MATH 1101Y 2009 Quiz 1 (a) Solution

1. (1.5) Find the domain of the function

$$f(x) = \frac{1}{\sqrt{1-2x}}.$$

Solution: The domain is all x such that $1 - 2x > 0$.

$$\begin{aligned} 1 - 2x &> 0 \Leftrightarrow 1 > 2x \\ &\Leftrightarrow x < \frac{1}{2}. \end{aligned}$$

The domain is $\left\{x : x < \frac{1}{2}\right\}$ or $\left(-\infty, \frac{1}{2}\right)$. □

2. (1.5) Find the functions $f \circ g$ and $g \circ f$ where

$$f(x) = \sqrt{x}, g(x) = \frac{1}{2+x}.$$

Do not simplify.

Solution:

$$\begin{aligned} f \circ g(x) &= f(g(x)) = f\left(\frac{1}{2+x}\right) \\ &= \sqrt{\frac{1}{2+x}}. \end{aligned}$$

$$\begin{aligned} g \circ f(x) &= g(f(x)) = g\left(\sqrt{x}\right) \\ &= \frac{1}{2+\sqrt{x}}. \end{aligned}$$

□

3. (2) Solve the equation for x.

$$e^{2x-1} = 3.$$

Solution:

$$\begin{aligned} \ln\left(e^{2x-1}\right) &= \ln 3 \\ 2x - 1 &= \ln 3 \\ 2x &= \ln 3 + 1 \\ x &= \frac{\ln 3 + 1}{2}. \end{aligned}$$

□