

**Solution Manual for Algebra A Combined Approach 5th Edition
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**Solutions Manual for Algebra A Combined Approach
5th Edition by Elayn Martin-Gay**

Chapter 2

Section 2.1 Practice Exercises

1. $x - 5 = 8$
 $x - 5 + 5 = 8 + 5$
 $x = 13$
Check: $x - 5 = 8$
 $13 - 5 = 8$
 $8 = 8$ True

The solution is 13.

2. $y + 1.7 = 0.3$
 $y + 1.7 - 1.7 = 0.3 - 1.7$
 $y = -1.4$
Check: $y + 1.7 = 0.3$
 $-1.4 + 1.7 = 0.3$

$0.3 = 0.3$ True

The solution is -1.4 .

3. $\frac{7}{3} = y - \frac{1}{3}$
 $\frac{7}{3} + \frac{1}{3} = y - \frac{1}{3} + \frac{1}{3}$
 $\frac{8}{3} = y$

$\frac{8}{24} + \frac{3}{24} = y$
 $\frac{11}{24} = y$

4. $3x + 10 = 4x$
 $3x + 10 - 3x = 4x - 3x$
 $10 = x$
Check: $3x + 10 = 4x$
 $3(10) + 10 = 4(10)$
 $30 + 10 = 40$
 $40 = 40$ True
The solution is 10.

5. $10w + 3 - 4w + 4 = -2w + 3 + 7w$
 $6w + 7 = 5w + 3$
 $-5w + 6w + 7 = -5w + 5w + 3$
 $w + 7 = 3$
 $w + 7 - 7 = 3 - 7$
 $w = -4$

Check:

$$\begin{array}{r} \text{Check: } \frac{24}{7} = y - \frac{1}{8} \\ \frac{24}{7} \quad \frac{29}{7} - \frac{1}{8} \\ \frac{24}{7} \quad \frac{24}{7} - \frac{3}{8} \\ \frac{24}{7} \quad \frac{24}{7} - \frac{8}{8} \\ \frac{24}{7} \quad \frac{21}{7} \\ \frac{24}{7} = \frac{21}{7} \text{ True} \\ \frac{24}{8} = \frac{21}{8} \end{array}$$

The solution is $\frac{29}{7}$.

$$\begin{array}{r}
10w+3 \\
-4w+4 \\
=-2w+ \\
3+7w \\
10(-4)+3-4(-4)+4 \quad - \\
2(-4)+3+7(-4) \quad 8 \\
-40+3+16+4 \\
+3-28 \\
- \\
1 \\
7
\end{array}$$

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The solution is -4.

6. $3(2w-5)-(5w+1)$
 $= -3$
 $3(2w)-3(5)-1(5w)-1(1)$
 $= -3$

6

w

-

1

5

$$\begin{array}{r}
-5w-1=-3 \\
w-16=-3 \\
w-16+16=-3+16 \\
w=13 \\
\text{Check: } 3(2w-5)-(5w+1)=-3 \\
3(2 \cdot 13-5)-(5 \cdot 13+1) \quad -3 \\
3(26-5)-(65+1) \quad -3 \\
3(21)-66 \quad -3 \\
63-66 \quad -3 \\
-3=-3 \text{ True}
\end{array}$$

The solution is 13.

7. $12-y=9$
 $12-y-12=9-12$
 $-y=-3$
 $y=3$
Check: $12-y=9$
 $12-3=9$
 $9=9$ True

The solution is 3.

- 8. a.** If the sum of two numbers is 11 and one number is 4, find the other number by subtracting 4 from 11. The other number is $11 - 4$, or 7.

- b. If the sum of two numbers is 11 and one number is x , find the other number by subtracting x from 11. The other number is $11 - x$.
 - c. If the sum of two numbers is 56 and one number is a , find the other number by subtracting a from 56. The other number is $56 - a$.
9. Mike received 100,445 more votes than Zane, who received n votes. So, Mike received $(n + 100,445)$ votes.

Vocabulary, Readiness & Video Check 2.1

1. A combination of operations on variables and numbers is called an expression.
2. A statement of the form “expression = expression” is called an equation.
3. An equation contains an equal sign (=).
4. An expression does not contain an equal sign (=).
5. An expression may be simplified and evaluated while an equation may be solved.
6. A solution of an equation is a number that when substituted for a variable makes the equation a true statement.
7. Equivalent equations have the same solution.
8. By the addition property of equality, the same number may be added to or subtracted from both sides of an equation without changing the solution of the equation.

9. $x + 4 = 6$
 $x = 2$
10. $x + 7 = 17$
 $x = 10$
11. $n + 18 = 30$
 $n = 12$
12. $z + 22 = 40$
 $z = 18$
13. $b - 11 = 6$
 $b = 17$

14. $d - 16 = 5$
 $d = 21$

15. The addition property of equality means that if we have an equation, we can add the same real number to both sides of an equation and have an equivalent equation.

16. $15x - 14 = 14x - 1$

17. $\frac{1}{7}x$

Exercise Set 2.1

2. $x + 14 = 25$
 $x + 14 - 14 = 25 - 14$
 $x = 11$
Check: $x + 14 = 25$
 $11 + 14 = 25$
 $25 = 25$ True
The solution is 11.

4. $y - 9 = 1$
 $y - 9 + 9 = 1 + 9$
 $y = 10$
Check: $y - 9 = 1$
 $10 - 9 = 1$
 $1 = 1$ True
The solution is 10.

6. $-8 = 8 + z$
 $-8 - 8 = -8 + 8 + z$
 $-16 = z$
Check: $-8 = 8 + z$
 $-8 = 8 + (-16)$
 $-8 = -8$ True
The solution is -16 .

8. $t - 9.2 = -6.8$
 $9.2 + t - 9.2 = 9.2 - 6.8$
 $t = 2.4$
Check: $t - 9.2 = -6.8$
 $2.4 - 9.2 = -6.8$
 $-6.8 = -6.8$ True
The solution is 2.4.

10. $y - \frac{4}{7} = -\frac{3}{14}$

$$y - \frac{4}{7} + \frac{4}{7} = -\frac{3}{14} + \frac{4}{7}$$

$$y = -\frac{3}{14} + \frac{8}{14}$$

$$y = \frac{5}{14}$$

Check: $y - \frac{4}{7} = -\frac{3}{14}$

$$\frac{5}{14} - \frac{4}{7} = \frac{-3}{14}$$

$$\frac{5}{14} - \frac{8}{14} = \frac{-3}{14}$$

$$-\frac{3}{14} = -\frac{3}{14} \quad \text{True}$$

The solution is $\frac{5}{14}$.

