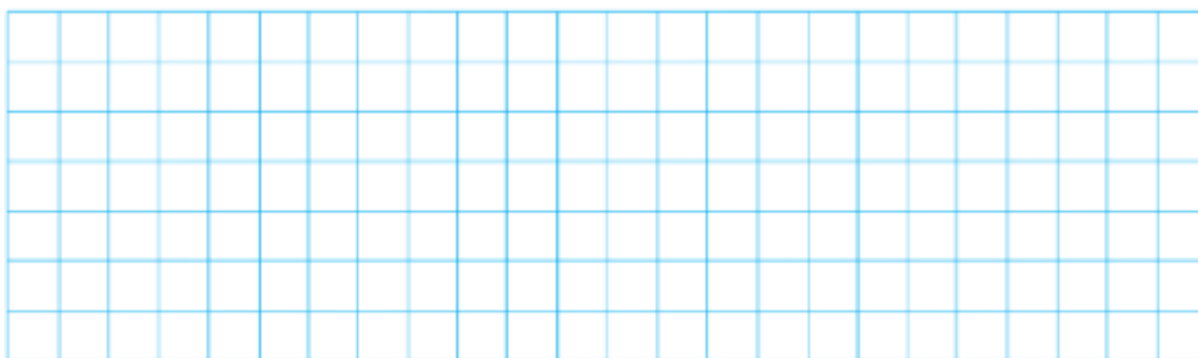
Problem Solving • Applications (Real World)

11. GO DEEPER Compare the areas of the two rugs at the right. Each unit square represents 1 square foot. Which rug has the greater area? Explain.

_____

_____

_____

12. THINK SMARTER A tile company tiled a wall using square tiles. A mural is painted in the center. The drawing shows the design. The area of each tile used is 1 square foot.
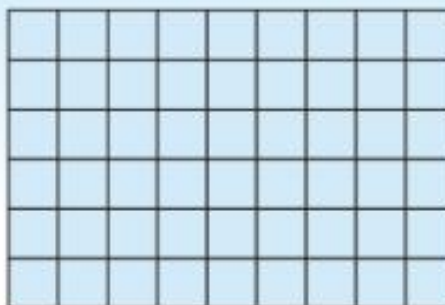
Write a problem that can be solved by using the drawing. Then solve your problem.

_____

_____

_____

13. THINK SMARTER Colleen drew this rectangle. Select the equation that can be used to find the area of the rectangle. Mark all that apply.

(A) $9 \times 6 = n$

(B) $9 + 9 + 9 + 9 + 9 + 9 = n$

(C) $9 + 6 = n$

(D) $6 \times 9 = n$

(E) $6 + 6 + 6 + 6 + 6 + 6 = n$

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Name _____

✓ Mid-Chapter Checkpoint

Vocabulary

Vocabulary
- area
- perimeter
- square unit

Choose the best term from the box.

1. The distance around a figure is the _____. (p. 625)

2. The measure of the number of unit squares needed to cover a figure with no gaps or overlaps is the _____. (p. 643)

Concepts and Skills

Find the perimeter of the figure. Each unit is 1 centimeter. (3.MD.D.8)

3.

_____ centimeters

4.
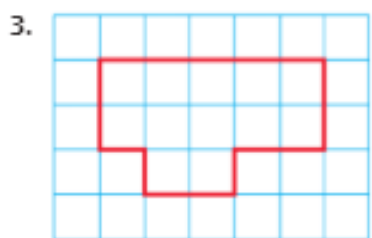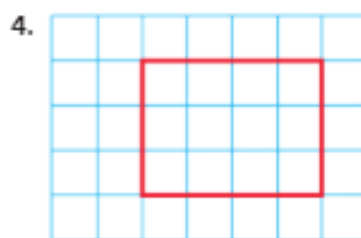
_____ centimeters

Find the unknown side lengths. (3.MD.D.8)

5. Perimeter = 33 centimeters

10 cm
4 cm
6 cm
g
10 cm
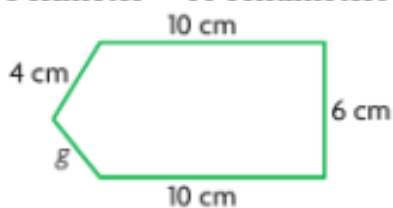
$g =$ _____ centimeters

6. Perimeter = 32 feet

12 ft
k k
12 ft
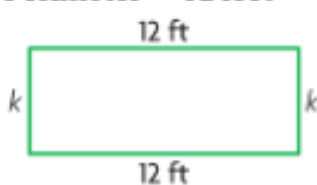
$k =$ _____ feet

Find the area of the figure. Each unit square is 1 square meter.
(3.MD.C.5, 3.MD.C.5a, 3.MD.C.5b, 3.MD.C.6, 3.MD.C.7, 3.MD.C.7a)

7.

