Quiz 7

Name: SOLUTIONS

1. Compute the first derivative of each of the following functions:

(a) $f(x) = \ln\left(x^4 + 2x^2 + 1\right)$

$$f'(x) = \frac{1}{x^4+2x^2+1} \cdot (4x^3+4x) = \frac{4x^3+4x}{x^4+2x^2+1}$$ } 2

(b) $f(x) = e^{5x}\cos(x^3)$

$$f'(x) = (5e^{5x})(\cos(x^3)) + e^{5x}\left(-\sin(x^3)\cdot 3x^2\right)$$
$$= e^{5x}\left[5\cos(x^3) - 3x^2\sin(x^3)\right]$$ } 4

(c) $f(x) = \arctan\left(\frac{4x-1}{4x+1}\right)$

$$f'(x) = \frac{1}{1+\left(\frac{4x-1}{4x+1}\right)^2} \cdot \left(\frac{4(4x+1) - (4x-1)(4)}{(4x+1)^2}\right)$$
$$= \frac{1}{1+\left(\frac{4x-1}{4x+1}\right)^2} \cdot \frac{16x+4-16x+4}{(4x+1)^2}$$
$$= \frac{1}{1+\left(\frac{4x-1}{4x+1}\right)^2} \cdot \frac{8}{(4x+1)^2} = \frac{8}{(4x+1)^2+(4x-1)^2}$$ } 4