Math 208: Calculus - Fall 06
Quiz 4: Name _____

1. Let $f(x,y) = \frac{x}{y}$ be a function in two variables and let $z = f(x,y)$.
   (a) Compute $\partial z/\partial x$ and $\partial z/\partial y$.

   (b) Let $x = s\,e^t$ and $y = 1 + s\,e^{-t}$. Compute $\frac{\partial z}{\partial s}$.

   (c) Compute the tangent plane to the function at the point $(3,6)$.

   (d) Give the equation of the linear approximation $L(x,y)$ of the function at the point $(3,6)$.

   (e) Use the linear approximation to approximate the value of the function at $(3.01, 6.01)$.

   (f) Give the gradient of $f$ at the point $(3,6)$.

   (g) Compute the maximum rate of change of the function $f$ at the point $(3,6)$.

   (h) Give the direction for which the function has the minimum rate of change at the point $(3,6)$.

   (i) Compute $D_{\mathbf{u}}f(3,6)$, where $\mathbf{u} =< 1, 1/\sqrt{2} >$.