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: $\qquad$ $4b + 5 = 17$

① Add or subtract on each side. $\qquad$ $4b + 5 - 5 = 17 - 5$

$$4b = 12$$

② Multiply or divide to isolate the variable. $\qquad$ $\frac{4b}{4} = \frac{12}{4}$

$b = 3$ $\quad$ ← Each book cost $3.

③ Check by substituting your answer for the variable. $\quad$ Check: $4b + 5 = 17$

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

$$17 = 17 ✔$$

Show your steps to solve each equation. Then check.

1. $\qquad$ $2k + 5 = 25$

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

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

$k = \boxed{}$

Check: $2k + 5 = 25$

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

$\boxed{} = 25$

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

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

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

$p = \boxed{}$

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

$\dfrac{\boxed{}}{2} - 2 \overset{?}{=} 2$

$\boxed{} = 2$

3. $7y - 17 = -38$

_____

_____

_____

Check: _____

_____

_____

Solve each equation.

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

$x =$ _____

5. $14j - 7 = 91$

$j =$ _____

6. $240a - 3 = 5$

$a =$ _____

7. $2.4 + 3s = -0.6$

$s =$ _____

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

$n =$ _____

9. $140 = -4 - 12e$

$e =$ _____

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.

Simplify: $3a + 5b - a + 2b$
$= (3a - a) + (5b + 2b)$
$= 2a + 7b$

Simplify: $2(x - 4)$
$= 2x - 2(4)$
$= 2x - 8$

Combine like terms.

1. $6x + 2x = $ _____

2. $4c - c = $ _____

3. $-h - h = $ _____

4. $-3y + 4y = $ _____

5. $m - 5m = $ _____

6. $6n + n = $ _____

7. $2s - 6s = $ _____

8. $-t - 2t = $ _____

9. $3b - 9b = $ _____

Simplify each expression.

10. $3(m + 4) - 5m= $ _____

11. $(v - 4)5 = $ _____

12. $4a + 2 - 8a + 1 = $ _____

13. $6s + 5 - (s - 6) = $ _____

14. $3(u + 4) - 5u = $ _____

15. $2x + y - (9 - 4x) = $ _____

16. $-5x + 3(x - y) = $ _____

17. $v + 6v - 2v = $ _____

18. $-2s + 6 - s - 4 = $ _____

19. $-x + 4(x - 2) = $ _____

20. $3(k + j) - 4k - k = $ _____

21. $4a - 6 - a + 1 = $ _____

Reteaching 2-3

Solving Multi-Step Equations

Combining terms can help solve equations.

Solve: $5n + 6 + 3n = 22$
$5n + 3n + 6 = 22$ ← Commutative Property
$8n + 6 = 22$
$8n + 6 - 6 = 22 - 6$
$8n = 16$
$\frac{8n}{8} = \frac{16}{8}$
$n = 2$

Check: $5n + 6 + 3n = 22$
$5(2) + 6 + 3(2) \stackrel{?}{=} 22$
$22 = 22$ ✔

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

Solve: $4(x + 2) = 28$
$4x + 8 = 28$ ← Distributive Property
$4x = 20$
$\frac{4x}{4} = \frac{20}{4}$
$x = 5$

Check: $4(n + 2) = 28$
$4(5 + 2) \stackrel{?}{=} 28$
$28 = 28$ ✔

Solve each equation. Check the solution.

1. $a - 4a = 36$

$a = $ _____

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

$b = $ _____

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

$n = $ _____

4. $12k + 6 = 10$

$k = $ _____

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

$x = $ _____

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

$y = $ _____

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

$s = $ _____

8. $-15 = p + 4p$

$p = $ _____

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

$g = $ _____

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

$c = $ _____

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

$x = $ _____

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

$y = $ _____

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

$z = $ _____

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

$b = $ _____

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

$g = $ _____

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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 = $ _____

2. $13s = 2s - 66$

$s = $ _____

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

$t = $ _____

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

$q = $ _____

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

$t = $ _____

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

$w = $ _____

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

$q = $ _____

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

$z = $ _____

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

$x = $ _____

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

$k = $ _____

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

$m = $ _____

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

$n = $ _____

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

$p = $ _____

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

$q = $ _____

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

$t = $ _____

Reteaching 2-5

Types of Solutions of Linear Equations

If an equation is true for all values of *x*:

$$a = a$$

infinitely many solutions

$4x + 8 = 4(x + 2)$	
$4x + 8 = 4x + 8$	Distributive Property
$4x + 8 - 4x = 4x + 8 - 4x$	Subtract
$8 = 8$	Simplify

If an equation is true for one value of *x*:

$$x = a$$

one solution

$5x - 3 = -3x + 5$	
$5x - 3 + 3 = -3x + 5 + 3$	Add
$5x = -3x + 8$	Simplify
$5x + 3x = -3x + 3x + 8$	Add
$8x = 8$	Divide
$x = 1$	

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

$$a = b$$

no solutions

$6x + 2 = 6(x - 1)$	
$6x + 2 = 6x - 6$	Distributive Property
$6x - 6x + 2 = 6x - 6x - 6$	Subtract
$2 = -6$	

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

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

_____

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

_____

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

_____

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

_____

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

_____

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

_____

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

_____

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

_____

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

_____