

NAME: _____ Group Nr: _____

Worksheet 10/18- MAC 2313, F'18 Optimization and optimization with constraints

1. (Pb. 43, section 13.8, textbook) A closed rectangular box with a volume 16 ft^3 is made from two kinds of material. The top and bottom are made of material costing 10 cents per square foot and the sides from material costing 5 cents per square foot. Find the dimensions of the box so that the cost of the material is minimized.
2. Find the point(s) on the curve $x^2y = 2$ that are closest to the origin.
3. (Pb. 24, section 13.9, textbook) Suppose that the temperature at a point (x, y) on a metal plate is $T(x, y) = 4x^2 - 4xy + y^2$. 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?
4. Find the points on the sphere $x^2 + y^2 + z^2 = 25$ where $f(x, y, z) = x + 2y + 3z$ has its maximum and minimum values.