Math 233 Fall 2004

Homework # 6

(*Due* : Thursday 11/4 , "handed in")

1) Find the **local maximum** and the **local minimum values** of the function $f(x,y) = 2x^3 + xy^2 + 5x^2 + y^2$ on its domain .

2) Find the **absolute maximun** and the **absolute minimum values** of $f(x,y) = 4x + 6x - x^2 - y^2$ over $D = \{ (x,y) \mid 0 \leq x \leq 4 , 0 \leq y \leq 5 \}$.

3) Find the point on the plane $x - y + z = 4$ that is closest to (1 , 2 , 3) .

4) The base of an aquarium with volume **V** is made of slate and the sides are made of glass . If slate costs five times as much (per unit area) as glass , find the dimensions of the aquarium (in terms of **V**) that **minimize** the cost of materials.

5) Use **Lagrange multipliers** to find the maximum and minimum values of $f(x,y,z) = 3x - y - 3z$ subject to the constaints $x + y - z = 0$ and $x^2 + 2z^2 = 1$.

6) Use **Lagrange multipliers** to find the highest and lowest points on the ellipse formed from the intersection of the plane $4x - 3y + 8z = 5$ with the cone $z^2 = x^2 + y^2$.