

Homework I Second-Half

Due in class Monday July 09 2017

1. $f(x, y) = |x| + |y|$. Draw the level set $f(x, y) = 1$.
2. $f(x, y) = \max\{|x|, |y|\}$. Draw the level set $f(x, y) = 1$.
3. Suppose you are climbing a hill whose shape is given by the equation $z = 1000 - 0.005x^2 - 0.01y^2$, where x, y, z are measured in meters. You are standing at a point with coordinates $(60, 40, 966)$. The positive x -axis points east and the positive y -axis points north.
 - (a). If you walk due south, will you start to ascend or descend? At what rate?
 - (b). If you walk northwest, will you start to ascend or descend? At what rate?
 - (c). In which direction is the slope largest? What is the rate of ascend in that direction? At what angle above the horizon does the path in that direction begin?
4. Maximize the function $f(x, y) = 2x - y$ under the constraint $x^2 + y^2 = 4$
5. Use the Lagrange multiplier method to find the largest possible area of a rectangle all of whose vertexes are on a circle of radius 2.