

Exercise 1.1.43

Instruction

For the pair of functions $f(x) = x + 4$ and $g(x) = 4x - 1$, find the below listed compositions. Simplify the results. Find the domain of each of the results.

(a) $(f \circ g)(x)$

(b) $(g \circ f)(x)$

Solution

(a) The composition is given by

$$(f \circ g)(x) = f(g(x)) = (4x - 1) + 4 = 4x - 1 + 4 = 4x + 3.$$

The domain of the above composition is all real numbers.

(b) The composition is given by

$$(g \circ f)(x) = g(f(x)) = 4(x + 4) - 1 = 4x + 16 - 1 = 4x + 15.$$

The domain of the above composition is all real numbers.

Answer

(a) $4x + 3$, domain: all real numbers.

(b) $4x + 15$, domain: all real numbers.