

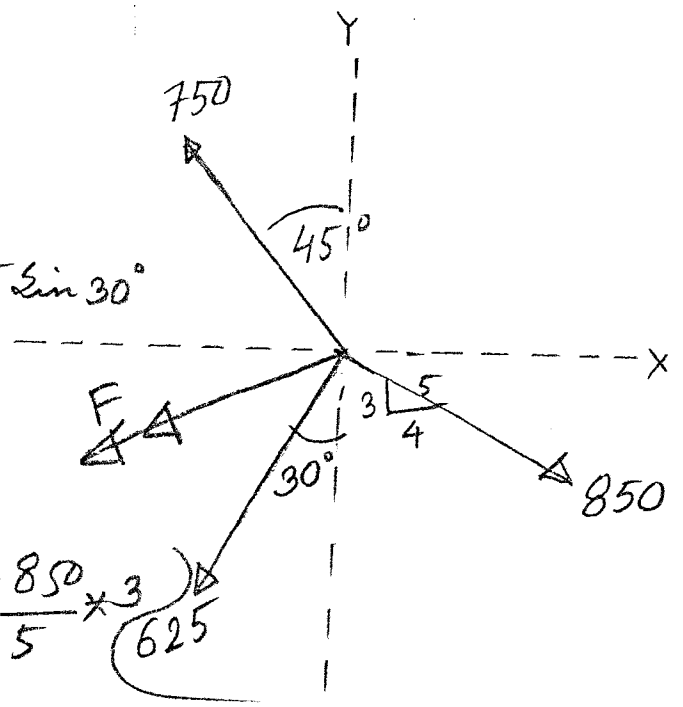
CE - 201, H.W # 02 Page-01

2.36/2.52/2.62/2.69/2.90/2.99

2-36

$$\begin{aligned} \sum F_x &= \frac{850}{5} \times 4 - 750 \sin 45 - 625 \sin 30 \\ &= -162.8 \text{ N} \end{aligned}$$

$$\begin{aligned} \sum F_y &= 750 \cos 45 - 625 \cos 30 - \frac{850}{5} \times 3 \\ &= -520.9 \end{aligned}$$



$$\begin{aligned} F &= \sqrt{(\sum F_x)^2 + (\sum F_y)^2} \\ &= \sqrt{(-162.8)^2 + (-520.9)^2} \end{aligned}$$

$$\theta = \tan^{-1} \left( \frac{\sum F_y}{\sum F_x} \right) = \tan^{-1} \left( \frac{-520.9}{-162.8} \right) = 72.6$$

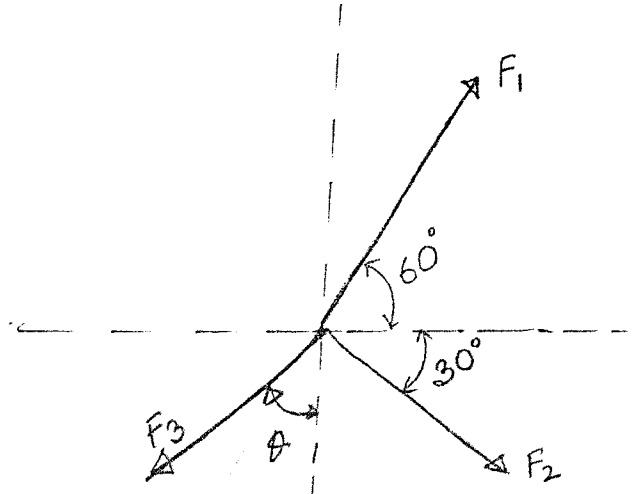
From X-axis, angle  $\theta = (180 + 72.6) = 252.64^\circ$

2-52

As  $F_R = 0 \therefore \sum F_x = 0; \sum F_y = 0$

$$\begin{aligned} \sum F_x = 0 &\Rightarrow F_1 \cos 60^\circ + F_2 \cos 30^\circ - F_3 \sin \theta = 0 \\ &\Rightarrow F_1 \times \frac{1}{2} + \left(\frac{2}{3}\right) \left(\frac{\sqrt{3}}{3}\right) F_1 - F_3 \sin \theta = 0 \\ &\Rightarrow \frac{F_1}{2} + \frac{1}{\sqrt{3}} F_1 - F_3 \sin \theta = 0 \\ &\Rightarrow 1.077 F_1 = F_3 \sin \theta \quad \text{--- (I)} \end{aligned}$$

$$\begin{aligned} \sum F_y = 0; &F_1 \sin 60^\circ - F_3 \cos \theta - F_2 \sin 30^\circ = 0 \\ &\Rightarrow F_1 \times \frac{\sqrt{3}}{2} - F_3 \cos \theta - \left(\frac{2}{3} F_1\right) \times \frac{1}{2} = 0 \\ &\Rightarrow 0.532 F_1 = F_3 \cos \theta \quad \text{--- (II)} \end{aligned}$$



$$\text{(I)} \div \text{(II)} \Rightarrow \tan \theta = 2.024, \theta = 63.7^\circ \quad F_3 = 1.2$$