Homework 5

For more information on partial derivatives consult Stewart's Calculus book chapter 15, especially section 15.2

Find $\frac{\partial f}{\partial x}$, $\frac{\partial f}{\partial y}$ and $\frac{\partial f}{\partial z}$ for the following functions.

1. $f = \sin(k_1 x - k_2 y)\cos(z)$
2. $f = e^{x^2+y^2+z^2}$
3. $f = 2x^2y^4$
4. $f = \tan(x + y^2)\cot(x + z)$

Find the values for which y and t and the slope $\frac{dy}{dt}$ are defined, state whether or not the differential equations have solutions:

1. $\frac{dy}{dt} = \frac{\sqrt{2-2y}}{\sqrt{y-1}}$
2. $\frac{dy}{dt} = \frac{\sqrt{2-2y}}{\sqrt{1-y}}$
3. $\frac{dy}{dt} = \cos^{-1}(y) + \cos^{-1}(t)$