13. $w - \frac{1}{3} = \frac{1}{3}$ **14.** $w - \frac{1}{3} = \frac{1}{2}$

Solve each equation. Show your work and check your answer.
See Example 2.

15. $x + 3 = -6$ **16.** $x + 4 = -3$

17. $12 + x = -7$ **18.** $19 + x = -11$

19. $t + \frac{1}{2} = \frac{3}{4}$ **20.** $t + \frac{1}{3} = 1$

21. $\frac{1}{19} + m = \frac{1}{19}$ **22.** $\frac{1}{3} + n = \frac{1}{2}$

23. $a + 0.05 = 6$ **24.** $b + 4 = -0.7$

Solve each equation. Show your work and check your answer.
See Example 3.

25. $2 = x + 7$ **26.** $3 = x + 5$

27. $-13 = y - 9$ **28.** $-14 = z - 12$

29. $0.5 = -2.5 + x$ **30.** $0.6 = -1.2 + x$

31. $\frac{1}{8} = -\frac{1}{8} + r$ **32.** $\frac{1}{6} = -\frac{1}{6} + h$

⟨2⟩   The Multiplication Property of Equality

Solve each equation. Show your work and check your answer.
See Example 4.

33. $\frac{x}{2} = -4$ **34.** $\frac{x}{3} = -6$

35. $0.03 = \frac{y}{60}$ **36.** $0.05 = \frac{y}{80}$

37. $\frac{a}{2} = \frac{1}{3}$ **38.** $\frac{b}{2} = \frac{1}{5}$

39. $\frac{1}{6} = \frac{c}{3}$ **40.** $\frac{1}{12} = \frac{d}{3}$

Solve each equation. Show your work and check your answer.
See Example 5.

41. $-3x = 15$ **42.** $-5x = -20$

43. $20 = 4y$ **44.** $18 = -3a$

45. $2w = 2.5$ **46.** $-2x = -5.6$

47. $5 = 20x$ **48.** $-3 = 27d$

49. $5x = \frac{3}{4}$ **50.** $3x = -\frac{2}{3}$

Solve each equation. Show your work and check your answer.
See Example 6.

51. $\frac{3}{2}x = -3$ **52.** $\frac{2}{3}x = -8$

53. $90 = \frac{3y}{4}$ **54.** $14 = \frac{7y}{8}$

55. $-\frac{3}{5}w = -\frac{1}{3}$ **56.** $-\frac{5}{2}t = -\frac{3}{5}$

57. $\frac{2}{3} = -\frac{4x}{3}$ **58.** $\frac{1}{14} = -\frac{6p}{7}$

Solve each equation. Show your work and check your answer.
See Example 7.

59. $-x = 8$ **60.** $-x = 4$

61. $-y = -\frac{1}{3}$ **62.** $-y = -\frac{7}{8}$

63. $3.4 = -z$ **64.** $4.9 = -t$

65. $-k = -99$ **66.** $-m = -17$

⟨3⟩   Variables on Both Sides

Solve each equation. Show your work and check your answer.
See Example 8.

67. $4x = 3x - 7$ **68.** $3x = 2x + 9$

69. $9 - 6y = -5y$ **70.** $12 - 18w = -17w$

71. $-6x = 8 - 7x$ **72.** $-3x = -6 - 4x$

73. $\frac{1}{2}c = 5 - \frac{1}{2}c$ **74.** $-\frac{1}{2}h = 13 - \frac{3}{2}h$

Miscellaneous

Use the appropriate property of equality to solve each equation.

75. $12 = x + 17$ **76.** $-3 = x + 6$

77. $\frac{3}{4}y = -6$ **78.** $\frac{5}{9}z = -10$

79. $-3.2 + x = -1.2$ **80.** $t - 3.8 = -2.9$

81. $2a = \frac{1}{3}$ **82.** $-3w = \frac{1}{2}$

83. $-9m = 3$ **84.** $-4h = -2$

85. $-b = -44$ **86.** $-r = 55$

87. $\frac{2}{3}x = \frac{1}{2}$ **88.** $\frac{3}{4}x = \frac{1}{3}$

89. $-5x = 7 - 6x$ **90.** $-\frac{1}{2} + 3y = 4y$

91. $\frac{5a}{7} = -10$ **92.** $\frac{7r}{12} = -14$

93. $\frac{1}{2}v = -\frac{1}{2}v + \frac{3}{8}$ **94.** $\frac{1}{3}s + \frac{7}{9} = \frac{4}{3}s$

⟨4⟩   Applications

Solve each problem by writing and solving an equation.
See Example 9.

