

Reteaching 2-1

Solving Two-Step Equations

Michael bought 4 books for the same price at a fair. Admission to the fair was \$5. How much was each book if Michael spent a total of \$17 at the fair?

Follow these steps to solve the two-step equation:

$$4b + 5 = 17$$

① Add or subtract on each side.

$$4b + 5 - 5 = 17 - 5$$

$$4b = 12$$

② Multiply or divide to isolate the variable.

$$\frac{4b}{4} = \frac{12}{4}$$

$$b = 3 \quad \leftarrow \text{Each book cost } \$3.$$

③ Check by substituting your answer for the variable.

Check: $4b + 5 = 17$

$$4 \cdot 3 + 5 \stackrel{?}{=} 17$$

$$17 = 17 \checkmark$$

Show your steps to solve each equation. Then check.

1. $2k + 5 = 25$

2. $\frac{p}{2} - 2 = 2$

3. $7y - 17 = -38$

$$2k + 5 - \boxed{5} = 25 - \boxed{5}$$

$$\frac{p}{2} - 2 + \boxed{2} = 2 + \boxed{2}$$

$$\underline{7y - 17 + 17 = -38 + 17}$$

$$\frac{2k}{\boxed{2}} = \frac{20}{\boxed{2}}$$

$$\frac{p}{2} \cdot \boxed{2} = 4 \cdot \boxed{2}$$

$$\underline{\frac{7y}{7} = \frac{-21}{7}}$$

$$k = \boxed{10}$$

$$p = \boxed{8}$$

$$\underline{y = -3}$$

Check: $2k + 5 = 25$

Check: $\frac{p}{2} - 2 = 2$

Check: _____

$$2 \cdot \boxed{10} + 5 \stackrel{?}{=} 25$$

$$\frac{\boxed{8}}{2} - 2 \stackrel{?}{=} 2$$

$$\underline{7y - 17 = -38}$$

$$\boxed{25} = 25$$

$$\boxed{2} = 2$$

$$\underline{7 \cdot (-3) - 17 \stackrel{?}{=} -38, -38 = -38}$$

Solve each equation.

4. $\frac{x}{-2} + 6 = 4$

5. $14j - 7 = 91$

6. $240a - 3 = 5$

$$x = \underline{\hspace{2cm} 4 \hspace{2cm}}$$

$$j = \underline{\hspace{2cm} 7 \hspace{2cm}}$$

$$a = \underline{\hspace{2cm} \frac{1}{30} \hspace{2cm}}$$

7. $2.4 + 3s = -0.6$

8. $2 + \frac{n}{5} = 4$

9. $140 = -4 - 12e$

$$s = \underline{\hspace{2cm} -1 \hspace{2cm}}$$

$$n = \underline{\hspace{2cm} -10 \hspace{2cm}}$$

$$e = \underline{\hspace{2cm} -12 \hspace{2cm}}$$

Reteaching 2-2**Simplifying Algebraic Expressions**

A *term* is a number, a variable, or the product of a number and variable(s). The two terms in $-2x + 4y$ are $-2x$ and $4y$.

Terms with exactly the same variable factor are called *like terms*. In $-3x + 4y + 5x$, $-3x$ and $5x$ are like terms.

One way to *combine like terms* is by addition or subtraction.

- Add to combine like terms in $4y + y$.

$$4y + y = (4 + 1)y = 5y$$

- Subtract to combine like terms in $2m - 5m$.

$$2m - 5m = (2 - 5)m = -3m$$

To *simplify* an expression, combine its like terms. Perform as many of its operations as possible.

$$\begin{aligned} \text{Simplify: } & 3a + 5b - a + 2b \\ & = (3a - a) + (5b + 2b) \\ & = 2a + 7b \end{aligned}$$

$$\begin{aligned} \text{Simplify: } & 2(x - 4) \\ & = 2x - 2(4) \\ & = 2x - 8 \end{aligned}$$

Combine like terms.

$$1. \quad 6x + 2x = \underline{8x} \quad 2. \quad 4c - c = \underline{3c} \quad 3. \quad -h - h = \underline{-2h}$$

$$4. \quad -3y + 4y = \underline{y} \quad 5. \quad m - 5m = \underline{-4m} \quad 6. \quad 6n + n = \underline{7n}$$

$$7. \quad 2s - 6s = \underline{-4s} \quad 8. \quad -t - 2t = \underline{-3t} \quad 9. \quad 3b - 9b = \underline{-6b}$$

