TOPIC: COMPOSITION OF FUNCTIONS

Function Composition

◆ Function composition is like evaluating, but you replace the inside variable of a function with ***ANOTHER*** _____.

EVALUATING a Function	COMPOSING a Function
$f(x) = x^2 + 3x - 10$	$f(x) = x^2 + 3x - 10$ $g(x) = x - 2$
$f(7) = (\quad)^2 + 3(\quad) - 10$	$f(g(x)) = (\quad)^2 + 3(\quad) - 10$
$=$	$=$
Result is a **[NUMBER | FUNCTION]**	Result is a **[NUMBER | FUNCTION]**

Note: $f(g(x))$ is often written as _____. First letter = outside function, second letter = inside function

EXAMPLE: Given the functions $f(x) = x + 4$ and $g(x) = x^2 - 3$, find the following composite functions (fully simplify your answer).

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

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

TOPIC: COMPOSITION OF FUNCTIONS

PRACTICE

Given the functions $f(x) = \sqrt{x+4}$ and $g(x) = (x-2)^2 - 4$, (A) find $(f \circ g)(x)$ and (B) $(g \circ f)(x)$.

PRACTICE

Given the functions $f(x) = \frac{1}{x^2-2}$ and $g(x) = \sqrt{x+2}$, (A) find $(f \circ g)(x)$ and (B) $(g \circ f)(x)$.

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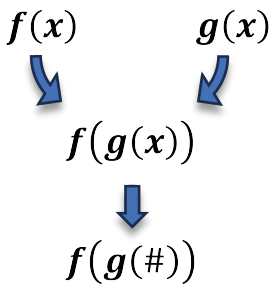
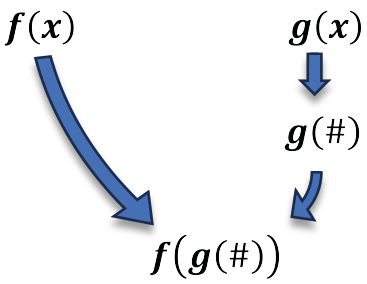
Evaluating Composed Functions

◆ You may have to compose functions and ***then*** _____ at a specific value, $f(g(\#))$. Two common methods:

Method 1: Compose → Evaluate *Use when first asked to find* $f(g(x))$	**Method 2: Evaluate inside → Evaluate outside**
	
EXAMPLE: For $f(x) = x^2$ and $g(x) = x - 1$, find $f(g(x))$ and then evaluate $f(g(3))$	EXAMPLE: For $f(x) = x^2$ and $g(x) = x - 1$, evaluate $f(g(3))$

PRACTICE Given the functions $f(x) = x + 3$ and $g(x) = x^2$, **(A)** find $(f \circ g)(2)$ and **(B)** $(g \circ f)(2)$.