Graphing and Linear Equations

We use graphs to represent data and the relationships between variables. One very important type of relationship that you will be graphing is the linear (bivariate) equation, which has the following form:

$$y = mx + b$$

With the variables defined as follows:

'x' the **independent variable**, the variable we have control over.

'y' the **dependent variable**, what we measure a change in as we vary x.

'b' the "**y-intercept**", the **constant** point at which our graph will cross the y-axis or the value of y when x =0. The **y-intercept** defines the point (0,b).

'm' the **slope** of the graph. The **constant** factor by which y changes when x changes.

A generic graph of this type might look like:

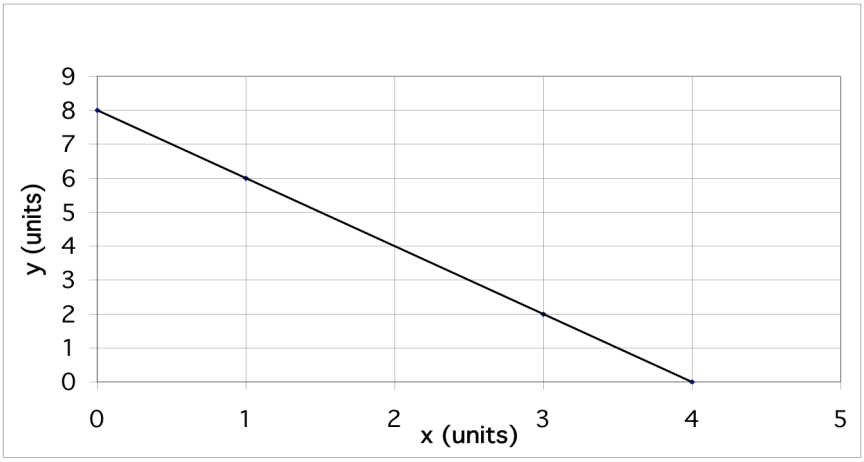

Figure 1. A plot of the equation y = -2x +8.

The slope tells us that for every unit change in x, there should be a -2 unit change in y and that is indeed what we observe. In other words,

$$\frac{\Delta y}{\Delta x} = \frac{\text{rise}}{\text{run}} = \text{slope} = -2.$$

Graphing Etiquette

- Always provide a figure legend for your graph summarizing the experimental methods that led to the results. Be careful to NOT interpret the results in the legend.
- Label both axes (what variable is on the x axis, the y axis?).
- Don't forget to include units (is that time in seconds, hours or years?).
- Include the y-intercept if it seems at all important. Is (0,0) a point on your graph? This could help you determine whether you are seeing a line or a curve.
- Try to use a computer for best results.
- If you cannot use a computer to find the best line fit, draw the line with a straight edge and then find the slope of that line.