Simplify each expression.

$$10. \quad 3(m + 4) - 5m = \underline{-2m + 12} \quad 11. \quad (v - 4)5 = \underline{5v - 20}$$

$$12. \quad 4a + 2 - 8a + 1 = \underline{-4a + 3} \quad 13. \quad 6s + 5 - (s - 6) = \underline{5s + 11}$$

$$14. \quad 3(u + 4) - 5u = \underline{-2u + 12} \quad 15. \quad 2x + y - (9 - 4x) = \underline{6x + y - 9}$$

$$16. \quad -5x + 3(x - y) = \underline{-2x - 3y} \quad 17. \quad v + 6v - 2v = \underline{5v}$$

$$18. \quad -2s + 6 - s - 4 = \underline{-3s + 2} \quad 19. \quad -x + 4(x - 2) = \underline{3x - 8}$$

$$20. \quad 3(k + j) - 4k - k = \underline{3j - 2k} \quad 21. \quad 4a - 6 - a + 1 = \underline{3a - 5}$$

Reteaching 2-3

Solving Multi-Step Equations

Combining terms can help solve equations.

$$\begin{aligned} \text{Solve: } 5n + 6 + 3n &= 22 \\ 5n + 3n + 6 &= 22 && \leftarrow \text{Commutative Property} \\ 8n + 6 &= 22 \\ 8n + 6 - 6 &= 22 - 6 \\ 8n &= 16 \\ \frac{8n}{8} &= \frac{16}{8} \end{aligned}$$

$$n = 2$$

$$\begin{aligned} \text{Check: } 5n + 6 + 3n &= 22 \\ 5(2) + 6 + 3(2) &\stackrel{?}{=} 22 \\ 22 &= 22 \quad \checkmark \end{aligned}$$

Sometimes you need to distribute a term in order to simplify.

$$\begin{aligned} \text{Solve: } 4(x + 2) &= 28 \\ 4x + 8 &= 28 && \leftarrow \text{Distributive Property} \\ 4x &= 20 \\ \frac{4x}{4} &= \frac{20}{4} \\ x &= 5 \end{aligned}$$

$$\begin{aligned} \text{Check: } 4(n + 2) &= 28 \\ 4(5 + 2) &\stackrel{?}{=} 28 \\ 28 &= 28 \quad \checkmark \end{aligned}$$

Solve each equation. Check the solution.

1. $a - 4a = 36$

$$a = \underline{\hspace{2cm} -12 \hspace{2cm}}$$

2. $3b - 5 - 2b = 5$

$$b = \underline{\hspace{2cm} 10 \hspace{2cm}}$$

3. $5n + 4 - 8n = -5$

$$n = \underline{\hspace{2cm} 3 \hspace{2cm}}$$

4. $12k + 6 = 10$

$$k = \underline{\hspace{2cm} \frac{1}{3} \hspace{2cm}}$$

5. $3(x - 4) = 15$

$$x = \underline{\hspace{2cm} 9 \hspace{2cm}}$$

6. $y - 8 + 2y = 10$

$$y = \underline{\hspace{2cm} 6 \hspace{2cm}}$$

7. $3(s - 10) = 36$

$$s = \underline{\hspace{2cm} 22 \hspace{2cm}}$$

8. $-15 = p + 4p$

$$p = \underline{\hspace{2cm} -3 \hspace{2cm}}$$

9. $2g + 3g + 5 = 0$

$$g = \underline{\hspace{2cm} -1 \hspace{2cm}}$$

10. $6c + 4 - c = 24$

$$c = \underline{\hspace{2cm} 4 \hspace{2cm}}$$

11. $3(x - 2) = 15$

$$x = \underline{\hspace{2cm} 7 \hspace{2cm}}$$

12. $4y + 9 - 7y = -6$

$$y = \underline{\hspace{2cm} 5 \hspace{2cm}}$$

13. $4(z - 2) + z = -13$

$$z = \underline{\hspace{2cm} -1 \hspace{2cm}}$$

14. $24 = -2(b - 3) + 8$

$$b = \underline{\hspace{2cm} -5 \hspace{2cm}}$$

15. $17 = 3(g + 3) - g$

$$g = \underline{\hspace{2cm} 4 \hspace{2cm}}$$

Reteaching 2-4 Solving Equations With Variables on Both Sides

When an equation has a variable on both sides, add or subtract to get the variable on one side.

