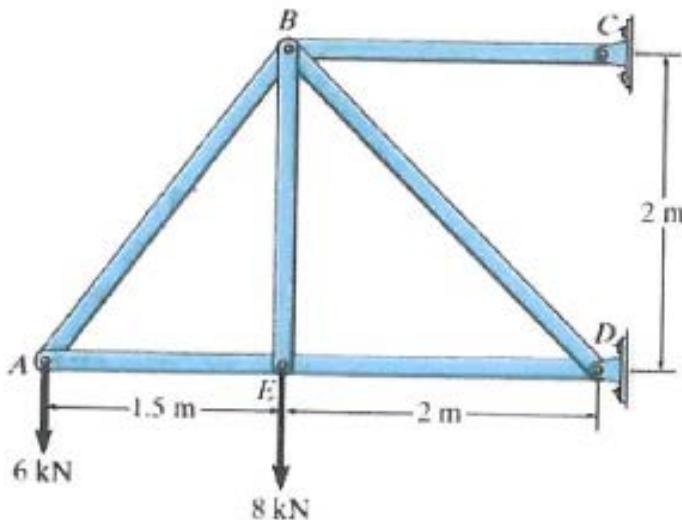


Problem 2 -Trusses I

Determine the force in each member of the truss.



START @ A!

Z UNKNOWN & NO
NEED TO SOLVE
~~REACTIONS @ C¹³~~
w FULL FBD.

USE METHOD OF JOINTS SINCE UNKNOWN FORCES IN EACH MEMBER

JOUNT A

$$\begin{aligned} \uparrow \Sigma F_y &= 0 & \frac{4}{5}AB - G &= 0 \\ \rightarrow \Sigma F_x &= 0 & \frac{3}{5}AB + AE &= 0 \end{aligned}$$

$$\underline{AB = 7.5 \text{ kN (T)}}$$

JOINT E

Free body diagram of joint E showing forces EB (upward), ED (rightward), and a downward force of 8kN.

$$\rightarrow \sum F_y = 0 \quad EB - 8 = 0$$

$$ED = 4.5 \text{ kN (c)}$$

NOTE: YOU COULD SOLVE "BY INSPECTION" - NO NEED FOR EQUATIONS OF EQUILIBRIUM

Joint B

A free body diagram of a beam segment. At the left support, a reaction force of 7.5 kN acts downwards. At the right support, a reaction force of 8 kN acts upwards. The beam has a horizontal dimension of 3 and a vertical dimension of 2 . A coordinate system is established at the left end.

$$\Rightarrow \sum F_y = 0 \quad -\frac{4}{5}(7.5) - 8 - \frac{1}{\sqrt{2}}BD = 0 \quad BD = -19.8 \text{ kN}$$

(-19.8)

$$\therefore \underline{BD = 19.8 \text{ kN (c)}}$$