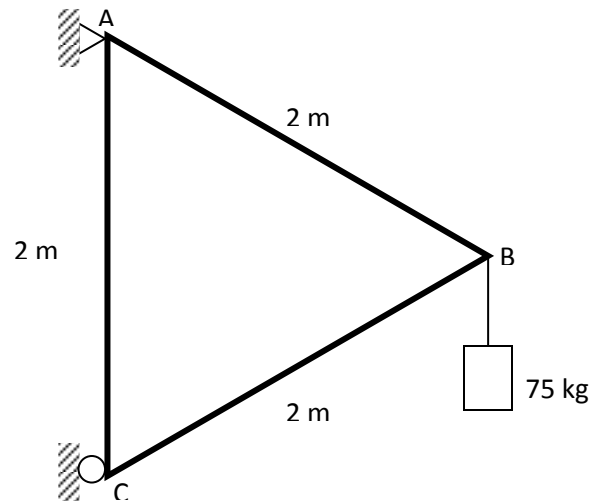


Example #1:

- Find the reactions at supports.
- Find the force in all members.



Solution:

$$\sum M_A = 0$$

$$-75 \times 9.8 \times 2 \sin 60 + C_x \times 2 = 0$$

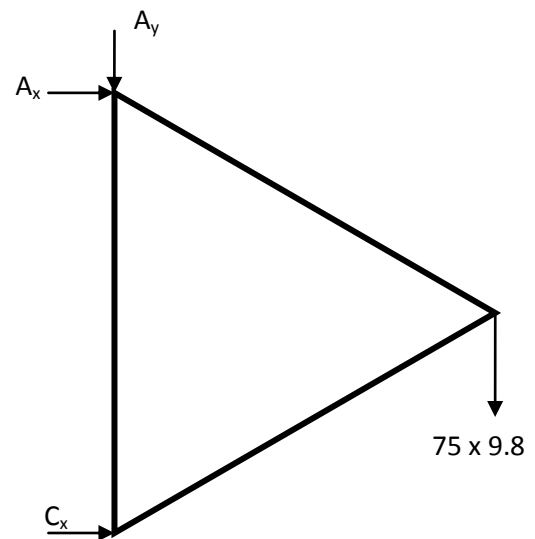
$$-1273.06 + C_x \times 2 = 0 \rightarrow C_x = 636.5 \text{ N}$$

$$\sum F_y = 0$$

$$-A_y - 75 \times 9.8 = 0 \rightarrow A_y = -735 \text{ N} = 735 \text{ N} \uparrow$$

$$\sum F_x = 0$$

$$A_x + 636.5 = 0 \rightarrow A_x = -636.5 \text{ N} = 636.5 \text{ N} \leftarrow$$



For joint C:

$$\sum F_x = 0$$

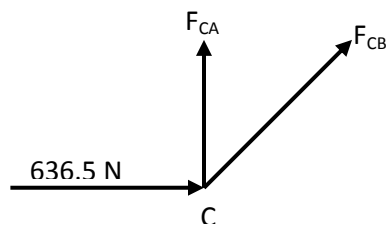
$$636.5 + F_{CB} \sin 60 = 0$$

$$F_{CB} = -735 \text{ N} = 735 \text{ N (comp)}$$

$$\sum F_y = 0$$

$$F_{CA} + (-735) \cos 60 = 0$$

$$F_{CA} = 367.5 \text{ N (tension)}$$

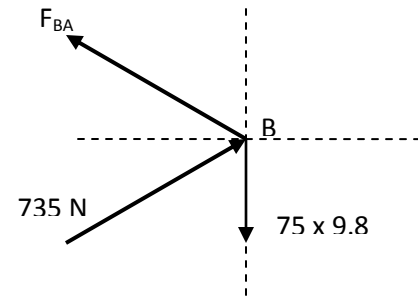


For joint B:

$$\sum F_x = 0$$

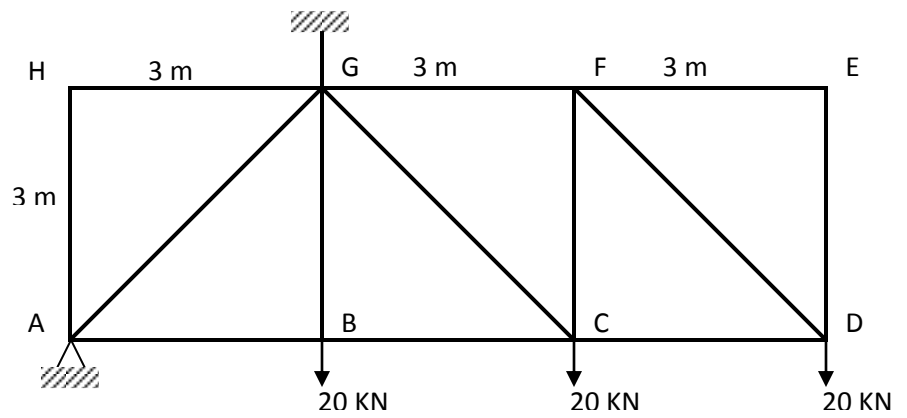
$$-F_{BA} \cos 30 + 735 \cos 30 = 0$$

$$F_{BA} = 735 \text{ N (tension)}$$



Example # 2:

