EXERCISES

Practice and Problem Solving

A Practice by Example

Example 1
(page 52)

Find the perimeter of each figure.

1.

4 in.

7 in.

2.

9 cm
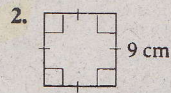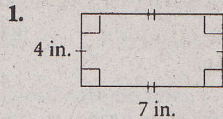
Find the perimeter of each rectangle with the given base and height.

3. 21 in., 7 in.

4. 16 cm, 23 cm

5. 24 m, 36 m

6. Framing A rectangular certificate 8 in. by 10 in. will have a frame $1\frac{1}{2}$ in. wide surrounding it. What is the perimeter of the outside edge of the frame?

7. Fencing A garden that is 5 ft by 6 ft has a walkway 2 ft wide around it. Find the amount of fencing needed to surround the walkway.

Example 2
(page 53)

Find the circumference of each circle in terms of π.

8.

O

15 cm

9.

5 ft

O

10.

O

3.7 in.

11.

$\frac{1}{4}$ m

O
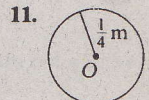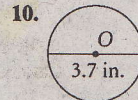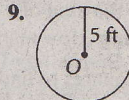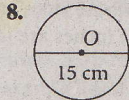
Find the circumference of the circle to the nearest tenth.

12. $r = 9$ in.

13. $d = 7.3$ m

14. $d = \frac{1}{2}$ yd

15. $r = 56$ cm

Example 3
(page 53)

Draw each figure in the coordinate plane. Find the perimeter.

16. $X(0, 2)$, $Y(4, -1)$, $Z(-2, -1)$

17. $A(-4, -1)$, $B(4, 5)$, $C(4, -2)$

18. $L(0, 1)$, $M(3, 5)$, $N(5, 5)$, $P(5, 1)$

19. $S(-5, 3)$, $T(7, -2)$, $U(7, -6)$, $V(-5, -6)$
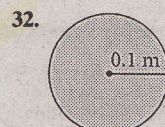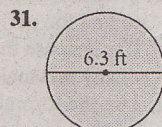
Example 4
(page 53)

Find the area of each rectangle with the given base and height.

20. 4 ft, 4 in.

21. 30 in., 4 yd

22. 2 ft 3 in., 6 in.

23. 40 cm, 2 m

24. 3 m, 190 cm

25. 240 cm, 5 m

26. Find the area of a section of road pavement that is 20 ft wide and 100 yd long.

Example 5
(page 54)

Find the area of each circle in terms of π.

27.

20 m

28.

16 ft

29.

$\frac{3}{4}$ in.

30.

0.5 m

31.

6.3 ft

32.

0.1 m
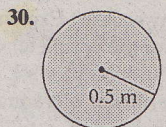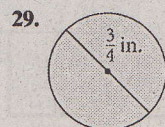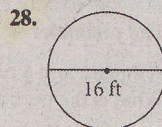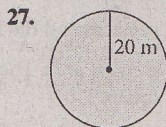
Find the area of each circle to the nearest tenth.

33. $r = 7$ ft   **34.** $d = 8.3$ m   **35.** $d = 24$ cm   **36.** $r = 12$ in.

Example 6
(page 54)

Find the area of the shaded region. All angles are right angles.

37.

20 m

18 m

5 m   10 m

5 m

38.

2 yd   4 yd

1 yd

4 yd

3 yd

3 yd

39.

6 cm

6 cm

40.

4 in.

8 in.   4 in.

12 in.

Ⓑ Apply Your Skills

41. a. What is the area of a square whose sides are 12 in. long?
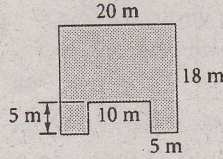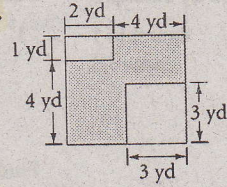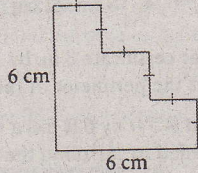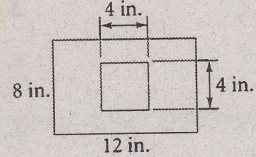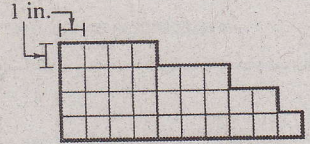   **b.** What is the area of a square whose sides are 1 ft long?
   c. Reasoning How many square inches are in a square foot? Explain.

