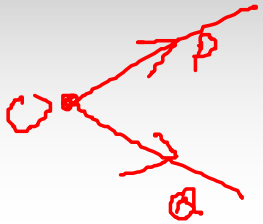
SHORT CUT RULES

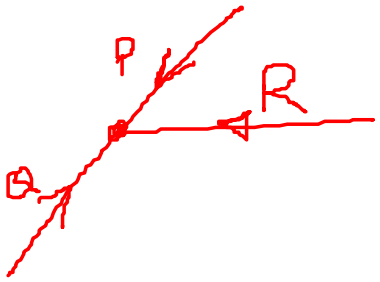
1. 

$P = 0$

2. 

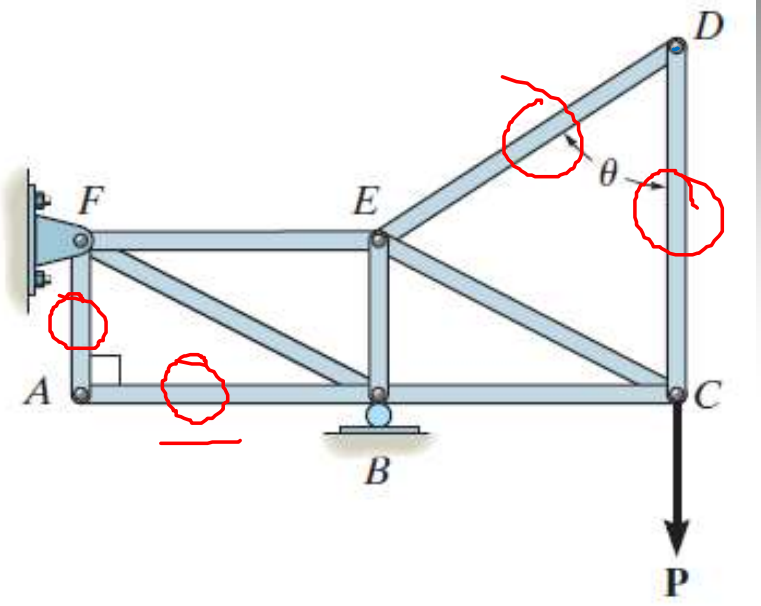
$P = 0$
$Q = 0$

$P = 0$
$Q = 0$

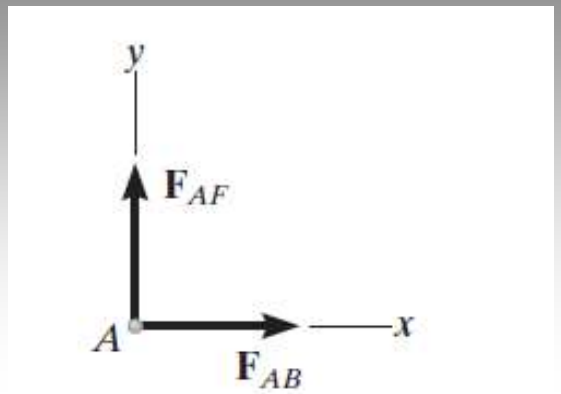
3. 

