

**3-8****Study Guide and Intervention****Solving Equations and Formulas**

**Solve for Variables** Sometimes you may want to solve an equation such as  $V = \ell wh$  for one of its variables. For example, if you know the values of  $V$ ,  $w$ , and  $h$ , then the equation  $\ell = \frac{V}{wh}$  is more useful for finding the value of  $\ell$ . If an equation that contains more than one variable is to be solved for a specific variable, use the properties of equality to isolate the specified variable on one side of the equation.

**Example 1**Solve  $2x - 4y = 8$  for  $y$ .

$$\begin{aligned}
 2x - 4y &= 8 \\
 2x - 4y - 2x &= 8 - 2x \\
 -4y &= 8 - 2x \\
 \frac{-4y}{-4} &= \frac{8 - 2x}{-4} \\
 y &= \frac{8 - 2x}{-4} \text{ or } \frac{2x - 8}{4}
 \end{aligned}$$

The value of  $y$  is  $\frac{2x - 8}{4}$ .

**Example 2**Solve  $3m - n = km - 8$  for  $m$ .

$$\begin{aligned}
 3m - n &= km - 8 \\
 3m - n - km &= km - 8 - km \\
 3m - n - km &= -8 \\
 3m - n - km + n &= -8 + n \\
 3m - km &= -8 + n \\
 m(3 - k) &= -8 + n \\
 \frac{m(3 - k)}{3 - k} &= \frac{-8 + n}{3 - k} \\
 m &= \frac{-8 + n}{3 - k}, \text{ or } \frac{n - 8}{3 - k}
 \end{aligned}$$

*Look!*  
undoing the D.P.

The value of  $m$  is  $\frac{n - 8}{3 - k}$ . Since division by 0 is undefined,  $3 - k \neq 0$ , or  $k \neq 3$ .

**Exercises**

Solve each equation or formula for the variable specified.

1.  $ax - b = c$  for  $x$

2.  $15x + 1 = y$  for  $x$

3.  $(x + f) + 2 = j$  for  $x$

4.  $xy + z = 9$  for  $y$

5.  $x(4 - k) = p$  for  $k$

6.  $7x + 3y = m$  for  $y$

7.  $4(c + 3) = t$  for  $c$

8.  $2x + b = c$  for  $x$

9.  $x(1 + y) = z$  for  $x$

10.  $16z + 4x = y$  for  $x$

11.  $d = rt$  for  $r$

12.  $A = \frac{h(a + b)}{2}$  for  $h$

13.  $C = \frac{5}{9}(F - 32)$  for  $F$

14.  $P = 2\ell + 2w$  for  $w$

15.  $A = \ell w$  for  $\ell$

*All work on looseleaf please.*