NAME:

Quiz 2a; Math 225

This exam is a closed book, no notes, no "crib sheets" quiz. Calculators are permitted. There are five problems on this quiz. Good luck!

1. (4 points) If $f(x, y) = \cos(x + y)e^{xy}$, compute $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$.

2. (4 points) If $f(x, y, z) = x^2yz^2 - 2\ln(xz)$, compute $f_{xz}(x, y)$.

3. (4 points) Suppose the radius and height of a cylinder are changing with time. Find the rate of change in the volume of the cylinder with time when $r = 2$ and $h = 5$ if $\frac{dr}{dt} = -2$ and $\frac{dh}{dt} = 3$. (Hint: Recall that the formula for the volume of cylinder is $V = \pi r^2 h$, and then use the chain rule.)

4. (4 points) Compute the equation for the tangent plane to the graph of $f(x, y) = \sqrt{x^2 + y^2}$ at the point $(3, 4, 5)$.

5. (4 points) Compute the directional derivative of the function $f(x, y) = (x + y)/(x - y)$ at the point $(2, 1)$ in the direction of the unit vector $\mathbf{u} = \langle 3/5, 4/5 \rangle$.