

Name _____

Area

Essential Question How can you use a formula to find the area of a rectangle?

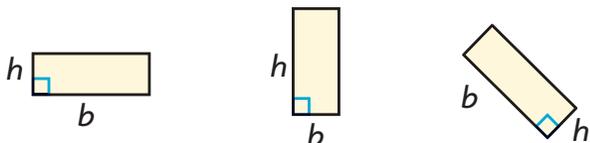


Measurement and Data—
4.MD.A.3

MATHEMATICAL PRACTICES
MP3, MP6, MP7

Unlock the Problem

The **base, b** , of a two-dimensional figure can be any side. The **height, h** , is the measure of a perpendicular line segment from the base to the top of the figure.



Area is the number of **square units** needed to cover a flat surface without gaps or overlaps. A square unit is a square that is 1 unit long and 1 unit wide. To find the area of a figure, count the number of square units inside the figure.

How are the base, height, and area of a rectangle related?



Complete the table to find the area.

Remember

Perpendicular lines and perpendicular line segments form right angles.

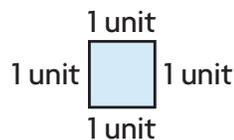


Figure	Base	Height	Area
	5 units		

© Houghton Mifflin Harcourt Publishing Company

1. What relationship do you see among the base, height, and area?

2. Write a formula for the area of a rectangle. Use the letter A for area. Use the letter b for base. Use the letter h for height.

Formula: _____



MATHEMATICAL PRACTICES 7

Look for Structure How do you decide which side of a rectangle to use as the base?

Use a Formula You can use a formula to find the area.

$$A = b \times h$$

↑
↑
↑
area
base
height



Math Idea

You can think of the base and height of a rectangle as length (l) and width (w), since the length and width are perpendicular. You can write the formula for the area (A) of a rectangle as $A = l \times w$.

Examples Use a formula to find the area of a rectangle and a square.

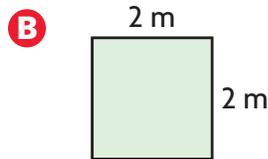


$$A = b \times h$$

$$= \underline{\quad} \times \underline{\quad}$$

$$= \underline{\quad}$$

The area is _____.



$$A = b \times h$$

$$= \underline{\quad} \times \underline{\quad}$$

$$= \underline{\quad}$$

The area is _____.

Try This! Write a formula for the area of a square.

Use the letter _____ for area.

Use the letter _____ for the length of a side.

Formula: _____

Share and Show

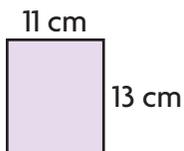


1. Find the area of the rectangle.

$$A = b \times \underline{\quad}$$

$$= \underline{\quad} \times \underline{\quad}$$

$$= \underline{\quad}$$



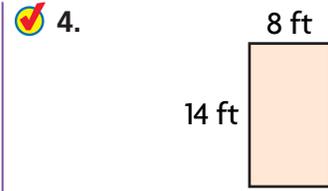
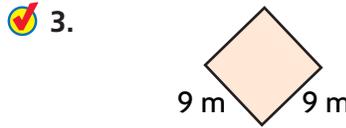
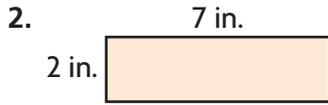
Name _____

Formulas for Area

Rectangle:
 $A = b \times h$

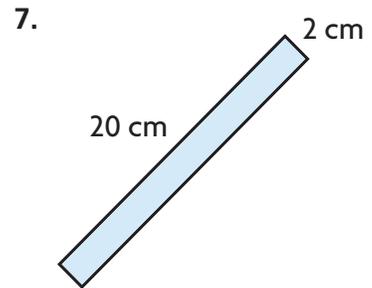
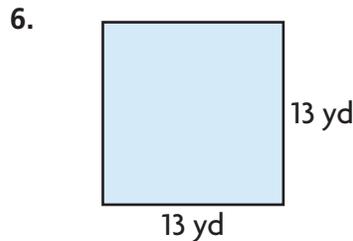
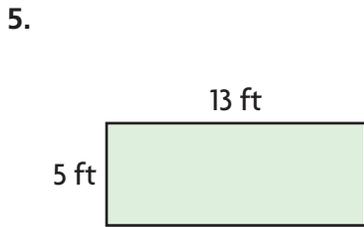
Square:
 $A = s \times s$

Find the area of the rectangle or square.



