Math 282                      Homework 3                      Name: _____

Complete the following problems and submit your solutions at the beginning of class on Tuesday. If you use notebook paper, please remove the jagged edges of the paper before submitting your homework. Your solutions must be numbered and submitted in the order the problems were given, legibly written using correct notation and including all mathematical details. If you submit work that is disorganized, messy, or lacking detail, you should expect to receive little credit regardless of having the correct final answer.

**Due:** 9:00am on Tuesday, January 28

For each of the following integrals, you must sketch the region of integration.

1. Evaluate $\iiint_E 3y\,dV$ where $E$ is the solid bounded by the cylinder $y = \sqrt{x}$ and the planes $y = x$, $z = -3$ and $z = x + y$.

2. For any continuous $f(x, y, z)$, write $\iiint_E f(x, y, z)\,dV$ as an iterated integral in the six orders of integration where $E$ is a solid bounded by the surfaces $z = 0$, $x = 0$, $y + 2z = 2$, and $y = \sqrt{x}$.

   Clearly sketch the solid and each of the projections of $E$ onto the coordinate planes.

3. Use a triple integral to find the volume of the tetrahedron bounded by $z = 0$, $y = 0$, $3x + y + 2z = 6$ and $2y - 4x + 4z = 12$.

4. Consider the solid bounded by $z = \sqrt{x^2 + y^2}$ and $z = 1$. Find the center of mass of the solid using the density function $\rho(x, y, z) = z(x^2 + y^2)$.