MATH 202
Quiz 6

Name : _____

March 18, 2008

Instructions: This quiz is worth five points. You get one point for taking this quiz.

1. (2 pts.) Let $z = e^{xy} \tan x$ for $x = st$ and $y = s + 2t$.

   (a) Use the chain rule to find $\frac{\partial z}{\partial t}$.
   (Your answer should be simplified, but can contain the variables x, y, s, and t.)

$$\frac{\partial z}{\partial t} = \frac{\partial z}{\partial x}\frac{\partial x}{\partial t} + \frac{\partial z}{\partial y}\frac{\partial y}{\partial t} = (ye^{xy}\tan x + e^{xy}\sec^2 x)\cdot s + (xe^{xy}\tan x)\cdot 2 = e^{xy}(\tan x\cdot(2x+ys) + s\cdot\sec^2$$

   (b) Find $\frac{\partial z}{\partial t}$ when $s = 0$ and $t = 1$.

$$\frac{\partial z}{\partial t} = e^0(\tan 0\cdot(0) + 0) = 0$$

2. (2 pts.) Find the direction derivative of $f(x, y) = y\sin(xy)$ at the point $(0, 2)$ in the direction of $\mathbf{v} = (\sqrt{3}, 1)$.

$$\nabla f = \langle y^2\cos(xy),\ \sin(xy) + yx\cos(xy)\rangle$$
$$= \langle 4, 0\rangle$$
$$\vec{u} = \frac{\vec{v}}{\sqrt{(\vec{v},\vec{v})}} = \left\langle \frac{\sqrt{3}}{2}, \frac{1}{2}\right\rangle$$
$$D_{\vec{u}} f = 2\sqrt{3}$$