Mathematics 122

Quiz #20 Name: Key

You must show your work to get full credit.

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

$y = \dfrac{x+1}{x-1}$ $y' = \dfrac{-2}{(x-1)^2}$

$y' = \dfrac{(x+1)'(x-1) - (x+1)(x-1)'}{(x-1)^2} = \dfrac{x-1-(x-1)}{(x-1)^2} = \dfrac{-2}{(x-1)^2}$

$R(q) = 2aq^3e^{q^2}$ $\dfrac{dR}{dq} = (6aq^2 + 4aq^4)e^{q^2}$

$R'(q) = 2a3q^2e^{q^2} + 2aq^3e^{q^2}(2q)$

$= (6aq^2 + 4aq^4)e^{q^2}$

$w = b^2e^{(2z+1)^2}$ $\dfrac{dw}{dz} = 4b^2(2z+1)e^{(2z+1)^2}$

$\dfrac{dw}{dz} = b^2e^{(2z+1)^2}(2z+1)(2)$

$= 4b^2(2z+1)e^{(2z+1)^2}$

$f(\cancel{t}z) = z^2\ln(z) - \dfrac{z^2}{2}$ $f'(\cancel{t}z) = 2z\ln(z)$

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

$= 2z\ln(z) + z - z$

$h(s) = \sqrt{c^2 - s^2} = (c^2-s^2)^{1/2}$ $h'(s) = \dfrac{-s}{\sqrt{c^2-s^2}}$

$h'(s) = \frac{1}{2}(c^2-s^2)^{-\frac{1}{2}}(0-2s)$

$= \frac{1}{2}\dfrac{1}{\sqrt{c^2-s^2}}(-2s)$

$= \dfrac{-s}{\sqrt{c^2-s^2}}$