

Warm-up: If $f(x) = 2x^2 + 5x$ and $g(x) = -x - 9$

Find $(f + g)(2)$

$$2x^2 + 5x + (-x - 9)$$

$$(f+g)(x) = 2x^2 + 4x - 9$$

$$(f+g)(2) = 2(2)^2 + 4(2) - 9 \quad (f+g)(2) = 7$$
$$= 2(4) + 8 - 9 = 7$$

Find $(f - g)(-4)$

$$2x^2 + 5x - (-x - 9)$$

$$(f-g)(x) = 2x^2 + 6x + 9$$

$$(f-g)(-4) = 2(-4)^2 + 6(-4) + 9$$
$$= 32 - 24 + 9$$

$$(f-g)(-4) = 17$$

3.2 Day 2 Composition of Functions

Composition of functions: involves using two or more functions in succession

Written as $(f \circ g)$ and defined as $f(g(x))$

NOT MULTIPLICATION

Ex 2: Let $f(x) = 2x - 5$ and $g(x) = 4x + 2$

Find $(f \circ g)(x)$

$$(f \circ g)(x) = 2(4x + 2) - 5$$
$$= 8x + 4 - 5$$

$$(f \circ g)(x) = 8x - 1$$

Find $(g \circ f)(x)$

$$(g \circ f)(x) = 4(2x - 5) + 2$$
$$8x - 20 + 2$$

$$(g \circ f)(x) = 8x - 18$$

Try: Let $f(x) = -n - 3$ and $g(x) = n^2 + 1$

Find $(f \circ g)(n)$

$$-(n^2 + 1) - 3$$

$$-n^2 - 1 - 3$$

$$(f \circ g)(n) = -n^2 - 4$$

Find $(g \circ f)(n)$

$$(-n - 3)^2 + 1$$

$$(-n - 3)(-n - 3) + 1$$

$$n^2 + 3n + 3n + 9 + 1$$

$$(g \circ f)(n) = n^2 + 6n + 10$$