MTH U341 Triple integrals homework
Due Monday, Nov. 10

1. Let D be the half-washer $1 \leq x^2 + y^2 \leq 9$, $y \geq 0$, and let E be the solid region above D and below the graph $z = 10 - x^2 - y^2$. Suppose E is made of a material with varying density y gms/cm^2. Compute the mass of E; use cylindrical coordinates to compute the integral.

2. Let E the the hollow hemisphere $1 \leq x^2 + y^2 + z^2 \leq 4$, $z \geq 0$. If the density is z gms/cm^2, compute the mass of E. Use spherical coordinates. *Hint:* $\int \sin t \cos t \, dt$ can be found by using the substitution $u = \sin t$.

3. Let E be the tetrahedron with vertices $(0, 0, 0)$, $(1, 0, 0)$, $(0, 2, 0)$ and $(0, 0, 3)$ with density x gms/cm^2. Find the mass of E.