42. a. Count squares to find the area of the polygon outlined in blue.
   b. Use a formula to find the area of each square outlined in red.
   c. How does the sum of your results in part (b) compare to your result in part (a)? Which postulate does this support?

1 in.

43. Estimation On a postcard from Mexico, Ky sketched the "footprint" of the pyramid known as El Castillo in the ancient Mayan city Chichen Itza. He said he estimated the three different lengths on each side to be 22 m, 6 m, and 11 m. Use those estimates to estimate the area of El Castillo's footprint.

Estimation Estimate the perimeter and area of each object.

44. the front cover of this book   **45.** the front cover of your notebook

46. a classroom bulletin board   **47.** the top of your desk

48. Writing Choose one exercise from Exercises 44–47 and explain why you chose your unit of length.

49. The area of an 11-cm wide rectangle is 176 cm². What is its length?

50. The perimeter of a rectangle is 40 cm and the base is 12 cm. What is its area?

51. A square and a rectangle have equal area. The rectangle is 64 cm by 81 cm. What is the perimeter of the square?

52. a. Critical Thinking Can you use the formula for the perimeter of a rectangle to find the perimeter of any square? Explain.
   b. Can you use the formula for the perimeter of a square to find the perimeter of any rectangle? Explain.
   c. Use the formula for the perimeter of a square to write a formula for the area of a square in terms of its perimeter.
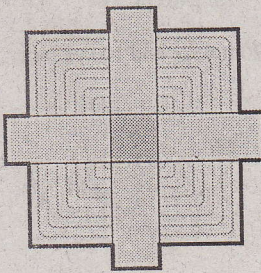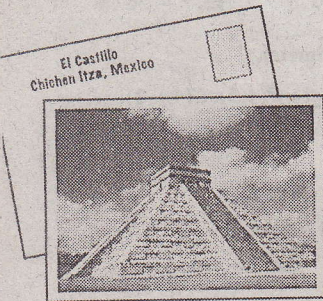
53. Tiling The students in the Art Club are tiling a wall that is 8 ft by 16 ft at the entrance to the community center. They are using tiles that are 6 in. by 6 in. to create a multi-colored design. How many tiles do the students need?

x^2 **Algebra** Draw each rectangle in the coordinate plane. Find its perimeter and area.

54. $A(-3, 2), B(-2, 2), C(-2, -2), D(-3, -2)$

55. $A(-2, -6), B(-2, -3), C(3, -3), D(3, -6)$

Coordinate Geometry On graph paper, draw polygon $ABCDEFGH$ with vertices $A(1, 1)$, $B(10, 1)$, $C(10, 8)$, $D(7, 8)$, $E(7, 5)$, $F(4, 5)$, $G(4, 8)$, and $H(1, 8)$.

56. Find the perimeter of the polygon.

57. Divide the polygon into rectangles. Find the area of the polygon.

58. Biology In the Pacific Northwest, a red fox has a circular home range with a radius of about 718 meters. To the nearest thousand square meters, what is the area of the home range of a red fox?

59. A circle has area 225π m^2. What is the diameter of the circle?

x^2 **60. Algebra** A rectangle has a base of x units. The area is $(4x^2 - 2x)$ square units. What is the height of the rectangle in terms of x?

Home Maintenance To determine how much of each item to buy, tell whether you need to know area or perimeter. Explain your choice.

61. wallpaper for a bedroom

62. weatherstripping for a door

63. fence for a garden

**64.** paint for a basement floor

65. Coordinate Geometry The endpoints of a diameter of a circle are $A(2, 1)$ and $B(5, 5)$. Find the area of the circle in terms of π.

