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* $(f \circ g)(-4)$ *and* $(g \circ f)(-4)$

$$f(x) = -4\,x^2 - 5\,x - 3$$
$$g(x) = 3\,x + 3$$

$(f \circ g)(-4) =$ $\boxed{-282.0}$

$(g \circ f)(-4) =$ $\boxed{-138.0}$

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

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

$$f(x) = 5\,x^2 + 5\,x + 4$$
$$g(x) = \frac{1}{4\,x + 5}$$

$(f \circ g)(2) =$ $\boxed{4.414}$

$(g \circ f)(2) =$ $\boxed{0.007}$

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* $(g \circ f)(-3)$

$$f(x) = -4\,x^2 - 3\,x - 5$$
$$g(x) = \sqrt{-6\,x + 3}$$

$(f \circ g)(-3) =$ $\boxed{-102.748}$

$(g \circ f)(-3) =$ $\boxed{13.964}$

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* $(f \circ g)(-2)$ *and* $(g \circ f)(-2)$

$$f(x) = (x-4)^3 - 6$$
$$g(x) = (x+6)^{\frac{1}{3}} + 4$$

$(f \circ g)(-2) =$ $\boxed{-2.0}$

$(g \circ f)(-2) =$ $\boxed{-2.0}$

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 $(f \circ g)(x) = (g \circ f)(x)$*?* $\boxed{4}$

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.*
