Graphing Basic Functions

The term “basic function” isn’t something you’re likely to find in any math book because it’s just something I use to describe functions that aren’t “complicated” or “fancy”. They tend to be centered around the origin (0, 0). Here are some examples of basic functions:

\[ f(x) = x + 2 \quad f(x) = x^2 \quad f(x) = 2x - 1 \quad f(x) = 2x^3 \quad f(x) = 3^x \quad f(x) = \log_2 x \]

Notice how none of the numbers in the problems are large.

If we want to graph a function in general, we pick values of “x”, plug those in, and see what that gives us for “y”. In basic functions, the values to pick for “x” are -2, -1, 0, 1, 2 since the graph will be centered around the origin.

\[
\begin{array}{c|c}
 x & y \\
-2 & \ \\
-1 & \ \\
0 & \ \\
1 & \ \\
2 & \ \\
\end{array}
\]

The graphs of the first and third functions are lines and are of the form “f(x) = ax + b”. The second is called a “parabola” and all functions in the form “f(x) = ax^2 + bx + c” give us this shape.
Evaluating a function

Evaluating a function simply means to plug in some value for “x” and see what we get as a result. One thing to keep in mind is that “f(x)” is just another name for “y”! So, when we have f(x) = 2x + 1, that means the same thing as y = 2x + 1.

So, if we use the equation above, what does it mean when we say “Find f(2)”?

All this means is that we want to know the value of the function (“f(x)” or “y”) when x = 2. So, we plug in 2 for “x” and see what we get!

\[ f(2) = 2 \cdot (2) + 1 = 4 + 1 = 5. \]

Therefore, f(2) = 5.

Look back at the functions on the other page. The first one is f(x) = x + 2. We found the function values (y) for when x is -2, -1, 0, 1, and 2. Let’s write these in ordered pairs first and then we’ll look at the function notation.

(-2, ____ ) (-1, ____ ) (0, ____ ) (1, ____ ) (2, ____ )

In function notation, these would be as follows:

f(-2) = _____    f(-1) = _____    f(0) = _____    f(1) = _____    f(2) = _____

Remember, f(-2) just is the y-value when x = -2 because “f(x)” is just another name for “y”.

Let’s try a couple. Given the following functions find the indicated value.

1) f(x) = 3x + 4  Find f(-2).
2) f(x) = x^2 − 1  Find f(3).
3) f(x) = 4  Find f(2).
4) f(x) = 5 − x  Find f(-3).