Exercise 48

Let $f(x) = 1/x$ and $g(x) = 1/x^2$.

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

(b) Is $f \circ g$ continuous everywhere? Explain.

Solution

The composition of f and g is

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

$$= \frac{1}{\frac{1}{x^2}}$$

$$= x^2.$$

Since $g(x) = 1/x^2$ is not continuous at $x = 0$, neither is $f \circ g$ at $x = 0$ as the graph below illustrates.