## Math 13 Worksheet #5: Triple integrals and cylindrical coordinates

(1) Use a triple integral to find the volume of a pyramid whose base is the square with vertices (1,0,0), (0,1,0), (-1,0,0), and (0,-1,0) and whose top vertex is (0,0,1).

(2) Find the center of mass of the pyramid assuming the density is uniform inside.

- (3) Find the mass of the slice of the right circular cylinder  $x^2 + z^2 = 4$  bounded on the left by the xz-plane and the on right by the plane with equation x - y + z = -4 if the density at each point in the cylinder is proportional to the distance of the point to the xz-plane. (You can choose cylindrical or Cartesian coordinates.)
- (4) Find the volume of the solid that lies between the paraboloid  $z = x^2 + y^2$  and the sphere  $x^2 + y^2 + z^2 = 4$