Name: Solutions Quiz 6

1. Consider the equation $2x^3 + tan(y) + xy^2 = 1$.
   (a) Use implicit differentiation to find $\frac{dy}{dx}$. (6 pts))
   (b) Verify that the point $(0, \pi/4)$ satisfies the equation. (1 pt)
   (c) Find the slope of the tangent line at the point $(0, \pi/4)$. (3 pts)

(a) $2x^2 + \tan(y) + xy^2 = 1$

$\frac{d}{dx} \Rightarrow$ $4x + \sec^2(y) \cdot y' + y^2 + x2y\,y' = 0$

$$y' = \frac{-y^2 - 4x}{\sec^2(y) + 2xy}$$

(b) $2(0)^3 + \tan\left(\frac{\pi}{4}\right) + 0 \cdot \left(\frac{\pi}{4}\right)^2 = \tan\left(\frac{\pi}{4}\right) = 1$ ✓

(c) $$y'\Big|_{(0,\frac{\pi}{4})} = \frac{-\left(\frac{\pi}{4}\right)^2 - 4 \cdot 0}{\left(\sec\left(\frac{\pi}{4}\right)\right)^2 + 0}$$

$$= \frac{-\left(\frac{\pi}{4}\right)^2}{\left(\frac{2}{\sqrt{2}}\right)^2}$$