New Jersey Institute of Technology
DEPARTMENT OF MATHEMATICAL SCIENCES
Math 111-029 Quiz 4

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1. Find dy/dx, of the following functions. DO NOT SIMPLIFY:

(a) $y = e^{\sin(x)+2x^3}$

(+2) $dy/dx = e^{\sin x + 2x^3} \cdot (\cos x + 6x^2)$

(+2) (b) $y = (x^2+1)^{100}$

$y' = 100(x^2+1)^{99}(2x) = 200x(x^2+1)^{99}$

(+2) (c) $y = \dfrac{3x+\tan(2x)}{x\sec(x)}$

$y' = \dfrac{x\sec x[3+2\sec^2(2x)] - [3x+\tan(2x)][x\sec x\tan x + \sec x]}{(x\sec x)^2}$

2. Suppose the position of an object is given by $s(t) = t^3 - 6t^2 + 9t$ meters. (i) What is the velocity and acceleration as a function of time? (ii) At what time(s) does the object stop moving?

$$\begin{cases} v(t) = s'(t) = 3t^2 - 12t + 9 \\ a(t) = v'(t) = 6t - 12 \end{cases} \quad (+4)$$

Stop $v(t) = 0$

$3(t^2 - 4t + 3) = 0$

$3(t-3)(t-1) = 0$

$t = 1, 3$