12. $c + \frac{1}{6} = \frac{3}{8}$

$$c + \frac{1}{6} - \frac{1}{6} = \frac{3}{8} - \frac{1}{6}$$

$$c = \frac{9}{24} - \frac{4}{24}$$

$$c = \frac{5}{24}$$

Check: $c + \frac{1}{6} = \frac{3}{8}$

$$\frac{5}{24} + \frac{1}{6} = \frac{3}{8}$$

$$\frac{5}{24} + \frac{4}{24} = \frac{3}{8}$$

$$\frac{9}{24} = \frac{3}{8}$$

$$\frac{3}{8} = \frac{3}{8} \quad \text{True}$$

The solution is $\frac{5}{24}$.

14. $3n + 2n = 7 + 4n$

$$5n = 7 + 4n$$

$$5n - 4n = 7 + 4n - 4n$$

$$n = 7$$

Check: $3n + 2n = 7 + 4n$

$$3(7) + 2(7) = 7 + 4(7)$$

$$21 + 14 = 7 + 28$$

$$35 = 35 \quad \text{True}$$

The solution is 7.

16. $\frac{13}{11}y - \frac{2}{11}y = -3$

$$\frac{11}{11}y = -3$$

$$y = -3$$

$$\frac{13}{11}y - \frac{2}{11}y = -3$$

Check:

$$\frac{13}{11}(-3) - \frac{2}{11}(-3) = -3$$

$$-\frac{39}{11} + \frac{6}{11} = -3$$

$$-\frac{33}{11} = -3$$

$$-3 = -3 \quad \text{True}$$

The solution is -3.

18. $4x - 4 = 10x - 7x$

$$4x - 4 = 3x$$

$$4x - 4 - 4x = 3x - 4x$$

$$-4 = -x$$

$$4 = x$$

Check: $4x - 4 = 10x - 7x$

$$4(4) - 4 = 10(4) - 7(4)$$

$$16 - 4 = 40 - 28$$

$$12 = 12 \quad \text{True}$$

The solution is 4.

20. $-4(z - 3) = 2 - 3z$

$$-4z + 12 = 2 - 3z$$

$$-4z + 12 + 3z = 2 - 3z + 3z$$

$$-z + 12 = 2$$

$$-z + 12 - 12 = 2 - 12$$

$$-z = -10$$

$$z = 10$$

Check: $-4(z - 3) = 2 - 3z$

$$-4(10 - 3) = 2 - 3(10)$$

$$-4(7) = 2 - 30$$

$$-28 = -28 \quad \text{True}$$

The solution is 10.

22. $\frac{1}{5}x - 1 = -\frac{4}{5}x - 13$

$$\frac{4}{5}x + \frac{1}{5}x - 1 = -\frac{4}{5}x - 13$$

$$\frac{5}{5}x - 1 = -13$$

$$x - 1 = -13$$

$$x - 1 + 1 = -13 + 1$$

$$x = -12$$

Check: $\frac{1}{5}x - 1 = -\frac{4}{5}x - 13$
 $\frac{1}{5}(-12) - 1 = -\frac{4}{5}(-12) - 13$
 $-\frac{12}{5} - \frac{5}{5} = \frac{48}{5} - \frac{65}{5}$
 $-\frac{17}{5} = -\frac{17}{5}$ True

The solution is -12.

24. $2x + 7 = x - 10$
 $-x + 2x + 7 = -x + x - 10$
 $x + 7 = -10$
 $x + 7 - 7 = -10 - 7$
 $x = -17$

Check: $2x + 7 = x - 10$
 $2(-17) + 7 = -17 - 10$
 $-34 + 7 = -27$

$-27 = -27$ True

The solution is -17.

26. $4p - 11 - p = 2 + 2p - 20$
 $3p - 11 = 2p - 18$
 $-2p + 3p - 11 = -2p + 2p - 18$
 $p - 11 = -18$

$p - 11 + 11 = -18 + 11$

Check: $p = -7$
 $4p - 11 - p = 2 + 2p - 20$
 $4(-7) - 11 - (-7) = 2 + 2(-7) - 20$

$-28 - 11 + 7 = 2 - 14 - 20$
 $-32 = -32$ True

The solution is -7.

28. $-2(x - 1) = -3x$
 $-2x + 2 = -3x$
 $2x - 2x + 2 = 2x - 3x$
 $2 = -x$
 $-2 = x$

Check: $-2(x - 1) = -3x$
 $-2(-2 - 1) = -3(-2)$
 $-2(-3) = 6$
 $6 = 6$ True

30. $\frac{2}{5}x - \frac{1}{12} = -\frac{3}{5}x - \frac{3}{4}$
 $\frac{2}{5}x - \frac{1}{12} + \frac{3}{5}x = -\frac{3}{5}x - \frac{3}{4} + \frac{3}{5}x$
 $\frac{5}{5}x - \frac{1}{12} = -\frac{3}{4}$
 $x - \frac{1}{12} = -\frac{3}{4}$
 $x - \frac{1}{12} + \frac{1}{12} = -\frac{3}{4} + \frac{1}{12}$

$x = -\frac{9}{12} + \frac{1}{12}$
 $x = -\frac{8}{12}$
 $x = -\frac{2}{3}$

Check: $\frac{2}{5}x - \frac{1}{12} = -\frac{3}{5}x - \frac{3}{4}$

$\frac{2}{5}\left(-\frac{2}{3}\right) - \frac{1}{12} = -\frac{3}{5}\left(-\frac{2}{3}\right) - \frac{3}{4}$
 $-\frac{4}{15} - \frac{1}{12} = \frac{2}{5} - \frac{3}{4}$

$-\frac{4}{15} - \frac{1}{12} = \frac{2}{5} - \frac{3}{4}$
 $-\frac{16}{60} - \frac{5}{60} = \frac{24}{60} - \frac{45}{60}$
 $-\frac{21}{60} = -\frac{21}{60}$ True

The solution is $-\frac{2}{3}$.

32. $3(y + 7) = 2y - 5$
 $3y + 21 = 2y - 5$
 $-2y + 3y + 21 = -2y + 2y - 5$
 $y + 21 = -5$
 $y + 21 - 21 = -5 - 21$
 $y = -26$

Check: $3(y + 7) = 2y - 5$
 $3(-26 + 7) = 2(-26) - 5$
 $3(-19) = -52 - 5$
 $-57 = -57$ True

The solution is -26.

