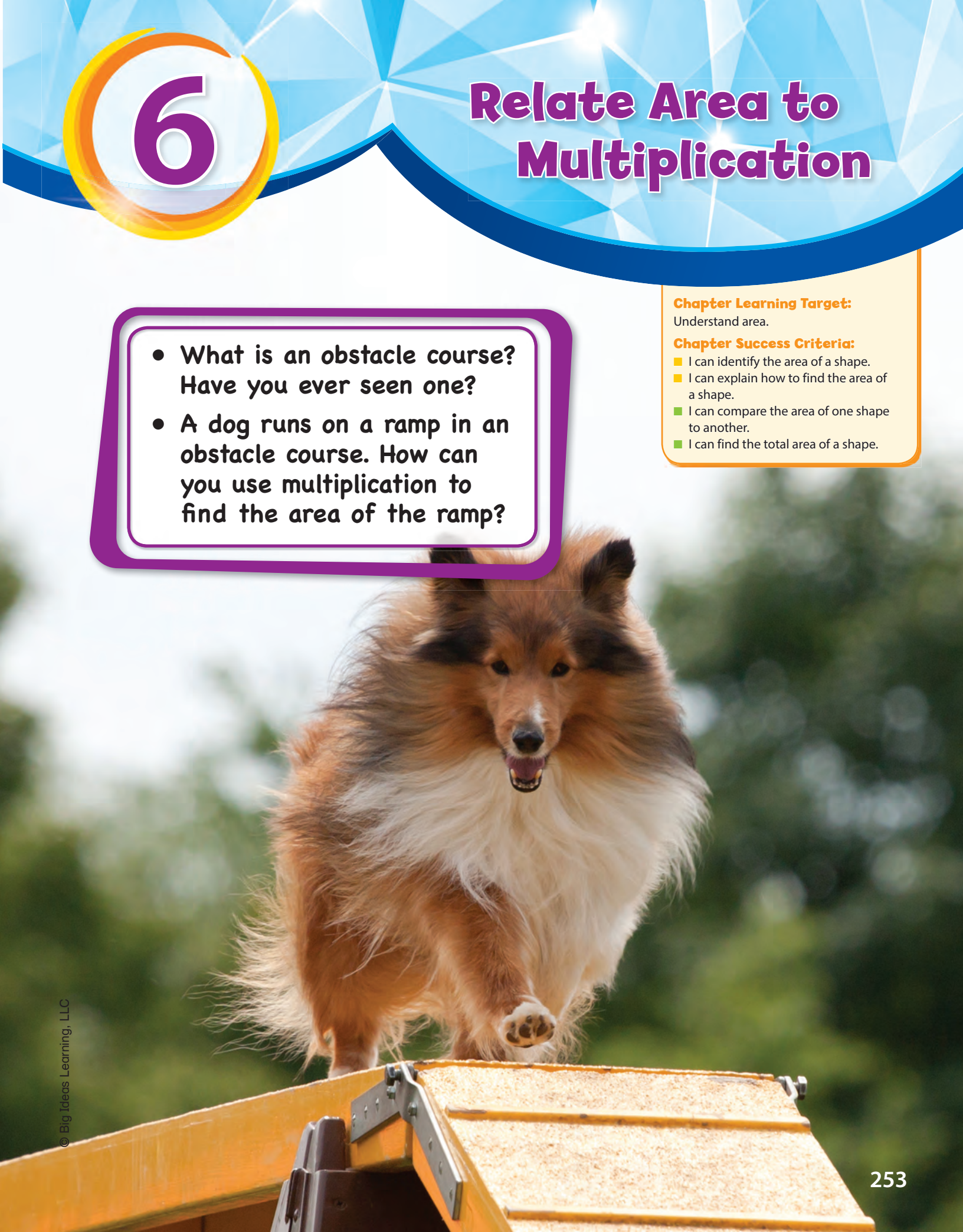
6 Relate Area to Multiplication

Chapter Learning Target:
Understand area.

Chapter Success Criteria:
- I can identify the area of a shape.
- I can explain how to find the area of a shape.
- I can compare the area of one shape to another.
- I can find the total area of a shape.

- What is an obstacle course? Have you ever seen one?
- A dog runs on a ramp in an obstacle course. How can you use multiplication to find the area of the ramp?



Name _____

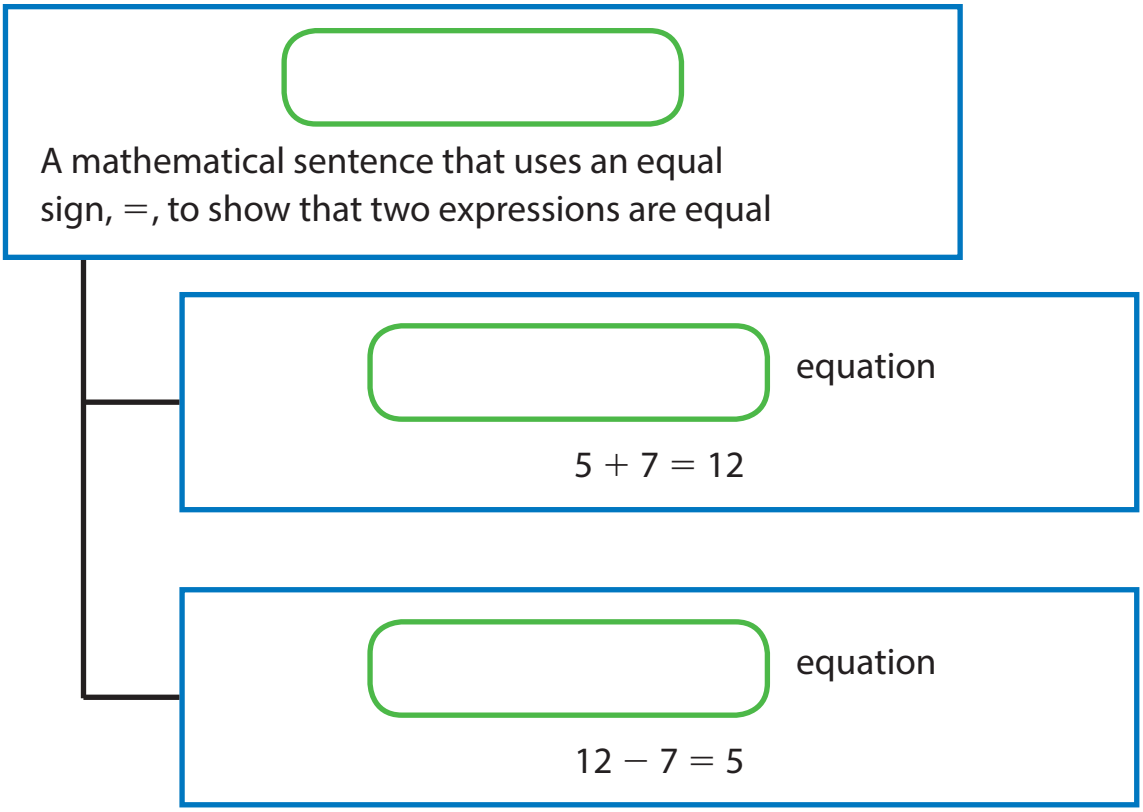
6 Vocabulary

Review Words

addition
equation
subtraction

Organize It

Use the review words to complete the graphic organizer.



Define It

Use your vocabulary cards to complete the definition.

1. area: The amount of _____ a _____ covers

2. square unit: A _____ used to measure _____

3. unit square: A square with _____ that are each _____ unit long

Chapter 6 Vocabulary Cards

area

square unit

unit square

A unit used to measure area

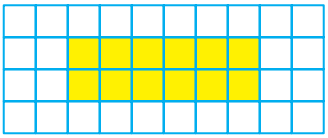
square centimeter

square meter

square inch

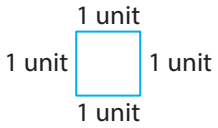
square foot

The amount of surface a shape covers



You can measure area by counting the number of unit squares needed to cover a flat surface with no gaps or overlaps.

