

MATH 251 - Worksheet 9

NAME:

I.D.:

**Instruction:** Circle your answers and show all your work CLEARLY. Solutions with answer only and without supporting procedures will have little credit.

1. Find the the mass and centroid of the first-octant region that is interior to  $x^2 + z^2 = 1$  and  $y^2 + z^2 = 1$ .

2. Find the volume of the region that lies inside both  $x^2 + y^2 + z^2 = 4$  and  $x^2 + y^2 - 2x = 0$ .

3. Find the volume of the region bounded by  $z = x^2 + 2y^2$  and  $z = 12 - 2x^2 - y^2$ .

4. (Use spherical coordinates) Find the volume of the region bounded by the plane  $z = 1$  and the cone  $z = \sqrt{x^2 + y^2}$ .

5. (Use cylindrical coordinates) Find the volume of the region bounded by the plane  $z = 1$  and the cone  $z = \sqrt{x^2 + y^2}$ .