The solution is -2 .

$$\begin{aligned} 34. \quad 5(3+z) - (8z+9) &= -4z \\ 15+5z-8z-9 &= -4z \\ -3z+6 &= -4z \\ 3z-3z+6 &= 3z-4z \\ 6 &= -z \\ -6 &= z \end{aligned}$$

Check: $5(3+z) - (8z+9) = -4z$
 $5(3+(-6)) - (8(-6)+9) = -4(-6)$
 $5(-3) - (-48+9) = 24$
 $-15 - (-39) = 24$
 $-15 + 39 = 24$
 $24 = 24$ True

The solution is -6 .

36. $-5(x+1) + 4(2x-3) = 2(x+2) - 8$
 $-5x - 5 + 8x - 12 = 2x + 4 - 8$
 $3x - 17 = 2x - 4$
 $3x - 17 - 2x = 2x - 4 - 2x$
 $-17 = -4$
 $x - 17 + 17 = -4 + 17$
 $x = 13$

Check: $-5(x+1) + 4(2x-3) = 2(x+2) - 8$
 $-5(13+1) + 4(2 \cdot 13 - 3) = 2(13+2) - 8$
 $-5(14) + 4(26 - 3) = 2(15) - 8$
 $-70 + 4(23) = 30 - 8$
 $-70 + 92 = 22$
 $22 = 22$ True

The solution is 13.

38. $18x - 9 = 19x$
 $18x - 9 - 18x = 19x - 18x$
 $-9 = x$

40. $9x + 5.5 = 10x$
 $9x + 5.5 - 9x = 10x - 9x$
 $5.5 = x$

42. $7y + 2 = 6y + 2$
 $7y + 2 - 6y = 6y + 2 - 6y$
 $y + 2 = 2$
 $y + 2 - 2 = 2 - 2$
 $y = 0$

44. $15x + 20 - 10x - 9 = 25x + 8 - 21x - 7$
 $5x + 11 = 4x + 1$
 $-4x + 5x + 11 = -4x + 4x + 1$
 $x + 11 = 1$
 $x + 11 - 11 = 1 - 11$
 $x = -10$

46. $6(5+c) = 5(c-4)$
 $30 + 6c = 5c - 20$

$30 + 6c - 5c = 5c - 20 - 5c$
 $30 + c = -20$

48. $m + 2 = 7.1$
 $m + 2 - 2 = 7.1 - 2$
 $m = 5.1$

50. $15 - (6 - 7k) = 2 + 6k$
 $15 - 6 + 7k = 2 + 6k$
 $9 + 7k = 2 + 6k$
 $9 + 7k - 6k = 2 + 6k - 6k$
 $9 + k = 2$
 $-9 + 9 + k = -9 + 2$
 $k = -7$

52. $\frac{1}{11} = y + \frac{10}{11}$
 $\frac{1}{11} - \frac{10}{11} = y + \frac{10}{11} - \frac{10}{11}$
 $-\frac{9}{11} = y$

54. $-1.4 - 7x - 3.6 - 2x = -8x + 4.4$
 $-9x - 5 = -8x + 4.4$
 $8x - 9x - 5 = 8x - 8x + 4.4$
 $-x - 5 = 4.4$
 $-x - 5 + 5 = 4.4 + 5$
 $-x = 9.4$
 $x = -9.4$

56. If the sum of the two numbers is 13 and one number is y , then the other number is $13 - y$.

58. If the sum of the lengths of the two pieces is 5 feet and one piece is x feet, then the other piece has a length of $(5 - x)$ feet.

60. If the sum of the measures of two angles is 90° and one angle measures x° , then the other angle measures $(90 - x)^\circ$.

62. If the length of I-80 is m miles and the length of I-90 is 121 miles longer than I-80, the length of I-90 is $(m + 121)$ miles.

64. If the weight of the Armanty meteorite is y kilograms and the weight of the Hoba West meteorite is 3 times the weight of the Armanty meteorite, then the weight of the Hoba West meteorite is $3y$ kilograms.

66. The multiplicative inverse of $\frac{7}{6}$ is $\frac{6}{7}$, since

$$\begin{aligned} -30 + 30 + c &= -30 - 20 \\ c &= -50 \end{aligned}$$

$$\frac{7}{6} \cdot \frac{6}{7} = 1.$$

$$6 \cdot 7$$

68. The multiplicative inverse of 5 is $\frac{1}{5}$, since

$$5 \cdot \frac{1}{5} = 1.$$

70. The multiplicative inverse of $-\frac{3}{5}$ is $-\frac{5}{3}$ since

$$-\frac{3}{5} \cdot \left(-\frac{5}{3}\right) = 1.$$

72. $-2y = -2 \cdot y = -y = y$

$$74. \begin{array}{l} \left(\begin{array}{c} 2 \\ 1 \\ 7 \end{array} \right) = \left(\begin{array}{c} 1 \\ 1 \\ 7 \end{array} \right) \\ \left(\begin{array}{c} 2 \\ 1 \\ 7 \end{array} \right) = \left(\begin{array}{c} 1 \\ 1 \\ 7 \end{array} \right) \end{array} r=1r=r$$

$$\left(\begin{array}{c} 2 \\ 2 \end{array} \right) \left(\begin{array}{c} 2 \\ 2 \end{array} \right)$$

76. $\left. \begin{array}{l} 9^x \\ \end{array} \right| \cdot \left. \begin{array}{l} x \\ \end{array} \right| x = 1x = x$

78. answers may vary

80. $a + 9 = 15$
 $a + 9 + (-9) = 15 + (-9)$
 $a = 6$

82. answers may vary

84. $360 - x - 3x - 5x = 360 - 9x$
 The measure of the fourth angle is $(360 - 9x)^\circ$.

86. answers may vary

88. $-85.325 = x - 97.985$
 $-85.325 + 97.985 = x - 97.985 + 97.985$
 $12.66 = x$

Check: $\frac{3}{7}x = 9$

$$\frac{3}{7}(21) = 9$$

9 = 9 True
 The solution is 21.

2. $7x = 42$

$$\frac{7x}{7} = \frac{42}{7}$$

$$1 \cdot x = 6$$

$$x = 6$$

Check: $7x = 42$
 $7 \cdot 6 = 42$ True

The solution is 6.

3. $-4x = 52$

$$\frac{-4x}{-4} = \frac{52}{-4}$$

$$1x = -13$$

$$x = -13$$

Check: $-4x = 52$

$$4(-13) = 52$$

$$-52 = 52 \text{ True}$$

The solution is -13.

4. $\frac{y}{5} = 13$

$$\frac{1}{5}y = 13$$

$$5 \cdot \frac{1}{5}y = 5 \cdot 13$$

$$1y = 65$$

$$y = 65$$

Check: $\frac{y}{5} = 13$

Section 2.2 Practice Exercises

1. $\frac{3}{7}x = 9$
 $\frac{7}{7} \cdot \left(\frac{3}{7}x \right) = \frac{7}{7} \cdot 9$

$$\left(\frac{3}{7}x \right) = 9$$

$$1x = 21$$

$$x = 21$$

$$\frac{65}{5} = 13$$

$13 = 13$ True
 The solution is 65.

