MTH 220 Quiz 7

1. If $x^3 + y^3 = 4xy$, find $\frac{dy}{dx}$. Then equation of the tangent line to the $x^3 + y^3 = 4xy$ at the point (2,2).(**4 points.**)

   Solution:

$$\frac{d}{dx}(x^3 + y^3) = \frac{d}{dx}4xy$$
$$3x^2 + 3y^2\frac{dy}{dx} = 4(y + x.1.\frac{dy}{dx})$$
$$\frac{dy}{dx}(3y^2 - 4x) = 4y - 3x^2$$
$$\frac{dy}{dx} = \frac{4y - 3x^2}{3y^2 - 4x}$$

   Slope of the tangent line at (2,2) is $\frac{dy}{dx}(2,2) = \frac{8-12}{12-8} = -1$

   Equation of the tangent line at (2,2) is $y - 2 = -1(x - 2)$, which is $y = -x + 4$

2. Find the following derivatives (**2 points each.**)

   (a) $f(x) = (x^5 + 4x^2 + 3)^5$

   Solution:
   $f'(x) = 5(x^5 + 4x^2 + 3)^4.(x^5 + 4x^2 + 3)' = 5(x^5 + 4x^2 + 3)^4.(5x^4 + 8x)$

   (b) $g(x) = ln(secx)$

   Solution:
   $g'(x) = \frac{(secx)'}{secx} = \frac{secx.tanx}{secx} = tanx$

   (c) $e^{(sin2x)}$

   Solution: $(e^{sin(2x)})' = (e^{sin(2x)}).(sin2x)' = (e^{sin(2x)}).cos(2x).2$