A square with sides that are each 1 unit long



Name _____

Understand Area 6.1

Learning Target: Count to find the area of a shape.

Success Criteria:

- I can count the number of unit squares covering a shape.
- I can tell the area of a shape in square units.
- I can explain how to find the area of a shape.

Explore and Grow

Try to cover the rectangle with the given number of color tiles.

6 color tiles	**10 color tiles**	**8 color tiles**
Are there any gaps or overlaps?	Are there any gaps or overlaps?	Are there any gaps or overlaps?

How many color tiles do you need to completely cover the rectangle with no gaps or overlaps?

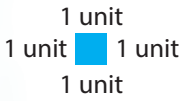
_____ color tiles

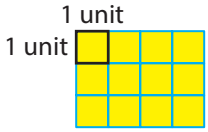
MP **Precision** Why is it important to line up the tiles side to side?

Think and Grow: Counting to Find Area

Area is the amount of surface a shape covers. The area of a unit square is 1 **square unit**.

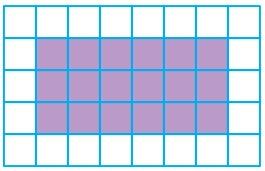
Unit Square





12 unit squares cover the rectangle with no gaps or overlaps. So, the area of the rectangle is 12 square units.

How is finding the area of a shape different from finding the length of the shape?



☐ = 1 square unit

Example Find the area of the rectangle.

Count the unit squares needed to cover the rectangle.

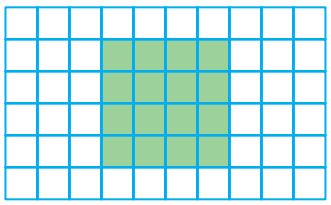
_____ unit squares cover the rectangle.

So, the area is _____ square units.

Show and Grow

Find the area of the shape.

1.

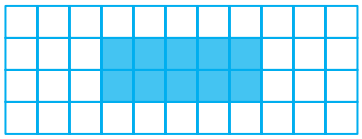


_____ unit squares cover the shape.

So, the area is _____ square units.

☐ = 1 square unit

2.



_____ unit squares cover the shape.

So, the area is _____ square units.

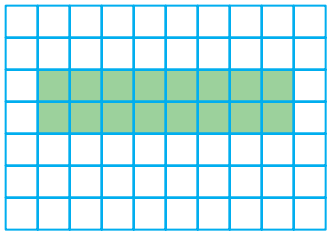
☐ = 1 square unit

Name _____

Apply and Grow: Practice

Find the area of the shape.

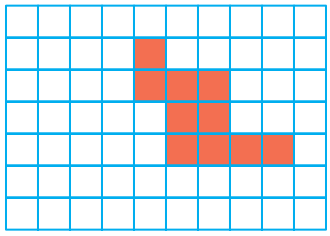
3.



_____ unit squares cover the shape.

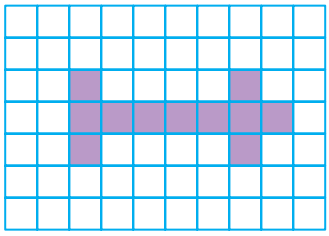
So, the area is _____ square units.

4.



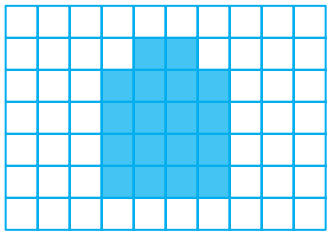
Area = _____ square units

5.



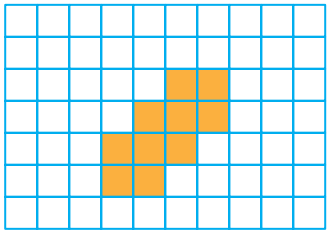
Area = _____ square units

6.



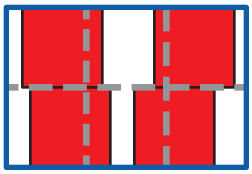
Area = _____ square units

7.

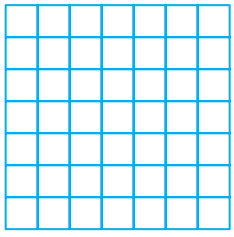


Area = _____ square units

8. **YOU BE THE TEACHER** Newton uses 4 color tiles to cover the rectangle. He says the area is 4 square units. Is he correct? Explain.

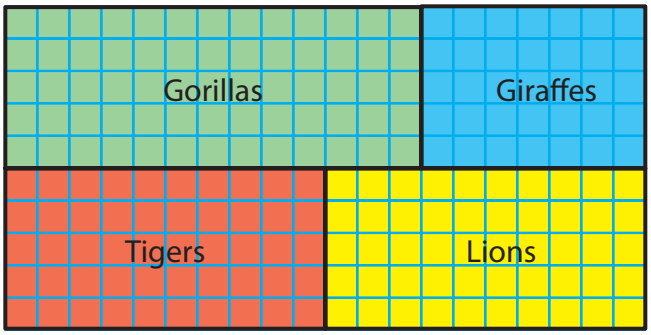


9. **Open-Ended** Draw a shape that has an area of 16 square units.



Think and Grow: Modeling Real Life

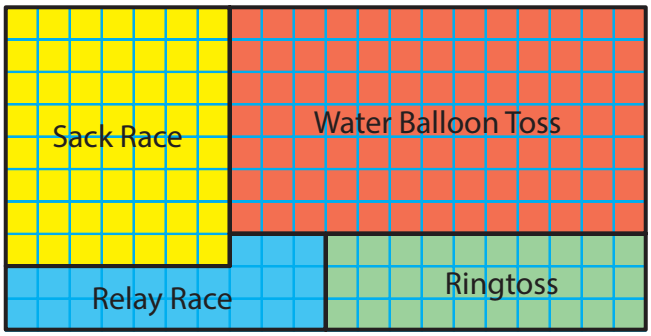
Part of a zoo map is shown. What is the area of the lion exhibit?



The lion exhibit is _____ square units.

Show and Grow

Use the field day map to answer the question.



10. What is the area of the relay race section?

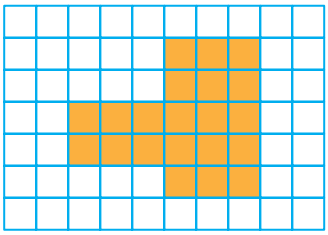
11. Which area is greater, the ringtoss section or the relay race section? Explain.

Name _____

Homework & Practice 6.1

Learning Target: Count to find the area of a shape.

Example Find the area of the shape.

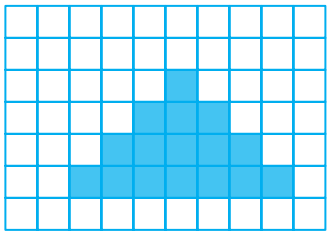


21 unit squares cover the shape.

So, the area is 21 square units.

Find the area of the shape.

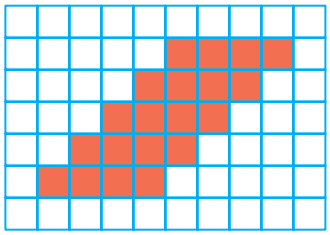
1.



_____ unit squares cover the shape.

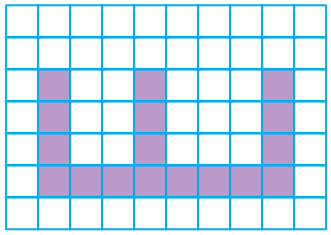
So, the area is _____ square units.

2.



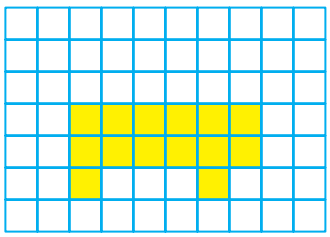
Area = _____ square units

3.