5. $2.6x = 13.52$
 $\frac{2.6x}{2.6} = \frac{13.52}{2.6}$
 $x = 5.2$

Check: $2.6x = 13.52$
 $2.6(5.2) = 13.52$

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$$6. \quad \begin{aligned} \frac{5}{6}y &= -\frac{3}{5} \\ -\frac{6}{5} \cdot \frac{5}{6}y &= -\frac{6}{5} \cdot \frac{3}{5} \\ y &= \frac{18}{25} \end{aligned}$$

$$\text{Check: } \begin{aligned} \frac{5}{6} \left(\frac{18}{25} \right) &= -\frac{3}{5} \\ \frac{5}{6} \cdot \frac{18}{25} &= -\frac{3}{5} \\ \frac{15}{25} &= -\frac{3}{5} \text{ True} \end{aligned}$$

The solution is $\frac{18}{25}$.

$$7. \quad -x + 7 = -12$$

$$\begin{aligned} -x + 7 - 7 &= -12 - 7 \\ -x &= -19 \end{aligned}$$

$$\begin{aligned} \frac{-x}{-1} &= \frac{-19}{-1} \\ x &= 19 \end{aligned}$$

$$\text{Check: } \begin{aligned} -x + 7 &= -12 \\ -19 + 7 &= -12 \\ -12 &= -12 \text{ True} \end{aligned}$$

The solution is 19.

$$8. \quad \begin{aligned} -7x + 2x + 3 - 20 &= -2 \\ -5x - 17 &= -2 \\ -5x - 17 + 17 &= -2 + 17 \\ -5x &= 15 \\ \frac{-5x}{-5} &= \frac{15}{-5} \\ x &= -3 \end{aligned}$$

$$\text{Check: } \begin{aligned} -7x + 2x + 3 - 20 &= -2 \\ -7(-3) + 2(-3) + 3 - 20 &= -2 \\ 21 - 6 + 3 - 20 &= -2 \\ -2 &= -2 \text{ True} \end{aligned}$$

The solution is -3.

$$9. \quad \begin{aligned} 10x - 4 &= 7x + 14 \\ 10x - 4 - 7x &= 7x + 14 - 7x \end{aligned}$$

$$\begin{aligned} \text{Check: } 10x - 4 &= 7x + 14 \\ 10(6) - 4 &= 7(6) + 14 \\ 60 - 4 &= 42 + 14 \\ 56 &= 56 \text{ True} \end{aligned}$$

The solution is 6.

$$10. \quad \begin{aligned} 4(3x - 2) &= -1 + 4 \\ 4(3x) - 4(2) &= -1 + 4 \\ 12x - 8 &= 3 \\ 12x - 8 + 8 &= 3 + 8 \end{aligned}$$

$$\begin{aligned} 12x &= 11 \\ \frac{12x}{12} &= \frac{11}{12} \\ x &= \frac{11}{12} \end{aligned}$$

$$\text{Check: } \begin{aligned} 4(3x - 2) &= -1 + 4 \\ 4 \left(3 \left(\frac{11}{12} \right) - 2 \right) &= -1 + 4 \end{aligned}$$

$$4 \left(3 \left(\frac{11}{12} \right) - 2 \right) = -1 + 4$$

$$4 \left(\frac{11}{4} - 2 \right) = -1 + 4$$

$$\begin{aligned} 11 - 8 &= 3 \\ 3 &= 3 \text{ True} \end{aligned}$$

The solution is $\frac{11}{12}$.

$$\begin{aligned} 3x - 4 &= 14 \\ 3x - 4 + 4 &= 14 + 4 \\ 3x &= 18 \\ \frac{3x}{3} &= \frac{18}{3} \\ x &= 6 \end{aligned}$$

11. a. If x is the first integer, then $x + 1$ is the second integer.
Their sum is $x + (x + 1) = x + x + 1 = 2x + 1$.
- b. If x is the first odd integer, then $x + 2$ is the second consecutive odd integer.
Their sum is $x + (x + 2) = x + x + 2 = 2x + 2$.

Vocabulary, Readiness & Video Check 2.2

1. By the multiplication property of equality, both sides of an equation may be multiplied or divided by the same nonzero number without changing the solution of the equation.
2. By the addition property of equality, the same number may be added to or subtracted from both sides of an equation without changing the solution of the equation.
3. An equation may be solved while an expression may be simplified and evaluated.
4. An equation contains an equal sign (=) while an expression does not.
5. Equivalent equations have the same solution.

6. A solution of an equation is a number that when substituted for a variable makes the equation a true statement.

7. $3a = 27$
 $a = 9$

8. $9c = 54$
 $c = 6$

9. $5b = 10$
 $b = 2$

10. $7t = 14$
 $t = 2$

11. $6x = -30$
 $x = -5$

12. $8r = -64$
 $r = -8$

13. We can multiply both sides of an equation by the same nonzero number and have an equivalent equation.

14. addition property; multiplication property; answers may vary

15. $(x + 1) + (x + 3) = 2x + 4$

Exercise Set 2.2

2. $-7x = -49$
 $\underline{-7x = -49}$

$\frac{-7}{-7} = \frac{-7}{-7}$
 $x = 7$

Check: $-7x = -49$
 $-7(7) = -49$
 $-49 = -49$ True

The solution is 7.

4. $2x = 0$
 $\frac{2x}{2} = \frac{0}{2}$
 $x = 0$

Check: $2x = 0$

6. $-y = 8$
 $\underline{-y = 8}$
 $-1 \quad -1$
 $y = -8$

Check: $-y = 8$
 $-(-8) = 8$
 $8 = 8$ True

The solution is -8.

8. $\frac{3}{4}n = -15$

$\frac{4}{4} \cdot \frac{3}{4}n = \frac{4}{4} \cdot (-15)$
 $\frac{3}{4}n = -20$

Check: $\frac{3}{4}n = -15$
 $\frac{3}{4}(-20) = -15$

$\frac{3}{4}(-20) = -15$
 $-15 = -15$ True

The solution is -20.

10. $\frac{1}{8}v = \frac{1}{4}$
 $8 \cdot \frac{1}{8}v = 8 \cdot \frac{1}{4}$
 $v = 2$

Check: $\frac{1}{8}v = \frac{1}{4}$
 $\frac{1}{8} \cdot 2 = \frac{1}{4}$

$\frac{1}{8} \cdot 2 = \frac{1}{4}$
 $\frac{1}{4} = \frac{1}{4}$ True

The solution is 2.

