

# 1-4 Reteaching

## Solving Equations

To solve an equation that contains a variable, find all of the values of the variable that make the equation true. Use the equality properties of real numbers and inverse operations to rewrite the equation until the variable is alone on one side of the equation. Whatever remains on the other side of the equation is the solution.

<i>Addition Property of Equality</i>	<i>Subtraction Property of Equality</i>
<p>To isolate <math>\frac{w}{2}</math> on one side of the equation, <i>add</i> 7 to each side.</p> $\begin{array}{r} \frac{w}{2} - 7 = 11 \\ +7 \quad +7 \\ \hline \frac{w}{2} = 18 \end{array}$	<p>To isolate <math>5z</math> on one side of the equation, <i>subtract</i> 3 from each side.</p> $\begin{array}{r} 5z + 3 = 13 \\ -3 \quad -3 \\ \hline 5z = 10 \end{array}$
<i>Multiplication Property of Equality</i>	<i>Division Property of Equality</i>
<p>To isolate <math>w</math> on one side of the equation, <i>multiply</i> each side by 2.</p> $\begin{array}{r} \frac{w}{2} = 18 \\ \times 2 \quad \times 2 \\ \hline w = 36 \end{array}$	<p>To isolate <math>z</math> on one side of the equation, <i>divide</i> each side by 5.</p> $\begin{array}{r} \frac{5z}{5} = \frac{10}{5} \\ \hline z = 2 \end{array}$

### Exercises

Solve each equation.

1.  $y + 12 = 8$  **-4**

2.  $p - 9 = 12$  **21**

3.  $-3 + r = 20$  **23**

4.  $8 = 15 + k$  **-7**

5.  $9q = 27$  **3**

6.  $\frac{t}{6} = -4$  **-24**

7.  $5 = -\frac{d}{7}$  **-35**

8.  $49 = 10m$  **4.9**

9.  $3g - 14 = 13$  **9**

10.  $\frac{n}{8} + 19 = 3$  **-128**

11.  $27 = -5 - \frac{c}{4}$  **-128**

12.  $12 = 2f + 9$  **1.5**

# 1-4 Reteaching (continued)

## Solving Equations

To solve an equation for one of its variables, rewrite the equation as an equivalent equation with the specified variable on one side of the equation by itself and an expression not containing that variable on the other side.

### Problem

The equation  $\frac{ax - b}{2} = x + 2b$  defines a relationship between  $a$ ,  $b$ , and  $x$ . What is  $x$  in terms of  $a$  and  $b$ ?

Use the properties of equality and the properties of real numbers to rewrite the equation as a sequence of equivalent equations.

$$\frac{ax - b}{2} = x + 2b$$

$$2\left(\frac{ax - b}{2}\right) = 2(x + 2b) \quad \text{Multiply each side by 2.}$$

$$ax - b = 2(x + 2b) \quad \text{Simplify.}$$

$$ax - b = 2x + 4b \quad \text{Distributive Property}$$

$$ax - 2x = 4b + b \quad \text{Add and subtract to get terms with } x \text{ on one side and terms without } x \text{ on the other side.}$$

$$ax - 2x = 5b \quad \text{Simplify.}$$

$$x(a - 2) = 5b \quad \text{Distributive Property}$$

$$x = \frac{5b}{a - 2} \quad \text{Divide each side by } a - 2.$$

The final form of the equation has  $x$  on the left side by itself and an expression not containing  $x$  on the right side.

### Exercises

Solve each equation for the indicated variable.

13.  $3m - n = 2m + n$ , for  $m$   $m = 2n$

14.  $2(u + 3v) = w - 5u$ , for  $u$   $u = \frac{w - 6v}{7}$

15.  $ax + b = cx + d$ , for  $x$   $x = \frac{d - b}{a - c}$

16.  $k(y + 3z) = 4(y - 5)$ , for  $y$   $y = -\frac{3kz + 20}{k - 4}$

17.  $\frac{1}{2}r + 3s = 1$ , for  $r$   $r = 2 - 6s$

18.  $\frac{2}{3}f + \frac{5}{12}g = 1 - fg$ , for  $f$   $f = \frac{12 - 5g}{8 + 12g}$

19.  $\frac{x + k}{j} = \frac{3}{4}$ , for  $x$   $x = \frac{3j - 4k}{4}$

20.  $\frac{a - 3y}{b} + 4 = a + y$ , for  $y$   $y = \frac{a + 4b - ab}{b + 3}$