Math 16C
Kouba
Worksheet 6

Use Lagrange multipliers to solve each of the following problems.

1.) Minimize $f(x, y, z) = x^2 + y^2 + z^2$

subject to $x - y + z = 0$ and $-x + 2y - z = 3$.

2.) Maximize $f(x, y, z) = 10 - x^2 - 2y^2 - 3z^2$

subject to $x - y = 5$ and $x + y - z = 2$.

3.) The temperature T in degrees Fahrenheit at a point (x, y) on a metal plate is given by

$$T = x^2 - 6x + 9 + y^2 .$$

An ant, walking on the plate, traverses a circle of radius 5 centered at the origin. What are the highest and lowest temperatures encountered by the ant ?