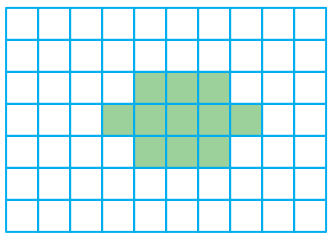
Area = _____ square units

4.



Area = _____ square units

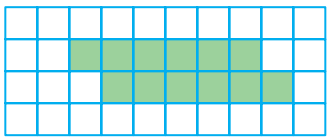
5.



Area = _____ square units

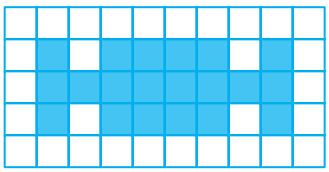
Find the area of the shape.

6.



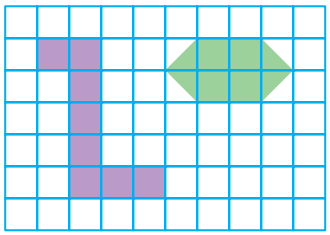
Area = _____ square units

7.

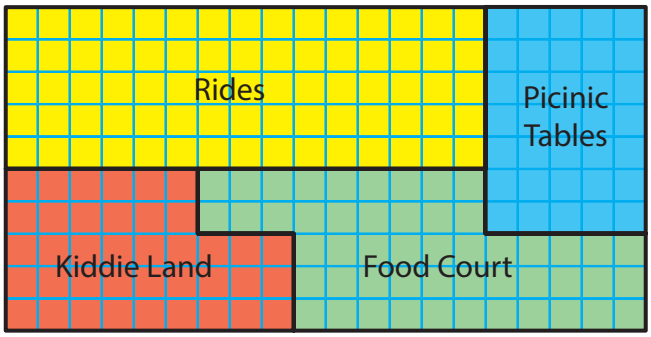


Area = _____ square units

8. DIG DEEPER! Your friend says each shape has an area of 8 square units. Is your friend correct? Explain.



Modeling Real Life Use the amusement park map to answer the question.



9. What is the area of the food court section?

10. Which area is greater, the kiddie land section or the picnic tables section? Explain.

Review & Refresh

Find the quotient.

11. $2\overline{)12}$

12. $7\overline{)28}$

13. $6\overline{)54}$

14. $7\overline{)49}$

Name _____

Measure Area Using Standard Units

6.2

Learning Target: Count to find the area of a shape using standard units.

Success Criteria:

- I can count the number of unit squares covering a shape.
- I can tell the area of a shape in square units.
- I can identify units as square inches, square feet, square centimeters, or square meters.

Explore and Grow

Use the colored squares.

How many blue squares do you think it will take to cover the rectangle?

_____ blue squares

How many red squares do you think it will take to cover the rectangle?

_____ red squares

Find the area of the rectangle using the blue squares.

Area = _____ blue square units

Find the area of the rectangle using the red squares.

Area = _____ red square units

MP **Reasoning** Why is the number of blue squares needed to cover the rectangle different from the number of red squares needed?

Think and Grow: Measure Area Using Standard Units

You can measure area using different standard units. Here are some standard units of length and area.

Unit	Square Unit
inch (in.)	square inch
foot (ft)	square foot
centimeter (cm)	square centimeter
meter (m)	square meter

Unit squares can represent different standard units.

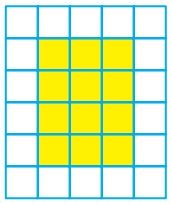
1 unit
1 unit ☐ 1 unit
1 unit

Each side is 1 unit.
The area is 1 square unit.

1 in.
1 in. ☐ 1 in.
1 in.

Each side represents 1 inch.
The area is 1 square inch.

Example Find the area of the rectangle.



☐ = 1 square meter

_____ unit squares cover the rectangle.

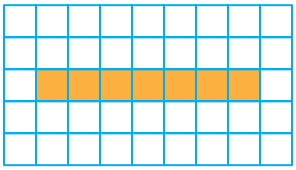
Each unit square represents

_____.

So, the area is _____.

Show and Grow

1. Find the area of the shape.



☐ = 1 square foot

_____ unit squares cover the rectangle.

Each unit square represents

_____.

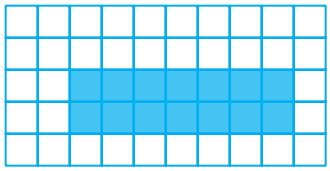
So, the area is _____.

Name _____

Apply and Grow: Practice

Find the area of the shape.

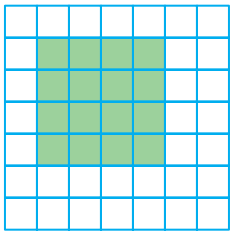
2.



☐ = 1 square foot

Area = _____

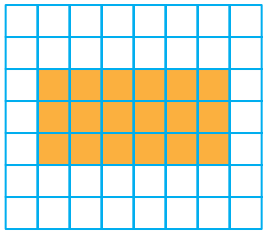
3.



☐ = 1 square centimeter

Area = _____

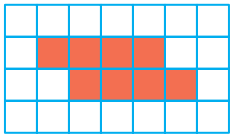
4.



☐ = 1 square inch

Area = _____

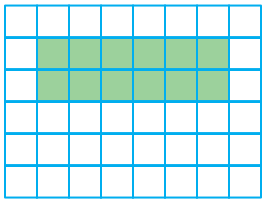
5.



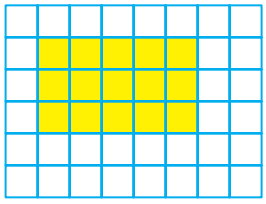
☐ = 1 square meter

Area = _____

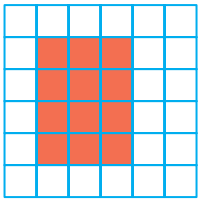
6. MP **Number Sense** Which rectangle has an area of 12 square inches?



☐ = 1 square inch



☐ = 1 square inch



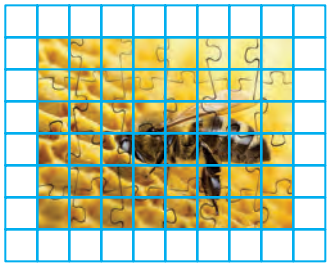
☐ = 1 square meter

7. MP **Reasoning** Is the area of a blanket more likely to be 30 square feet or 30 square centimeters? Explain.

Think and Grow: Modeling Real Life

Whose puzzle has a greater area?

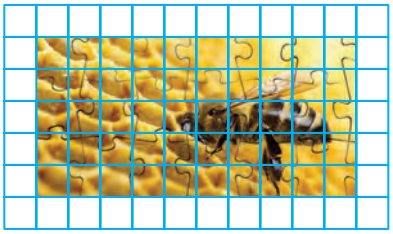
Newton



□ = 1 square inch

Area of Newton's puzzle:

Descartes



□ = 1 square inch

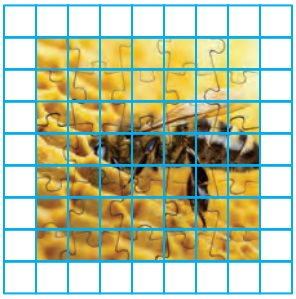
Area of Descartes's puzzle:

Compare: _____ ◯ _____ _____ puzzle has a greater area.

Show and Grow

8. Compare the area of Newton's puzzle shown above to the area of your friend's puzzle. Whose puzzle has a greater area?

Friend



□ = 1 square inch

9. You want to weave a rectangular rug that has an area of 12 square feet. Draw and shade a rectangle to represent the rug.

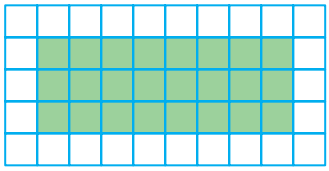
□ = 1 square foot

Name _____

Homework & Practice 6.2

Learning Target: Count to find the area of a shape using standard units.

Example Find the area of the shape.



☐ = 1 square foot

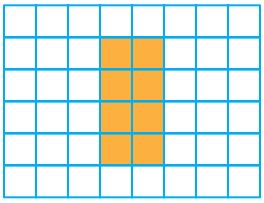
24 unit squares cover the rectangle.

