17.3 – Composite Functions

Composition of Functions
$(f \circ g)(x) = f(g(x))$ $(g \circ f)(x) = g(f(x))$

Examples:

1. Let $f(x) = x - 2$ and $g(x) = x^2$.

$(f \circ g)(x) = \underline{\quad x^2 - 2 \quad}$

$f(g(x)) = \underline{\quad x^2 \quad} - 2$

• Replace the x in the f function with the g function.

$(g \circ f)(x) = \underline{\quad x^2 - 4x + 4 \quad}$

$g(f(x)) = \underline{\quad (x-2)^2 \quad}$

$= (x-2)(x-2) \ *FOIL$

$= x^2 - 2x - 2x + 4$

• Replace the x in the g function with the f function.

2. Let $f(x) = 2x$ and $g(x) = x^2 + 4$.

$(f \circ g)(x) = \underline{\quad 2x^2 + 8 \quad}$

$f(g(x)) = 2 \underline{\quad (x^2 + 4) \quad}$

* Distribute

$(g \circ f)(x) = \underline{\quad 4x^2 + 4 \quad}$

$g(f(x)) = \underline{\quad (2x)^2 + 4 \quad}$

* Both must be squared!