Math 3202 **Due Tue March 8** **Assignment #5**

1. Find volume of the solid that lies within both the cylinder $x^2+y^2=1$ and the sphere $x^2+y^2+z^2=4$.
2. Find the mass of a ball of radius a if the density at any point is proportional to its distance from a fixed axis of symmetry of the ball.
3. Evaluate $\int\int\int_H (x^2+y^2)dV$, where H is the semispherical region below $x^2+y^2+z^2=1$ and above xy-plane.
4. Evaluate $\int\int\int_H e^{\sqrt{x^2+y^2+z^2}}dV$, where H is enclosed by sphere $x^2+y^2+z^2=9$ in the first octant.
5. Find the volume of the solid that lies within the sphere $x^2+y^2+z^2=4$, above the xy-plane and below the cone $z=\sqrt{x^2+y^2}$.
6. Find the volume of the smaller wedge cut from a sphere of radius a by two planes that intersect along a diameter at an angle of $\pi/6$.
7. Evaluate using spherical coordinates.

$$\int_0^3 \int_0^{\sqrt{9-y^2}} \int_{\sqrt{x^2+y^2}}^{\sqrt{18-x^2-y^2}} (x^2+y^2+z^2)dz\,dx\,dy.$$

8. Use transformation $x=\sqrt{2}u-\sqrt{2/3}v$, $y=\sqrt{2}u+\sqrt{2/3}v$ to evaluate $\int\int_R (x^2-xy+y^2)dA$, where the region R is bounded by $x^2-xy+y^2=2$.