Pledge:

3/17/2009 MATH261 Calculus I Name: Solution
Dr. Lunsford Quiz 8 (20 Points Total)

I. Find the indicated derivatives. You are NOT required to simplify your answers. (4 points each, 16 total)

(a) $f(t)=\dfrac{t}{\left(t^3+1\right)^4}$ $= t(t^3+1)^{-4}$

$f'(t)=$ ↓ QR $\dfrac{(t^3+1)^4 - t\,(4(t^3+1)^3(3t^2))}{(t^3+1)^8}$ OR ↓ PR $= (t^3+1)^{-4} + t(-4(t^3+1)^{-5}(3t^2))$

(b) $g(w)=\sin^3\left(w^8-w+1\right)$ $= [\sin(w^8-w+1)]^3$

$\dfrac{d}{dw}g(w)=$ $3[\sin(w^8-w+1)]^2\cos(w^8-w+1)(8w^7-1)$

(c) $l(x)=\sqrt[3]{x+\tan(2x)}$ $= (x+\tan(2x))^{1/3}$

$l'(x)=$ $\frac{1}{3}(x+\tan(2x))^{-2/3}(1+\sec^2(2x)(2))$

(d) $p(y)=e^{-4y}\cos(7y)$

$\dfrac{dp}{dy}=$ $-4e^{-4y}(\cos(7y)) + e^{-4y}(-\sin(7y)(7))$

II. Below you are given the graph of $5x^2-xy+5y^2=11$. Find the equation of and accurately graph the tangent line to the graph at $(x,y)=(1,-1)$.
Hint: First find the slope via implicit differentiation. (4 points)

$10x - y - x\dfrac{dy}{dx} + 10y\dfrac{dy}{dx} = 0$

$\dfrac{dy}{dx} = \dfrac{y-10x}{10y-x}$

$\left.\dfrac{dy}{dx}\right|_{(x,y)=(1,-1)} = \dfrac{-1-10}{-10-1} = 1$

$y-(-1)=1(x-1) \Rightarrow \boxed{y=x-2}$