

Sec1	Notes 4.4 Function Operations	Unit 4
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Warm Up-

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

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

$f(-4) = (-4)^2 - 9 = 7$
 $f(0) = 0^2 - 9 = -9$
 $f(2) = 2^2 - 9 = -5$
 $f(4) = 4^2 - 9 = 7$

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

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Operations of Functions

Operation	Notation	Example: $f(x) = 2x + 3$, $g(x) = 3x + 2$	Does Order Matter?
Addition	$(f+g)(x)$ $(f)(x) + (g)(x)$	$(2x+3) + (3x+2) = 5x+5$ $(3x+2) + (2x+3) = 5x+5$	No
Subtraction	$(f-g)(x)$ $(f)(x) - (g)(x)$	$(2x+3) - (3x+2) = -x+1$ $(3x+2) - (2x+3) = x-1$	Yes

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

A. $(f+g)(x) = (x-8) + (2x+3) = 3x-5$

B. $(g+f)(x) = (2x+3) + (x-8) = 3x-5$

C. $(f-g)(x) = (x-8) - (2x+3) = -x-11$

D. $(g-f)(x) = (2x+3) - (x-8) = x+11$

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Operations of Functions

Operation	Notation	Example: $f(x) = 2x + 3$, $g(x) = 3x + 2$	Does Order Matter?
Multiplication	$(fg)(x)$ $(f)(x) \cdot (g)(x)$	$(2x+3)(3x+2) = 6x^2 + 17x + 6$ $(3x+2)(2x+3) = 6x^2 + 17x + 6$	No

Example 2: Let $f(x) = 4x$ and $g(x) = 3x$

A. $(f \cdot g)(x) = (4x)(3x) = 12x^2$

B. $(g \cdot f)(x) = (3x)(4x) = 12x^2$

Example 3: Let $f(x) = 4x + 1$, $g(x) = 2x + 3$, and $h(x) = 4x^2 + 1$

A. $(f \cdot g)(x) = (4x+1)(2x+3) = 8x^2 + 14x + 3$

B. $(g \cdot f)(x) = (2x+3)(4x+1) = 8x^2 + 14x + 3$

C. $(f \cdot h)(x) = (4x+1)(4x^2+1) = 16x^3 + 4x^2 + 4x + 1$

D. $(h \cdot f)(x) = (4x^2+1)(4x+1) = 16x^3 + 4x^2 + 4x + 1$

E. $(h \cdot g)(x) = (4x^2+1)(2x+3) = 8x^3 + 12x^2 + 2x + 3$

F. $(g \cdot h)(x) = (2x+3)(4x^2+1) = 8x^3 + 12x^2 + 2x + 3$

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Practice:

$f(x) = x - 8$	$g(x) = 2x + 3$	$h(x) = 3x$
$f(x) = x + 5$		$h(x) = 12x$

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

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

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

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

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

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

G. $(f+g) \cdot h(x) =$

H. $(f-h) \cdot f(x) + 8 =$

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

J. $(\frac{g}{f})(x) =$