$R = 0$

Zero Force Members

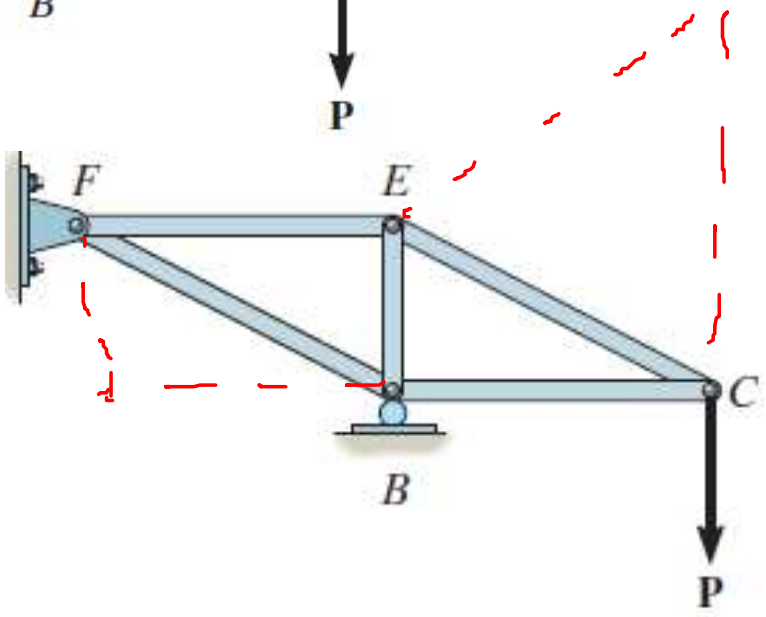


Draw FBD of joint A

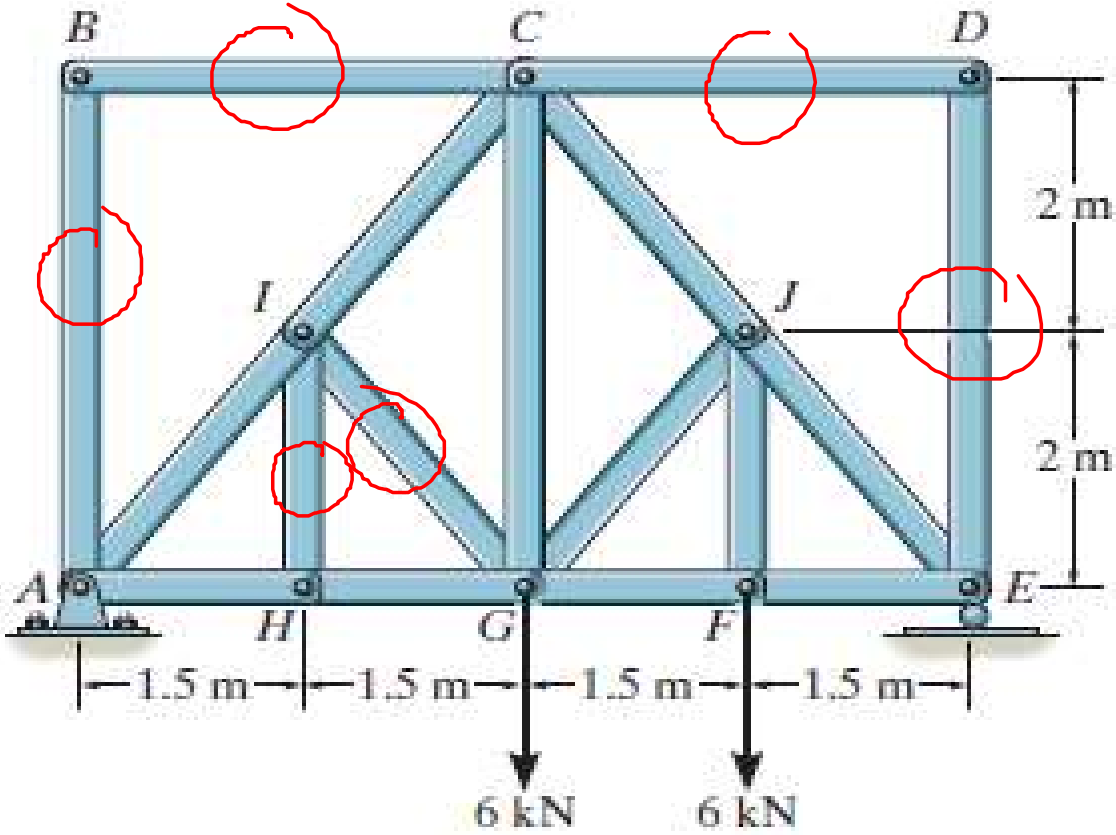


