Math 53 - Multivariable Calculus

Quiz # 6

March 2nd, 2012

Exercise 1. *Show that if* $z(x, y) = f(x - y)$ *then* z *satisfies the partial differential equation given by* $\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} = 0$.

Exercise 2. *Let* $u = y/x$, $v = x^2 + y^2$, $w = w(u, v)$. *Express the partial derivatives* w_x *and* w_y *in terms of* w_u *and* w_v (*and* x *and* y).

Exercise 3. *Let* $f(x, y) = x^2y^2 - x$. *Find the gradient* ∇f *at* $(2, 1)$. *Write the equation for the tangent plane to the graph of* f *at* $(2, 1, 2)$. *Now, use a linear approximation to find the approximate value of* $f(1.9, 1.1)$. *Finally, find the directional derivative of* f *at* $(2, 1)$ *in the direction* $\langle -1, 1\rangle$.