Mathematics 122

Quiz #~~25~~ 22 Name: Key

You must show your work to get full credit.

Let a, b and c be constants. Compute the following derivatives.

1 pt (1) $y = x^2 e^{3x}$ $\quad y' =$ $(2x + 3x^2)e^{3x}$

$y' = 2x e^{3x} + x^2 e^{3x}(3)$ ← both ok

$= (2x + 3x^2) e^{3x}$

1 pt (2) $f(t) = t^5(2t^2 + t)^4$ $\quad f'(t) =$

$f'(t) = 5t^4 (2t^2+t)^4 + t^5 (2t^2+t)^3 (4t+1)$

1 pt (3) $w = z\ln(z) - z$ $\quad \dfrac{dw}{dz} =$ $\ln(z)$

$w' = 1 \cdot \ln(z) + z\,\frac{1}{z} - 1$ ← both ok.

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

1 pt (4) $A(r) = \dfrac{r+1}{r-1}$ $\quad A'(r) =$ $\dfrac{-2}{(1-r)^2}$

$A' = \dfrac{1(r-1) - 1(r+1)}{(1-r)^2} = \dfrac{-2}{(1-r)^2}$ ↑ both ok.

or $A = (r+1)(r-1)^{-1}$ $\quad A' = (1)(r-1)^{-1} - (r-1)(-1)(r-1)^{-2}$

1 pt (5) $y = \dfrac{be^x}{x^3} = b x^{-3} e^x$ $\quad \dfrac{dy}{dx} =$

$y' = -3b x^{-4} e^x + b x^{-3} e^x$ ↕ both ok.

or

$y' = \dfrac{be^x(x^3) - be^x(3x^2)}{(x^3)^2}$