Student ID: your Student ID Here

Assignment # 01 MTH101 (Fall 2022)

Marks: 10

Due Date: 02-12-2022

Question # 1:

If $f(x) = |x|$ *and* $g(x) = \frac{\sqrt{x}}{x}$

I. Determine whether $fog(x) = gof(x)$ or not.

II. Find the domain of $fog(x)$ *and* $gof(x)$.

Solution:

$f(x) = |x| \text{ and } g(x) = \frac{\sqrt{x}}{x}$

$fog(x) = ?$

$fog(x) = f(g(x))$

$fog(x) = f(\frac{\sqrt{x}}{x})$

$fog(x) = \left|\frac{\sqrt{x}}{x}\right|$

$fog = \left|\frac{\sqrt{x}}{\sqrt{x^2}}\right|$

$fog(x) = \left|\frac{\sqrt{x}}{\sqrt{x}\sqrt{x}}\right|$

$fog(x) = \left|\frac{1}{\sqrt{x}}\right|$

now :

$gof(x) = ?$

$gof(x) = g(f(x))$

$gof(x) = g(|x|)$

$gof(x) = \frac{\sqrt{|x|}}{|x|}$

$gof(x) = \frac{\sqrt{|x|}}{\sqrt{|x|}.\sqrt{|x|}}$

$gof(x) = \frac{1}{\sqrt{|x|}}$

hence proved

$fog(x) \neq gof(x)$

Part 2:

domain of $fog(x) = (0, \infty)$

domain of $gof(x) = (-\infty, 0)U(0, \infty)$