

Exercise 45

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.

$$f(x) = x^2 + 7, \quad g(x) = x^2 - 3$$

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

Solution

$$(f \circ g)(x) = f(g(x)) = f(x^2 - 3) = (x^2 - 3)^2 + 7 = x^4 - 6x^2 + 16 \quad \text{Domain: } \{x \mid -\infty < x < \infty\}$$

$$(g \circ f)(x) = g(f(x)) = g(x^2 + 7) = (x^2 + 7)^2 - 3 = x^4 + 14x^2 + 46 \quad \text{Domain: } \{x \mid -\infty < x < \infty\}$$