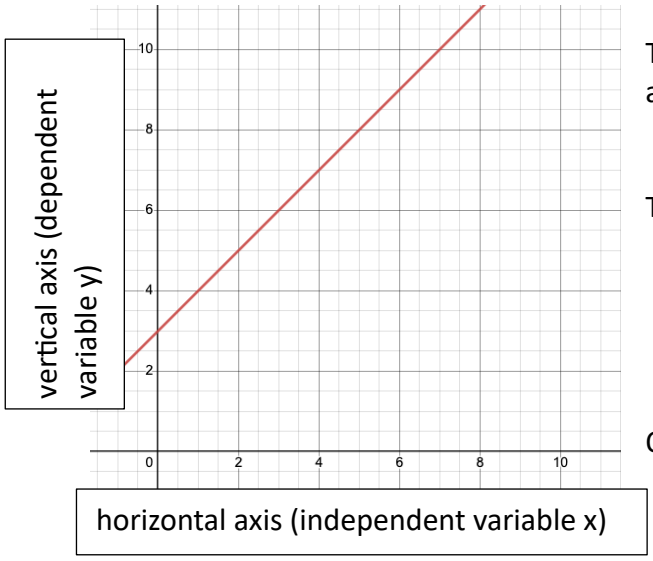
Business Math **How Variables (Letters Representing Numbers) in Functions Are Used**

In applications (how we apply math to real world concepts) variables are not always specified "x" and "y". We will consistently be using "x" for the independent variable and "y" for the dependent variable. Shown here is a graph of an (x,y) relationship:



This pattern has a corresponding equation that also describes the relationship between x and y:

$$y = x + 3$$

This pattern also can be described by a table:

x	y
0	3
2	5
4	7

OR simply list some of the ordered pairs:

(0, 3), (2, 5), (4, 7)

We will see applications in which different letters of the alphabet are used, but one is always "x" and the other is always "y".

1) In supply and demand, we will see quantity represented by the letter "q" and price represented by the lower-case letter "p". For consistency, we prefer to spell out the word "price" and prefer to use "x" for quantity. Example: The relationship in the graph above might be given as:

$$p = q + 3$$

$$price = x + 3$$

2) In cost, revenue, and profit applications, we will see quantity sometimes represented by the letter "n" and capital letters C = cost, R = revenue, and P = profit. Example:

$$C = n + 3$$

$$Cost = C(x) = x + 3$$

3) In general applications, the "x" variable will be some quantity of a good/service or time. Look for time (such as minutes in a cell phone plan, or hours of labor, or months of a loan, or the year something was measured). If not time, then look for something that answers the question "how many" (how many of a thing are sold, mileage used, quantity in demand, quantity in supply, quantity produced). Any of these will represent the "x" variable.

For the "y" variable 80-90% of the applications will involve money, $. Look for the cost to make/sell something, sales revenue, profit, price, employee pay, value of an asset, amount of interest earned, etc. Other common uses for the "y" variable are: population statistics, any measurable thing we track over a specified number of years. Example might be: tons of garbage put into a certain landfill since 2000.

Lastly, ***we will be consistent*** in use of ***reserved constants*** that mean something special in a unit of study.

Examples: LINEAR EQUATIONS

$y = \boldsymbol{m}x + \boldsymbol{b}$ *or* $p = \boldsymbol{m}n + \boldsymbol{b}$ ← $\boldsymbol{m}$ **and** $\boldsymbol{b}$ will represent **'slope'** and **'y-intercept'** of a linear function. They are reserved constants in these situations.

QUADRATIC EQUATIONS

$y = \boldsymbol{a}x^2 + \boldsymbol{b}x + \boldsymbol{c}$ ← $\boldsymbol{a, b, c}$ will represent the **quadratic constants** of a quadratic function. They are reserved constants in these situations.

Similarly, $\boldsymbol{a}$ means the same thing in $y = \boldsymbol{a}(x - \boldsymbol{h})^2 + \boldsymbol{k}$ where $\boldsymbol{a, h, and\ k}$ represent the **vertex form constants** of a quadratic function. They are served constants in these situations.

More **"reserved constants"** will get added to the list as we learn about more types of functions and equations. We will do our best to remain consistent in our use of letters of the alphabet when working with formulas and special equations.