Problem Set 1.5

Use the formula $P = 2l + 2w$ to find the length l of a rectangular lot if

1. The width w is 50 feet and the perimeter P is 300 feet.

2. The width w is 75 feet and the perimeter P is 300 feet.

Use the formula $2x + 3y = 6$ to find y when

3. x is 3 **4.** x is -2 **5.** x is 0 **6.** x is -3

Use the formula $2x - 5y = 20$ to find x when

7. y is 2 **8.** y is -4 **9.** y is 0 **10.** y is -6

Use the equation $y = (x + 1)^2 - 3$ to find the value of y when

11. $x = -2$ **12.** $x = -1$ **13.** $x = 1$ **14.** $x = 2$

15. Use the formula $y = \dfrac{20}{x}$ to find y when

a. $x = 10$ **b.** $x = 5$

16. Use the formula $y = 2x^2$ to find y when

a. $x = 5$ **b.** $x = -6$

17. Use the formula $y = Kx$ to find K when

a. $y = 15$ and $x = 3$ **b.** $y = 72$ and $x = 4$

18. Use the formula $y = Kx^2$ to find K when

a. $y = 32$ and $x = 4$ **b.** $y = 45$ and $x = 3$

Solve each of the following for the indicated variable.

19. $A = lw$ for l **20.** $d = rt$ for r

21. $V = lwh$ for h **22.** $PV = nRT$ for P

23. $P = a + b + c$ for a **24.** $P = a + b + c$ for b

25. $x - 3y = -1$ for x **26.** $x + 3y = 2$ for x

27. $-3x + y = 6$ for y **28.** $2x + y = -17$ for y

29. $2x + 3y = 6$ for y **30.** $4x + 5y = 20$ for y

31. $y - 3 = -2(x + 4)$ for y **32.** $y + 5 = 2(x + 2)$ for y

33. $y - 3 = -\dfrac{2}{3}(x + 3)$ for y **34.** $y - 1 = -\dfrac{1}{2}(x + 4)$ for y

35. $P = 2l + 2w$ for w **36.** $P = 2l + 2w$ for l

37. $h = vt + 16t^2$ for v **38.** $h = vt - 16t^2$ for v

39. $A = \pi r^2 + 2\pi rh$ for h **40.** $A = 2\pi r^2 + 2\pi rh$ for h

41. Solve for y.

a. $\dfrac{y-1}{x} = \dfrac{3}{5}$ **b.** $\dfrac{y-2}{x} = \dfrac{1}{2}$ **c.** $\dfrac{y-3}{x} = 4$

42. Solve for y.

a. $\dfrac{y+1}{x} = -\dfrac{3}{5}$ **b.** $\dfrac{y+2}{x} = -\dfrac{1}{2}$ **c.** $\dfrac{y+3}{x} = -4$

1. 100 feet
2. 75 feet
3. 0
4. $\frac{10}{3}$
5. 2
6. 4
7. 15
8. 0
9. 10
10. -5
11. -2
12. -3
13. 1
14. 6
15. a. 2
    b. 4
16. a. 50
    b. 72
17. a. 5
    b. 18
18. a. 2
    b. 5
19. $l = \frac{A}{w}$
20. $r = \frac{d}{t}$
21. $h = \frac{V}{lw}$
22. $P = \frac{nRT}{V}$
23. $a = P - b - c$
24. $b = P - a - c$
25. $x = 3y - 1$
26. $x = -3y + 2$
27. $y = 3x + 6$
28. $y = -2x - 17$
29. $y = -\frac{2}{3}x + 2$
30. $y = -\frac{4}{5}x + 4$
31. $y = -2x - 5$
32. $y = 2x - 1$
33. $y = -\frac{2}{3}x + 1$
34. $y = -\frac{1}{2}x - 1$
35. $w = \frac{P - 2l}{2}$
36. $l = \frac{P - 2w}{2}$
37. $v = \frac{h - 16t^2}{t}$
38. $v = \frac{h + 16t^2}{t}$
39. $h = \frac{A - \pi r^2}{2\pi r}$
40. $h = \frac{A - 2\pi r^2}{2\pi r}$
41. a. $y = \frac{3}{5}x + 1$
    b. $y = \frac{1}{2}x + 2$
    c. $y = 4x + 3$
42. a. $y = -\frac{3}{5}x - 1$
    b. $y = -\frac{1}{2}x - 2$
    c. $y = -4x - 3$

