

c.  $5(x+1) - 6x = -x + 5$

**Solution**

$$5(x+1) - 6x = -x + 5$$

$$5x + 5 - 6x = -x + 5$$

$$-x + 5 = -x + 5$$

$$5 = 5$$

Use the distributive property.

Simplify.

Add  $x$  to both sides.

The last equation is always true. Therefore, the original equation is an identity and has an infinite number of solutions. Every real number is a solution.

**1.1 EXERCISES****💡 PRACTICE**

Solve each equation. See Examples 1 through 4.

1.  $3x + 11 = 2$

2.  $3x + 10 = -5$

3.  $5x - 4 = 6$

4.  $4y - 8 = -12$

5.  $6x + 10 = 22$

6.  $3n + 7 = 19$

7.  $9x - 5 = 13$

8.  $2x - 4 = 12$

9.  $1 - 3y = 4$

10.  $5 - 2x = 9$

11.  $14 + 9t = 5$

12.  $5 + 2x = -7$

13.  $-5x + 2.9 = 3.5$

14.  $3x + 2.7 = -2.7$

15.  $10 + 3x - 4 = 18$

16.  $5 + 5x - 6 = 9$

17.  $15 = 7x + 7 + 8$

18.  $14 = 9x + 5 + 8$

19.  $5y - 3y + 2 = 2$

20.  $6y + 8y - 7 = -7$

21.  $x - 4x + 25 = 31$

22.  $3y + 9y - 13 = 11$

23.  $-20 = 7y - 3y + 4$

24.  $-20 = 5y + y + 16$

25.  $4n - 10n + 35 = 1 - 2$

26.  $-5n - 3n + 2 = 34$

27.  $3n - 15 - n = 1$

28.  $2n + 12 + n = 0$

29.  $5.4x - 0.2x = 0$

30.  $0 = 5.1x + 0.3x$

31.  $\frac{1}{2}x + 7 = \frac{7}{2}$

32.  $\frac{3}{5}x + 4 = \frac{9}{5}$

33.  $\frac{1}{2} - \frac{8}{3}x = \frac{5}{6}$

35.  $\frac{3}{2} = \frac{1}{3}x + \frac{11}{3}$

37.  $\frac{7}{2} - 5 - \frac{5}{2}x = 9$

39.  $\frac{5}{8}x - \frac{1}{4}x + \frac{1}{2} = \frac{3}{10}$

41.  $\frac{y}{2} + \frac{1}{5} = 3$

43.  $\frac{7}{8} = \frac{3}{4}x - \frac{5}{8}$

45.  $\frac{y}{7} + \frac{y}{28} + \frac{1}{2} = \frac{3}{4}$

47.  $x + 1.2x + 6.9 = -3.0$

49.  $10 = x - 0.5x + 32$

51.  $2.5x + 0.5x - 3.5 = 2.5$

53.  $6.4 + 1.2x + 0.3x = 0.4$

55.  $-12.13 = 2.42y + 0.6y - 13.64$

57.  $-0.4x + x + 17.2 = 18.1$

59.  $0 = 17.3x - 15.02x - 0.456$

61.  $3x + 2 = x - 8$

63.  $4n - 3 = n + 6$

65.  $3y + 18 = 7y - 6$

67.  $3x + 11 = 8x - 4$

69.  $14n = 3n$

71.  $6y - 2.1 = y - 2.1$

73.  $2(z + 1) = 3z + 3$

75.  $16y + 23y - 3 = 16y - 2y + 2$

77.  $0.25 + 3x + 6.5 = 0.75x$

34.  $\frac{2}{5} - \frac{1}{2}x = \frac{7}{4}$

36.  $\frac{11}{8} = \frac{1}{5}x + \frac{4}{5}$

38.  $\frac{8}{3} + 2 - \frac{7}{3}x = 6$

40.  $\frac{1}{2}x + \frac{3}{4}x - \frac{5}{3} = \frac{5}{6}$

42.  $\frac{y}{3} - \frac{2}{3} = 7$

44.  $\frac{1}{10} = \frac{4}{5}x + \frac{3}{10}$

46.  $\frac{5y}{6} - \frac{7y}{8} - \frac{1}{12} = \frac{1}{3}$

48.  $3x - 0.75x - 1.72 = 3.23$

50.  $33 = y + 3 - 0.4y$

52.  $4.7 - 0.5x - 0.3x = -0.1$

54.  $5.2 - 1.3x - 1.5x = -0.4$

56.  $-7.01 = 1.75x + 3.05x - 8.45$

58.  $y - 0.75y + 13.76 = 14.66$

60.  $0 = 20.5x - 16.35x + 0.1245$

62.  $5x + 1 = 2x - 5$

64.  $6y + 3 = y - 7$

66.  $2y + 5 = 8y + 10$

68.  $9x + 3 = 5x - 9$

70.  $1.6x = 0.8x$

72.  $13x + 5 = 2x + 5$

74.  $6x - 3 = 3(x + 2)$

76.  $5x - 2x + 4 = 3x + x - 1$

78.  $0.9y + 3 = 0.4y + 1.5$

79.  $6.5 + 1.2x = 0.5 - 0.3x$

80.  $x - 0.1x + 0.8 = 0.2x + 0.1$

