Math 2551 (L1-L3)
2/15/2016

Worksheet 8

1. For each of the functions below, find all the first order partial derivatives:

a). $f(x,y) = xy^3 + x^2y^2$.

b). $f(x,y) = xe^{2x+3y}$.

c). $f(x,y) = \frac{x-y}{x+y}$.

d). $f(x,y) = 2x\sin(x^2y)$.

e). $f(x,y,z) = x\cos z + x^2y^3e^z$.

2. Show that the function $u(x,y) = \ln(1+xy^2)$ satisfies the partial differential equation:

$$2\frac{\partial^2 u}{\partial x^2} + y^3\frac{\partial^2 u}{\partial y \partial x}.$$

3. If $g(s,t) = f(s^2-t^2, t^2-s^2)$ and f is differentiable, show that g satisfies the equation:

$$t\frac{\partial g}{\partial s} + s\frac{\partial g}{\partial t} = 0.$$