43. $y = \frac{3}{7}x - 3$
44. $y = \frac{9}{5}x - 9$
45. $y = 2x + 8$
46. $y = \frac{1}{3}x + 3$
47. 60°; 150°
48. 30°; 120°
49. 45°; 135°
50. 75°; 165°
51. 10
52. 30
53. 240
54. 270
55. 25%
56. 75%
57. 35%
58. 70%
59. 64
60. 32
61. 2,000
62. 3,000
63. 100°C; yes
64. 212°F; yes
65. 20°C; yes
66. 98.6°F; yes
67. $C = \frac{5}{9}(F - 32)$
68. $F = \frac{9}{5}C + 32$
69. 4°F over
70. 2°F under
71. 7 meters
72. 28 meters
73. $\frac{3}{2}$ or 1.5 inches
74. 2 inches
75. 132 feet
76. 66 inches
77. $\frac{2}{9}$ centimeters
78. 1 centimeter

Solve each formula for y.

43. $\frac{x}{7} - \frac{y}{3} = 1$

44. $\frac{x}{5} - \frac{y}{9} = 1$

45. $-\frac{1}{4}x + \frac{1}{8}y = 1$

46. $-\frac{1}{9}x + \frac{1}{3}y = 1$

Find the complement and the supplement of each angle.

47. 30° **48.** 60° **49.** 45° **50.** 15°

Translate each of the following into an equation, and then solve that equation.

51. What number is 25% of 40?

52. What number is 75% of 40?

53. What number is 12% of 2,000?

54. What number is 9% of 3,000?

55. What percent of 28 is 7?

56. What percent of 28 is 21?

57. What percent of 40 is 14?

58. What percent of 20 is 14?

59. 32 is 50% of what number?

60. 16 is 50% of what number?

61. 240 is 12% of what number?

62. 360 is 12% of what number?

63. Let F = 212 in the formula $C = \frac{5}{9}(F - 32)$, and solve for C. Does the value of C agree with the information in Table 1?

64. Let C = 100 in the formula $F = \frac{9}{5}C + 32$, and solve for F. Does the value of F agree with the information in Table 1?

65. Let F = 68 in the formula $C = \frac{5}{9}(F - 32)$, and solve for C. Does the value of C agree with the information in Table 1?

66. Let C = 37 in the formula $F = \frac{9}{5}C + 32$, and solve for F. Does the value of F agree with the information in Table 1?

67. Solve the formula $F = \frac{9}{5}C + 32$ for C.

68. Solve the formula $C = \frac{5}{9}(F - 32)$ for F.

69. How far off is Budd's estimate when the temperature is 30°C? (See Example 11)

70. How far off is Budd's estimate when the temperature is 0°C? (See Example 11)

Circumference The circumference of a circle is given by the formula $C = 2\pi r$. Find r if

71. The circumference C is 44 meters and π is $\frac{22}{7}$

72. The circumference C is 176 meters and π is $\frac{22}{7}$

73. The circumference is 9.42 inches and π is 3.14

74. The circumference is 12.56 inches and π is 3.14

Volume The volume of a cylinder is given by the formula $V = \pi r^2 h$. Find the height h if

75. The volume V is 42 cubic feet, the radius is $\frac{7}{22}$ feet, and π is $\frac{22}{7}$

76. The volume V is 84 cubic inches, the radius is $\frac{7}{11}$ inches, and π is $\frac{22}{7}$

77. The volume is 6.28 cubic centimeters, the radius is 3 centimeters, and π is 3.14.

78. The volume is 12.56 cubic centimeters, the radius is 2 centimeters, and π is 3.14.

79. 60%
80. 15.6%
81. 26.5%
82. 16.9%

Nutrition Labels The nutrition label in Figure 2 is from a quart of vanilla ice cream. The label in Figure 3 is from a pint of vanilla frozen yogurt. Use the information on these labels for problems 79–82. Round your answers to the nearest tenth of a percent.

