Math 13: Written Homework #2.
Due Wednesday, January 23, 2013.

1. A cylindrical hole of radius a is drilled through the center of a sphere of radius $2a$. What is the volume of the remaining solid?

2. Let D be the disk centered at the origin of radius a. What is the average distance of points in D to the origin?

3. A square fan blade has sides of length 2 parallel to the coordinate axes and with lower left corner at the origin. If the density of the blade is proportional to $\rho(x, y) = 1 + 0.1x$, is it more difficult to rotate the blade about the x-axis or the y-axis?

4. Find the center of mass of the lamina the occupies the region bounded by $y = x^2$ and $y = x + 2$ with density function $\rho(x, y) = kx^2$.

5. Evaluate the triple integral $\iiint_T xyz\, dV$ where T is the tetrahedron with vertices $(0, 0, 0)$, $(1, 0, 0)$, $(1, 1, 0)$, and $(1, 0, 1)$.

6. Sketch the solid whose volume is given by the following iterated integral and compute the value of that volume:

$$\int_0^2 \int_0^{2-y} \int_0^{4-y^2} \cancel{dx\, dy\, dz}\, dx\, dz\, dy.$$

(This is the corrected version of this problem as of Saturday, January 19, at 12:30 pm.)