Each unit square represents 1 square foot.

So, the area is 24 square feet.

Find the area of the shape.

1.



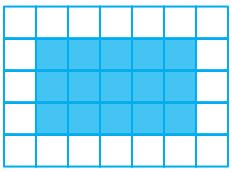
☐ = 1 square centimeter

_____ unit squares cover the rectangle.

Each unit square represents _____.

So, the area is _____.

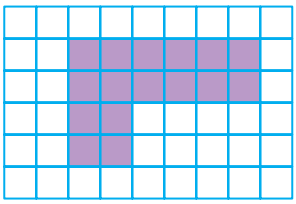
2.



☐ = 1 square meter

Area = _____

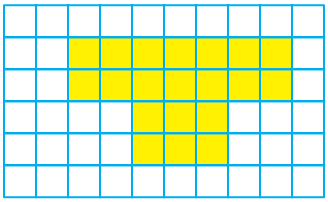
3.



☐ = 1 square foot

Area = _____

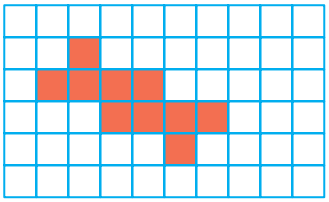
4.



☐ = 1 square centimeter

Area = _____

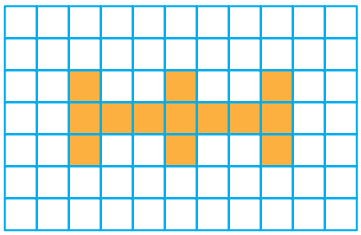
5.



☐ = 1 square inch

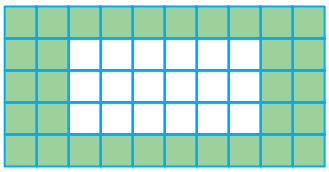
Area = _____

6. **Precision** Your friend says the area of the shape is 13. What is wrong with her answer?



☐ = 1 square centimeter

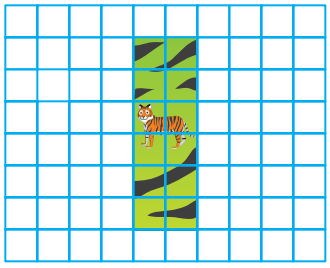
7. **Number Sense** Find the area of the shape.



☐ = 1 square foot

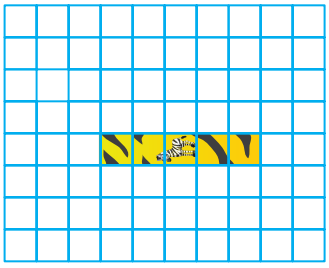
8. **Modeling Real Life** Compare the areas of your bookmark and your friend's bookmark. Whose bookmark has a greater area?

You



☐ = 1 square inch

Friend

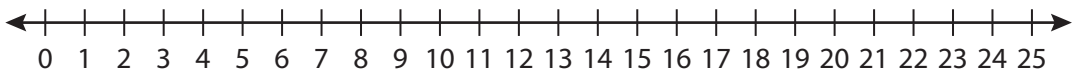


☐ = 1 square inch

Review & Refresh

9. Find the product of 4×5.

Number of jumps: _____ Size of jumps: _____



$4 \times 5 =$ _____

Name _____

Find Area by Multiplying 6.3

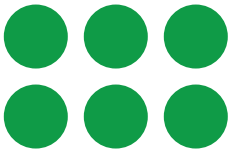
Learning Target: Use multiplication to find the area of a rectangle.

Success Criteria:

- I can use an array to find the area of a rectangle.
- I can write a multiplication equation to find the area of a rectangle.

Explore and Grow

Write an equation for the array.



_____ × _____ = _____

Cover the rectangle with color tiles. Find the area of the rectangle.

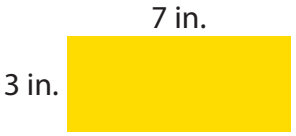
1 color tile = 1 square unit

Area = _____ square units

MP **Structure** How can you use an array to find the area of rectangle?

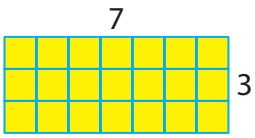
Think and Grow: Find Area by Multiplying

Example Find the area of the rectangle.



One Way:

Count the unit squares to find the area.

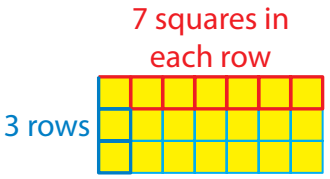


☐ = 1 square inch

There are _____ unit squares.

Another Way:

Think of the rectangle as an array. Then use repeated addition or multiplication to find the area.



☐ = 1 square inch

3 rows of _____ unit squares

$7 + 7 + 7 =$ _____

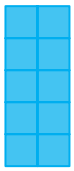
$3 \times 7 =$ _____

So, the area is _____.

Show and Grow

Find the area of the rectangle.

1.



☐ = 1 square centimeter

_____ rows of _____ unit squares

_____ + _____ + _____ + _____ + _____ = _____

Area = _____

2.

_____ × _____ = _____

Area = _____

Name _____

Apply and Grow: Practice

Find the area of the rectangle.

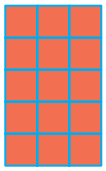
3.

☐ = 1 square centimeter

_____ × _____ = _____

Area = _____

4.

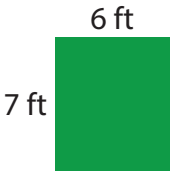


☐ = 1 square inch

_____ × _____ = _____

Area = _____

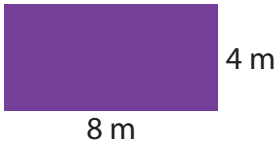
5.



_____ × _____ = _____

Area = _____

6.

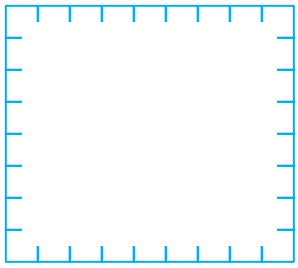


_____ × _____ = _____

Area = _____

7. **Open-Ended** Draw and label two different rectangles that each have an area of 12 square meters.

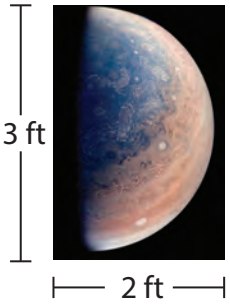
8. DIG DEEPER! Explain how to find the area of the rectangle.



Think and Grow: Modeling Real Life

Your rectangular animal poster is 4 feet long and 1 foot wide. Which poster has a greater area, your animal poster or your space poster?

Space Poster



Understand the problem:

Make a plan:

Solve:

Your _____ poster has a greater area.

Show and Grow

9. Descartes's rectangular tablet is 10 inches long and 7 inches wide. Whose tablet has a greater area, Newton's tablet or Descartes's?

Newton's Tablet

10. Your friend paints a rectangular tile that is 8 inches long and 4 inches wide. You paint a square tile that is 6 inches long. Whose tile has a greater area?

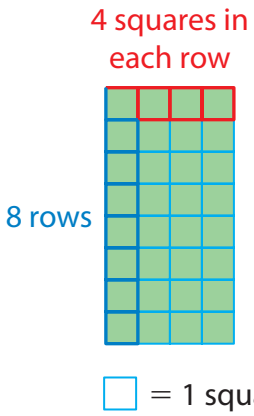
11. DIG DEEPER! A sign has an area of 18 square feet. The sign is 6 feet long. How wide is the sign?

Name _____

Homework & Practice 6.3

Learning Target: Use multiplication to find the area of a rectangle.

Example Find the area of the rectangle.

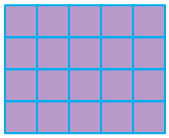


$8 \times 4 = \underline{32}$

So, the area is 32 square meters.

Find the area of the rectangle.

