MATH 241 Spring, 2010 Quiz #5 Name:_____

For full credit you must show sufficient work that the method of obtaining your answer is clear. There is no need to "simplify" answers.

1. The function $z = f(x,y) = \tan^{-1}(xy)$ is defined everywhere on the (x,y)-plane except along the x and y-axes.

   a. Compute $\operatorname{grad} f = \vec{\nabla} f$.

   b. Compute $\dfrac{\partial^2 z}{\partial x \partial y} = f_{yx}$; then give $\dfrac{\partial^2 z}{\partial y \partial x} = f_{xy}$.

2. Compute $\dfrac{\partial z}{\partial t}$ in terms of x, y, s, and t if $z = xy^2 \sin x$, $x = st^3$, and $y = s^4 t$.