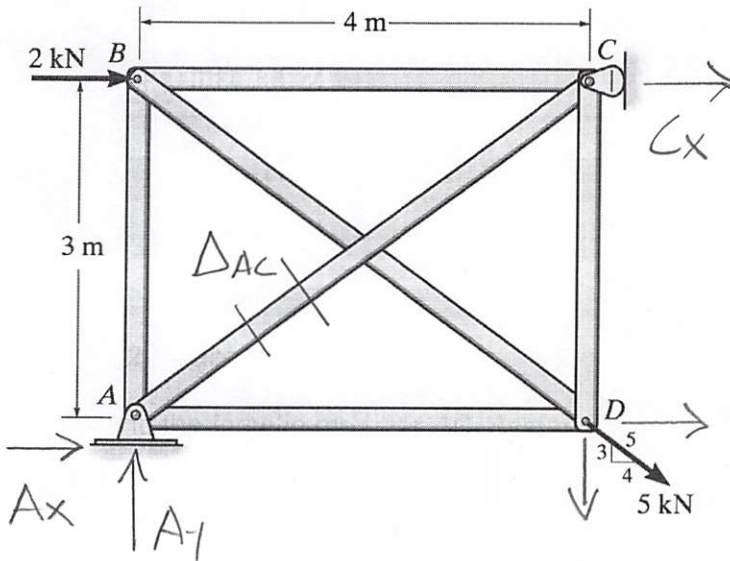


Determine the force in member AC. Assume AE is constant.



$$\begin{aligned} \sum M_A = 0 &= -2\text{ kN}(3\text{ m}) \\ &\quad - \frac{3}{5} 5\text{ kN}(4\text{ m}) - C_x(3\text{ m}) \end{aligned}$$

$$C_x = -6\text{ kN}$$

$$\sum F_y = 0 = A_y - \frac{3}{5} 5\text{ kN}$$

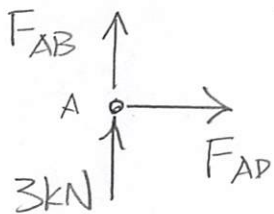
$$A_y = 3\text{ kN}$$

$$\begin{aligned} \sum F_x = 0 &= A_x + C_x + 2\text{ kN} \\ &\quad + \frac{4}{5} 5\text{ kN} \end{aligned}$$

