MAT 175 HW #7

(12.9.**2**) Find the maximum of $f(x, y) = xy$ subject to the constraint
$$g(x, y) = 4x^2 + 9y^2 - 36 = 0.$$

(12.9.**8**) Using the method of Lagrange multipliers, find the minimum distance between the origin and the plane
$$x + 3y - 2z = 4.$$
Hint: The calculations will be simpler if you minimize *the square* of the distance.

(12.9.**22**) Find the maximum and the minimum of the function
$$f(x, y) = x + y - xy$$
on the set
$$S = \{(x, y) \colon x^2 + y^2 \leqslant 9\}.$$
Hint: As in some of the examples we did in class, study first the stationary points (i.e., where $\nabla f(x, y) = \langle 0, 0 \rangle$) in the interior of S, and then study the boundary of S using Lagrange multipliers.