# Math 2415
## Paper Homework #11

1. **15.3, Double Integrals in Polar Coordinates:**

   (a) Calculate $\iint_D xy \, dA$ where $D$ is that portioin of the annulus $4 \le x^2 + y^2 \le 9$ that is in the first quadrant.

   (b) Find the volume of the solid that is in the first octant and which is bounded by the cylinder $x^2 + y^2 = 9$ and the plane $z = 1 + x + y$.

   (c) Convert the iterated integral $\int_0^2 \int_0^{\sqrt{4-y^2}} (x^2 + y^2) dx \, dy$ to polar coordinates and then evaluate.

2. **15.6, Triple Integrals in Rectangular Coordinates:**

   (a) Sketch the region bounded by the surfaces $z = x^2 + y^2$, $x = 0$, $y = 0$, $z = 0$, $x + y = 1$. Each pair of the surfaces intersects in a curve. Be sure to include these curves in your sketch. Then use a triple integral to calculate the volume of the solid.

   (b) Find the volume of the region in the first octant bounded by the coordinate planes, the plane $x + z = 2$, and the parabolic cylinder $y = 9 - x^2$.