

MAT 302
Assignment 7
Friday, March 29, 2013

For full credit on these problems, each must be submitted with a complete and clear solution, showing all of your work. You may work with other classmates on these problems, but please indicate on your assignment if you received help. Partial answers and incomplete solutions may be eligible for some partial credit, depending on the level of completeness and demonstrated understanding.

1. Find the area of the surface of the portion of the sphere $x^2 + y^2 + z^2 = 49$ which is inside the cylinder $x^2 + y^2 = 16$.
2. A hole of radius 4 centimeters is drilled through a sphere of radius 16 centimeters to make an object. Find the volume and the outer surface area of the object.
3. Evaluate the following triple integral.

$$\int_0^2 \int_{-1}^2 \int_0^3 x^2 y z^3 \, dx \, dy \, dz$$

4. Sketch the solid whose volume is given by the iterated integral and rewrite the integral using the order of integration $dx \, dy \, dz$.

$$\int_0^2 \int_{2x}^4 \int_0^{y/2} dz \, dy \, dx$$

5. Find the mass and the coordinates of the center of mass of the solid bounded by $2x + y + 3z = 6$ and the coordinate axes in the first octant, where the density of the object is proportional to the distance from the xy -plane.