

HW #7 prob #4

4a has two parts, one for $M_1 = 200\text{kg}$ and the other for $M_1 = 500\text{kg}$

$$F_{g1} = \frac{GM_1M_2}{d^2} = \frac{(6.67 \times 10^{-11})(200)(50)}{(.2)^2} = \frac{6.67 \times 2 \times 5 (10^{-11} 10^2 10^1)}{4 (10^{-2})}$$

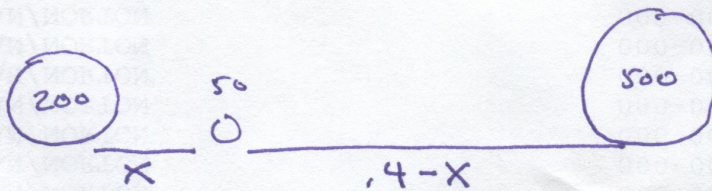
$$= \frac{6.67 \times 10 \times 10^{-8}}{4 \times 10^{-2}}$$

$$= 6.67 \times 2.5 \times 10^{-6}$$

$$= 1.67 \times 10^{-5} \text{ N}$$

$$F_{g2} = \frac{GM_1M_2}{d^2} = \frac{(6.67 \times 10^{-11})(500)(50)}{(.2)^2} = 4.17 \times 10^{-5} \text{ N}$$

4b Where does 50kg object need to be placed for $F_{g1} = F_{g2}$ (need to find distance)



$F_{g1} = F_{g2}$ remember M_1 for $F_{g1} = 200\text{kg}$
 M_1 for $F_{g2} = 500\text{kg}$

$$\frac{GM_1M_2}{x} = \frac{GM_1M_3}{.4-x}$$

$$200(.4-x) = 500x$$

$$80 - 200x = 500x$$

$$80 = 700x$$

$$x = \frac{8}{70} = .114\text{m}$$

The 50kg MASS IS .114m from the 200 kg mass and 0.286m from the 500kg MASS