Properties of Functions

A function is a mathematical relation such that for every input (usually x) there is at most one output (usually y.)

The following properties (operations) hold true for all functions:

Addition of Functions	$(f+g)(x)=f(x)+g(x)$
Subtraction of Functions	$(f-g)(x)=f(x)-g(x)$
Multiplication of Functions	$(f \bullet g)(x)=f(x) \bullet g(x)$
Division of Functions	$\left(\frac{f}{g}\right)(x)=(f \div g)(x)=f(x)\div g(x)$ This is true as long as $g(x)\neq 0$
Composition of Functions*	$(f \circ g)(x)=f(g(x))$ $(g \circ f)(x)=g(f(x))$ If $(f \circ g)(x)=(g \circ f)(x)=x$ then the functions are inverses of each other

If $f(-x)=f(x)$ then the function is even and symmetric over the y-axis.
If $f(-x)=-f(x)$ then the function is odd and is symmetric about the origin.
A function is either even, odd, or neither. A function can not be both even and odd.

*The domain of $(f \circ g)(x)$ is the set of x in the domain of $g(x)$ such that $g(x)$ is in the domain of f.

<u>Think about the domain of composite funtions like this:</u>

If you have $f(g(x))$ this means you plug a number, x, into $g(x)$. You then take this output and then put it into $f(x)$. Your domian is then any x that when put into $g(x)$ will give you something that you can then put into $f(x)$

