

**22M:025 Quiz #2****Name:****(Total 25 Points)****Section:**

You have roughly 45 minutes to complete the quiz. Relax and good luck!

**1. (2 Pts)** If  $f(x)$  and  $g(x)$  are differentiable functions, then

$$(f(g(x)))' =$$

$$(e^{(f(x)^2)})' =$$

**2. (5 Pts)** Let  $f(x) = x^3(\tan(x))^{\frac{1}{2}}$ . Find  $f'(x)$ .

**3. (6 Pts)** Suppose  $f(x) + x \sin(f(x)) = x^5 + \frac{\pi}{2}$  and  $f(0) = \frac{\pi}{2}$ . Find  $f'(0)$ .

4. (6 Pts) Let  $y = \left(\frac{x^2+1}{x^2-1}\right)^{\frac{1}{4}}$ .

Find the equation of the line tangent to the graph of the function at  $(2, \left(\frac{5}{3}\right)^{\frac{1}{4}})$ .

5. (6 Pts) Let  $f(x) = \ln(\ln(\ln(x^2)))$ . Find  $f'(x)$  and the domain of  $f'(x)$ .