Name Key

Math 111 Section 4

Quiz 8 (over sections 5.4 & 5.5)

(Time < 7min To Take)

7:57am

Find the first derivative of the first seven problems. (1 point each)

1. $f(x) = e^{3x}$ $\quad f'(x) = (e^{3x})(3) = 3e^{3x}$

answer 1. $3e^{3x}$

2. $f(x) = e^{x} + x^{2}$ $\quad f'(x) = e^{x} + 2x$

answer 2. $e^{x} + 2x$

3. $f(x) = (e^{x} + 1)^{25}$ $\quad f'(x) = 25(e^{x}+1)^{24}(e^{x})$

answer 3. $25e^{x}(e^{x}+1)^{24}$

4. $f(x) = 5 \ln x$ $\quad f'(x) = 5\left(\frac{1}{x}\right)$

answer 4. $\frac{5}{x}$ or $5\left(\frac{1}{x}\right)$

5. $f(x) = \ln \frac{1}{x^2} = \ln x^{-2} = -2\ln x$ $\quad f'(x) = -2\left(\frac{1}{x}\right)$

answer 5. $-2\left(\frac{1}{x}\right)$ OR $\frac{-2}{x}$

6. $f(x) = \ln(4x^2 - 5x + 3)$ $\quad f'(x) = \frac{8x-5}{4x^2-5x+3}$

answer 6. $\frac{8x-5}{4x^2-5x+3}$

Continue finding the first derivative of number 7

7. $f(x) = x^2 (\ln x)$

$f'(x) = x^2\left(\frac{1}{x}\right) + \ln x\,(2x)$

$= x + 2x \ln x$

answer 7. $x(1 + 2\ln x)$

Find the second derivative of the final three problems.

8. $f(x) = e^{-4x} + e^{3x}$

$f'(x) = e^{-4x}(-4) + e^{3x}(3)$

$= 3e^{3x} - 4e^{-4x}$

$f''(x) = 9e^{3x} + 16e^{-4x}$

first

2nd derivative

answer 8. $\boxed{3e^{3x} - 4e^{-4x}}$ ~~OR $e^{3x}(1 - 4e^{-7x})$~~ $\boxed{9e^{3x} + 16e^{-4x}}$

9. $f(t) = 3e^{-2t} - 5e^{-t}$

$f'(t) = 3e^{-2t}(-2) - 5e^{-t}(-1)$

$f'(t) = -6e^{-2t} + 5e^{-t}$; $f''(t) = 12e^{-2t} - 5e^{-t}$

1st derivative

2nd derivative

answer 9. $\boxed{5e^{-t} - 6e^{-2t}}$ ~~OR $e^{-t}(5 - 6e^{-t})$~~ $\boxed{12e^{-2t} - 5e^{-t}}$

10. $f(x) = \ln(2x)$ OR $f(x) = \ln 2 + \ln x$

$f'(x) = \frac{2}{2x} = \frac{1}{x} = x^{-1}$

$f''(x) = -x^{-2}$ OR $-\frac{1}{x^2}$

1st derivative

2nd derivative

answer 10. ~~$\frac{1}{x}$~~ $\boxed{-x^{-2} \text{ OR } -\frac{1}{x^2}}$

8:04 am