$$A_x = 0$$

### REAL FORCES

#### JOINT A

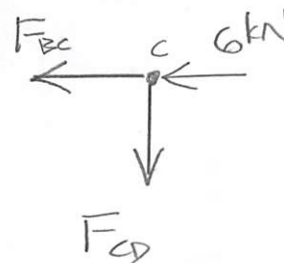


$$\begin{aligned} \sum F_y = 0 \\ = F_{AB} + 3\text{ kN} \end{aligned}$$

$$F_{AB} = -3\text{ kN}$$

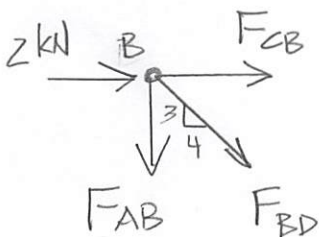
$$\sum F_x = 0 = F_{AD}$$

#### JOINT C



$$\sum F_y = 0 = -F_{CD}$$

#### JOINT B

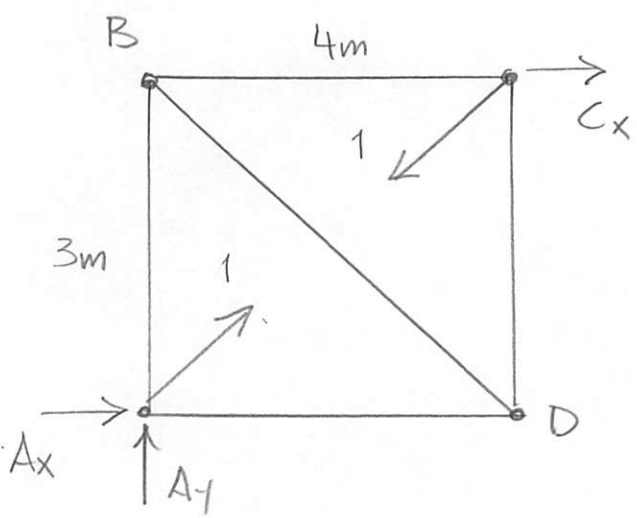


$$\begin{aligned} \sum F_y = 0 \\ = -F_{AB} - \frac{3}{5} F_{BD} \end{aligned}$$

$$F_{BD} = 5\text{ kN}$$

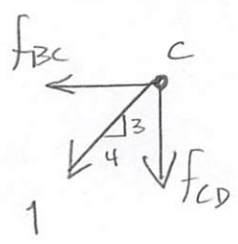
$$\begin{aligned} \sum F_x = 0 \\ = F_{CB} + \frac{4}{5} F_{BD} + 2\text{ kN} \end{aligned}$$

$$F_{CB} = -6\text{ kN}$$



$$\begin{aligned} \sum M_A &= 0 = -C_x(3\text{m}) & \underline{C_x = 0} \\ \sum F_x &= 0 = A_x + C_x & \underline{A_x = 0} \end{aligned}$$

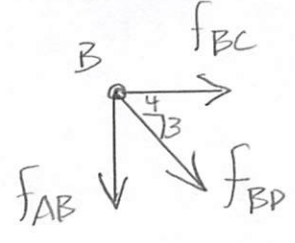
JOINT C



$$\begin{aligned} \sum F_y &= 0 \\ &= -f_{CD} - \frac{3}{5}(1) \\ \underline{f_{CD} = -0.6} \end{aligned}$$

$$\begin{aligned} \sum F_x &= 0 \\ &= -f_{BC} - \frac{4}{5}(1) \\ \underline{f_{BC} = -0.8} \end{aligned}$$

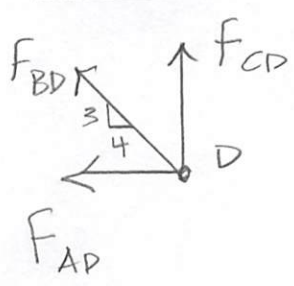
JOINT B



$$\begin{aligned} \sum F_x &= 0 \\ &= f_{BC} + \frac{4}{5}f_{BD} \\ \underline{f_{BD} = 1} \end{aligned}$$

$$\begin{aligned} \sum F_y &= 0 \\ &= -f_{AB} - \frac{3}{5}f_{BD} \\ \underline{f_{AB} = -0.6} \end{aligned}$$

JOINT D



$$\begin{aligned} \sum F_x &= 0 \\ &= -f_{AD} - \frac{4}{5}f_{BD} \\ \underline{f_{AD} = -0.8} \end{aligned}$$

$$\Delta_{AC} + F_{AC} f_{AC} = 0$$

$$F_{AC} = - \frac{\Delta_{AC}}{f_{AC}} = - \frac{49.60 \text{ kNm}}{17.28 \text{ m}} = \underline{\underline{-2.87 \text{ kN}}}$$

| MEMBER | F (kN) | f    | L (m) | FfL (kNm) | ffL (m) |
|--------|--------|------|-------|-----------|---------|
| AD     | 0      | -0.8 | 4     | 0         | 2.56    |
| CD     | 0      | -0.6 | 3     | 0         | 1.08    |
| BC     | -6     | -0.8 | 4     | 19.20     | 2.56    |
| AB     | -3     | -0.6 | 3     | 5.40      | 1.08    |
| AC     | 0      | 1    | 5     | 0         | 5       |
| BD     | 5      | 1    | 5     | 25        | 5       |
|        |        |      |       | 49.60     | 17.28   |