Name: _____   Date: _____

Functions and Relations

◎ Relation: Any set of __input__ that has an __output__.

◎ Function: A __relation__ such that every single __input__ has exactly __one__ output.

     **Never __repeat x-values__ **

Function Notation:

◎ Function notation is a way to __name a function__. It is pronounced __f of x__.

◎ f(x) is a fancy way of writing __y__ in an __equation__.

   ○ Example: y = 2x + 4 is the same as __$f(x) = 2x+4$__

Combining Functions

Examples:

1. Given the functions $f(x) = 6x^2 - 3x + 5$ and $g(x) = 4x^2 + 5x - 8$

Find $g(x) - f(x) = 4x^2 + 5x - 8 - (6x^2 - 3x + 5)$
$$= 4x^2 + 5x - 8 - 6x^2 + 3x - 5$$
$$= \boxed{-2x^2 + 8x - 13}$$

2. Given the functions $f(x) = 6x^2 - x + 3$ and $g(x) = x^2 + 3x$

Find $2f(x) + 3g(x) = 2(6x^2 - x + 3) + 3(x^2 + 3x)$
$$= 12x^2 - 2x + 6 + 3x^2 + 9x$$
$$= \boxed{15x^2 + 7x + 6}$$

3. Given the functions $f(x) = 2x - 4$ and $g(x) = x^2 - 3$

Find $2g(x) \cdot f(x) = 2(x^2 - 3) \cdot (2x - 4)$
$$= (2x^2 - 6)(2x - 4)$$
$$= \boxed{4x^3 - 8x^2 - 12x + 24}$$

Given the functions $f(x) = 4x^2 - 2x + 5$ and $g(x) = x^2 + 7x - 8$

4. Find $f(x) + g(x) =$
$$4x^2 - 2x + 5 + x^2 + 7x - 8$$
$$= \boxed{5x^2 + 5x - 3}$$

5. Find $4g(x) - f(x) =$
$$4(x^2 + 7x - 8) - (4x^2 - 2x + 5)$$
$$4x^2 + 28x - 32 - 4x^2 + 2x - 5$$
$$\boxed{30x - 37}$$