1.

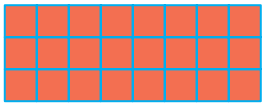


☐ = 1 square foot

_____ × _____ = _____

Area = _____

2.



☐ = 1 square centimeter

_____ × _____ = _____

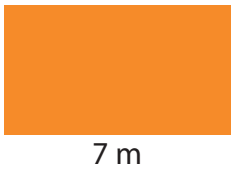
Area = _____

3.

_____ × _____ = _____

Area = _____

4.



_____ × _____ = _____

Area = _____

5. DIG DEEPER! Find the missing side length.

10 cm

____ cm | Area: 30 square centimeters

6. YOU BE THE TEACHER Descartes says he only needs the length of one side of a square to find the area. Is he correct? Explain.

7. **Modeling Real Life** A picture of your friend is 6 inches long and 4 inches wide. Which picture has a greater area, the picture of your friend or the picture of your pets?

Pets Picture

5 in.

7 in.

8. DIG DEEPER! A city street parking spot has an area of 72 square feet. The parking spot is 9 feet long. How wide is the parking spot?

Review & Refresh

Use the Distributive Property to fill in the blanks.

9. $9 \times 3 = \_\_\_\_ \times (2 + \_\_\_\_)$

$= (9 \times 2) + (\_\_\_\_ \times \_\_\_\_)$

$= \_\_\_\_ + \_\_\_\_$

$= \_\_\_\_$

10. $6 \times 7 = (\_\_\_\_ + \_\_\_\_) \times 7$

$= (5 \times \_\_\_\_) + (\_\_\_\_ \times 7)$

$= \_\_\_\_ + \_\_\_\_$

$= \_\_\_\_$

Name _____

Area and the Distributive Property

6.4

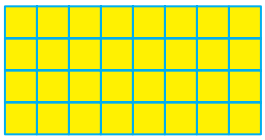
Learning Target: Use the Distributive Property to find the area of a rectangle.

Success Criteria:

- I can break apart a rectangle into two smaller rectangles.
- I can explain how the area of a rectangle is equal to the areas of its smaller rectangles.

Explore and Grow

Find the area of the rectangle two different ways.



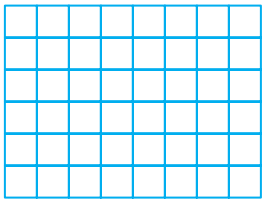
☐ = 1 square inch

Use multiplication.

Area = _____

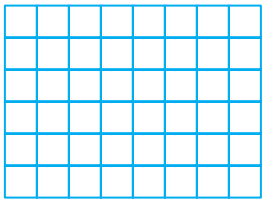
Break apart the rectangle into smaller rectangles. Draw and label your rectangles. Then find each area.

Rectangle 1



Area of Rectangle 1: _____

Rectangle 2

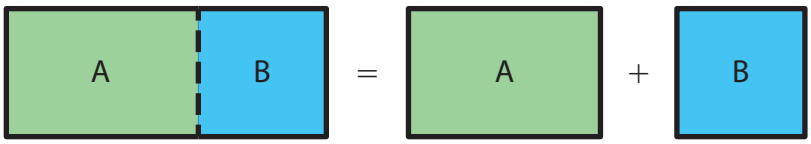


Area of Rectangle 2: _____

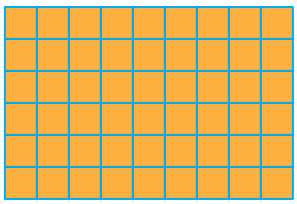
MP **Structure** How does the area of the large rectangle compare to the areas of the smaller rectangles? What property does this show?

Think and Grow: Area and the Distributive Property

You can use the Distributive Property to find the area of a rectangle. First, break apart the large rectangle into smaller rectangles. Then find the sum of the areas of the smaller rectangles.



Example Use the Distributive Property to find the area of the rectangle.



☐ = 1 square inch

Area of large rectangle = Sum of area of smaller rectangles

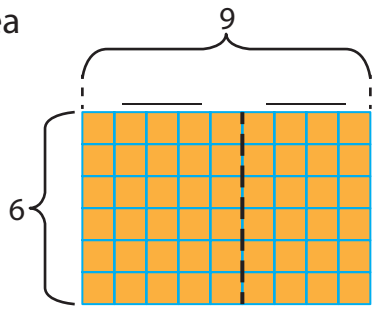
$6 \times 9 = 6 \times (\_\_\_\_ + \_\_\_\_)$

$6 \times 9 = (6 \times \_\_\_\_) + (6 \times \_\_\_\_)$

$6 \times 9 = \_\_\_\_ + \_\_\_\_$

$6 \times 9 = \_\_\_\_$

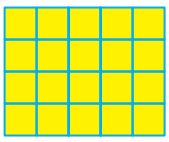
So, the area is _____.



☐ = 1 square inch

Show and Grow

1. Use the Distributive Property to find the area of the rectangle.



☐ = 1 square centimeter

$4 \times 5 = 4 \times (\_\_\_\_ + \_\_\_\_)$

$4 \times 5 = (4 \times \_\_\_\_) + (4 \times \_\_\_\_)$

$4 \times 5 = \_\_\_\_ + \_\_\_\_$

$4 \times 5 = \_\_\_\_$

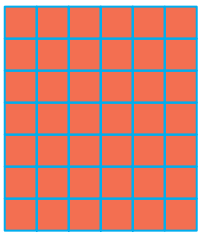
Area = _____

Name _____

Apply and Grow: Practice

Use the Distributive Property to find the area of the rectangle.

2.



☐ = 1 square meter

$7 \times 6 = 7 \times (\_\_\_\_ + \_\_\_\_)$

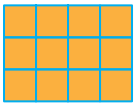
$7 \times 6 = (\_\_\_\_ \times \_\_\_\_) + (\_\_\_\_ \times \_\_\_\_)$

$7 \times 6 = \_\_\_\_ + \_\_\_\_$

$7 \times 6 = \_\_\_\_$

Area = _____

3.



☐ = 1 square foot

$3 \times 4 = (\_\_\_\_ + \_\_\_\_) \times 4$

$3 \times 4 = (\_\_\_\_ \times \_\_\_\_) + (\_\_\_\_ \times \_\_\_\_)$

$3 \times 4 = \_\_\_\_ + \_\_\_\_$

$3 \times 4 = \_\_\_\_$

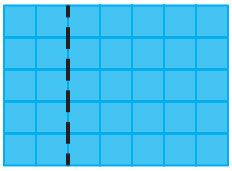
Area = _____

4. MP **Structure** Which equation represents the area of the rectangle?

$5 \times 7 = 5 \times (6 + 1) = (5 \times 6) + (5 \times 1)$

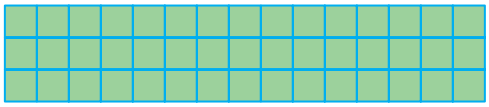
$5 \times 8 = 5 \times (6 + 2) = (5 \times 6) + (5 \times 2)$

$5 \times 7 = 5 \times (2 + 5) = (5 \times 2) + (5 \times 5)$



☐ = 1 square inch

5. DIG DEEPER! Explain how to use the Distributive Property to find the area of the rectangle.



☐ = 1 square centimeter

Think and Grow: Modeling Real Life

Descartes cuts 1 rectangular piece of construction paper into 2 rectangles. One rectangle is 8 inches wide and 10 inches long. The other rectangle is 8 inches wide and 2 inches long. What were the dimensions and total area of the paper before it was cut?

Draw a picture:

Multiplication equation:

Distributive Property:

The piece of paper was _____ inches wide and _____ inches long before it was cut.

The total area of the piece of paper was _____ square inches.

Show and Grow

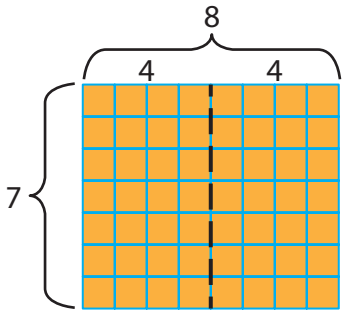
6. You cut 1 rectangular piece of fabric into 2 rectangles. One rectangle is 3 feet wide and 6 feet long. The other rectangle is 3 feet wide and 9 feet long. What were the dimensions and total area of the fabric before it was cut?

