Friday, October 16, 2020

Example 1: Mass of a Comet

diameter $\simeq$ 10 km $= 10^4$ m

density (water ice) $\simeq 1\ g/cm^3 = 1\ ton/m^3 = 1000\ kg/m^3$

$$\text{Volume} = \frac{4}{3}\pi R^3 = \frac{4}{3}(3.1415926)(0.5\times 10^4)^3$$

(0.5 × 10^4 converts diameter to radius)

$$\text{Mass} = \text{Volume} \times \text{density} = \frac{4}{3}(3.1415926)(0.5\times 10^4)^3 \times 1000\ kg/m^3$$

$$\simeq 10^{15}\ kg$$

$\Rightarrow$ **Comet mass $\simeq 10^{15}$ kg**

Example 2: Mass of Oort Cloud

Total mass = comet mass × "trillion"

$= 10^{15}\ Kg \times 10^{12}$

$= 10^{27}\ Kg$

Mass of Oort cloud $\simeq 10^{27}$ Kg

$\sim 1/2$ mass of Jupiter

$\sim 150 \times$ Mass of Earth