Feb 7th, 2006

Math 151

Winter 2006

QUIZ # 4

(Form B)

Name: KEY

TA: Oguz Kurt

$10x^{-3}$

1)[4 Points] For $f(x) = 9x^7 + \dfrac{10}{x^3} + 11\sqrt{\pi}$ compute the derivative function $f'(x)$.

2)[5 Points] For $g(t) = \dfrac{\sin(t)}{5t^2 + 8\cos(t)}$ compute $D_t g(t)$.

($11\sqrt{\pi}$ is a constant)

3)[5 Points] Compute $D_v\left(v^{15}\sqrt{8v+7}\right)$.

4)[6 Points] Let $h(y) = \cot(y)$. Suppose further $g(x)$ is a differentiable function with $g(-5) = \dfrac{\pi}{4}$ and $g'(-5) = \dfrac{\pi}{8}$.
For the composite $f(x) = (h \circ g)(x) = h(g(x))$ compute the value of $f'(-5)$.

You must show all work!

1) $f'(x) = 63x^6 - 30x^{-4} + 0$ SR, Power Rule

2) $g'(t) = D_t(g(t)) = \dfrac{\cos(t)(5t^2 + 8\cos t) - \sin t(10t - 8\sin t)}{(5t^2 + 8\cos t)^2}$ SR, QR, Power rule

3) $D_v\left(v^{15}\sqrt{8v+7}\right) = (15v^{14})\sqrt{8v+7} + (v^{15})\underbrace{\left(\frac{1}{2}(8v+7)^{-1/2}\cdot 8\right)}_{\text{C.R.}}$ P.R.

4) $f(x) = \cot(g(x))$

$f'(x) = -\csc^2(g(x)) \cdot g'(x)$ chain rule

$f'(-5) = -\csc^2(g(-5)) \cdot g'(-5)$

$= -\csc^2\left(\frac{\pi}{4}\right) \cdot \frac{\pi}{8}$

$= -(2) \cdot \frac{\pi}{8}$

$= -\frac{\pi}{4}$