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.*

Learning outcomes:
Author(s): Darryl Chamberlain Jr.

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

$$f(x) = 5\,x^2 + 6\,x - 6$$
$$g(x) = \sqrt{4\,x - 6}$$

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

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

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.*