Mathematics 122

Quiz #20 Name: Key

You must show your work to get full credit.

Let a and b be constants, then find the derivatives of the following:

(1) $y = 4x^7 - 9x^4 + 2x - 9$ $y' = 28x^6 - 36x^3 + 2$

1 pt

(2) $f(t) = 4\sqrt{t} + \frac{5}{t^3} = 4t^{\frac{1}{2}} + 5t^{-3}$ $f'(t) = 2t^{-\frac{1}{2}} - 15t^{-4}$

1 pt

(3) $w = 3e^z + \ln(z)$ $\frac{dw}{dz} = 3e^z + \frac{1}{z}$

1 pt

(4) $C(q) = 4(.7)^q$ $C'(q) = 4\ln(.7)(.7)^q$

1 pt

(5) $A(r) = 5(r^2+r)^7$ $A'(r) =$ $35(r^2+r)^6(2r+1)$

1 pt $A'(r) = 35(r^2+r)^6(2r+1)$

(6) $y = 4e^{2x^3+x^2}$ $\frac{dy}{dx} =$ $4e^{2x^3+x^2}(6x^2+2x)$

1 pt $y' = 4e^{2x^3+x^2}(6x^2+2x)$

(7) $f(u) = -3\ln(e^u+u)$ $f'(u) =$ $\frac{-3(e^u+1)}{e^u+u}$

1 pt $f'(u) = -3\frac{(e^u+u)'}{e^u+u}$

(8) $h(x) = 3x^2e^{3x}$ $h'(x) =$ $(9x^2+6x)e^{3x}$

1 pt $h'(x) = (3x^2)'e^{3x} + 3x^2(e^{3x})'$

$= \boxed{6xe^{3x} + 3x^2e^x(3)}$ or either is ok

(9) $P(t) = \frac{e^t}{t+1} = e^t(t+1)^{-1}$ $P'(t) =$ $\frac{te^t}{(t+1)^2}$

1 pt $P'(t) = \boxed{\frac{e^t(t+1) - e^t(1)}{(t+1)^2}}$ or $\boxed{P' = e^t(t+1)^{-1} - e^t(t+1)^{-2}}$

any of those ok

(10) $h(s) = ax^4e^{3bx}$ $h'(s) =$ $(3abx^4 + 4ax^3)e^{3bx}$

1 pt. $h'(s) = \boxed{4ax^3e^{3bx} + ax^4e^{3bx}3b}$ either ok