

Analytic Geometry and Calculus III (22005 Section 02)

HW6, due Friday, October 21

Instructor: Prof. Artem Zvavitch

**Problem 1.** Use Lagrange multipliers to find the maximum and minimum values of  $f(x, y) = xy$  subject to  $2x^2 + y^2 = 3$

**Problem 2.** Use Lagrange multipliers to find the maximum and minimum values of  $f(x, y, z) = x + y + z$  subject to  $x^2 + y^2 + z^2 = 1$

**Problem 3.** Calculate the following integrals

$$\int \int_R y + x dA, \text{ where } R = [0, 1] \times [4, 5].$$

$$\int \int_R \frac{xe^x}{y} dA, \text{ where } R = [0, 1] \times [1, 2].$$

$$\int \int_D y + x dA, \text{ where } D \text{ is the region bounded by } y = x^3 \text{ and } y = x.$$

$$\int \int_D y^2 x dA, \text{ where } D \text{ is the region bounded by } y^2 = x \text{ and } y = x.$$