3-8 Study Guide and Intervention

Solving Equations and Formulas

Solve for Variables Sometimes you may want to solve an equation such as $V = \ell w h$ for one of its variables. For example, if you know the values of V, w, and h, then the equation $\ell = \dfrac{V}{wh}$ is more useful for finding the value of ℓ. 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.

$$2x - 4y = 8$$
$$2x - 4y - 2x = 8 - 2x$$
$$-4y = 8 - 2x$$
$$\frac{-4y}{-4} = \frac{8 - 2x}{-4}$$
$$y = \frac{8 - 2x}{-4} \text{ or } \frac{2x - 8}{4}$$

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

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

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

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

Lesson 3-8

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

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

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

15. $A = \ell w$ for ℓ