81.  $\frac{2}{3}x + 1 = \frac{1}{3}x - 6$

82.  $\frac{4}{5}n + 2 = \frac{2}{5}n - 4$

83.  $\frac{y}{5} + \frac{3}{4} = \frac{y}{2} + \frac{3}{4}$

84.  $\frac{5n}{6} + \frac{1}{9} = \frac{3n}{2} + \frac{1}{9}$

85.  $\frac{3}{8}\left(y - \frac{1}{2}\right) = \frac{1}{8}\left(y + \frac{1}{2}\right)$

86.  $\frac{1}{2}\left(\frac{x}{2} + 1\right) = \frac{1}{3}\left(\frac{x}{2} - 1\right)$

87.  $\frac{2x}{3} + \frac{x}{3} = -\frac{3}{4} + \frac{x}{2}$

88.  $\frac{3}{4}x + \frac{1}{5}x = \frac{1}{2}x - \frac{3}{10}$

89.  $x + \frac{2}{3}x - 2x = \frac{x}{6} - \frac{1}{8}$

90.  $3x + \frac{1}{2}x - \frac{2}{5}x = \frac{x}{10} + \frac{7}{20}$

91.  $3(1 + 9x) = 6(2 - 4x)$

92.  $4(5 - x) = 8(3x + 10)$

93.  $3(4x - 1) = 4(2x - 3) + 8$

94.  $7(2x - 1) = 5(x + 6) - 13$

95.  $5 - 3(2x + 1) = 4(x - 5) + 6$

96.  $-2(y + 5) - 4 = 6(y - 2) + 2$

97.  $8 + 4(2x - 3) = 5 - (x + 3)$

98.  $8(3x + 5) - 9 = 9(x - 2) + 14$

99.  $4.7 - 0.3x = 0.5x - 0.1$

100.  $5.8 - 0.1x = 0.2x - 0.2$

101.  $0.2(x + 3) = 0.1(x - 5)$

102.  $0.4(x + 3) = 0.3(x - 6)$

103.  $\frac{1}{2}(4 - 8x) = \frac{1}{3}(4x + 7) - 3$

104.  $3 + \frac{1}{4}(x - 4) = \frac{2}{5}(2 + 3x)$

105.  $0.6x - 22.9 = 1.5x - 18.4$

106.  $0.1y + 3.8 = 5.72 - 0.3y$

107.  $0.12n + 0.25n - 5.895 = 4.3n$

108.  $0.15n + 32n - 21.0005 = 10.5n$

109.  $0.7(x + 14.1) = 0.3(x + 32.9)$

110.  $0.8(x - 6.21) = 0.2(x - 24.84)$

Determine whether each equation is a conditional equation, an identity, or a contradiction. See Example 5.

111.  $2(3x - 1) + 5 = 3$

112.  $-2x + 13 = -2(x - 7)$

113.  $5x + 13 = -2(x - 7) + 3$

114.  $3x + 9 = -3(x - 3) + 6x$

115.  $7(x - 1) = -3(3 - x) + 4x$

116.  $3(x - 2) + 4x = 6(x - 1) + x$

117.  $5(x + 1) = 3(x + 1) + 2(x + 1)$

118.  $8x - 20 + x = -3(5 - 2x) + 3(x - 4)$

119.  $2x + 3x = 5.2(3 - x)$

120.  $5.2x + 3.4x = 0.2(x - 0.42)$

 **WRITING & THINKING**

**121.** Find the error(s) made in solving each equation and give the correct solution.

**a.**  $\frac{1}{3}x + 4 = 9$

$$3 \cdot \frac{1}{3}x + 4 = 3 \cdot 9$$

$$x + 4 = 27$$

$$x + 4 - 4 = 27 - 4$$

$$x = 23$$

**b.**  $5x + 3 = 11$

$$(5x - 3) + (3 - 3) = 11 - 3$$

$$2x + 0 = 8$$

$$\frac{2x}{2} = \frac{8}{2}$$

$$x = 4$$

**122.** Answer each question.

**a.** Simplify the expression  $3(x + 5) + 2(x - 7)$ .

**b.** Solve the equation  $3(x + 5) + 2(x - 7) = 31$ .

**c.** How are the methods you used to answer parts **a.** and **b.** similar? How are they different?

**123.** Write an equation to represent each situation, using  $x$  to represent Ryan's current age. Determine whether each equation is a conditional equation, an identity, or a contradiction, and explain why that makes sense for the situation represented.

**a.** In 6 years, Ryan will be 20 years old.

**b.** In 6 years, Ryan will be 8 years older than he is now.

**c.** In 6 years, Ryan will be 3 years older than he will be 3 years from now.