

Calc III: Workshop 5, Fall 2017

Problem 1. You want to construct an open top box (i.e., 4 sides and a bottom, but no top) having a volume of 4000 cubic centimeters, but using the least amount of materials (i.e., having minimal surface area). What are the dimensions of such a box?

Problem 2. Find and classify the local maxima and minima of the function

$$f(x, y) = x^3 - 3xy + y^3 + 2.$$

Problem 3. Find the max and min of $f(x, y) = x + 2y + 1$ on the ellipse $x^2 + 2y^2 = 1$.

Problem 4. Find the global maximum and minimum of $f(x, y) = 4x^2 - 4x + y$ over the region where $0 \leq y \leq 4 - x^2$.