Nutrition Facts
Serving Size 1/2 cup (65g)
Servings 8

Amount/Serving	
Calories 150	Calories from Fat 90
	% Daily Value*
Total Fat 10g	**16%**
Saturated Fat 6g	**32%**
Cholesterol 35mg	**12%**
Sodium 30mg	**1%**
Total Carbohydrate 14g	**5%**
Dietary Fiber 0g	**0%**
Sugars 11g	
Protein 2g	
Vitamin A 6% •	Vitamin C 0%
Calcium 6% •	Iron 0%

* Percent Daily Values are based on a 2,000 calorie diet.

FIGURE 2 *Vanilla ice cream*

Nutrition Facts
Serving Size 1/2 cup (98g)
Servings Per Container 4

Amount Per Serving	
Calories 160	Calories from Fat 25
	% Daily Value*
Total Fat 2.5g	**4%**
Saturated Fat 1.5g	**7%**
Cholesterol 45mg	**15%**
Sodium 55mg	**2%**
Total Carbohydrate 26g	**9%**
Dietary Fiber 0g	**0%**
Sugars 19g	
Protein 8g	
Vitamin A 0% •	Vitamin C 0%
Calcium 25% •	Iron 0%

* Percent Daily Values are based on a 2,000 calorie diet.

FIGURE 3 *Vanilla frozen yogurt*

79. What percent of the calories in one serving of the vanilla ice cream are fat calories?

80. What percent of the calories in one serving of the frozen yogurt are fat calories?

81. One serving of frozen yogurt is 98 grams, of which 26 grams are carbohydrates. What percent of one serving are carbohydrates?

82. One serving of vanilla ice cream is 65 grams. What percent of one serving is sugar?

83. The sum of 4 and 1 is 5.
84. The sum of 7 and 3 is 10.
85. The difference of 6 and 2 is 4.
86. The difference of 8 and 1 is 7.
87. The difference of a number and 5 is −12.
88. The sum of twice a number and 3 is 7.
89. The sum of a number and 3 is four times the difference of that number and 3
90. Twice the difference of twice a number and 5 is the difference of twice that number and 34.
91. $2(6 + 3) = 18$
92. $4 + 5(-1) = -1$
93. $2(5) + 3 = 13$
94. $2(8 - 2) = 12$
95. $x + 5 = 13$
96. $10 - x = -8$
97. $5(x + 7) = 30$
98. $5(2x - 6) = -20$

Getting Read for the Next Section

To understand all of the explanations and examples in the next section you must be able to work the problems below.

Write an equivalent expression in English. Include the words *sum* and *difference* when possible.

83. $4 + 1 = 5$ **84.** $7 + 3 = 10$ **85.** $6 - 2 = 4$ **86.** $8 - 1 = 7$

87. $x - 15 = -12$ **88.** $2x + 3 = 7$

89. $x + 3 = 4(x - 3)$ **90.** $2(2x - 5) = 2x - 34$

For each of the following expressions, write an equivalent equation.

91. Twice the sum of 6 and 3 is 18.

92. Four added to the product of 5 and -1 is -1.

93. The sum of twice 5 and 3 is 13.

94. Twice the difference of 8 and 2 is 12.

95. The sum of a number and five is thirteen.

96. The difference of ten and a number is negative eight.

97. Five times the sum of a number and seven is thirty.

98. Five times the difference of twice a number and six is negative twenty.