

Name: _____

Quiz 7, sections 3.4, 3.5

1. (3 pts) Find the derivative of
- $f(x) = \sqrt{x + \sin^3(x^4)}$
- . Do not simplify.

$$f'(x) = \left[\frac{1}{2} (x + \sin^3(x^4))^{-1/2} \right] \left[1 + \underbrace{[3 \sin^2(x^4)]}_{\text{careful with parentheses}} [\cos(x^4)] [4x^3] \right]$$

careful with parentheses
this multiplies only
the $3 \sin^2$, not the 1.

2. (3 pts) Find the derivative of
- $f(x) = e^x (1 + e^x)^2$
- . Do not simplify.

$$f'(x) = [e^x] (1 + e^x)^2 + e^x [2(1 + e^x) e^x]$$

$2u \cdot u'$

3. (4 pts) Use implicit differentiation to find
- $\frac{dy}{dx}$
- if
- $1 + xy^3 + x^2y = e^y$
- .

$$0 + [1]y^3 + x[3y^2y'] + [2x]y + x^2[y'] = [e^y]y'$$

$$(y^3 + 2xy) + (3xy^2 + x^2)y' = e^y y'$$

$$\begin{array}{c} \hookrightarrow \\ y^3 + 2xy = (e^y - 3xy^2 - x^2)y' \end{array}$$

$$\frac{y^3 + 2xy}{e^y - 3xy^2 - x^2} = y'$$