Mathematics 2934-010 Name (please print) _____

Quiz 4

October 6, 2011

Instructions: Give concise answers, but clearly indicate your reasoning.

Remember that $\frac{d}{dx}\arctan(x) = \frac{1}{1+x^2}$.

I. Calculate the following partial derivatives.
(7)

1. $f_t(x,y,z,t)$ if $f(x,y,z) = \frac{1}{x^2y^2z^2t^2}$
2. $\frac{\partial}{\partial y}\left(\int_y^x \cos(t^2)\,dt\right)$
3. $\frac{\partial}{\partial x}\left(\arctan\left(\frac{y}{x}\right)\right)$

II. Describe the level curves of $f(x,y) = |y|$ for $c > 0$, $c = 0$, and $c < 0$. (Draw a graph illustrating them for
(3) some specific values. For some c, the level curves may be empty).

III. State Clairaut's Theorem (hypotheses not needed).
(2)

IV. Find $\frac{\partial z}{\partial x}$ if $x - z = \arctan(yz)$.
(3)