

# Quiz 1

Math 1A, section 106

January 28, 2014

1. Find the function  $f \circ g$  where  $f(x) = \frac{x}{1+x}$  and  $g(x) = \sin(2x)$ . What is the domain of  $f \circ g$ ?

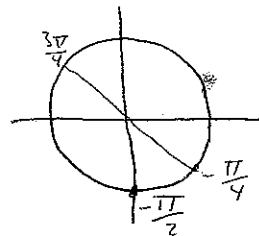
$$\begin{aligned} f \circ g(x) &= f(g(x)) \\ &= f(\sin(2x)) \\ &= \frac{\sin(2x)}{1 + \sin(2x)} \end{aligned}$$

Only undefined when  $1 + \sin(2x) = 0$ , i.e.

$$\sin(2x) = -1$$

$$2x = -\frac{\pi}{2} + 2\pi k, \quad k \in \mathbb{Z}$$

$$x = -\frac{\pi}{4} + \pi k$$



So, the domain consists of all real numbers except those of the form

$$-\frac{\pi}{4} + \pi k \quad \text{for integers } k.$$