

Math 233 Warm Up Problems

October 1, 2009

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

$$T = \{(x, y) | 0 \leq x \leq 3; -2 \leq y \leq 1; x + y \leq 1\}$$

- (a) Graph T .
- (b) Find all critical points in the interior of T .
- (c) Find all max/mins on the side of the triangle: $x = 0$ and $-2 \leq y \leq 1$.
- (d) Find all max/mins on the bottom of the triangle: $y = -2$ and $0 \leq x \leq 3$.
- (e) Find all max/mins on the hypotenuse of the triangle: $y = 1 - x$ and $0 \leq x \leq 3$.
- (f) Find the absolute max and mins on the triangle.

Lecture Problems

2. Find the max and mins of $f(x, y, z) = x + 2y - z$ on the sphere $x^2 + y^2 + z^2 = 4$.
- (a) Set up 4 equations with 4 unknowns.
 - (b) Solve the equations for x, y, z and λ .
 - (c) Find the max and min of the function on the sphere.