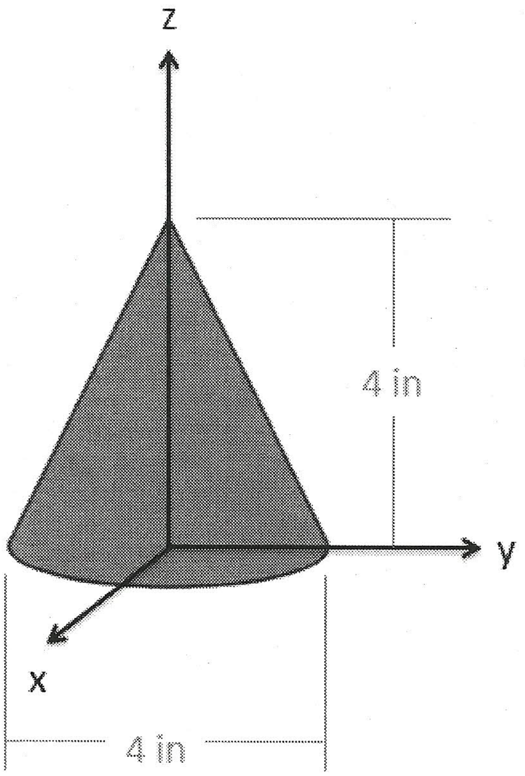
## Question 1:

The cone shown below is four inches tall and has a four inch diameter base. Find the x, y, and z coordinates of the center of mass.




Symetrical about yz & xz planes

$\bar{X} = 0$

$\bar{Y} = 0$

$$\bar{z} = \frac{\int (dV)(z)}{V} = \frac{\int_0^4 (\pi(-\frac{1}{2}z+2)^2 (z)}{\frac{\pi(2)^2(4)}{3}}$$

$$dV = \pi r^2$$

$$r = -\frac{1}{2}z + 2$$

$$\bar{z} = \frac{\cancel{\pi}\int_0^4 \frac{1}{4}z^3 - 2z^2 + 4z}{\cancel{\pi}\ 5.33} = \frac{\Big|_0^4 \frac{1}{16}z^4 - \frac{2}{3}z^3 + 2z^2}{5.33}$$

$$\bar{z} = \frac{5.33}{5.33} = 1 \text{ in}$$

Solution:

$$\bar{z} = 1 \text{ in}$$