

QUIZ 3

Math 1110, Section 2

March 3, 2017

Name: _____

(1) Find the derivative of each of the functions listed below.

(a) $f(x) = x^3 + 7x^2 - 3 + \sqrt{x}$.

SOLUTION: $f'(x) = 3x^2 + 14x + \frac{1}{2\sqrt{x}}$

(b) $\sin(\ln(x^2))$

SOLUTION: $f'(x) = \cos(\ln(x^2)) \cdot \frac{1}{x^2} \cdot 2x$

(2) Use implicit differentiation to find $\frac{dy}{dx}$: $e^{xy} = 2x + 2y$.

SOLUTION: Take the derivative of both sides and use implicit differentiation.

$$\begin{aligned}\frac{d}{dx}(e^{xy}) &= \frac{d}{dx}(2x + 2y) \\ e^{xy} \frac{d}{dx}(xy) &= 2 + 2 \frac{dy}{dx} \\ e^{xy} \left(y + x \frac{dy}{dx}\right) &= 2 + 2 \frac{dy}{dx} \\ xe^{xy} \frac{dy}{dx} - 2 \frac{dy}{dx} &= 2 - ye^{xy} \\ \frac{dy}{dx}(xe^{xy} - 2) &= 2 - ye^{xy} \\ \frac{dy}{dx} &= \frac{2 - ye^{xy}}{xe^{xy} - 2}\end{aligned}$$