$$\overset{+}{\rightarrow} \Sigma F_x = 0;\ F_{AB} = 0$$

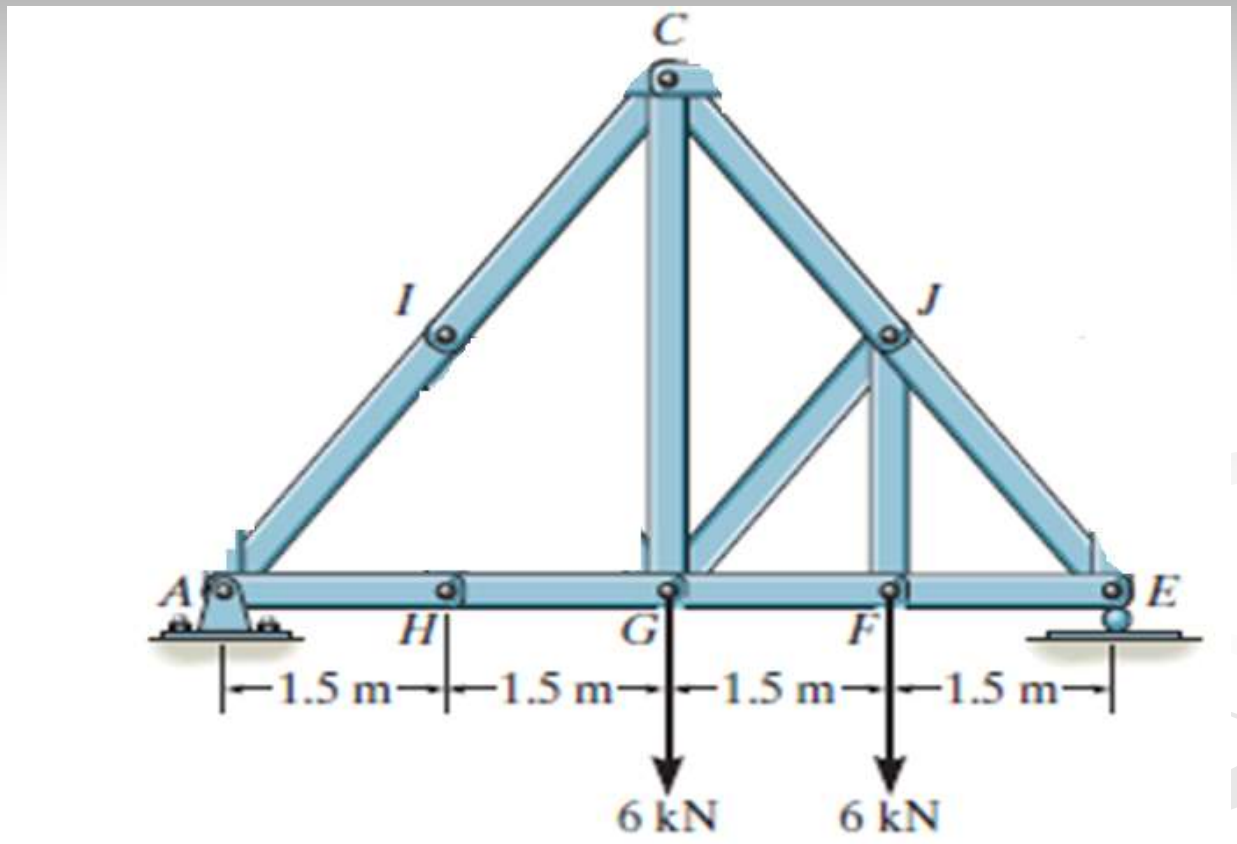
$$+\uparrow \Sigma F_y = 0;\ F_{AF} = 0$$