_____ square meters

8.

_____ square meters   Chapter 11   661

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9. Ramona is making a lid for her rectangular jewelry box. The jewelry box has side lengths of 6 centimeters and 4 centimeters. What is the area of the lid Ramona is making? **(3.MD.C.7, 3.MD.C.7a)**
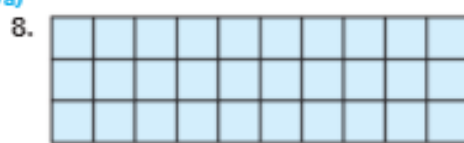
6 cm

4 cm

_____
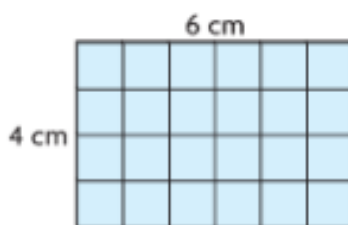
10. Adrienne is decorating a square picture frame. She glued 36 inches of ribbon around the edge of the frame. What is the length of each side of the picture frame?**(3.MD.D.8)**

a

a a

a

_____
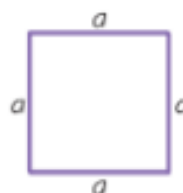
11. Margo will sweep a room. A diagram of the floor that she needs to sweep is shown at the right. What is the area of the floor? **(3.MD.C.5b, 3.MD.C.6)**

_____
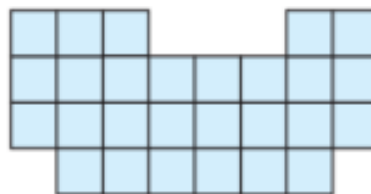
12. Jeff is making a poster for a car wash for the Campout Club. What is the perimeter of the poster? **(3.MD.D.8)**

3 ft

1 ft   CAMPOUT CLUB   CAR WASH   1 ft

3 ft

_____

13. **GO DEEPER**   A rectangle has two side lengths of 8 inches and two side lengths of 10 inches. What is the perimeter of the rectangle? What is the area of the rectangle? **(3.MD.C.5, 3.MD.C.5a, 3.MD.D.8)**

_____

Name _____

Problem Solving • Area of Rectangles

Essential Question How can you use the strategy *find a pattern* to solve area problems?

Common Core — Measurement and Data—3.MD.C.7b
Also 3.OA.A.3, 3.OA.C.7, 3.OA.D.9
MATHEMATICAL PRACTICES
MP1, MP2, MP7

Unlock the Problem Real World

Mr. Koi wants to build storage buildings, so he drew plans for the buildings. He wants to know how the areas of the buildings are related. How does the area change from the area of Building A to the area of Building B? How does the area change from the area of Building C to the area of Building D?
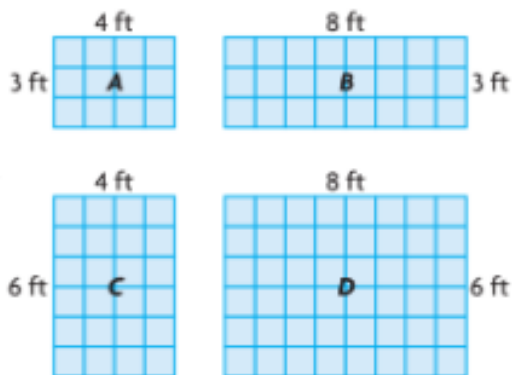
Use the graphic organizer to help you solve the problem.

4 ft   8 ft
3 ft A   B   3 ft
4 ft   8 ft
6 ft C   D   6 ft

Read the Problem

What do I need to find?

I need to find how the areas will change from A to B and from

_____ to _____.

What information do I need to use?

I need to use the

_____ and _____ of each building to find its area.

How will I use the information?

I will record the areas in a table. Then I will look for a pattern to see how the _____ will change.

Solve the Problem

I will complete the table to find patterns to solve the problem.

