***Lesson 2.3: Solving Equations for Variables***

***Creating Equations from Verbal Descriptions***

***Examples:***

1). The mathematical formula for the volume of a rectangular prism, $B=v(h)$ or$ V=(l)(w)(h)$, is a literal equation. *V* represents volume, *l* represents length, *w* represents width, and *h* represents height. Using inverse operations, the formula can be rearranged to solve for any one of the variables that might be unknown. Like solving for *x*, a formula can be rearranged to isolate a variable.

Rearrange the following Equations to isolate the correct variable.

Isolate the letter *h.* Isolate the letter *l.*

$V=(l)(w)(h)$$V=(l)(w)(h)$

2). The formula for density is $d=\frac{m}{v}$. Lead has a very high density of 11,340$kg/m^{3}$. Plastic foam has a very low density of 75$kg/m^{3}$. The formula for density can be rearranged to solve for *V,* volume or *m,* mass.

 a). A sinker on a fishing line is made of lead and has a volume of 0.000015$m^{3}$. What is the mass of the sinker?

 $ d=\frac{m}{v}$

 b). The design of a life preserver requires 0.3 kilograms of plastic foam to provide proper buoyancy. What is the volume of the plastic foam required?

 $ d=\frac{m}{v}$

3). For altitudes up to 36,000 feet, the relationship between ground temperature and atmospheric temperature can be described by the formula $t=-0.0035a+g$, in which *t* represents atmospheric temperature in degrees Fahrenheit, *a* represents the altitude, in feet, at which the atmospheric temperature is measured, and *g* is the ground temperature in degrees Fahrenheit. Determine the altitude in feet when *t* is -37.5$℉$ and *g* is 60$℉$.

 $t=-0.0035a+g$

4). The interest formula, $I=p\left(r\right)(t)$, is another example of a literal equation. In the formula, *I* represents interest, *p* represents the principal or the initial amount to which interest will be applied, *r* represents the rate at which interest will be paid and *t* is the time of year.

 a). Find the number of years used in the calculation of a $1000 loan at an interest rate of 5% with interest totaling $600.

 $I=p\left(r\right)(t)$

 b). Determine the interest rate for a $2000 loan that will be paid off in 4 years with interest totaling $640.

 $ I=p\left(r\right)(t)$

5). The formula $y=mx+b$ is the slope-intercept form of the equation of a line. Solve the equation for m.

 $y=mx+b$