Math 2415

Paper Homework #10

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

   (a) Calculate $\iint_D (3x + 2y)\, dA$ where D is the region in the first quadrant that is inside the circle $x^2 + y^2 = 4$, above the x-axis and below the line $y = \sqrt{3}x$.

   (b) Sketch the solid that lies inside the cylinder $x^2 + y^2 = 1$, above the xy-plane, and below the plane $z = x + 1$. The cylinder and the slanted plane intersect in a curve. Be sure to include this curve in your sketch. Use a double integral to calculate the volume of this solid.

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

   (a) Sketch the region bounded by the surfaces $y + z = 4$, $y = 4 - x^2$, $y = 0$, $z = 0$. 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) Sketch the solid, E, in the first octant that is bounded by the planes $x + z = 2$ and $2y + z = 2$. Calculate $\iiint_E z\, dV$.