Calculate the force in the member **CG**



Solution:

$$\sum M_G = 0$$

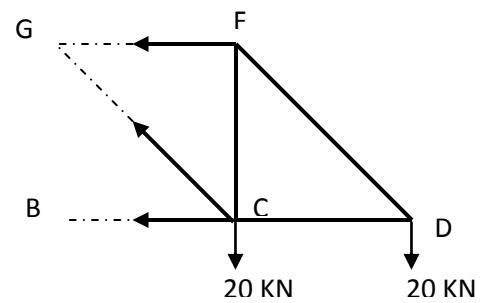
$$-20 \times 3 - 20 \times 6 - F_{CB} \times 3 = 0$$

$$F_{CB} = -60 \text{ KN} = 60 \text{ KN (comp)}$$

$$\sum M_F = 0$$

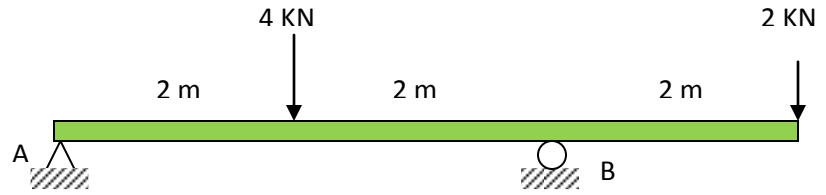
$$-20 \times 3 + 60 \times 3 - F_{CG} \times \cos 45 \times 3 = 0$$

$$F_{CG} = 56.6 \text{ KN (tension)}$$



Example #3:

Draw the shear and moment diagram for the loaded beam.



Solution:

$$\sum M_A = 0$$

$$-4 \times 2 + B_y \times 4 - 2 \times 6 = 0 \rightarrow B_y = 5 \text{ KN}$$

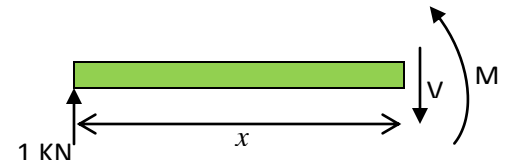
$$\sum F_y = 0$$

$$-4 + 5 - 2 + A_y = 0 \rightarrow A_y = 1 \text{ KN}$$

First Segment:

$$\sum M = 0 \rightarrow -1 \times x + M = 0 \rightarrow M = x \text{ KN.m}$$

$$\sum F_y = 0 \rightarrow 1 - V = 0 \rightarrow V = 1 \text{ KN}$$

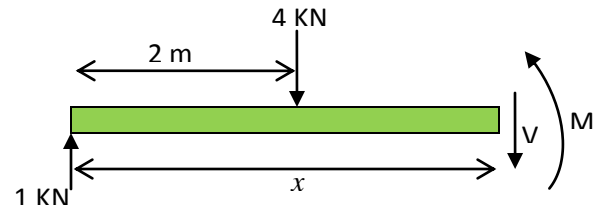


Second Segment:

$$\sum M = 0 \rightarrow -x + 4 \times (x - 2) + M = 0$$

$$M = 8 - 3x$$

$$\sum F_y = 0 \rightarrow 1 - 4 - V = 0 \rightarrow V = -3 \text{ KN}$$

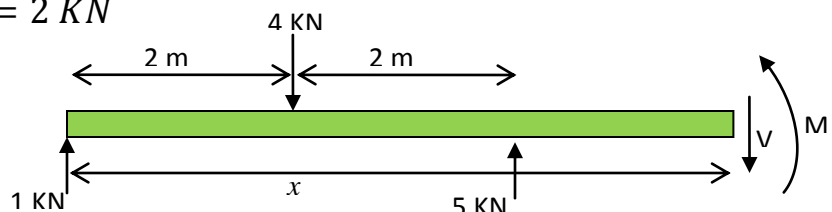


Third Segment:

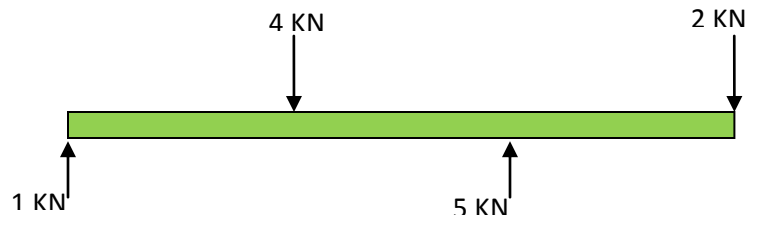
$$\sum M = 0 \rightarrow -x + 4 \times (x - 2) - 5 \times (x - 4) + M = 0$$

$$M = 2x - 12$$

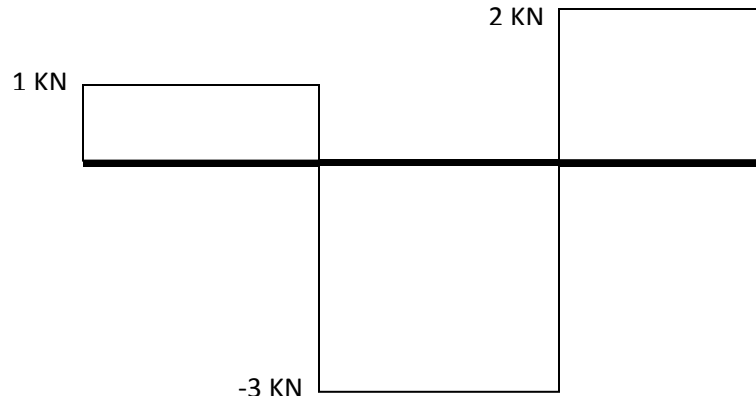
$$\sum F_y = 0 \rightarrow 1 - 4 + 5 - V = 0 \rightarrow V = 2 \text{ KN}$$



Load Diagram



Shear Force Diagram



Bending Moment Diagram

