Math 121 F09N05 - Quiz 4
Oct 26 2009

Name: SOLUTIONS
Stu#:

(1) [3 points] Differentiate $y = \frac{r^2}{1+\sqrt{r}}$. $= \frac{r^2}{1+r^{1/2}}$

$$y' = \frac{(1+r^{1/2})(2r) - (r^2)\,\frac{1}{2}r^{-\frac{1}{2}}}{(1+r^{1/2})^2}$$

(2) [3 points] Differentiate $g(t) = t^5 \sin(t)$.

$$g'(t) = 5t^4 \sin(t) + t^5 \cos(t)$$

(3) [3 points] Differentiate $y = (5x-2)^5(5x^2-8)^{-4}$.

$$y' = 5(5x-2)^4(5)(5x^2-8)^{-4} + (5x-2)^5(-4)(5x^2-8)^{-5}(10x)$$

Chain! Chain!

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(4) [3 points] Differentiate $y = \cot^2(\tan(\theta))$ . $= [\cot(\tan\theta)]^2$

$$y' = 2[\cot(\tan\theta)]\cdot[-\csc^2(\tan\theta)]\cdot\sec^2\theta$$

Chain Chain

(5) [3 points] User implicit differentiation to determine $y'$ if $x^2y + xy^2 = 3x$ .

$$\frac{d}{dx}\left[x^2y + xy^2\right] = \frac{d}{dx}[3x]$$

$$2xy + x^2y' + 1\cdot y^2 + x\,2yy' = 3$$

$$y'\left[x^2 + 2xy\right] = 3 - 2xy - y^2$$

$$y' = \frac{3 - 2xy - y^2}{x^2 + 2xy}.$$