95. *Births to teenagers.* In 2000 there were 48.5 births per 1000 females 15 to 19 years of age (National Center for

67. $3x + 0.3 = 2 + 2x$ **68.** $2y - 0.05 = y + 1$

69. $k - 0.6 = 0.2k + 1$ **70.** $2.3h + 6 = 1.8h - 1$

71. $0.2x - 4 = 0.6 - 0.8x$ **72.** $0.3x = 1 - 0.7x$

73. $-3(k - 6) = 2 - k$ **74.** $-2(h - 5) = 3 - h$

75. $2(p + 1) - p = 36$ **76.** $3(q + 1) - q = 23$

77. $7 - 3(5 - u) = 5(u - 4)$

78. $v - 4(4 - v) = -2(2v - 1)$

79. $4(x + 3) = 12$ **80.** $5(x - 3) = -15$

81. $\dfrac{w}{5} - 4 = -6$ **82.** $\dfrac{q}{2} + 13 = -22$

83. $\dfrac{2}{3}y - 5 = 7$ **84.** $\dfrac{3}{4}u - 9 = -6$

85. $4 - \dfrac{2n}{5} = 12$ **86.** $9 - \dfrac{2m}{7} = 19$

87. $-\dfrac{1}{3}p - \dfrac{1}{2} = \dfrac{1}{2}$ **88.** $-\dfrac{3}{4}z - \dfrac{2}{3} = \dfrac{1}{3}$

89. $3.5x - 23.7 = -38.75$

90. $3(x - 0.87) - 2x = 4.98$

⟨4⟩ **Applications**

Solve each problem. See Example 7.

91. *The practice.* A lawyer charges $300 plus $65 per hour for a divorce. If the total charge for Bill's divorce was $1405, then for what number of hours did the lawyer work on the case?

92. *The plumber.* Tamika paid $165 to her plumber for a service call. If her plumber charges $45 plus $40 per hour for a service call, then for how many hours did the plumber work?

93. *Celsius temperature.* If the air temperature in Quebec is 68° Fahrenheit, then the solution to the equation $\frac{9}{5}C + 32 = 68$ gives the Celsius temperature of the air. Find the Celsius temperature.

94. *Fahrenheit temperature.* Water boils at 212°F.

a) Use the accompanying graph to determine the Celsius temperature at which water boils.

b) Find the Fahrenheit temperature of hot tap water at 70°C by solving the equation

$$70 = \frac{5}{9}(F - 32).$$

95. *Rectangular patio.* If the rectangular patio in the accompanying figure has a length that is 3 feet longer than its width and a perimeter of 42 feet, then the width can be found by solving the equation $2x + 2(x + 3) = 42$. What is the width?
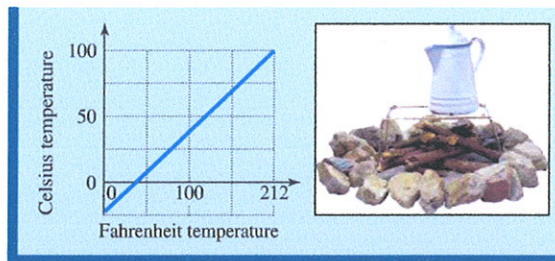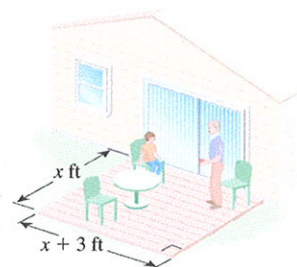

Figure for Exercise 94

Figure for Exercise 95

96. *Perimeter of a triangle.* The perimeter of the triangle shown in the accompanying figure is 12 meters. Determine the values of x, $x + 1$, and $x + 2$ by solving the equation
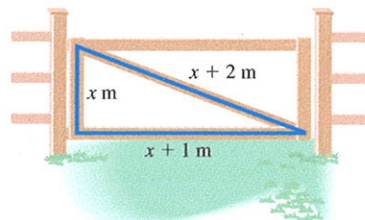
$$x + (x + 1) + (x + 2) = 12.$$

Figure for Exercise 96

97. *Cost of a car.* Jane paid 9% sales tax and a $150 title and license fee when she bought her new Saturn for a total of $16,009.50. If x represents the price of the car, then x satisfies $x + 0.09x + 150 = 16,009.50$. Find the price of the car by solving the equation.

98. *Cost of labor.* An electrician charged Eunice $29.96 for a service call plus $39.96 per hour for a total of $169.82 for installing her electric dryer. If n represents the number of hours for labor, then n satisfies

$$39.96n + 29.96 = 169.82.$$

Find n by solving this equation.