

## Objective 2 - Composition

*Evaluate the composition of two functions.*

Link to section in online textbook.

First, watch [this video](#) to learn how use a new operation on functions: Composition.

**Question 1** For the two functions below, evaluate  $(f \circ g)(1)$  and  $(g \circ f)(1)$

$$f(x) = -5x - 5$$

$$g(x) = 3x^2 + 4x - 3$$

$$(f \circ g)(1) = \boxed{-25.0}$$

$$(g \circ f)(1) = \boxed{257.0}$$

**Feedback(attempt):** Remember, the order is important! This joins subtraction and division where the order matters.

**Question 2** For the two functions below, evaluate  $(f \circ g)(-4)$  and  $(g \circ f)(-4)$

$$f(x) = 5x^2 - 5x - 3$$

$$g(x) = \frac{1}{3(x+2)}$$

$$(f \circ g)(-4) = \boxed{-2.028}$$

$$(g \circ f)(-4) = \boxed{0.003}$$

**Feedback(correct):** Great! Beyond our first question, we needed to be careful that we could plug in our values, as  $g(x)$  has a restricted domain.

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**Question 3** For the two functions below, evaluate  $(f \circ g)(3)$  and  $(g \circ f)(3)$

$$f(x) = 5x^2 + 6x - 6$$

$$g(x) = \sqrt{4x - 6}$$

$$(f \circ g)(3) = \boxed{38.697}$$

$$(g \circ f)(3) = \boxed{14.9}$$

**Feedback(correct):** Great! Beyond our first question, we needed to be careful that we could plug in our values, as  $g(x)$  has a restricted domain.

**Question 4** For the two functions below, evaluate  $(f \circ g)(-3)$  and  $(g \circ f)(-3)$

$$f(x) = (x + 5)^3 - 4$$

$$g(x) = (x + 4)^{\frac{1}{3}} - 5$$

$$(f \circ g)(-3) = \boxed{-3.0}$$

$$(g \circ f)(-3) = \boxed{-3.0}$$

**Question 5** One of the biggest takeaways from this objective is noticing that  $(f \circ g)(x) \neq (g \circ f)(x)$  **in most cases**.

For which question was  $(f \circ g)(x) \neq (g \circ f)(x)$ ?  $\boxed{4}$

**Feedback(attempt):** It is just asking for the number of the question. The answer is either "1", "2", "3", or "4".

**Feedback(correct):** Great job! But since it wasn't always the case, it should make you wonder: when is it that  $(f \circ g)(x) = (g \circ f)(x)$ ? The next two objectives will answer this question.