Solve: $-6m + 45 = 3m$
 $-6m + 6m + 45 = 3m + 6m$ ← Add 6m to each side.
 $45 = 9m$
 $\frac{45}{9} = \frac{9m}{9}$
 $5 = m$

Check: $-6m + 45 = 3m$
 $-6(5) + 45 \stackrel{?}{=} 3(5)$
 $15 = 15$ ✓

Sometimes you need to distribute a term in order to simplify.

Solve: $5(x - 3) = 32 - 2$
 $5x - 15 = 32 - 2$ ← Distributive Property
 $5x - 15 = 30$
 $5x = 45$
 $\frac{5x}{5} = \frac{45}{5}$
 $x = 9$

Check: $5(x - 3) = 32 - 2$
 $5(9 - 3) = 32 - 2$
 $30 = 30$ ✓

Solve each equation. Check the solution.

1. $9j + 35 = 4j$

$j = \underline{\hspace{2cm} -7 \hspace{2cm}}$

2. $13s = 2s - 66$

$s = \underline{\hspace{2cm} -6 \hspace{2cm}}$

3. $2(5t - 4) = 12t$

$t = \underline{\hspace{2cm} -4 \hspace{2cm}}$

4. $6q = 6(4q + 1)$

$q = \underline{\hspace{2cm} -\frac{1}{3} \hspace{2cm}}$

5. $7(t - 2) - t = 4$

$t = \underline{\hspace{2cm} 3 \hspace{2cm}}$

6. $6w + 4 = 4w + 1$

$w = \underline{\hspace{2cm} -1.5 \hspace{2cm}}$

7. $2(2q + 1) = 3(q - 2)$

$q = \underline{\hspace{2cm} -8 \hspace{2cm}}$

8. $5z - 3 = 2(z - 3)$

$z = \underline{\hspace{2cm} -1 \hspace{2cm}}$

9. $4(x + 0) = 2x + 6$

$x = \underline{\hspace{2cm} 3 \hspace{2cm}}$

10. $5(k - 4) = 4 - 3k$

$k = \underline{\hspace{2cm} 3 \hspace{2cm}}$

11. $8 - m - 3m = 16$

$m = \underline{\hspace{2cm} -2 \hspace{2cm}}$

12. $6n + n + 14 = 0$

$n = \underline{\hspace{2cm} -2 \hspace{2cm}}$

13. $7(p + 1) = 9 - p$

$p = \underline{\hspace{2cm} \frac{1}{4} \hspace{2cm}}$

14. $41 - q = 3(q - 5)$

$q = \underline{\hspace{2cm} 14 \hspace{2cm}}$

15. $25 + 2t = 5(t + 2)$

$t = \underline{\hspace{2cm} 5 \hspace{2cm}}$

Reteaching 2-5

Types of Solutions of Linear Equations

If an equation is true for all values of x :

$$a = a$$

infinitely many solutions

$$4x + 8 = 4(x + 2)$$

$$4x + 8 = 4x + 8 \quad \text{Distributive Property}$$

$$4x + 8 - 4x = 4x + 8 - 4x \quad \text{Subtract}$$

$$8 = 8 \quad \text{Simplify}$$

If an equation is true for one value of x :

$$x = a$$

one solution

$$5x - 3 = -3x + 5$$

$$5x - 3 + 3 = -3x + 5 + 3 \quad \text{Add}$$

$$5x = -3x + 8 \quad \text{Simplify}$$

$$5x + 3x = -3x + 3x + 8 \quad \text{Add}$$

$$8x = 8 \quad \text{Divide}$$

$$x = 1$$

If an equation is not true for any values of x :

$$a = b$$

no solutions

$$6x + 2 = 6(x - 1)$$

$$6x + 2 = 6x - 6 \quad \text{Distributive Property}$$

$$6x - 6x + 2 = 6x - 6x - 6 \quad \text{Subtract}$$

$$2 = -6$$

Tell whether each equation has one solution, infinitely many solutions, or no solution.

1. $3x - 2 = x + 6$

one solution

2. $5x - 10 = 5(x - 2)$

infinitely many solutions

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

no solution

4. $8(x + 2) = 8x + 16$

infinitely many solutions

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

no solution

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

one solution

7. $x + 5 = 2x + 2$

one solution

8. $9(x + 1) = 9x + 9$

infinitely many solutions

9. $6x + 8 = x - 2$

one solution