

Math 2415
Paper Homework #9

1. **14.8, Constrained Optimization:** Use the method of Lagrange Multipliers to find the absolute maximum and minimum values of the function $f(x, y) = x^2 + y^2 - x - y + 1$ on the unit disc $x^2 + y^2 \leq 1$. To the extent possible solve the problem using a geometric method (a picture) as well as algebraically.

2. **15.1: Double Integrals over Rectangles:** Let V be the volume of the solid bounded by the xz -plane, the yz -plane, the xy -plane, the planes $x = 1$ and $y = 2$ and the surface $z = f(x, y) = (xy)^2 e^{x^3}$.
 - (a) Estimate V using a Riemann sum with 4 equal sized rectangles with $\Delta x = 0.5$ and $\Delta y = 1$ and evaluate f at the midpoints of the rectangles.
 - (b) Set up an iterated double integral for V .
 - (c) Evaluate this integral.