MATH 2210 HOMEWORK WORKSHEET 8

Name: _____

The Extreme Value Theorem

1. Find the absolute maximum and minimum values of

$$f(x, y) = x + y - xy$$

on the closed triangular region with vertices $(0, 0)$, $(0, 2)$, and $(4, 0)$.

Lagrange Multipliers

2. Each of these extreme value problems has a solution with both a maximum value and a minimum value. Use Lagrange multipliers to find the extreme values of the function subject to the given constraint.

(a) $f(x, y, z) = \mathrm{e}^{xyz}; \quad 2x^2 + y^2 + z^2 = 24$

(b) $f(x, y, z) = x^4 + y^4 + z^4, \quad x^2 + y^2 + z^2 = 1$

3. Find the extreme values of the function

$$f(x, y) = 2x^2 + 3y^2 - 4x - 5$$

on the region described by $x^2 + y^2 \leq 16$.