Name _____

Homework & Practice 6.4

Learning Target: Use the Distributive Property to find the area of a rectangle.

Example Use the Distributive Property to find the area of the rectangle.



□ = 1 square meter

$7 \times 8 = 7 \times (4 + 4)$

$7 \times 8 = (7 \times 4) + (7 \times 4)$

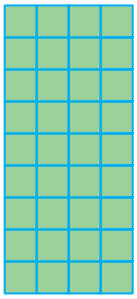
$7 \times 8 =$ 28 $+$ 28

$7 \times 8 =$ 56

Area = 56 square meters

Use the Distributive Property to find the area of the rectangle.

1.



□ = 1 square foot

$9 \times 4 = (\_\_\_\_ + \_\_\_\_) \times 4$

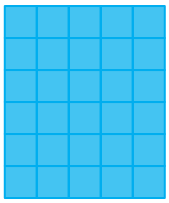
$9 \times 4 = (\_\_\_\_ \times \_\_\_\_) + (\_\_\_\_ \times \_\_\_\_)$

$9 \times 4 =$ _____ $+$ _____

$9 \times 4 =$ _____

Area = _____

2.



□ = 1 square centimeter

$6 \times 5 = 6 \times (\_\_\_\_ + \_\_\_\_)$

$6 \times 5 = (\_\_\_\_ \times \_\_\_\_) + (\_\_\_\_ \times \_\_\_\_)$

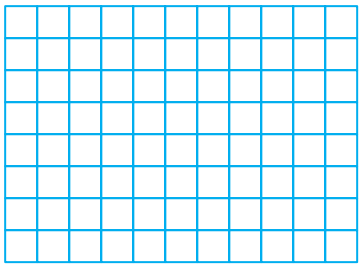
$6 \times 5 =$ _____ $+$ _____

$6 \times 5 =$ _____

Area = _____

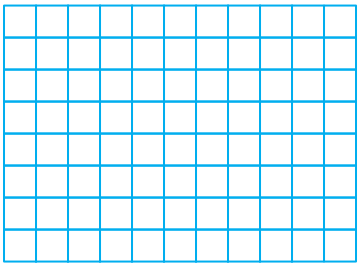
Structure Draw a rectangle for the expression.

3. $6 \times (4 + 5)$



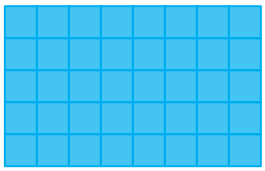
☐ = 1 square inch

4. $(7 + 1) \times 3$



☐ = 1 square inch

5. Which One Doesn't Belong? Which is *not* a way to break apart the rectangle?



☐ = 1 square meter

$5 \times (4 + 4)$ $(4 + 1) \times 8$

$5 \times (4 + 1)$ $(2 + 3) \times 8$

6. Modeling Real Life You cut a rectangular piece of wrapping paper into 2 rectangles. One rectangle is 10 inches wide and 6 inches long. The other rectangle is 10 inches wide and 5 inches long. What were the dimensions and the total area of the wrapping paper before it was cut?

Review & Refresh

Write the fact family for the numbers.

7. 3, 8, 24

____ × ____ = ____

____ × ____ = ____

____ ÷ ____ = ____

____ ÷ ____ = ____

8. 4, 9, 36

____ × ____ = ____

____ × ____ = ____

____ ÷ ____ = ____

____ ÷ ____ = ____

9. 2, 7, 14

____ × ____ = ____

____ × ____ = ____

____ ÷ ____ = ____

____ ÷ ____ = ____

Name _____

Find Areas of More Shapes 6.5

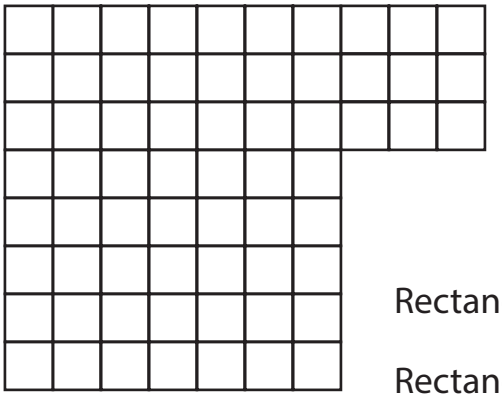
Learning Target: Find the area of a shape made up of rectangles.

Success Criteria:

- I can break apart a shape into rectangles.
- I can find the area of each smaller rectangle.
- I can find the total area of a shape.

Explore and Grow

Break apart the shape into two rectangles. Color each rectangle a different color. Find the area of each rectangle. Then find the total area of the shape.



☐ = 1 square inch

Areas of Rectangles

Rectangle 1: _____ × _____ = _____ square inches

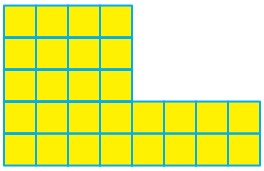
Rectangle 2: _____ × _____ = _____ square inches

Total Area of Shape: _____ + _____ = _____ square inches

MP **Reasoning** Break apart the shape into two different rectangles and find the total area. What do you notice? Why is this true?

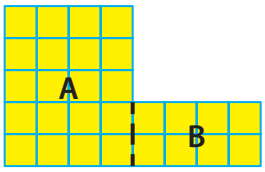
Think and Grow: Find Areas of More Shapes

Example Find the area of the shape.



☐ = 1 square foot

One Way:



☐ = 1 square foot

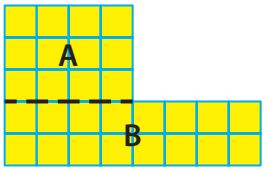
Areas of Rectangles

Rectangle A: $5 \times 4 =$ _____ square feet

Rectangle B: $2 \times 4 =$ _____ square feet

Area of the shape: _____ + _____ = _____ square feet

Another Way:



☐ = 1 square foot

Areas of Rectangles

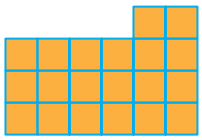
Rectangle A: $3 \times 4 =$ _____ square feet

Rectangle B: $2 \times 8 =$ _____ square feet

Area of the shape: _____ + _____ = _____ square feet

Show and Grow

1. Find the area of the shape.



☐ = 1 square meter

Areas of Rectangles

Rectangle A: _____ × _____ = _____ square meters

Rectangle B: _____ × _____ = _____ square meters

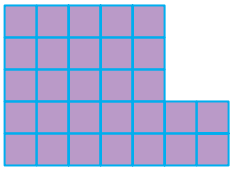
Area of the shape: _____ + _____ = _____ square meters

Name _____

Apply and Grow: Practice

Find the area of the shape.

2.



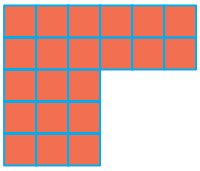
☐ = 1 square inch

Area of Rectangle A: _____ × _____ = _____ square inches

Area of Rectangle B: _____ × _____ = _____ square inches

Area of the shape: _____ + _____ = _____ square inches

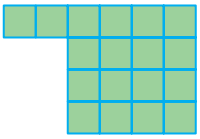
3.



☐ = 1 square centimeter

Area = _____

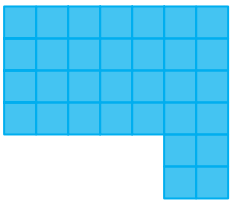
4.



☐ = 1 square inch

Area = _____

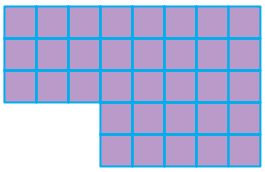
5.



