A **Practice by Example**

Example 1
(page 349)

Find the area of each parallelogram.

1.

15 cm / 12 cm

|← 20 cm →|

2.

3.5 m

5.8 m

4 m
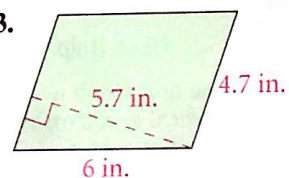
3.

5.7 in.

4.7 in.

6 in.
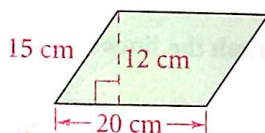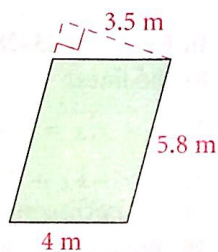
Example 2
(page 349)

Coordinate Geometry Find the area of the parallelogram with the given vertices.

4. $A(2, 0), B(7, 0), C(8, 4), D(3, 4)$

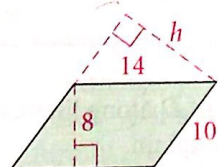**5.** $E(-4, 0), F(-1, 0), G(1, -3), H(-2, -3)$

6. $I(2, 2), J(4, 2), K(2, -3), L(0, -3)$
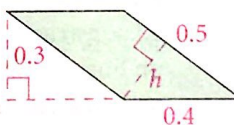
7. $M(-6, -1), N(-5, 0), P(1, 0), Q(0, -1)$

Example 3
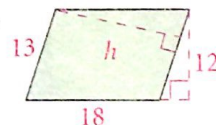**(page 350)**

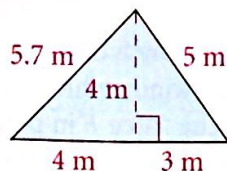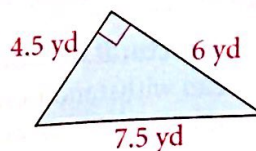Find the value of h for each parallelogram.

8.

h
14
8
10

9.

0.5
0.3
h
0.4

10.

13
h
12
18

Lesson 7-1   Areas of Parallelograms and Triangles   **351**

Example 4
(page 350)

Find the area of each shaded triangle.

11.

5.7 m · 5 m · 4 m · 4 m · 3 m

12.

4.5 yd · 6 yd · 7.5 yd

13.

3 ft · 2 ft · 2 ft
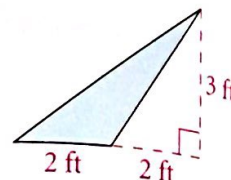
Example 5
(page 351)

14. Landscaping Taisha's Bakery has a plan for a 50 ft-by-31 ft parking lot. The four parking spaces are congruent parallelograms, the driving region is a rectangle, and the two unpaved areas for flowers are congruent triangles.

a. Find the area of the surface to be paved by adding the areas of the driving region and the four parking spaces.

b. Describe another method for finding the area of the surface to be paved.

c. Use your method from part (b) to find the area. Then compare answers from parts (a) and (b) to check your work.

10 ft · 50 ft · 15 ft · 31 ft
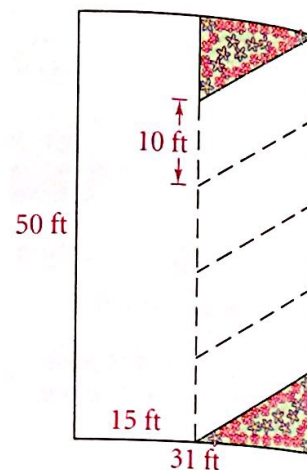
Find the area of each figure.

15. ▱ABJF

16. △BDJ

17. △DKJ

18. ▱BDKJ

19. ▱ADKF

20. △BCJ

21. ADJF
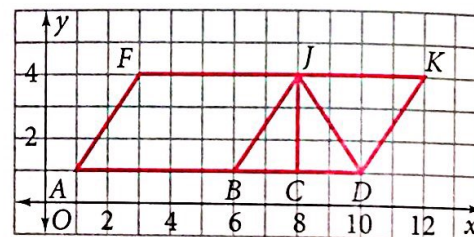
B Apply Your Skills

22. The area of a parallelogram is 24 in.^{2} and the height is 6 in. Find the corresponding base.

23. An isosceles right triangle has area of 98 cm^2. Find the length of each leg.

24. Algebra In a triangle, a base and a corresponding height are in the ratio $3:2$. The area is 108 in.^{2}. Find the base and the corresponding height.

Need Help?

The line $x = a$ is vertical and crosses the x-axis at $x = a$.

