Lesson 4

Area of a Parallelogram

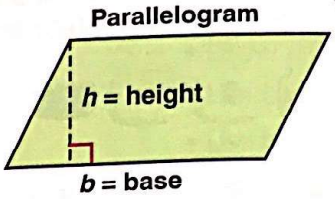
Vocabulary
parallelogram

Objective Find the area of a parallelogram.

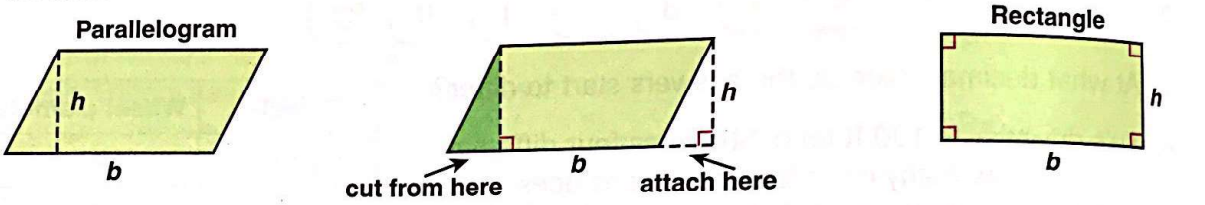
The height is the length of a line segment that is perpendicular to both bases.

Learn About It

A **parallelogram** is a quadrilateral with opposite sides that are parallel and congruent. You can use what you know about the area of a rectangle, $A = lw$, to find the area of a parallelogram.



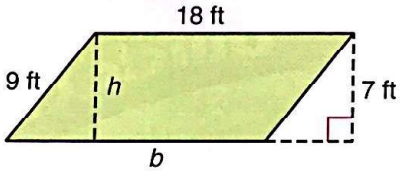
- Draw the height from a vertex to the base.
- Cut off the right triangle and attach it to the other side.
- The rectangle and parallelogram have the same area.



▶ The formula for the area of a parallelogram is $A = bh$.

Use the formula to find the area of the parallelogram.

STEP 1 Identify the length of the base and the perpendicular height.



$b = 18$ ft
$h = 7$ ft

STEP 2 Use the formula to find the area.

$A = bh$
$= 18 \times 7 = 126$

Solution: The area of the parallelogram is 126 square feet, or 126 ft^2.

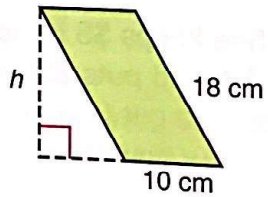
Guided Practice

Find the missing measure for each parallelogram, given base *b*, height *h*, or area *A*.

1. $b = 25$ m
$h = 30$ m
$A =$ ■

2. $b = 8.2$ yd
$h = 1.25$ yd
$A =$ ■

3. $A = 150$ cm^2



Ask Yourself
- Did I identify the height?
- Did I use the correct numbers in the formula?

Explain Your Thinking ▶ Does it matter where or how you draw a line segment to measure the height?

Practice and Problem Solving

Find the missing measure for each parallelogram or combination of parallelograms.

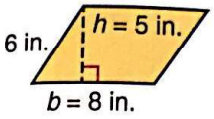
4. $b = 1{,}000$ ft
   $h = 2.5$ ft
   $A =$ ■

5. $A = 30$ ft²
   $h = 5$ ft
   $b =$ ■

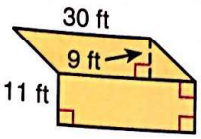
6. $b = 5\frac{1}{4}$ in.
   $h = 7\frac{3}{7}$ in.
   $A =$ ■

7. $b = 6.32$ m
   $h = 2.85$ m
   $A =$ ■

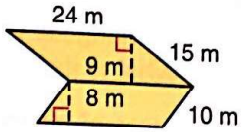
8. $A =$ ■



9. $A =$ ■

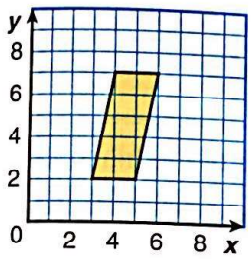


10. $A =$ ■



Find the area of each parallelogram.

11.



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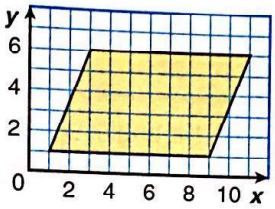

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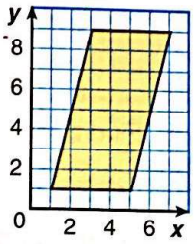


Measurement Use the landscape design for Problems 14–16.

14. Measure the base and height of the parallelograms that form the crushed stone patio design to the nearest quarter inch. Find the total area of the two parallelograms.

15. Suppose the scale in the drawing were $\frac{1}{4}$ inch = 1 yard. What would the actual area of the two parallelograms be?