☐ = 1 square foot

Area = _____

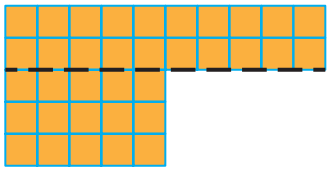
6.



☐ = 1 square meter

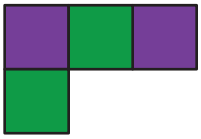
Area = _____

7. **YOU BE THE TEACHER** Your friend says there is only one way to break apart the shape. Is your friend correct? Explain.



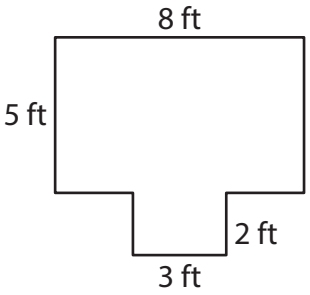
☐ = 1 square inch

8. **DIG DEEPER!** Newton uses square tiles to make the design. Each tile is 2 inches long. What is the area of the design? Explain.



Think and Grow: Modeling Real Life

What is the area of the balcony?



Area of Rectangle A:

Area of Rectangle B:

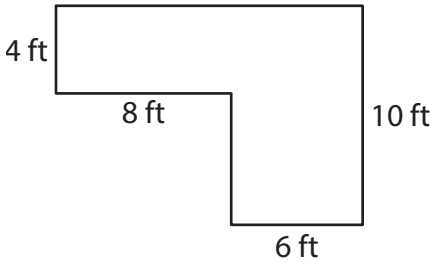
Area of the balcony:

The area of the balcony is _____.

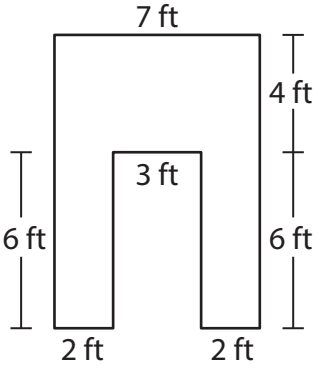
Show and Grow

Find the area of the miniature golf hole.

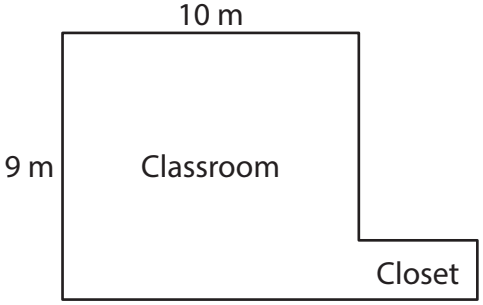
9.



10.



11. DIG DEEPER! The floors of the classroom and closet have an area of 98 square meters. What is the area of the closet floor? Explain.

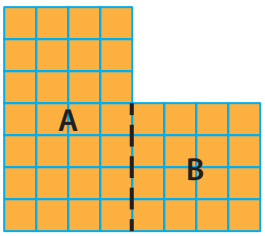


Name _____

Homework & Practice 6.5

Learning Target: Find the area of a shape made up of rectangles.

Example Find the area of the shape.



☐ = 1 square inch

Areas of Rectangles

Rectangle A: $7 \times 4 =$ 28 square inches

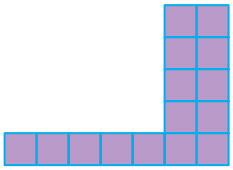
Rectangle B: $4 \times 4 =$ 16 square inches

Area of the shape:

28 + 16 = 44 square inches

Find the area of the shape.

1.



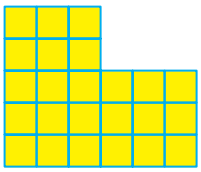
☐ = 1 square foot

Area of Rectangle A: _____ × _____ = _____ square feet

Area of Rectangle B: _____ × _____ = _____ square feet

Area of the shape: _____ + _____ = _____ square feet

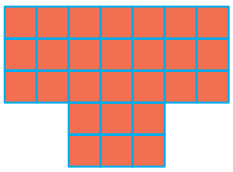
2.



☐ = 1 square meter

Area = _____

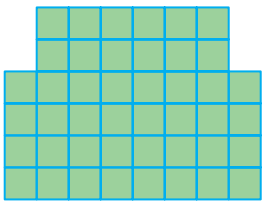
3.



☐ = 1 square foot

Area = _____

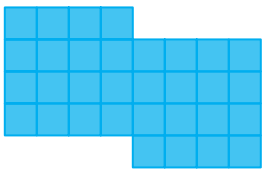
4.



☐ = 1 square inch

Area = _____

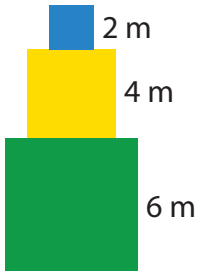
5.



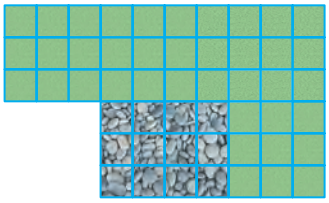
☐ = 1 square centimeter

Area = _____

6. **Number Sense** Newton makes a design with squares. What is the total area of his design?

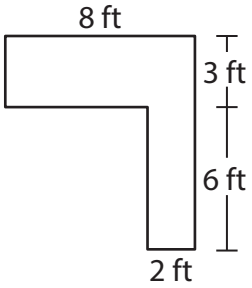


7. **Precision** A landscaper sketches a design for a yard. How much greater is the area of the grass than the area of the rocks?

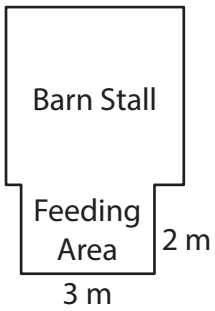


□ = 1 square foot

8. **Modeling Real Life** What is the area of the countertop?



9. **DIG DEEPER!** The floors of the barn stall and feeding area have an area of 22 square meters. What is the area of the barn stall floor? Explain.



Review & Refresh

Complete the table.

10.

×	□	3	□
□			16
6	6		48
8			

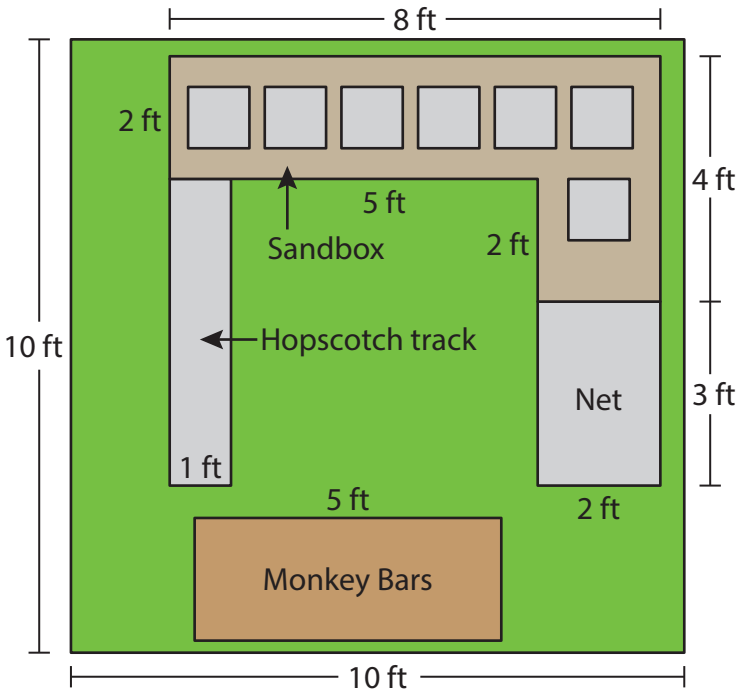
11.

×	2	□	9
4		12	
5	10		
□			54

Name _____

Performance Task 6

1. The map shows the top view of an obstacle course.



a. What is the area of the net?

b. What is the area of the hopscotch track?

c. The area of the mud pit under the monkey bars is 10 square feet. What is the missing side length of the mud pit?

d. Each stepping-stone in the sandbox covers 1 square foot. What is the area of the sandbox *not* covered with stones?

e. What is the area of just the grass?

