Mathematics 122

Quiz #19 Name: Key

You must show your work to get full credit.

Compute the following derivatives.

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

2. $w = 2e^{3z} + \ln(z+6)$ $\quad \dfrac{dw}{dz} = 6e^{3z} + \dfrac{1}{z+6}$

3. $y = 2xe^x$ $\quad y' = 2e^x + 2xe^x = (2+2x)e^x$

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

$= 2e^x + 2xe^x$

4. $f(x) = x\ln(x) - x$ $\quad f'(x) = \ln(x)$

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

$= \ln(x) + 1 - 1$

5. $f(t) = 2te^{-t^2}$ $\quad f'(t) = 2e^{-t^2} - 4t^2e^{-t^2} = (2-4t^2)e^{-t^2}$

$f'(t) = 2e^{-t^2} + 2t\,e^{-t^2}(-2t)$

$= 2e^{-t^2} - 4t^2e^{-t^2}$