

Math 210 (Lesieutre)

12.9, Lagrange multipliers, and a little 13.1

March 1, 2017

**Problem 1.** Find the maximum value of the function  $f(x, y) = x + y$  subject to the constraint  $x^2 + y^2 = 1$ .

**Problem 2.** You are making a open-top drawer out of wood. The material for the sides and back costs \$2 per square foot, and material for the bottom costs \$1, and the material for the front costs \$4.

a) Suppose that the dimensions of the drawer are  $x$  (side to side),  $y$  (top to bottom), and  $z$  (front to back). What is the total cost of the materials?

b) What are the dimensions of the cheapest drawer with volume 24 cubic feet?

**Problem 3.** Compute the following double integrals.

a)

$$\int_0^1 \int_1^2 xy \, dy \, dx$$

b)

$$\int_0^1 \int_0^2 ye^{xy} \, dx \, dy$$