Zero Force Members

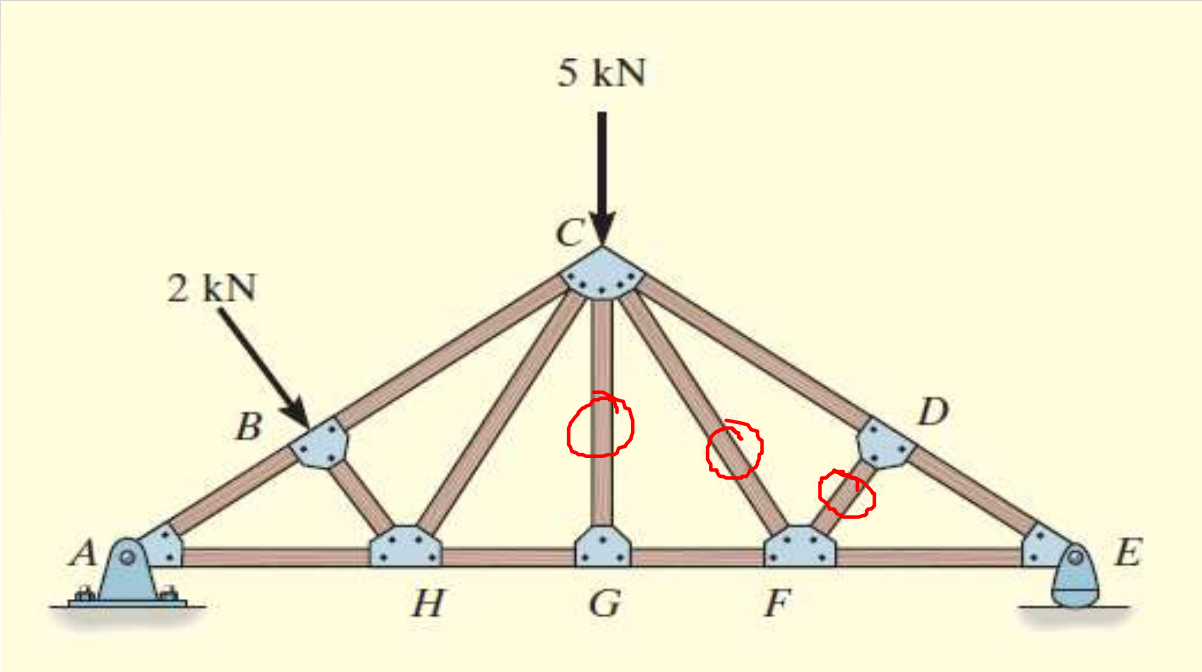


Zero Force Members



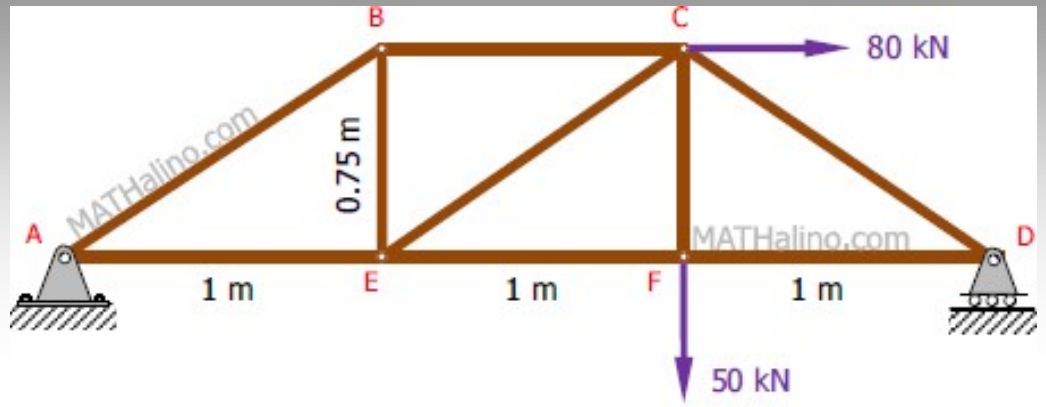
Zero Force Members

Example: Determine the zero-force members of the roof truss shown in figure.



METHOD OF JOINTS

Example: Determine magnitude and nature of the forces in all the members of the truss loaded and supported as shown in the figure.