In Exercises 25–28, (a) graph the lines and (b) find the area of the triangle enclosed by the lines.
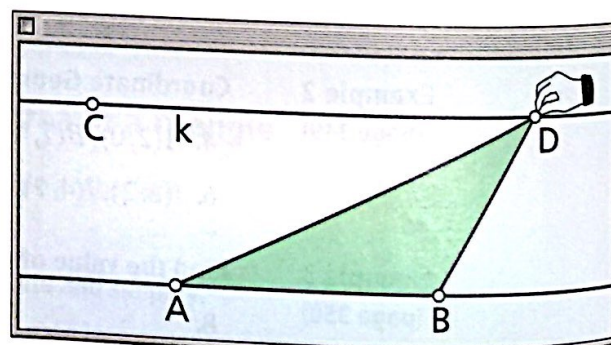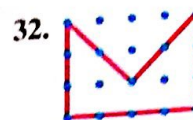
25. $y = x, x = 0, y = 7$

26. $y = x + 2, y = 2, x = 6$

27. $y = -\frac{1}{2}x + 3, y = 0, x = -2$

28. $y = \frac{3}{4}x - 2, y = -2, x = 4$

29. Technology Ki used geometry software to create the figure at the right. She constructed $\overleftrightarrow{AB}$ and a point C not on $\overleftrightarrow{AB}$. Then she constructed line k parallel to $\overleftrightarrow{AB}$ through point C. Next, Ki constructed point D on line k as well as $\overline{AD}$

and $\overline{BD}$. She dragged point D along line k to manipulate △ABD. How does the area of △ABD change? Explain.

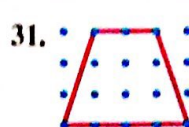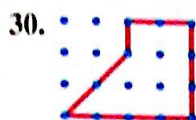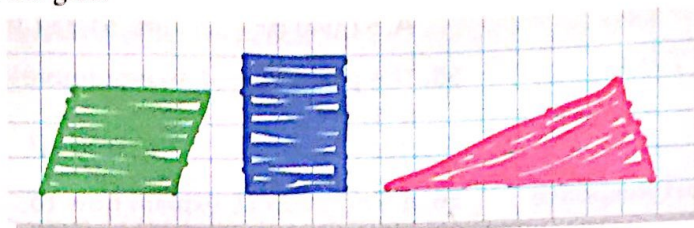**Find the area of each figure.**

30.

31.

32.

33. Find the area of the yellow triangular patch in the large field in the photo at the left. It has a base of 60 yd and a height of 140 yd.

34. **Open-Ended** Using graph paper, draw an acute triangle, an obtuse triangle, and a right triangle, each with area 12 units².

35. **Probability** Ann drew these three figures on a grid. A fly lands at random at a point on the grid.

a. **Writing** Is the fly more likely to land on one of the figures or on the blank grid? Explain.

b. Suppose you know the fly lands on one of the figures. Is the fly more likely to land on one figure than on another? Explain.

Exercise 33

Coordinate Geometry Find the area of a polygon with the given vertices.

36. $A(3, 9), B(8, 9), C(2, -3), D(-3, -3)$ 37. $E(1, 1), F(4, 5), G(11, 5), H(8, 1)$

38. $M(-2, -5), L(1, -5), N(2, -2)$ 39. $R(-7, 2), S(-3, -1), T(3, -1)$

40. $W(1, 2), X(1, 6), Y(4, 1)$ 41. $A(-8, 0), B(-7, 4), C(-3, 3)$

42. $D(0, 0), E(2, 4), F(6, 4), G(6, 0)$ 43. $K(-7, -2), L(-7, 6), M(1, 6), N(7, -2)$

Find the area of each figure.

44.

45.

46.
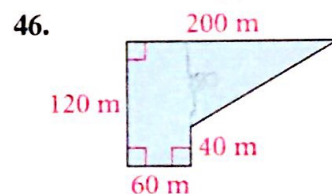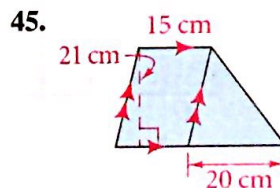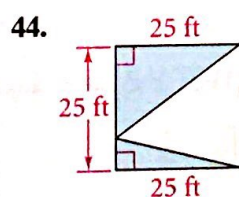
Challenge **History** The ancient Greek mathematician Heron is most famous for this formula for the area of a triangle in terms of the lengths of its sides a, b, and c.

$$A = \sqrt{s(s - a)(s - b)(s - c)}, \text{ where } s = \tfrac{1}{2}(a + b + c)$$

Use Heron's Formula and a calculator to find the area of each triangle. Round your answer to the nearest whole number.

47. $a = 8$ in., $b = 9$ in., $c = 10$ in. 48. $a = 15$ m, $b = 17$ m, $c = 21$ m

49. $a = 6$ cm, $b = 7$ cm, $c = 11$ cm 50. $a = 10$ ft, $b = 10.2$ ft, $c = 11$ ft

51. a. Use Heron's Formula to find the area of the triangle at the right.
    b. Verify your answer to part (a) by using the formula $A = \tfrac{1}{2}bh$.