Solving Literal Equations

A **Literal Equation** is an equation containing more than one variable. We can solve a literal equation for any one variable in terms of the others. For example, if we wish to solve $x - y = b$ for x, we will need to add y to each side of the equation in order to isolate x: $x - y = b$

$$x - y + y = b + y$$
$$x = b + y$$

Example: Solve $AC = V$ for A. Divide both sides of the equation by C to isolate A:

$$\frac{AC}{C} = \frac{V}{C}$$
$$A = \frac{V}{C}$$

Example:

Solve $2x + y = 5$ for y:

$$2x + y = 5$$
$$2x - 2x + y = 5 - 2x$$
$$y = 5 - 2x$$

Example: Solve $2x + 3y = 6$ for y:

$$2x + 3y = 6$$
$$2x - 2x + 3y = 6 - 2x$$
$$3y = 6 - 2x$$
$$y = \frac{6}{3} - \frac{2}{3}x$$

Note: This answer could also be written as

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

Example: Solve $4(2x - 3b) = 7x + 5b$ for x:

$$4(2x - 3b) = 7x + 5b$$
$$8x - 12b = 7x + 5b$$
$$8x - 7x - 12b = 7x - 7x + 5b$$
$$x - 12b + 12b = 5b \quad x - 12b \quad + 12b$$
$$x = 17b$$

Example: Solve the following equation for h:

$$V = \pi r h^2$$
$$\frac{V}{\pi r} = h^2$$
$$\sqrt{\frac{V}{\pi r}} = h$$