

Math 2415

Homework on 14.8

Use the method of Lagrange Multipliers to solve the following constrained optimization problems. Whenever possible solve the problem using a geometric method (a picture) as well as algebraically.

1. Find the maximum and minimum of $f(x, y) = xy$ on the ellipse $x^2 + 2y^2 = 1$.
2. Find the maximum of $f(x, y) = 49 - x^2 - y^2$ on the line $x + 3y = 10$. Does f have a minimum on this line? Why or why not?
3. Find the absolute maximum and minimum values of the function $f(x, y) = x^2y$ subject to the constraint $x^2 + y^2 = 4$.
4. Find the absolute maximum and minimum values of the function $f(x, y) = x^2 + y^2 - x - y + 1$ on the unit disc $x^2 + y^2 \leq 1$.