12. $\frac{d}{2} = 2$

$2(0) = 0$

$0 = 0$ True

The solution is 0.

$$\begin{aligned}
 &15 \\
 &1 \\
 &5 \\
 &\cdot \\
 &\underline{d} \\
 &= \\
 &1 \\
 &5 \\
 &\cdot \\
 &2 \\
 &15 \\
 &\underline{d} \\
 &= \\
 &3 \\
 &0 \\
 \text{Check: } &\frac{d}{15} = 2 \\
 &\frac{30}{15} = 2 \\
 &2 = 2 \text{ True}
 \end{aligned}$$

T
h
e
s
o
l
u
t
i
o
n
i
s
3
0
.

14.
$$\begin{array}{r} f \\ -5 \\ f \\ 0 \\ -5 \end{array} = -5$$

$f = 0$

Check:
$$\begin{array}{r} f \\ -5 \\ 0 \\ -5 \end{array} = 0$$

 $0 = 0$ True

The solution is 0.

16. $8.5y = 19.55$

$$\frac{8.5y}{8.5} = \frac{19.55}{8.5}$$

Check: $y = 2.3$
 $8.5y = 19.55$

$$\begin{array}{r} 8.5(2.3) \\ 19.55 \end{array} = 19.55$$
 True

The solution is 2.3.

18. $3x - 1 = 26$

$3x - 1 + 1 = 26 + 1$

$3x = 27$

$$\frac{3x}{3} = \frac{27}{3}$$

$x = 9$

Check: $3x - 1 = 26$

$3 \cdot 9 - 1 = 26$

$27 - 1 = 26$

$26 = 26$ True

The solution is 9.

20. $-x + 4 = -24$

$-x + 4 - 4 = -24 - 4$

$-x = -28$

$$\frac{-x}{-1} = \frac{-28}{-1}$$

$x = 28$

Check: $-x + 4 = -24$
 $-28 + 4 = -24$

$-24 = -24$ True

The solution is 28.

Check: $8t + 5 = 5$

$8 \cdot 0 + 5 = 5$

$0 + 5 = 5$

$5 = 5$ True

The solution is 0.

24. $\frac{b}{-1} - 1 = -7$

$$\frac{b}{-1} + 1 = -7 + 1$$

$$\frac{b}{-1} = -6$$

$$4 \cdot \frac{b}{-1} = 4 \cdot (-6)$$

$b = -24$

b

Check: $\frac{-24}{-1} - 1 = -7$

$$\frac{-24}{-1} - 1 = -7$$

$-6 - 1 = -7$

$-7 = -7$ True

The solution is -24.

26. $4a + 1 + a - 11 = 0$

$5a - 10 = 0$

$5a - 10 + 10 = 0 + 10$

$5a = 10$

$$\frac{5a}{5} = \frac{10}{5}$$

$a = 2$

Check: $4a + 1 + a - 11 = 0$

$4 \cdot 2 + 1 + 2 - 11 = 0$

$8 + 1 + 2 - 11 = 0$

$0 = 0$ True

The solution is 2.

28. $19 = 0.4x - 0.9x - 6$

$19 = -0.5x - 6$

$19 + 6 = -0.5x - 6 + 6$

$25 = -0.5x$

$$\frac{25}{-0.5} = \frac{-0.5x}{-0.5}$$

$-50 = x$

22. $8t + 5 = 5$

$8t + 5 - 5 = 5 - 5$

$8t = 0$

$$\frac{8t}{8} = \frac{0}{8}$$
$$t = 0$$

$$-50 = x$$

Check: $19 = 0.4x - 0.9x - 6$

$$19 = 0.4(-50) - 0.9(-50) - 6$$
$$19 = -20 + 45 - 6$$
$$19 = 19 \text{ True}$$

The solution is -50 .

$$\begin{aligned}
 30. \quad & \frac{3}{5}x - 14 = -8 \\
 & \frac{3}{5}x - 14 + 14 = -8 + 14 \\
 & \frac{3}{5}x = 6 \\
 & \frac{3}{5}x \cdot \frac{5}{3} = 6 \cdot \frac{5}{3} \\
 & x = 10
 \end{aligned}$$

Check: $\frac{3}{5}x - 14 = -8$

$$\begin{aligned}
 \frac{3}{5} \cdot 10 - 14 &= -8 \\
 6 - 14 &= -8 \\
 -8 &= -8 \text{ True}
 \end{aligned}$$

The solution is 10.

$$\begin{aligned}
 32. \quad & \frac{2}{7}z - \frac{1}{5} = \frac{1}{2} \\
 & \frac{2}{7}z - \frac{1}{5} + \frac{1}{5} = \frac{1}{2} + \frac{1}{5} \\
 & \frac{2}{7}z = \frac{5}{10} + \frac{2}{10} \\
 & \frac{2}{7}z = \frac{7}{10} \\
 & \frac{7}{2} \cdot \frac{2}{7}z = \frac{7}{2} \cdot \frac{7}{10} \\
 & z = \frac{49}{20}
 \end{aligned}$$

Check: $\frac{2}{7}z - \frac{1}{5} = \frac{1}{2}$

$$\begin{aligned}
 \frac{2}{7} \left(\frac{49}{20} \right) - \frac{1}{5} &= \frac{1}{2} \\
 \frac{7}{10} - \frac{1}{5} &= \frac{1}{2} \\
 \frac{7}{10} - \frac{2}{10} &= \frac{1}{2} \\
 \frac{5}{10} &= \frac{1}{2} \\
 \frac{1}{2} &= \frac{1}{2} \text{ True}
 \end{aligned}$$

The solution is $\frac{49}{20}$.

