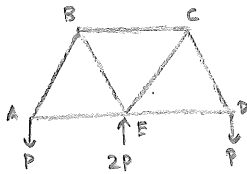


# Homework 2: Problem 1

$$T_{max} = 8 \text{ k} \quad C_{max} = 5 \text{ k}$$



Due to symmetry

$$F_{AB} = F_{CD}$$

$$F_{AE} = F_{DE}$$

$$F_{BE} = F_{CE}$$

Joint A



$$\sum F_x = 0: F_{AB} \cos 60 + F_{AE} = 0$$

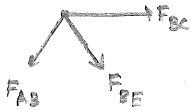
$$\sum F_y = 0: F_{AB} \sin 60 - P = 0$$

$\Rightarrow$

$$F_{AE} = -\frac{P}{\tan 60}$$

$$F_{AB} = \frac{P}{\sin 60}$$

Joint B



$$\sum F_x = 0: -F_{AB} \cos 60 + F_{BE} \cos 60 + F_{BC} = 0$$

$$\sum F_y = 0: -F_{AB} \sin 60 - F_{BE} \sin 60 = 0$$

$\Rightarrow$

$$F_{BC} = \frac{2P}{\tan 60}$$

$$F_{BE} = -\frac{P}{\sin 60}$$

Solve for smallest P

$$F_{AB} = F_{CD} = \frac{P}{\sin 60} = 8 \quad \Rightarrow P = 6.93 \text{ k}$$

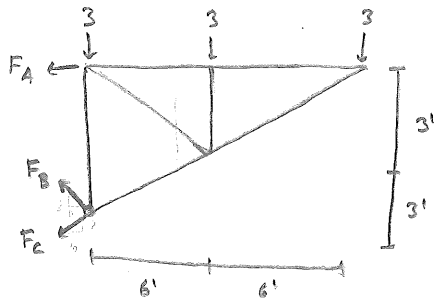
$$F_{AE} = F_{DE} = -\frac{P}{\tan 60} = -5 \quad \Rightarrow P = 8.66 \text{ k}$$

$$F_{BC} = \frac{2P}{\tan 60} = 8 \quad \Rightarrow P = 4.33 \text{ k}$$

$$\Rightarrow \boxed{P_{max} = 4.33 \text{ k}}$$

$$F_{BE} = F_{CE} = -\frac{P}{\sin 60} = -5 \quad \Rightarrow P = 4.33 \text{ k}$$

Homework 2: Problem 2



$$\pm \sum F_x = 0: -F_A - \frac{6}{\sqrt{12}} F_B - \frac{6}{\sqrt{45}} F_C = 0$$

$$+\uparrow \sum F_y = 0: \frac{6}{\sqrt{12}} F_B - \frac{3}{\sqrt{45}} F_C - 3 - 3 - 3 = 0$$

$$\odot \sum M_o = 0: F_A(6) - 3(6) - 3(12) = 0$$

$$\Rightarrow \begin{cases} F_A = 9 \text{ k} \\ F_B = 4.24 \text{ k} \\ F_C = -13.42 \text{ k} \end{cases}$$