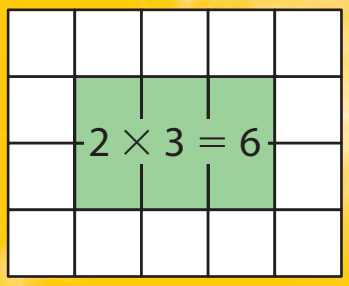
2. The obstacle course opens at 1 o'clock. It is half past 12. How many more minutes until the course opens?

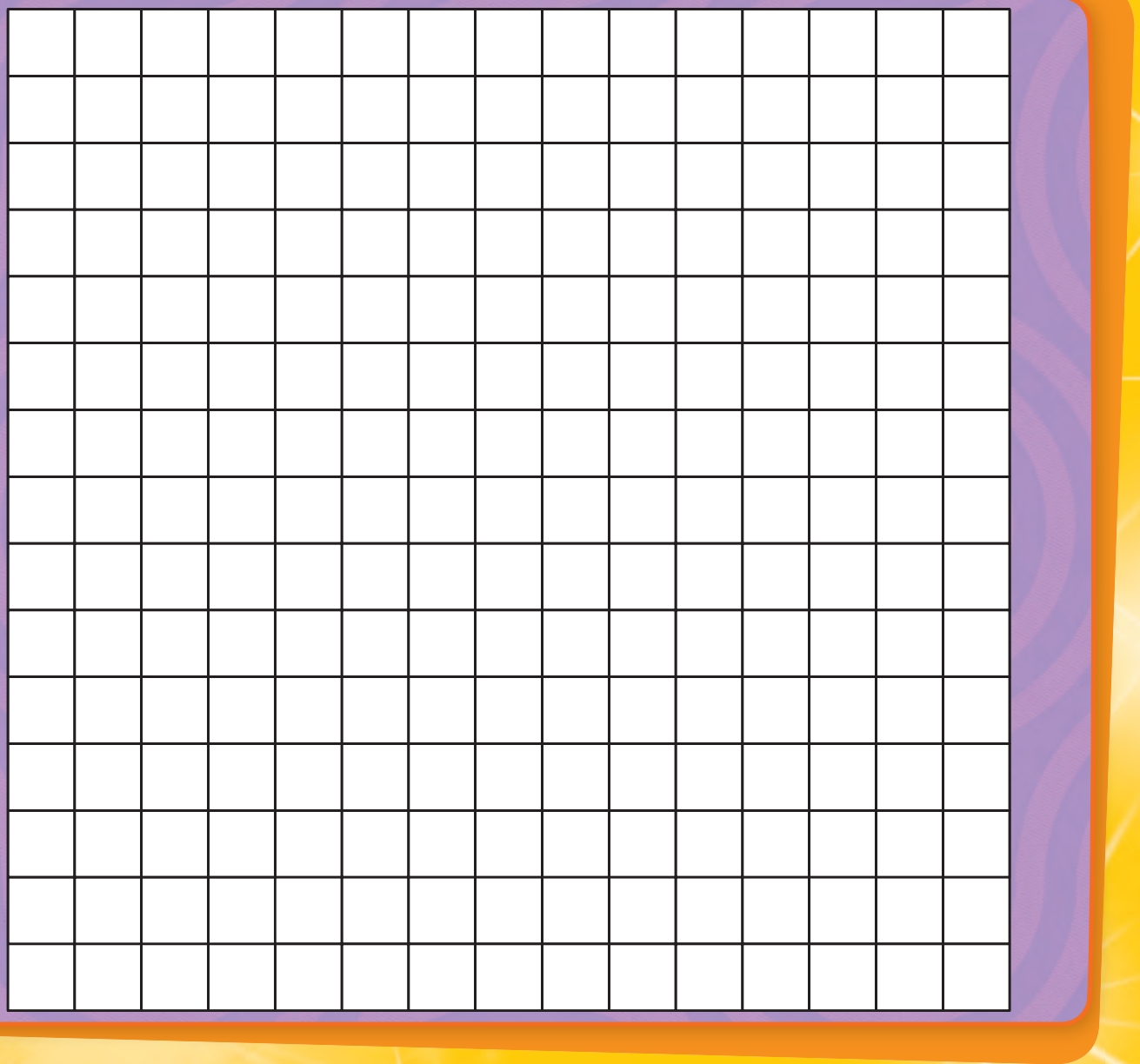
Area Roll and Conquer

Directions:

1. Players take turns rolling two dice.
2. On your turn, create a rectangle with the numbers on the dice as the side lengths. Your rectangle cannot cover another rectangle.
3. Shade the rectangle in your color. Record the multiplication equation for the rectangle.
4. If you cannot create a rectangle on the board, then you lose your turn. Play 10 rounds, if possible.
5. The player with the greatest area covered wins!

Example:





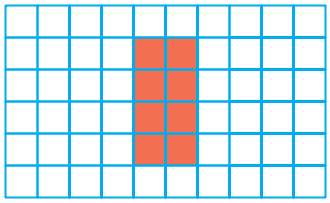
Name _____

Chapter Practice 6

6.1 Understand Area

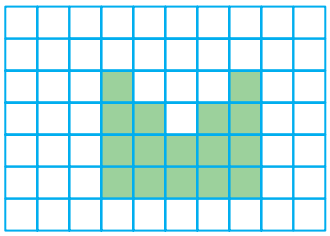
Find the area of the shape.

1.



Area = _____ square units

2.

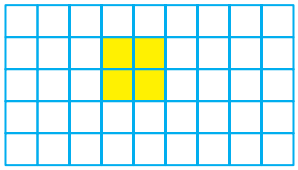


Area = _____ square units

6.2 Measure Area Using Standard Units

Find the area of the shape.

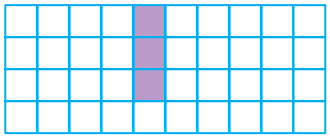
3.



☐ = 1 square meter

Area = _____

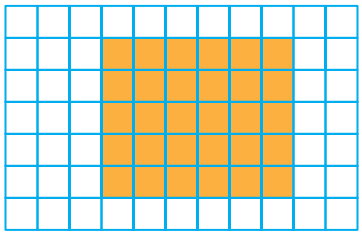
4.



☐ = 1 square inch

Area = _____

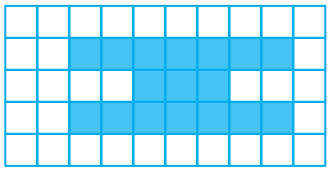
5.



☐ = 1 square centimeter

Area = _____

6.



☐ = 1 square foot

Area = _____

6.3 Find Area by Multiplying

7. Find the area of the rectangle.

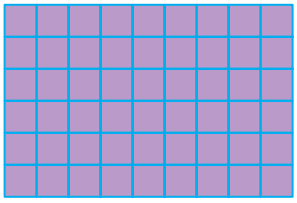
_____ × _____ = _____

Area = _____

8. **Modeling Real Life** A textbook cover has an area of 80 square inches. The cover is 8 inches wide. How long is the cover?

6.4 Area and the Distributive Property

9. Use the Distributive Property to find the area of the rectangle.



☐ = 1 square meter

$6 \times 9 =$ $\quad 6 \times (\_\_\_\_ + \_\_\_\_)$

$6 \times 9 = (\_\_\_\_ \times \_\_\_\_) + (\_\_\_\_ \times \_\_\_\_)$

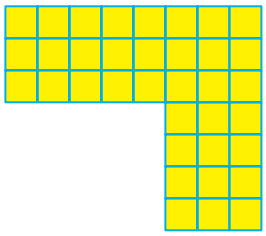
$6 \times 9 =$ $\quad \_\_\_\_ \quad + \quad \_\_\_\_$

$6 \times 9 =$ $\quad \_\_\_\_$

Area = _____

6.5 Find Areas of More Shapes

10. Find the area of the shape.



☐ = 1 square foot

Area = _____