Solution: Determine reactions at the supports

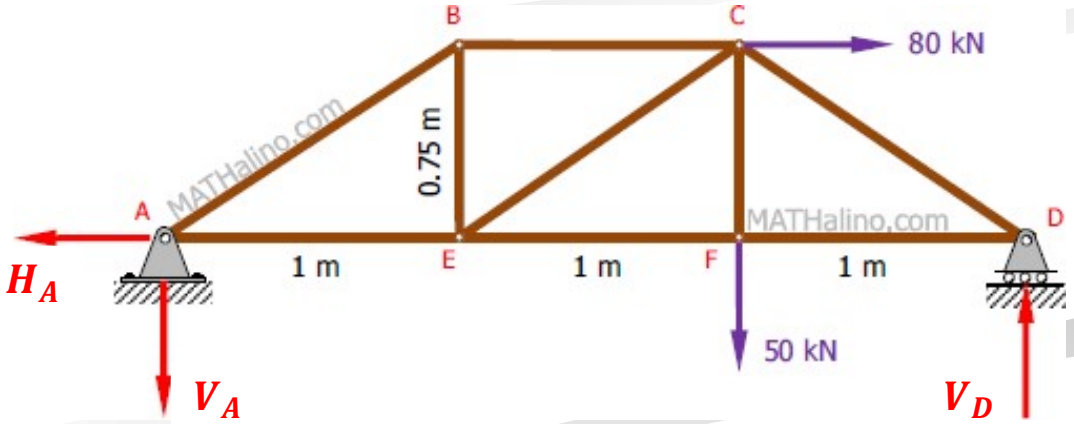
$$\Sigma M_D = 0$$

$$-3V_A - 50(1) + 80(0.75) = 0$$

$$V_A = 3.33\ kN$$

$$\Sigma F_Y = 0; V_D = 50 + 3.33 = 53.33\ kN$$

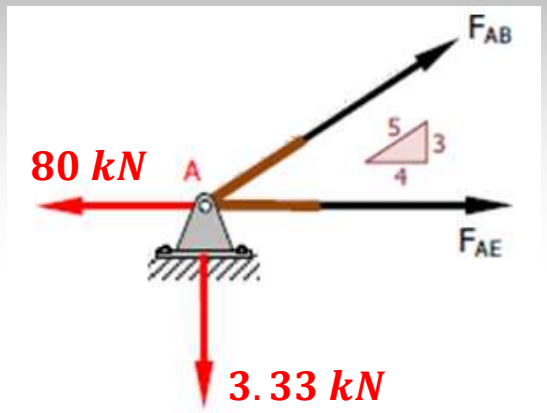
$$\Sigma F_H = 0; H_A = 80\ kN$$



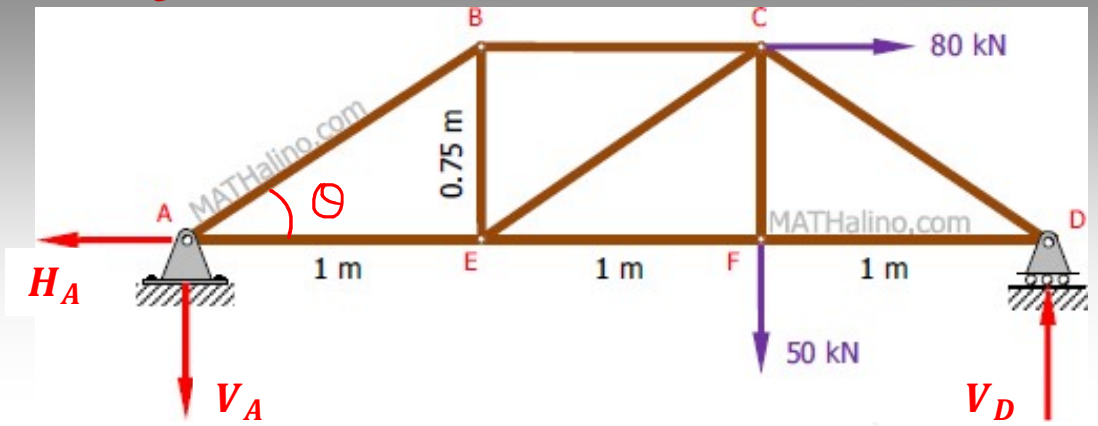
METHOD OF JOINTS

$\sin\theta = 3/5$

$\cos\theta = 4/5$



FBD of Joint A



Draw FBD of joint B