

Math 210 (Lesieutre)
12.8: Max/min, continued
February 22, 2017

Problem 1. For each of the following functions, find the critical points. Pick one, and determine whether it is a maximum, minimum, or saddle point.

a) $x^4 + y^4 - 16xy$

b) $f(x, y) = x^2 - 2x + y^2 - 4y + xy + 5$

c) $g(x, y) = x^2ye^{-x^2-y^2}$.

Problem 2. Find the point on the surface $x^2 - yz = 1$ which is closest to the origin. (Hint: minimize the square of the distance, instead of the distance itself).

Problem 3. Find the maximum value of the function $f(x, y) = (x - 1)^2 + y^2$ on or inside a circle of radius 2 centered at $(0, 0)$.

Problem 4. Find the maximum and minimum values of the function $f(x, y) = 5 - (x - 1)^2 - (y - 1)^2$ on a triangle with vertices $(0, 0)$, $(8, 0)$, and $(0, 4)$.