

Solving Literal Equations for a Specified Variable

Example 1: The equation $E_k = \frac{1}{2}mv^2$ is the formula for calculating the kinetic energy of an object. The m stands for mass and the v stands for velocity. Solve the equation for m .

$$E_k = \frac{1}{2}mv^2$$

$$2 \cdot E_k = 2 \cdot \frac{1}{2}mv^2 \quad \text{Multiply each side by two.}$$

$$2E_k = mv^2 \quad \text{Simplify } v^2.$$

$$\frac{2E_k}{v^2} = \frac{mv^2}{v^2} \quad \text{Divide each side by } v^2.$$

$$\frac{2E_k}{v^2} = m \quad \text{Simplify.}$$

Example 2: The equation $A = \frac{h}{2}(b_1 + b_2)$ is the formula for finding the area of a trapezoid. The h represents the perpendicular height of the trapezoid, b_1 is the length of one of the parallel sides, and b_2 is the length of the other parallel side. Solve the equation for b_1 .

$$A = \frac{h}{2}(b_1 + b_2)$$

$$2 \cdot A = 2 \cdot \frac{h}{2}(b_1 + b_2) \quad \text{Multiply each side of the equation by 2.}$$

$$2A = h(b_1 + b_2) \quad \text{Simplify.}$$

$$\frac{2A}{h} = \frac{h(b_1 + b_2)}{h} \quad \text{Divide each side of the equation by } h.$$

$$\frac{2A}{h} = b_1 + b_2 \quad \text{Simplify.}$$

$$\frac{2A}{h} - b_2 = b_1 + b_2 - b_2 \quad \text{Subtract } b_2 \text{ from each side of the equation.}$$

$$\frac{2A}{h} - b_2 = b_1 \quad \text{Simplify.}$$

Solving Linear Equations for x or y

Example 3: Solve the equation $2x - 6y = 12$ for x .

$$2x - 6y = 12$$

$$2x - 6y + 6y = 12 + 6y \quad \text{Add } 6y \text{ to each side of the equation.}$$

$$2x = 12 + 6y \quad \text{Simplify.}$$

$$\frac{2x}{2} = \frac{12 + 6y}{2} \quad \text{Divide each side of the equation by 2.}$$

$$x = 6 + 3y \quad \text{Simplify.}$$

Example 4: Solve the equation $2x - 6y = 12$ for y .

$$2x - 6y = 12$$

$$2x - 2x - 6y = 12 - 2x \quad \text{Add } -2x \text{ to each side of the equation.}$$

$$-6y = 12 - 2x \quad \text{Simplify.}$$

$$\frac{-6y}{-6} = \frac{12 - 2x}{-6} \quad \text{Divide each side of the equation by } -6.$$

$$y = -2 + \frac{1}{3}x \quad \text{Simplify.}$$