Exercise 44

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.

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

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

Solution

$(f \circ g)(x) = f(g(x)) = f(x^2 - 2) = 2(x^2 - 2) + 4 = 2x^2$ Domain: $\{x \mid -\infty < x < \infty\}$

$(g \circ f)(x) = g(f(x)) = g(2x + 4) = (2x + 4)^2 - 2 = 4x^2 + 16x + 14$ Domain: $\{x \mid -\infty < x < \infty\}$