$$\begin{aligned}
 34. \quad & 11x + 13 = 9x + 9 \\
 11x + 13 - 9x &= 9x + 9 - 9x \\
 2x + 13 &= 9 \\
 2x + 13 - 13 &= 9 - 13 \\
 2x &= -4 \\
 \frac{2x}{2} &= \frac{-4}{2} \\
 x &= -2
 \end{aligned}$$

$$\begin{aligned}
 36. \quad & 2(4x + 1) = -12 + 6 \\
 8x + 2 &= -12 + 6 \\
 8x + 2 &= -6 \\
 8x + 2 - 2 &= -6 - 2 \\
 8x &= -8 \\
 \frac{8x}{8} &= \frac{-8}{8} \\
 x &= -1
 \end{aligned}$$

$$\begin{aligned}
 38. \quad & 6x - 4 = -2x - 10 \\
 6x - 4 + 2x &= -2x - 10 + 2x \\
 8x - 4 &= -10 \\
 8x - 4 + 4 &= -10 + 4 \\
 8x &= -6 \\
 \frac{8x}{8} &= \frac{-6}{8} \\
 x &= \frac{-3}{4}
 \end{aligned}$$

$$\begin{aligned}
 40. \quad & 8 + 4 = -6(5x - 2) \\
 8 + 4 &= -30x + 12 \\
 12 &= -30x + 12 \\
 12 - 12 &= -30x + 12 - 12 \\
 0 &= -30x \\
 \frac{0}{-30} &= \frac{-30x}{-30} \\
 0 &= x
 \end{aligned}$$

$$\begin{aligned}
 42. \quad & -17z - 4 = -16z - 20 \\
 17z - 17z - 4 &= 17z - 16z - 20 \\
 -4 &= z - 20 \\
 -4 + 20 &= z - 20 + 20 \\
 16 &= z
 \end{aligned}$$

$$44. \frac{1}{3}(3x-1) = -\frac{1}{10} - \frac{2}{10}$$

$$x - \frac{1}{3} = -\frac{3}{10}$$

$$x - \frac{1}{3} + \frac{1}{3} = -\frac{3}{10} + \frac{1}{3}$$

$$x = -\frac{9}{30} + \frac{10}{30}$$

$$x = \frac{1}{30}$$

$$46. \begin{aligned} -14y - 1.8 &= -24y + 3.9 \\ -14y - 1.8 + 14y &= -24y + 3.9 + 14y \\ -1.8 &= -10y + 3.9 \\ -1.8 - 3.9 &= -10y + 3.9 - 3.9 \\ -5.7 &= -10y \\ \frac{-5.7}{-10} &= \frac{-10y}{-10} \end{aligned}$$

$$\frac{-10}{-10} = \frac{-10}{-10}$$

$$0.57 = y$$

$$48. -3x + 15 = 3x - 15$$

$$-3x - 3x + 15 = -3x + 3x - 15$$

$$-6x + 15 = -15$$

$$-6x + 15 - 15 = -15 - 15$$

$$-6x = -30$$

$$\frac{-6x}{-6} = \frac{-30}{-6}$$

$$-6x = 5 - 6$$

$$50. 81 = 3x$$

$$\frac{81}{3} = \frac{3x}{3}$$

$$27 = x$$

$$52. 6.3 = -0.6x$$

$$\frac{6.3}{-0.6} = \frac{-0.6x}{-0.6}$$

$$-10.5 = x$$

$$54. 10y + 15 = -5$$

$$10y + 15 - 15 = -5 - 15$$

$$56. -2 + 2 - 0.4p = -2 + 2$$

$$-0.4p = 0$$

$$\frac{-0.4p}{-0.4} = \frac{0}{-0.4}$$

$$-0.4 \quad -0.4$$

$$p = 0$$

$$58. 20x - 20 = 16x - 40$$

$$20x - 20 + 20 = 16x - 40 + 20$$

$$20x = 16x - 20$$

$$20x - 16x = 16x - 20 - 16x$$

$$4x = -20$$

$$\frac{4x}{4} = \frac{-20}{4}$$

$$x = -5$$

$$60. 7(2x + 1) = 18x - 19x$$

$$14x + 7 = -x$$

$$-14x + 14x + 7 = -14x - x$$

$$7 = -15x$$

$$\frac{7}{-15} = \frac{-15x}{-15}$$

$$\frac{-15}{-15} \quad \frac{-15}{-15}$$

$$\frac{7}{15} = x$$

$$62. \begin{aligned} & \left(\begin{array}{c} -4 \\ r \end{array} \right) = -5 \\ \frac{-5}{4} \cdot & \left(\begin{array}{c} -4 \\ r \end{array} \right) = \frac{-5}{4} \cdot (-5) \\ & \left(\begin{array}{c} 5 \\ r \end{array} \right) = \frac{25}{4} \end{aligned}$$

$$r = \frac{25}{4}$$

$$64. -\frac{10}{3}x = 30$$

$$-\frac{3}{10} \cdot \left(\begin{array}{c} -10 \\ x \end{array} \right) = -\frac{3}{10} \cdot 30$$

$$x = -9$$

$$66. -3n - \frac{1}{3} = \frac{8}{3}$$

$$\frac{1}{3} \quad \frac{3}{3} \quad \frac{3}{3} \quad \frac{1}{3}$$

$$10y = -20$$

$$\frac{10y}{10} = \frac{-20}{10}$$

$$y = -2$$

$$-3n - 1 = 8$$

$$-3n = 9$$

$$-3n = 9$$

$$\frac{-3n}{-3} = \frac{9}{-3}$$

$$n = -3$$

68. $12 = 3j - 4$
 $12 + 4 = 3j - 4 + 4$
 $16 = 3j$
 $\frac{16}{3} = \frac{3j}{3}$
 $\frac{16}{3} = j$
 3

70. $12x + 30 + 8x - 6 = 10$
 $20x + 24 = 10$
 $20x + 24 - 24 = 10 - 24$
 $20x = -14$
 $\frac{20x}{20} = \frac{-14}{20}$
 $x = \frac{-14}{20}$
 $x = -\frac{7}{10}$

72. $t - 6t = -13 + t - 3t$
 $-5t = -13 - 2t$
 $-5t + 2t = -13 - 2t + 2t$
 $-3t = -13$
 $\frac{-3t}{-3} = \frac{-13}{-3}$
 $t = \frac{13}{3}$

74. $x + \frac{3}{7} = -x + \frac{1}{7} + \frac{4}{7}$
 $x + \frac{3}{7} = -x + \frac{5}{7}$
 $x + \frac{3}{7} = -x + \frac{19}{21}$
 $x + \frac{3}{7} - \frac{3}{7} = -x + \frac{19}{21} - \frac{3}{7}$
 $x = -x + \frac{19}{21} - \frac{9}{21}$
 $x = -x + \frac{10}{21}$
 $x + x = -x + \frac{10}{21} + x$
 $2x = \frac{10}{21}$
 $\frac{1}{2} \cdot 2x = \frac{1}{2} \cdot \frac{10}{21}$

76. $-19 + 74 = -5(x + 3)$
 $55 = -5x - 15$
 $55 + 15 = -5x - 15 + 15$
 $70 = -5x$
 $\frac{70}{-5} = \frac{-5x}{-5}$
 $-14 = x$

78. If x represents the first of three consecutive even integers, then $x + 2$ and $x + 4$ represent the second and third even integers, respectively. Thus, the sum is represented by $x + x + 2 + x + 4 = 3x + 6$.

