

9. Compositions of Functions

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

$$f(x) = 2x + 3 \quad g(x) = x^2 \quad h(x) = 4x + 1$$

Examples:

$$f(3) = 2(3) + 3 = 6 + 3 = 9$$
$$h(-2) = 4(-2) + 1 = -8 + 1 = -7$$

$$h(g(-2)) = 17$$

$$g(-2) = (-2)^2 = 4$$

$$h(4) = 4(4) + 1 = 16 + 1 = 17$$

$$\boxed{f(h(-3)) = -19}$$

$$h(-3) = 4(-3) + 1 = -12 + 1 = -11$$

$$f(-11) = 2(-11) + 3 = -22 + 3 = -19$$

$$f(x) = 2x + 3 \quad g(x) = x^2 \quad h(x) = 4x + 1$$

$$f(g(x)) = 2(x^2) + 3 \\ = 2x^2 + 3$$

$$f(h(x)) = 2(4x + 1) + 3 \\ = 8x + 2 + 3 \\ = 8x + 5$$

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

$$= (2x + 3)^2 \\ = (2x + 3)(2x + 3)$$

$$= 4x^2 + 12x + 9$$

	$2x$	3
$2x$	$4x^2$	$6x$
3	$6x$	9

Inside \rightarrow Then Out!