

Name: _____

Quiz 6, sections 3.1, 3.2, 3.3

1. (3 pts) Find the derivative of $f(x) = e^x \sin x$.

$$f' = [e^x] \sin x + e^x [\cos x]$$

2. (3 pts) Find the derivative of $f(x) = \frac{3}{7}x^{-7/12} + 3e^x + \frac{5}{2}x^{3/2} - e^\pi$. Simplify the numerical coefficients. [this is a constant so its derivative is 0]

$$\begin{aligned} f' &= \frac{3}{7} \left[-\frac{7}{12} x^{-19/12} \right] + 3e^x + \frac{5}{2} \left[\frac{3}{2} x^{1/2} \right] - 0 \\ &= -\frac{3}{12} x^{-19/12} + 3e^x + \frac{15}{4} x^{1/2} \\ &\quad \uparrow \\ &\quad -\frac{1}{4} \end{aligned}$$

3. (4 pts) Find the derivative of $f(x) = \frac{x^2}{x^2+1}$. Simplify the numerator.

$$\begin{aligned} f' &= \frac{(x^2+1)[2x] - (x^2)[2x]}{(x^2+1)^2} \\ &= \frac{2x^3 + 2x - 2x^3}{(x^2+1)^2} = \frac{2x}{(x^2+1)^2} \end{aligned}$$