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

***Creating Equations from Verbal Descriptions***

***Examples:***

1). The mathematical formula for the volume of a rectangular prism, or, 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.*

2). The formula for density is . Lead has a very high density of 11,340. Plastic foam has a very low density of 75. 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. What is the mass of the sinker?

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?

3). For altitudes up to 36,000 feet, the relationship between ground temperature and atmospheric temperature can be described by the formula , 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.

4). The interest formula, , 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.

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

5). The formula is the slope-intercept form of the equation of a line. Solve the equation for m.