

Exercise 47

For the following exercises, for each pair of functions, find a. $(f \circ g)(x)$ and b. $(g \circ f)(x)$ Simplify the results. Find the domain of each of the results.

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

[**TYPO: Place a period before the word, "simplify."**]

Solution

$$(f \circ g)(x) = f(g(x)) = f\left(\frac{2}{x}\right) = \frac{3}{2\left(\frac{2}{x}\right) + 1} = \frac{3x}{4+x} \quad \text{Domain: } \{x \mid x \neq 0, x \neq -4\}$$

$$(g \circ f)(x) = g(f(x)) = g\left(\frac{3}{2x+1}\right) = \frac{2}{\frac{3}{2x+1}} = \frac{2}{3}(2x+1) \quad \text{Domain: } \{x \mid 2x+1 \neq 0\}$$

Note that the domain for any expression is the same regardless of simplification.