

3-8 Study Guide

Solving Equations and Formulas

**ALL WORK
ON LOOSE LEAF*

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 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 .

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

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

*LOOK
NO $\ominus$ in
bottom*

$$\frac{2x - 8}{4}$$

*THIS IS
"UNDOING"
the
DISTRIBUTIVE
PROPERTY*

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

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

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.

- $ax - b = c$ for x
- $15x + 1 = y$ for x
- $(x + f) + 2 = j$ for x
- $xy + z = 9$ for y
- $x(4 - k) = p$ for k
- $7x + 3y = m$ for y
- $4(c + 3) = t$ for c
- $2x + b = c$ for x
- $x(1 + y) = z$ for x
- $16z + 4x = y$ for x
- $d = rt$ for r
- $A = \frac{h(a + b)}{2}$ for h
- $C = \frac{5}{9}(F - 32)$ for F
- $P = 2\ell + 2w$ for w
- $A = \ell w$ for ℓ