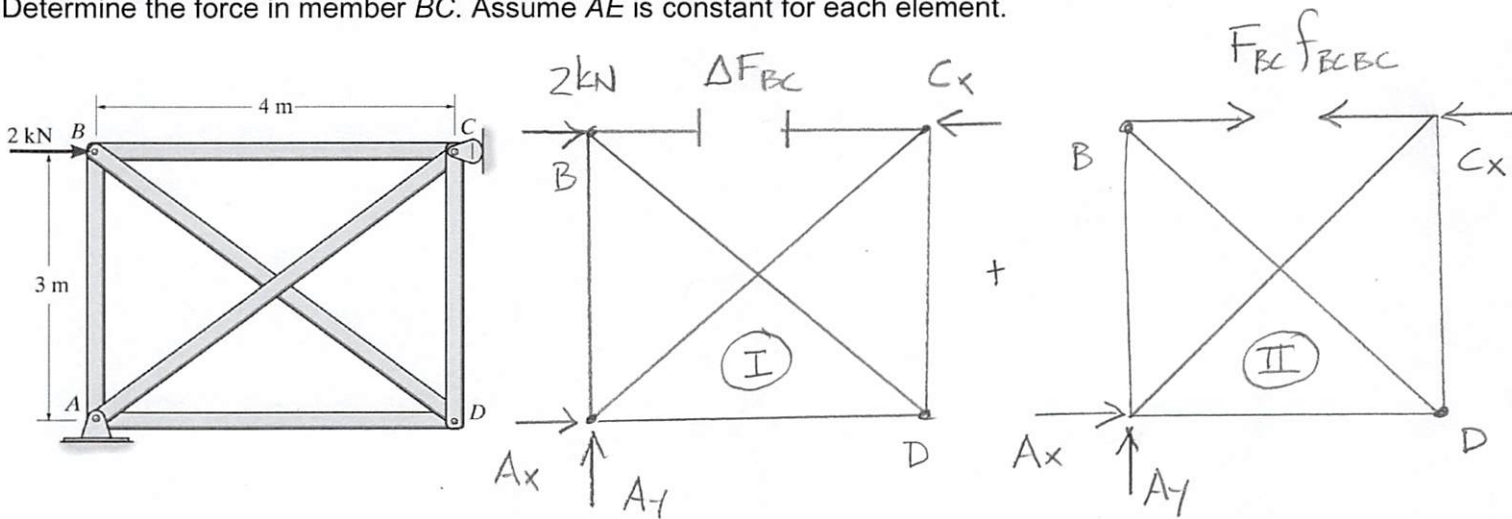


Determine the force in member BC. Assume AE is constant for each element.



$$\Delta F_{BC} + F_{BC} f_{BCBC} = 0$$

$$\textcircled{\text{I}} \quad \sum M_A = 0 = C_x(3\text{m}) - 2\text{kN}(3\text{m}) \quad \underline{C_x = 2\text{kN}}$$

$$\textcircled{\text{II}} \quad \sum M_A = 0 = C_x(3\text{m}) \quad \underline{C_x = 0}$$

REAL FORCES (I)

JOINT C

$$\begin{aligned} \sum F_x = 0 & \quad + \sum F_y = 0 = -\frac{3}{5}F_{AC} - F_{CD} \\ & = -\frac{4}{5}F_{AC} - 2\text{kN} \end{aligned} \quad \underline{F_{CD} = 1.5\text{kN}}$$

$$\underline{F_{AC} = -2.5\text{kN}}$$

JOINT B

$$\begin{aligned} \sum F_x = 0 & = \frac{4}{5}F_{BD} + 2\text{kN} \quad \underline{F_{BD} = -2.5\text{kN}} \\ \sum F_y = 0 & = -\frac{3}{5}F_{BD} - F_{AB} \quad \underline{F_{AB} = 1.5\text{kN}} \end{aligned}$$

JOINT D

$$\sum F_x = 0 = -F_{AD} - \frac{4}{5}F_{BD} \quad \underline{\underline{F_{AD} = 2\text{kN}}}$$

VIRTUAL FORCES II

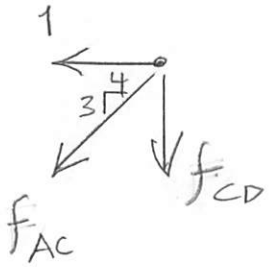
JOINT C

$$\rightarrow \sum F_x = 0 = -\frac{4}{5}f_{AC} - 1$$

$$\underline{f_{AC} = -1.25}$$

$$\uparrow \sum F_y = 0 = -\frac{3}{5}f_{AC} - f_{CD}$$

$$\underline{f_{CD} = 0.75}$$



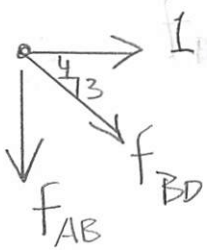
JOINT B

$$\rightarrow \sum F_x = 0 = 1 + \frac{4}{5}f_{BD}$$

$$\underline{f_{BD} = -1.25}$$

$$\uparrow \sum F_y = 0 = -f_{AB} - \frac{3}{5}f_{BD}$$

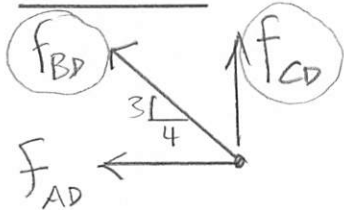
$$\underline{f_{AB} = 0.75}$$



JOINT D

$$\rightarrow \sum F_x = 0 = -f_{AD} - \frac{4}{5}f_{BD}$$

$$\underline{f_{AD} = 1}$$



MEMBER	F(kN)	f	L(m)	FfL(kNm)	ffL(m)
AB	1.5	0.75	3	3.375	1.6875
BC	0	1	4	0	4
CD	1.5	0.75	3	3.375	1.6875
DA	2	1	4	8	4
AC	-2.5	-1.25	5	15.625	7.8125
BD	-2.5	-1.25	5	15.625	7.8125
$\sum$				46.0	27.0

$$\Delta_{BC} + F_{BC} f_{BC} = 0 \Rightarrow F_{BC} = -\frac{\Delta_{BC}}{f_{BC}} = \frac{-46 \text{ kNm}}{27 \text{ m}} = \underline{\underline{-1.704 \text{ kN}}}$$