

Solving LITERAL EQUATIONS (FORMULAS)

Your Objective

You will solve a formula for one of its variables.



Key Word

■ A **formula** is an equation that contains two or more variables.

■ Examples of Formulas

■ $d = rt$

■ $P = 2l + 2w$

■ $I = prt$

■ ???

How to Solve a Formula

- Use steps you already know (like undoing $+$, $-$, \times , \div) to rearrange the variables in the formula.
- Isolate the variable you are solving for.



Solve for the indicated variable:

Example 1: $5x + a = y$; a

$$a + \cancel{5x} - \cancel{5x} = y - 5x$$

$$a = y - 5x$$

 Example 2: $m = 6(p + q); q$

$$\frac{m}{6} = \frac{\cancel{6}(p + q)}{\cancel{6}}$$

$$\frac{m}{6} = p + q$$

$$\frac{m}{6} - p = \cancel{p} - \cancel{p} + q$$

$$\frac{m}{6} - p = q$$



 **Example 3:** $2x + 3y = 8$; x

$$2x + 3y - 3y = 8 - 3y$$

$$2x = 8 - 3y$$

$$\frac{2x}{2} = \frac{8 - 3y}{2}$$

$$x = \frac{8 - 3y}{2}$$

$$x = 4 - \frac{3y}{2}$$

On Your Own

1. $A = lw$; w
2. $2w - 8y = z$; y
3. $xy = 3z$; z
4. $w = 3(x + y + z)$; y
5. $d = rt$; t



1. $A = lw$; w

$$A = lw$$

$$\frac{A}{l} = \frac{\cancel{lw}}{\cancel{l}}$$

$$\frac{A}{l} = w$$



2. $2w - 8y = z; y$

$$2w - 8y = z$$

$$-8y + 2w = z$$

$$\cancel{-8y + 2w} - \cancel{2w} = z - 2w$$

$$-8y = z - 2w$$

$$\cancel{-8y} = \frac{z - 2w}{\cancel{-8}}$$

$$\cancel{-8}$$

$$\frac{-8}{-8}$$

$$y = -\frac{1}{8}z + \frac{1}{4}w$$



3. $xy = 3z$; z

$$xy = 3z$$

$$\frac{xy}{3} = \frac{\cancel{3z}}{\cancel{3}}$$

$$\frac{xy}{3} = z$$



4. $w = 3(x + y + z); y$

$$w = 3(x + y + z)$$

$$\frac{w}{3} = \frac{\cancel{3}(x + y + z)}{\cancel{3}}$$

$$\frac{w}{3} = x + y + z$$

$$\frac{w}{3} - x = x - x + y + z$$



$$\frac{w}{3} - x = x - \cancel{x} + y + z$$

$$\frac{w}{3} - x - z = y + \cancel{z} - \cancel{z}$$

$$\frac{w}{3} - x - z = y$$



5. $d = rt$; t

$$d = rt$$

$$\frac{d}{r} = \frac{\cancel{rt}}{\cancel{r}}$$

$$\frac{d}{r} = t$$



Solve and Use a Formula

1. In the formula for the area for a triangle, solve for height h .
2. Then, use the new formula to find the height of a triangle that has an area of 25 square inches and a base of 10 inches.



1. In the formula for the area for a triangle, solve for height h .
2. Then, use the new formula to find the height of a triangle that has an area of 25 square inches and a base of 10 inches.

1.

$$A = \frac{1}{2}bh$$
$$2 \cdot A = 2 \cdot \frac{1}{2}bh$$

$$\frac{2A}{b} = \frac{\cancel{bh}}{\cancel{b}}$$

$$\frac{2A}{b} = h$$

2.

$$\frac{2A}{b} = h$$

$$\frac{2(25)}{10} = h$$

$$\frac{50}{10} = h$$

$$5 = h$$