	Length	Width	Area		Length	Width	Area
Building A	3 ft			Building C		4 ft	
Building B	3 ft			Building D		8 ft	

I see that the lengths will be the same and the widths will be doubled.

The areas will change from _____ to _____ and from _____ to _____.

So, when the lengths are the same and the widths are doubled,

the areas will be _____.

3rd Grade Math CH11

🔒 Try Another Problem

Mr. Koi is building more storage buildings. He wants to know how the areas of the buildings are related. How does the area change from the area of Building *E* to the area of Building *F* ? How does the area change from the area of Building *G* to the area of Building *H* ?

Use the graphic organizer to help you solve the problem.

8 ft — E — 5 ft   4 ft — F — 5 ft

8 ft — G — 10 ft   4 ft — H — 10 ft
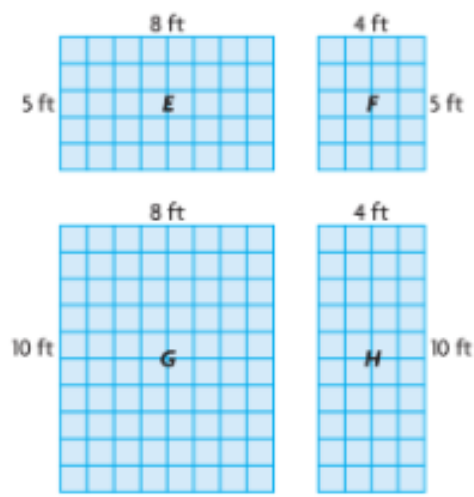
🔊 Read the Problem

What do I need to find?	What information do I need to use?	How will I use the information?

🔊 Solve the Problem

	Length	Width	Area		Length	Width	Area
Building *E*				Building *G*			
Building *F*				Building *H*			

• How did your table help you find a pattern?

_____

_____

_____

Math Talk

MATHEMATICAL PRACTICES ❷

Reason Abstractly
What if the length of both sides is doubled? How would the areas change?

3rd Grade Math CH11

Name _____

Share and Show MATH BOARD

Use the table for 1–2.

1. Many pools come in rectangular shapes. How do the areas of the swimming pools change when the widths change?

   First, complete the table by finding the area of each pool.

   Think: I can find the area by multiplying the length and the width.

Swimming Pool Sizes			
Pool	Length (in feet)	Width (in feet)	Area (in square feet)
A	8	20	
B	8	30	
C	8	40	
D	8	50	

   Then, find a pattern of how the lengths change and how the widths change.

   The _____ stays the same. The widths

   _____.

   Last, describe a pattern of how the area changes.

   The areas _____ by _____ square feet.

2. What if the length of each pool was 16 feet? Explain how the areas would change.

   _____

On Your Own

3. **Look for a Pattern** If the length of each pool in the table is 20 feet, and the widths change from 5, to 6, to 7, and to 8 feet, describe the pattern of the areas.

   _____

   _____

3ʳᵈ Grade Math CH11

4. **MATHEMATICAL PRACTICE ①** **Analyze Relationships** Jacob has a rectangular garden with an area of 56 square feet. The length of the garden is 8 feet. What is the width of the garden?

_____

5. **GO DEEPER** A diagram of Paula's bedroom is at the right. Her bedroom is in the shape of a rectangle. Write the measurements for the other sides. What is the perimeter of the room? (Hint: The two pairs of opposite sides are equal lengths.)

_____

17 ft

12 ft
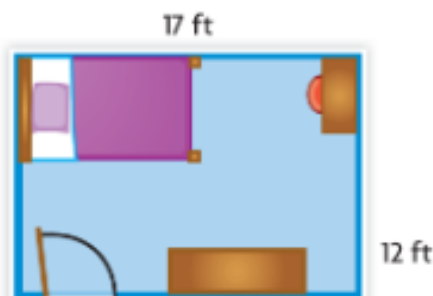
6. **THINK SMARTER** Elizabeth built a sandbox that is 4 feet long and 4 feet wide. She also built a flower garden that is 4 feet long and 6 feet wide and a vegetable garden that is 4 feet long and 8 feet wide. How do the areas change?

_____

_____

_____

_____

7. **THINK SMARTER** Find the pattern and complete the chart.

Total Area (in square feet)	50	60	70	80	
Length (in feet)	10	10		10	
Width (in feet)	5	6	7		

How can you use the chart to find the length and width of a figure with an area of 100 square feet?

_____

_____

3rd Grade Math CH11