80. If x represents the first integer, then $x + 1$ represents the second consecutive integer. The sum of 20 and the second integer is represented by $20 + x + 1 = x + 21$.

82. If x represents the first odd integer, then $x + 2$ represents the next consecutive odd integer. The sum of the lengths is $x + x + 2 + x + x + 2 = 4x + 4$.

84. $-7y + 2y - 3(y + 1) = -7y + 2y - 3 \cdot y - 3 \cdot 1$
 $= -7y + 2y - 3y - 3$
 $= -8y - 3$

86. $-(3a - 3) + 2a - 6 = -3a + 3 + 2a - 6$
 $= -3a + 2a + 3 - 6$
 $= -a - 3$

88. $8(z - 6) + 7z - 1 = 8z - 48 + 7z - 1$
 $= 8z + 7z - 48 - 1$
 $= 15z - 49$

90. If the solution is $\frac{1}{2}$, then replacing x by $\frac{1}{2}$ results in a true statement.
 $\frac{1}{2} \cdot \frac{1}{2} = 10$
 $\frac{1}{2} \cdot 2 = 10 \cdot 2$
 $\frac{1}{2} = 20$

$x = \frac{5}{21}$

21

The missing number
is 20.

92. answers may vary

94. answers may vary

$$\begin{aligned}
 96. \quad & 0.06y + 2.63 = 2.5562 \\
 & 0.06y + 2.63 - 2.63 = 2.5562 - 2.63 \\
 & 0.06y = -0.0738 \\
 & \frac{0.06y}{0.06} = \frac{-0.0738}{0.06} \\
 & y = -1.23
 \end{aligned}$$

Section 2.3 Practice Exercises

$$\begin{aligned}
 1. \quad & 5(3x-1)+2=12x+6 \\
 & 15x-5+2=12x+6 \\
 & 15x-3=12x+6
 \end{aligned}$$

$$\begin{aligned}
 15x-3-12x &= 12x+6-12x \\
 3x-3 &= 6 \\
 3x-3+3 &= 6+3
 \end{aligned}$$

$$\begin{aligned}
 3x &= 9 \\
 \frac{3x}{3} &= \frac{9}{3}
 \end{aligned}$$

$$\begin{aligned}
 x &= 3 \\
 \text{Check: } 5(3x-1)+2 &= 12x+6 \\
 5[3(3)-1]+2 &= 12(3)+6
 \end{aligned}$$

$$\begin{aligned}
 5(9-1)+2 &= 36+6 \\
 5(8)+2 &= 42 \\
 40+2 &= 42 \\
 42 &= 42 \text{ True}
 \end{aligned}$$

The solution is 3.

$$\begin{aligned}
 2. \quad & 9(5-x) = -3x \\
 & 45-9x = -3x \\
 & 45-9x+9x = -3x+9x \\
 & 45 = 6x \\
 & \frac{45}{6} = \frac{6x}{6} \\
 & \frac{15}{2} = x
 \end{aligned}$$

$$\begin{aligned}
 \text{Check: } & 9(5-x) = -3x \\
 & 9\left(5-\frac{15}{2}\right) = -3\left(\frac{15}{2}\right) \\
 & 9\left(\frac{10-15}{2}\right) = -\frac{45}{2}
 \end{aligned}$$

$$\begin{aligned}
 3. \quad & \frac{5}{2}\left(\frac{2}{3}x-1\right) = x-4 \\
 & \frac{5}{2}\left(\frac{2}{3}x-1\right) = \frac{2}{2}\left(\frac{3}{2}x-4\right) \\
 & 5x-2 = 3x-8 \\
 & 5x-2-3x = 3x-8-3x \\
 & 2x-2 = -8 \\
 & 2x-2+2 = -8+2 \\
 & 2x = -6 \\
 & \frac{2x}{2} = \frac{-6}{2} \\
 & x = -3
 \end{aligned}$$

$$\text{Check: } \frac{5}{2}x-1 = \frac{3}{2}x-4$$

$$\begin{aligned}
 \frac{5}{2}(-3)-1 &= \frac{3}{2}(-3)-4 \\
 -\frac{15}{2}-1 &= -\frac{9}{2}-4
 \end{aligned}$$

$$\begin{aligned}
 -\frac{15}{2}-\frac{2}{2} &= -\frac{9}{2}-\frac{8}{2} \\
 -\frac{17}{2} &= -\frac{17}{2}
 \end{aligned}$$

$$\frac{17}{2} = -\frac{17}{2} \text{ True}$$

The solution is -3.

$$\begin{aligned}
 4. \quad & \frac{3(x-2)}{5} = 3x+6 \\
 & \frac{3(x-2)}{5} = 5(3x+6) \\
 & 3(x-2) = 5(3x+6) \\
 & 3x-6 = 15x+30 \\
 & 3x-6-3x = 15x+30-3x \\
 & -6 = 12x+30 \\
 & -6-30 = 12x+30-30 \\
 & -36 = 12x \\
 & \frac{-36}{12} = \frac{12x}{12} \\
 & -3 = x \\
 & \frac{3(x-2)}{5} = 3x+6
 \end{aligned}$$

$$\text{Check: } \frac{3(x-2)}{5} = 3x+6$$

$$\begin{aligned} & \left(\frac{2}{2} \right) \cdot \frac{2}{2} \\ & 9 \left(\frac{5}{2} \right) - \frac{45}{2} \\ & -\frac{45}{2} = -\frac{45}{2} \text{ True} \end{aligned}$$

The solution is $\frac{15}{2}$.

$$\begin{aligned} & \frac{3(-3-2)}{5} \\ & \frac{3(-5)}{5} = \frac{-9+6}{5} \\ & \frac{-15}{5} = -3 \\ & -3 = -3 \end{aligned}$$

The solution is -3 .

5. $0.06x - 0.10(x - 2) = -0.16$
 $100[0.06x - 0.10(x - 2)] = 100[-0.16]$
 $6x - 10(x - 2) = -16$
 $6x - 10x + 20 = -16$
 $-4x + 20 = -16$
 $-4x + 20 - 20 = -16 - 20$
 $-4x = -36$
 $\frac{-4x}{-4} = \frac{-36}{-4}$
 $x = 9$

To check, replace x with 9 in the original equation. The solution is 9.

6. $5(2 - x) + 8x = 3(x - 6)$
 $10 - 5x + 8x = 3x - 18$
 $10 + 3x = 3x - 18$
 $10 + 3x - 3x = 3x - 18 - 3x$
 $10 = -18$

Since the statement $10 = -18$ is false, the equation has no solution.

