

Lesson #6: Working with Formulas

Date: _____

Learning Goal: We are learning to rearrange formulas to solve for a given variable.

We live in a world full of formulas (especially in science classes like physics). Quite often, a given formula needs to be rearranged to allow us to solve for something else. In the questions below, solve for the indicated variable using your Solving Equations skills.

- a) Given the formula for the area of a rectangle, $A = lw$, solve it for the width (w).

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

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

- b) Given the formula for the perimeter of a rectangle, $P = 2(l + w)$, solve it for the length (l).

$$P = 2(l + w)$$

$$P = 2l + 2w$$

$$\frac{P - 2w}{2} = \frac{2l}{2}$$

$$\frac{P - 2w}{2} = l$$

$$\left\{ \begin{array}{l} \frac{P}{2} - \frac{2w}{2} = l \\ \frac{P}{2} - w = l \end{array} \right.$$

- c) Given the formula for the circumference of a circle, $C = 2\pi r$, solve it for the radius, r .

$$\frac{C}{2\pi} = \frac{2\pi r}{2\pi}$$

$$\frac{C}{2\pi} = r$$

- d) Given the formula for the volume of a rectangular prism (a box), $V = lwh$, solve it for the width, w .

$$\frac{V}{\cancel{lh}} = \frac{\cancel{lh}w}{\cancel{lh}}$$

$$\frac{V}{lh} = w$$

- e) Given the formula for simple interest, $I = Prt$, solve it for time, t .

f) Given the formula for the Pythagorean Theorem, $a^2 + b^2 = c^2$, solve it for b .

$$\begin{array}{r} a^2 + b^2 = c^2 \\ -a^2 \quad -a^2 \\ \hline b^2 = c^2 - a^2 \end{array}$$

$$b = \sqrt{c^2 - a^2}$$

g) . Given the formula for the area of a trapezoid, $A = \frac{h(a+b)}{2}$, solve it for the base (b).

$$2A = \frac{h(a+b)}{2} \times 2$$

$$\frac{2A}{h} = \frac{h(a+b)}{h}$$

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

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

$$2A = ha + hb$$

$$\frac{2A - ha}{h} = \frac{hb}{h}$$

h) Given the volume of a cone (yum, ice cream), $V = \frac{\pi r^2 h}{3}$, solve for the radius of the cone, r .

$$\frac{3V}{\pi h} = \frac{\pi r^2 h}{\pi h}$$

$$\sqrt{\frac{3V}{\pi h}} = \sqrt{r^2}$$

$$r = \sqrt{\frac{3V}{\pi h}}$$

i) Given the formula for the converting Celsius to Farenheit, $F = \frac{9}{5}C + 32$, solve it for Celsius, C .

$$\frac{5}{9}(F - 32) = \frac{9}{5}C$$

$$\div \frac{9}{5} \Rightarrow \times \frac{5}{9}$$

$$\frac{5}{9}(F - 32) = C$$

Success Criteria: I can rearrange a formula by using inverse operations