16. Measure the dimensions of the brick border to the nearest quarter inch. Find the area of the border.

Mixed Review and Test Prep

Open Response

Find the perimeter and area of each figure. (Ch. 8, Lesson 7)

17. rectangle *RSTU*: $l = 24$ cm; $w = 16$ cm

18. square *JKLM*: $s = 3.4$ m

19. A tulip garden is in the shape of a parallelogram. The area of the garden is 14 square meters. What could be the garden's dimensions? Explain. (Ch. 20, Lesson 4)

Extra Practice See page 549, Set C.

Name _____ Date _____

Practice 20.4

Area of a Parallelogram

Find the missing measure for each parallelogram or combination of parallelograms.

1. $b = 15$ ft
   $h = 4.6$ ft

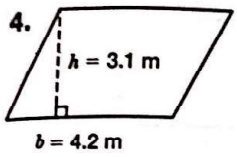
   $A =$ _____

2. $A = 48.6$ km^2
   $b = 6$ km

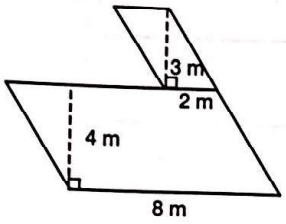
   $h =$ _____

3. $A = 129.94$ cm^2
   $h = 8.9$ cm

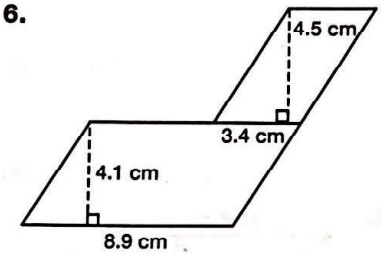
   $b =$ _____

4. 

   $A =$ _____

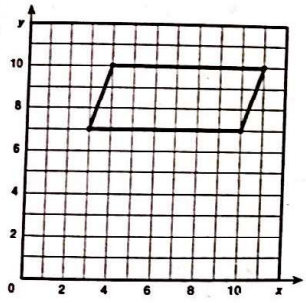
5. 

   $A =$ _____

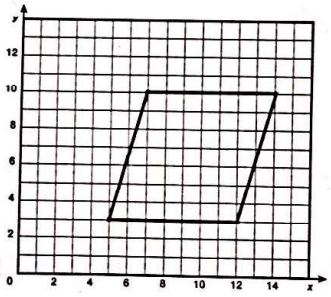
6. 

   $A =$ _____

Find the area of each parallelogram.

7. 

   _____

8. 

   _____

Test Prep

9. Scott made a curio shelf in the shape of a parallelogram. If the shelf has an area of 40 inches^2, which of the following could be the dimensions of the shelf?

   A $h = 8$ in., $b = 6$ in.

   B $h = 12$ in., $b = 3.5$ in.

   C $h = 15$ in., $b = 25$ in.

   D $h = 10$ in., $b = 4$ in.

10. Juana knows that the area of a rectangular vegetable garden is 60 feet^2. If she knows the length of the garden is 12 feet, how can she find the width of the garden?

    _____

    _____

    _____

Use with text pages 536–537.

Name _____ Date _____

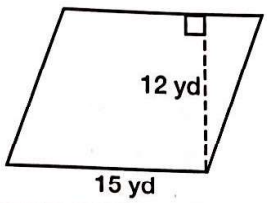
Homework 20.4

Area of a Parallelogram

How to Find the Area of a Parallelogram

$b = 15$ yd

$h = 12$ yd



Use the formula $A = bh$.

$A = bh$

$A = 15 \times 12$

$A = 180$ yd^2

Find the missing measure for each parallelogram or combination of parallelograms.

1. $b = 6\frac{1}{4}$ ft
   $h = 7\frac{1}{8}$ ft
   $A =$ _____

2. $b = 250$ m
   $h = 7.5$ m
   $A =$ _____

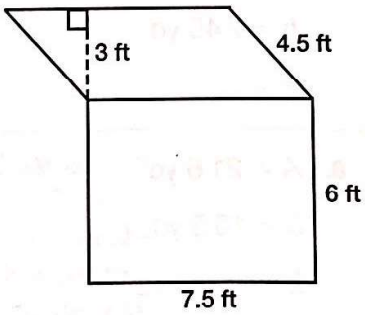
3. $b = 36$ in.
   $h = 24$ in.
   $A =$ _____

4. $b = 20$ in.
   $h = 15$ in.
   $A =$ _____

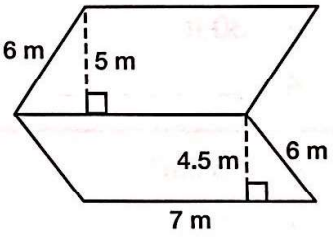
5. $b = 9.5$ yd
   $h = 3$ yd
   $A =$ _____

6. $A = 28.35$ m^2
   $b = 3.5$ m
   $h =$ _____

7. $A = 17.86$ ft^2
   $h = 4.7$ ft
   $b =$ _____

8. 

   $A =$ _____

9. 

   $A =$ _____

Problem Solving

Show Your Work

10. Jake designed a flowerbed shaped like a parallelogram. The flowerbed has a base of 25 inches and a height of 19 inches. What is the area of Jake's flowerbed?

_____

Use with text pages 536–537.