C Challenge

66. Graphing Calculator You want to build a rectangular corral by using the side of a barn for one side and 100 ft of fencing for the other three sides.

a. Create a table on your graphing calculator listing integer values for the base and the corresponding values of the height and area.

b. Make a graph using your table values. Graph the base on the horizontal axis and area on the vertical axis.

c. What are the dimensions of the corral with the greatest area?
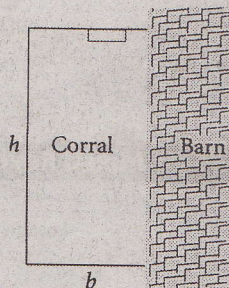
67. How many circles with the given radius are needed for the sum of their areas to equal the area of a circle with the second given radius?

a. 1 in., 3 in.

b. 2 in., 6 in.

c. 3 in., 9 in.

d. **Make a Conjecture** How many circles with a radius of n in. are needed for the sum of their areas to equal the area of a circle with a radius of $3n$ in.?

x^2 **Algebra** Find the area of each figure.

68. a rectangle with side lengths of $\frac{2a}{5b}$ units and $\frac{3b}{8}$ units

69. a square with perimeter $10n$ units

70. a square with side lengths of $(3m - 4n)$ units

71. Open-Ended The area of a 5 in.-by-5 in. square is the same as the sum of the areas of a 3 in.-by-3 in. square and a 4 in.-by-4 in. square. Find two or more squares whose total area is the same as the area of an 11 in.-by-11 in. square.

72. Track An athletic field is a rectangle, 100 yards by 40 yards, with a semicircle at each of the short sides. A running track 10 yards wide surrounds the field. Find the perimeter of the outside of the running track to the nearest tenth of a yard.

10 yd
100 yd
40 yd
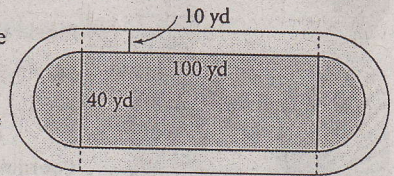
Gridded Response

For Exercises 73 and 74, a rectangular garden has a rectangular walkway around it. The width of the walkway is 8 ft.

73. How many feet greater than the perimeter of the garden is the outside perimeter of the walkway?

74. If the garden is a square with a perimeter of 260 ft, what is the area of the walkway in square feet?

75. You need to tile a 12 ft-by-15 ft floor. The color you want allows you the choices found in the table at the right. How many dollars would it cost to tile the floor with 12 in.-by-12 in. tiles?

Size of Tiles	Cost
12" × 12"	$3/ft²
11" × 11"	$3/ft²
10" × 12"	$4/ft²
6" × 8"	$4.50/ft²

76. How many tiles would cover the 12 ft-by-15 ft floor if you choose the 10 in.-by-12 in. tiles?

77. How many dollars would it cost to cover the 12 ft-by-15 ft floor with the tiles that are 6 in. by 8 in.?

Lesson 1-6

78. The midpoint of $\overline{CD}$ has coordinates $(5, 6)$. Point C has coordinates $(-5, -1)$. Find the coordinates of point D.

Find (a) AB to the nearest tenth and (b) the coordinates of the midpoint of $\overline{AB}$.

79. $A(4, 1), B(7, 9)$ **80.** $A(0, 3), B(3, 8)$ **81.** $A(9, 2), B(-3, 9)$

82. $A(0, 1), B(-4, 6)$ **83.** $A(4, 10), B(-2, 3)$ **84.** $A(-1, 1). B(-4, -5)$

Lesson 1-5

$\overleftrightarrow{BG}$ is the perpendicular bisector of $\overline{WR}$ at point I.

85. What is $m\angle BIR$?   **86.** Name two congruent segments.

87. $\overline{WR}$ has length 124. What is the length of $\overline{IR}$?

Lesson 1-4

For the given coordinates, find PQ.

88. $P: 12, Q: -6$ **89.** $P: 3, Q: 9$ **90.** $P: -23, Q: 10$