MATHEMATICS

Friday May 6 2016

Ninth Exercise Class

1) Find critical points of the following function and determine whether they are maximum, minimum or saddle points.

$$f(x, y, z) = 4x^2 + 2y^2 + z - xy - yz - 5x - 9y + z$$

2) Use Lagrange multipliers to find the maximum and minimum values of f subject to the given constraints

   a) $z = f(x, y) = x + y$ on $x + y^2 = 1$

   b) $z = f(x, y) = x^2 + y^2$ on $x + y = 1$

   c) $z = f(x, y) = x^2 + y^2$ on $x + y^2 = 1$

   d) $z = f(x, y) = y - x^2$ on $2x^2 - y = 0$

   e) $z = f(x, y) = x^2 - y^2$ on $x^2 - y = 0$

   f) $z = f(x, y) = x^3 - y^2$ on $x^2 + y^2 - 1 = 0$

   g) $w = f(x, y, z) = x + y + z$ on $x^2 + y^2 + z^2 = 3$

   h) $w = f(x, y, z) = x + y + z$ on $xyz = 1$

   i) $w = f(x, y, z) = -x - y + 2z$ on $\begin{cases} x^2 + y^2 = 10 \\ y + z = 3. \end{cases}$