Math 20550 Calculus III Tutorial
March 5 2015

**Name:** _____

**Tutorial Worksheet**

Show all your work.

1. Maximize the function $f(x, y, z) = xyz$ subject to the constraint $x^2 + 2y^2 + 3z^2 = 9$, assuming that $x$, $y$, and $z$ are nonnegative. Explain why the extremum you find is a maximum.

2. Find the minimum distance from the parabola $y = x^2$ to the point $(0, 9)$.

3. Minimize the function $f(x, y, z) = x^2 + y^2 + z^2$ subject to the constraints $x + 2z = 6$ and $x + y = 12$, assuming that $x$, $y$, and $z$ are nonnegative. Explain why the extrema you find is a minimum.

4. Use a double integral to find the volume of triangular prism bounded by the coordinate planes, $y = -x + 1$, and $z = 4$.