

Warm Up-

1. Evaluate the function $f(x) = x^2 - 9$ given the inputs $\{-4, 0, 2, 4\}$.

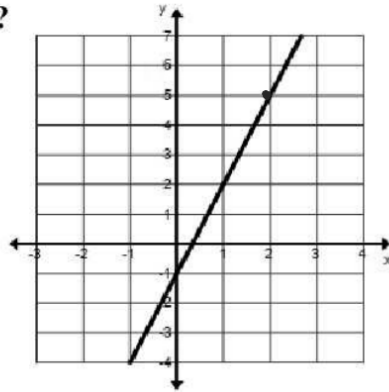
$$f(4) = (-4)^2 - 9 = 7$$

$$f(0) = (0)^2 - 9 = -9$$

$\{7, -9, -5, 7\}$

2. Given the graph, what is $f(2)$?

5



3. Given the table, what is $f(0)$?

7

x	f(x)
0	7
1	5
2	3
3	1
4	0

Operations of Functions

Operation	Notation	Ex: $f(x) = 6x, g(x) = 3x + 2$	Does Order Matter?	
Addition	$(f+g)(x)$ $f(x)+g(x)$	$(f+g)(x)$ $= 6x + 3x + 2$ $= 9x + 2$	$(g+f)(x)$ $= 3x + 2 + 6x$ $= 9x + 2$	NO
Subtraction	$(f-g)(x)$ $f(x)-g(x)$	$(f-g)(x)$ $= 6x - (3x + 2)$ $= 6x - 3x - 2$ $= 3x - 2$	$(g-f)(x)$ $= 3x + 2 - (6x)$ $= -3x + 2$	Yes

Example 1: Let $f(x) = x - 8$ and $g(x) = 2x + 3$

A. $(f + g)(x) =$

$$3x - 5$$

B. $(g - f)(x) =$

$$2x + 3 - (x - 8)$$

$$2x + 3 - x + 8$$

$$x + 11$$

C. $(f - g)(x) = x - 8 - (2x + 3)$ D. $(f + g)(x) - 6 =$

$$-x - 11$$

$$-x - 11$$

$$-(x + 11)$$

$$3x - 5 - 6$$

$$3x - 11$$

Operation	Notation	Example: $f(x) = 6x, g(x) = 3x + 2$	Does order matter?
Multiplication	$(f \cdot g)(x)$ $f(x) \cdot g(x)$	$(f \cdot g)(x)$ $= 6x(3x+2)$ $= 18x^2 + 12x$	$(g \cdot f)(x)$ $= (3x+2)6x$ $= 18x^2 + 12x$

NO

Example 4: Let $f(x) = 4x$ and $g(x) = 8x$

A. $(f \cdot g)(x) =$

$$4x \cdot 8x = 32x^2$$

B. $-2[g(x)] =$

$$-2(8x) = -16x$$

WHEN DO YOU PUT PARENTHESIS?When the function has more than 1 term**Example 5:** Let $f(x) = 4x + 1$, $g(x) = 2x$, $h(x) = 16x$, and $k(x) = 8$.

A. $(f \cdot g)(x) =$

B. $(g \cdot g)(x) =$

C. $(f \cdot k)(x) =$

D. $(f \cdot h)(x) =$

E. $(h \cdot g)(x) =$

F. $(h \cdot k)(x) =$

Practice:

$f(x) = x - 8$

$g(x) = 2x + 3$

$h(x) = 3x$

$j(x) = x^2 + 5$

$k(x) = 12x$

A. $(f + g)(x) =$

B. $(g - f)(x) =$

$$2x + 3 - (x - 8) = 2x + 3 - x + 8$$
$$= x + 11$$

C. $4[j(x)] =$

D. $(h \cdot g)(x) =$

$$6x^2 + 9x$$

E. $(h - k)(x) =$

F. $6[g(x)] + 2 =$

$$12x + 20$$

G. $2[g + k](x) =$

H. $(j - f)(x) + 8 =$

$$x^2 - x + 21$$

I. $(f + f)(x) =$

J. $\left(\frac{g}{g}\right)(x) = 1$