

# H.W. #3

31

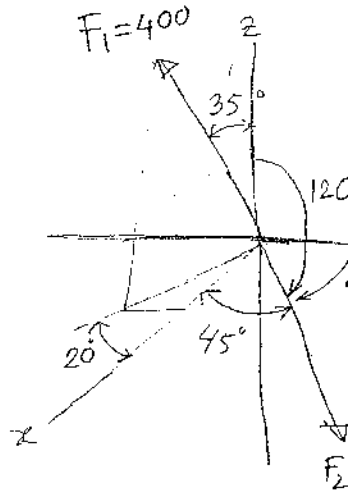
$$\begin{cases} F_{1x} = 400 \cos 55^\circ \cos 20^\circ = 215.6 \\ F_{1y} = -400 \cos 55^\circ \sin 20^\circ = -78.46 \\ F_{1z} = 400 \cos 35^\circ = 327.66 \end{cases}$$

$$\begin{cases} F_{2x} = 400 \cos 45^\circ = 282.84 \\ F_{2y} = 400 \cos 60^\circ = 200 \\ F_{2z} = +400 \cos 120^\circ = -200 \end{cases}$$

$$\vec{F}_1 \cdot \vec{F}_2 = (215.6)(282.84) + (-78.46)(200) + (327.66)(-200) = -20151$$

Again  $\vec{F}_1 \cdot \vec{F}_2 = |\vec{F}_1| |\vec{F}_2| \cos \theta$

$$\therefore \cos \theta = \frac{-20151}{400 \times 400} \therefore \theta = 97^\circ$$



41

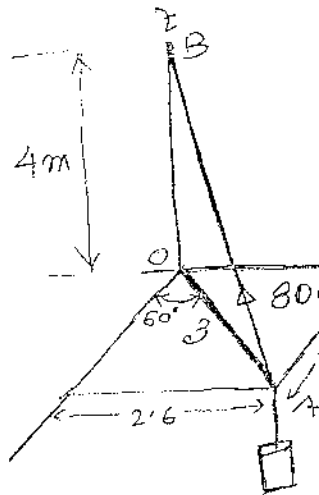
$$F_{AB} = -1.5\hat{i} - 2.6\hat{j} + 4\hat{k}$$

$$r = \sqrt{(-1.5)^2 + (-2.6)^2 + (4)^2} = 5$$

$$u_{AB} = \left( -\frac{1.5}{5}\hat{i} - \frac{2.6}{5}\hat{j} + \frac{4}{5}\hat{k} \right)$$

$$\therefore \vec{F} = 80 \left\{ -\frac{1.5}{5}\hat{i} - \frac{2.6}{5}\hat{j} + \frac{4}{5}\hat{k} \right\}$$

$$= -24\hat{i} - 41.6\hat{j} + 64\hat{k}$$



Line of action  $\vec{F}_{eq} = \sqrt{(-24)^2 + (-41.6)^2}$