On Your Own

Find the area of the rectangle or square.



Math Talk

MATHEMATICAL PRACTICES 6

Explain how to find the area of a square if you only know the length of one side is 23 feet.

Practice: Copy and Solve Find the area of the rectangle.

8. base: 16 feet
height: 6 feet

9. base: 9 yards
height: 17 yards

10. base: 14 centimeters
height: 11 centimeters

11. **GO DEEPER** Terry's rectangular yard is 15 meters by 18 meters. Todd's rectangular yard is 20 meters by 9 meters. How much greater is the area of Terry's yard than Todd's yard?

12. **MATHEMATICAL PRACTICE 2** Reason Quantitatively Carmen sewed a square baby quilt that measures 36 inches on each side. What is the area of the quilt?

Unlock the Problem



13. **THINK SMARTER** Nancy and Luke are drawing plans for rectangular flower gardens. In Nancy's plan, the garden is 18 feet by 12 feet. In Luke's plan, the garden is 15 feet by 15 feet. Who drew the garden plan with the greater area? What is the area?

- a. What do you need to find? _____

- b. What formula will you use? _____
- c. What units will you use to write the answer? _____
- d. Show the steps to solve the problem.

- e. Complete the sentences.

The area of Nancy's garden is

_____.

The area of Luke's garden is

_____.

_____ garden has the greater area.

14. **GO DEEPER** Victor wants to buy fertilizer for his yard. The yard is 35 feet by 55 feet. The directions on the bag of fertilizer say that one bag will cover 1,250 square feet. How many bags of fertilizer should Victor buy to be sure that he covers the entire yard?

15. **THINK SMARTER** Tuan is an artist. He is painting on a large canvas that is 45 inches wide. The height of the canvas is 9 inches less than the width. What is the area of Tuan's canvas?

_____ square inches

Name _____

Area



COMMON CORE STANDARD—4.MD.A.3
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

Find the area of the rectangle or square.

1.

12 ft



9 ft

2.

8 yd



8 yd

3.

15 m



3 m

$$A = b \times h$$

$$= 12 \times 9$$

108 square feet

Problem Solving



4. Meghan is putting wallpaper on a wall that measures 8 feet by 12 feet. How much wallpaper does Meghan need to cover the wall?

5. Bryson is laying down sod in his yard to grow a new lawn. Each piece of sod is a 1-foot by 1-foot square. How many pieces of sod will Bryson need to cover his yard if his yard measures 30 feet by 14 feet?

6. **WRITE** *Math* Think about what you know about perimeter and area. Describe how to find the perimeter and area of your classroom.

Lesson Check (4.MD.A.3)

1. Ellie and Heather drew floor models of their living rooms. Ellie's model represented 20 feet by 15 feet. Heather's model represented 18 feet by 18 feet. Whose floor model represents the greater area? How much greater?
2. Tyra is laying down square carpet pieces in her photography studio. Each square carpet piece is 1 yard by 1 yard. If Tyra's photography studio is 7 yards long and 4 yards wide, how many pieces of square carpet will Tyra need?

Spiral Review (4.NBT.B.5, 4.NF.B.4c, 4.MD.A.3)

3. Typically, blood fully circulates through the human body 8 times each minute. How many times does blood circulate through the body in 1 hour?
4. Each of the 28 students in Romi's class raised at least \$25 during the jump-a-thon. What is the least amount of money the class raised?
5. What is the perimeter of the shape below if 1 square is equal to 1 square foot?
6. Ryan is making small meat loaves. Each small meat loaf uses $\frac{3}{4}$ pound of meat. How much meat does Ryan need to make 8 small meat loaves?