7. $-6(2x + 1) - 14 = -10(x + 2) - 2x$
 $-12x - 6 - 14 = -10x - 20 - 2x$
 $-12x - 20 = -12x - 20$
 $12x - 12x - 20 = 12x - 12x - 20$
 $-20 = -20$

Since $-20 = -20$ is a true statement, every real number is a solution.

Calculator Explorations

1. $2x = 48 + 6x$

| | | | |
|----|-----|-----|-----|
| 2 | x | -12 | = |
| 48 | + 6 | x | -12 |

Display: -24
 Display: -24

Since the left side equals the right side, $x = -12$ is a solution.

2. $-3x - 7 = 3x - 1$

| | | | |
|----|---|----|---|
| -3 | x | -7 | = |
| 3 | x | -1 | = |

Display: -4
 Display: -4

Since the left side equals the right side, $x = -1$ is a solution.

3. $5x - 2.6 = 2(x + 0.8)$

| | | | | | |
|---|---|-------|-------|---|---|
| 5 | x | - 2.6 | = | | |
| 2 | (| 4.4 | + 0.8 |) | = |

Display: 19.4
 Display: 10.4

Since the left side does not equal the right side, $x = 4.4$ is not a solution.

4. $-1.6x - 3.9 = -6.9x - 25.6$

| | | | |
|------|---|--------|---|
| -1.6 | x | - 3.9 | = |
| -6.9 | x | - 25.6 | = |

Display: -11.9
 Display: -60.1

Since the left side does not equal the right side, $x = 5$ is not a solution.

5. $\frac{564x}{4} = 200x - 11(649)$

| | | | | | | | | |
|-----|-----|---|-----|-----|----|---|-----|---|
| (| 564 | x | - | 121 |) | = | 4 | = |
| 200 | x | - | 121 | - | 11 | x | 649 | = |

Display: 17061
 Display: 17061

Since the left side equals the right side, $x = 121$ is a solution.

6. $20(x - 39) = 5x - 432$

| | | | | | | |
|----|---|------|-----|----|---|---|
| 20 | (| 23.2 | - | 39 |) | = |
| 5 | x | - | 432 | = | | |

Display: -316
 Display: -316

Since the left side equals the right side, $x = 23.2$ is a solution.

Vocabulary, Readiness & Video Check 2.3

1. $x = -7$ is an equation.
2. $x - 7$ is an expression.
3. $4y - 6 + 9y + 1$ is an expression.
4. $4y - 6 = 9y + 1$ is an equation.
5. $\frac{1}{x} - \frac{x-1}{8}$ is an expression.

6. $\frac{x}{x-1} - \frac{8}{x} = 6$ is an equation.

7. $0.1x + 9 = 0.2x$ is an equation.

8. $0.1x^2 + 9y - 0.2x^2$ is an expression.

9. 3; distributive property, addition property of equality, multiplication property of equality

10. Since both sides have more than one term, you need to apply the distributive property to make sure you multiply every single term in the equation by the LCD.

11. The number of decimal places in each number helps you determine what power of 10 you can multiply through by so you are no longer dealing with decimals

12. a. If you have a true statement, then the equation has all real numbers as a solution.

b. If you have a false statement, then the equation has no solutions.

Exercise Set 2.3

$$\begin{aligned}
 2. \quad & -3x+1=-2(4x+2) \\
 & -3x+1=-8x-4 \\
 -3x+1+8x & =-8x-4+8x \quad 5x \\
 +1 & =-4 \\
 5x+1-1 & =-4-1 \\
 5x & =-5 \\
 \frac{5x}{5} & =\frac{-5}{5} \\
 x & =-1
 \end{aligned}$$

$$\begin{aligned}
 4. \quad & 15x-5=7+12x \\
 15x-5-12x & =7+12x-12x \\
 3x-5 & =7 \\
 3x-5+5 & =7+5 \\
 3x & =12 \\
 \frac{3x}{3} & =\frac{12}{3} \\
 x & =4
 \end{aligned}$$

$$\begin{aligned}
 6. \quad & -(5x-10)=5x \\
 -5x+10 & =5x \\
 5x-5x+10 & =5x+5x \\
 10 & =10x \\
 \frac{10}{10} & =\frac{10x}{10} \\
 1 & =x
 \end{aligned}$$

$$\begin{aligned}
 8. \quad & 3(2-5x)+4(6x)=12 \\
 6-15x+24x & =12 \\
 6+9x & =12 \\
 6+9x-6 & =12-6 \\
 9x & =6 \\
 \frac{9x}{9} & =\frac{6}{9} \\
 x & =\frac{2}{3}
 \end{aligned}$$

$$\begin{aligned}
 10. \quad & -4(n-4)-23=-7 \\
 -4n+16-23 & =-7 \\
 -4n-7 & =-7 \\
 -4n-7+7 & =-7+7 \\
 -4n & =0 \\
 \frac{-4n}{-4} & =\frac{0}{-4} \\
 n & =-4
 \end{aligned}$$

$$\begin{aligned}
 12. \quad & 5-6(2+b)=b-14 \\
 5-12-6b & =b-14 \\
 -7-6b & =b-14 \\
 -7-6b+6b & =b-14+6b \\
 -7 & =7b-14 \\
 -7+14 & =7b-14+14 \\
 7 & =7b \\
 \frac{7}{7} & =\frac{7b}{7} \\
 1 & =b
 \end{aligned}$$

$$\begin{aligned}
 14. \quad & 6y-8=-6+3y+13 \\
 6y-8 & =7+3y \\
 6y-8-3y & =7+3y-3y \\
 3y-8 & =7 \\
 3y-8+8 & =7+8 \\
 3y & =15 \\
 \frac{3y}{3} & =\frac{15}{3} \\
 y & =5
 \end{aligned}$$

$$\begin{aligned}
 16. \quad & -7n+5=8n-10 \\
 -7n+5+7n & =8n-10+7n \\
 5 & =15n-10 \\
 5+10 & =15n-10+10 \\
 15 & =15n \\
 \frac{15}{15} & =\frac{15n}{15} \\
 1 & =n
 \end{aligned}$$

$$\begin{aligned}
 18. \quad & 5 \left(\begin{array}{c} 4x-8 \\ 5 \end{array} \right) = -\frac{16}{5} \\
 \left| \begin{array}{c} 4x-8 \\ 5 \end{array} \right| & = \left| \begin{array}{c} 5 \\ -\frac{16}{5} \end{array} \right| \\
 4x-8 & =-16 \\
 4x-8+8 & =-16+8 \\
 4x & =-8 \\
 \frac{4x}{4} & =\frac{-8}{4} \\
 x & =-2
 \end{aligned}$$

$$n = 0$$

