# Calc 3 - Assignment 15

Note Title 10/12/2011

(1) If $f(x,y) = \sqrt{4 - x^2 - 4y^2}$, find $f_x(1,0)$ and $f_y(1,0)$ and interpret as slopes. Graph the surface.

(2) Verify that $u_{xy} = u_{yx}$ for $u(x,y) = x \sin(x + 2y)$

(3) Which is a solution to Laplace's PDE $u_{xx} + u_{yy} = 0$

a) $u = x^2 + y^2$

b) $u = x^2 - y^2$

c) $u = \sin(x)\cosh(y) + \cos(x)\sinh(y)$

d) $u = e^{-x}\cos(y) - e^{-y}\cos(x)$

(4) Show that $u = t/a^2t^2 - x^2$ solves the Wave Equation $u_{tt} = a^2 u_{xx}$

(5) How many n-th order partial derivatives does a function $f(x,y)$ have?

(6) Find equation of the tangent plane to the given surface at the specified point:

a) $z = y \ln(x)$ at $(1,4,0)$

b) $z = \sqrt{xy}$ at $(1,1,1)$

(7) Graph the surface and its tangent plane at the given point using Mathematica

$z = x^2 + xy + 3y^2$ at $(1, 1, 5)$