## Lesson 3 – Percent Error and Graphing

## Percent Error (% Error)

No matter how precise a measurement is, it still may not be accurate. Accuracy refers to how close a value is to its accepted value. The **percentage error** is the absolute value of the difference between experimental and accepted values expressed as a percentage of the accepted value.

 $\% \text{ error} = \frac{|\text{experimental value} - \text{accepted value}|}{\text{accepted value}} \times 100$ 

Often you will use this calculation to determine the accuracy or validity of your results in lab experiments.

Example 1The accepted value for the speed of light is  $2.998 \times 10^8$  m/s. Various groups in a physics class<br/>obtain the following values in a lab experiment. Find the % error for each value.<br/>a)  $2.4 \times 10^8$  m/sb)  $7.3 \times 10^7$  m/s $2.4 \times 10^8$  m/sb)  $7.3 \times 10^7$  m/s $2.4 \times 10^8$  m/s $2.998 \times 10^8$  $2.998 \times 10^8$  $2.998 \times 10^8$  $= \frac{12.4 \times 10^8 - 2.998 \times 10^8}{2.998 \times 10^8} \times 100$  $= \frac{17.3 \times 10^7 - 2.998 \times 10^8}{2.998 \times 10^8} \times 100$ = 19.95 //= 75.65 //= 75.65 //= 20 //= 76 //

## **Graphing Techniques**

In physics it is often much easier to observe relationships between data by creating graphs rather than looking at tables of value. Therefore, it is important to be able to produce graphs quickly and easily and be able to extract information from a graph. *Recall:* 

slope = 
$$\frac{rise}{run}$$
 Mathematically,  $M = \Delta y$   
 $\Delta x$   
=  $\frac{y_2 - y_1}{x_2 - x_1}$ 

## SPH 3UI



Graphing reminders:

Independent - x-axis, controlled by experimenter
Dependent - y-axis, measured by experimenter
Use a pencil
Use a ruler
Label axes
Give the graph a title
LOBF
through as many points as possible
equal distribution of point above and below the line.