4.7: Function Notation

***Goals:** - Identify function notation
- Find the value of a function for a given value of x
- Find the value of x for a given function value

Function Notation: Another way of expressing the relationship between input and outpout. It is simply a notation. It does NOT mean to multiply!

$f(x) = y$; x is still the input. Now instead of calling y the output, it is being called $f(x)$ (y has been substituted with $f(x)$)

So an ordered pair that use to be written: (x , y) could now be written:

(x , $f(x)$)

While f is typically the most common function name, other common functions are: $g(x)$, $h(x)$….

***f*(*x*) DOES NOT** mean to _MULTIPLY_____.

- ***f*(7)** would just mean to **__Subsitute_____** 7 in for x into the given function and find the output when the input is 7

Finding and output given an input.

Ex: What is the value of the function $f(x) = 3x - 15$ when $x = -3$?
- What is this problem really asking you to do? Think in terms of input and output.

This problem is really asking you to find the output, which is $f(x)$, when x is -3. So everywhere you see an x, substitute in -3.

$f(-3) = 3(-3) - 15$
$f(-3) = -9 - 15$
$f(-3) = -24$

So what this really says is that the function equals -24, when $x = -3$. You are done here.

Ex: Evaluate $h(x) = -7x$ when $x = 7$
Replace x with 7.

$h(7) = -7(7)$
$h(7) = -49$

When the input is 7 the output is -49

Ex: What is the value of the function $f(x) = 2x + 12$ when $x = -8$?

$f(-8) = -4$

Finding an input given an output.

Ex: For the function $f(x) = 2x - 10$, find the value of x so that $f(x) = 6$.

- **What is this problem asking you to do?**

This time the problem wants you to substitute 6 everywhere you see the $f(x)$ symbol. Then solve for x. Here you know the output, you want to know the input that created it.

$$f(x) = 2x - 10$$

$$\downarrow$$

$$6 = 2x - 10$$

$$+10 \qquad\qquad +10$$

$$\frac{16}{2} = \frac{2x}{2}$$

$$8 = x$$

*Now solve like a normal multi-step equation.

This means that when the outout was 6, the input was 8.

Ex: For the function $f(x) = -2x + 4$, find the value of x so that $f(x) = 16$.

$$16 = -2x + 4$$

$$-4 \qquad\quad -4$$

$$\frac{12}{-2} = \frac{-2x}{-2}$$

$$-6 = x$$