

Name: _____

Quiz 8, sections 3.5, 3.6

due on Monday 2 Mar

1. (3 pts) Find the derivative of $f(x) = \sin^{-1}(\sqrt{x+1})$. Simplify. $(\sin^{-1} u)' = \frac{1}{\sqrt{1-u^2}} \cdot u'$

$$\begin{aligned} f'(x) &= \frac{1}{\sqrt{1-(\sqrt{x+1})^2}} \cdot \frac{1}{2\sqrt{x+1}} \\ &= \frac{1}{\sqrt{x}} \cdot \frac{1}{2\sqrt{x+1}} = \frac{1}{2} \frac{1}{\sqrt{x^2+x}} \end{aligned}$$

2. (3 pts) Find the derivative of $f(x) = \tan^{-1}(x \ln x)$. Do not simplify. $(\tan^{-1} u)' = \frac{1}{1+u^2} \cdot u'$

$$f'(x) = \frac{1}{1+(x \ln x)^2} \cdot [\ln x + 1]$$

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 $[1] \ln x + x [\frac{1}{x}]$

3. (2 pts) Find the derivative of $f(x) = \ln(e^{2x} + x)$. Do not simplify. $(\ln u)' = \frac{1}{u} \cdot u'$

$$f'(x) = \frac{1}{e^{2x} + x} \cdot (2e^{2x} + 1)$$

4. (2 pts) Use logarithmic differentiation to find the derivative of $y = (x + \sin^{-1}(e^x))^x$. Do not simplify.

$$\begin{aligned} \ln y &= \ln (x + \sin^{-1}(e^x))^x = x \ln (x + \sin^{-1}(e^x)) \\ \frac{1}{y} y' &= [1] \ln (x + \sin^{-1} e^x) + x \left[\frac{1}{x + \sin^{-1}(e^x)} \cdot (1 + \frac{1}{\sqrt{1-e^{2x}}} \cdot e^x) \right] \\ y' &= y \left(\dots \right) \end{aligned}$$