

Joint D

$$\sum F_y = 0$$

$$CD \left(\frac{4}{\sqrt{20}} \right) = 0$$

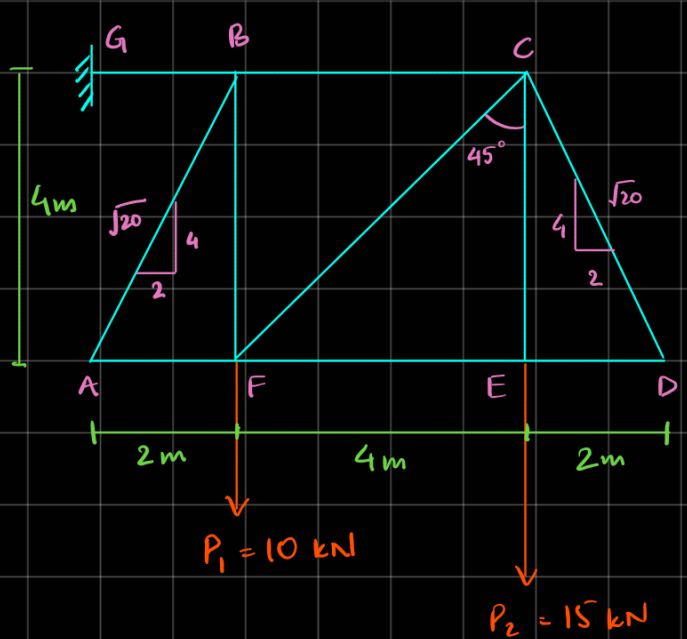
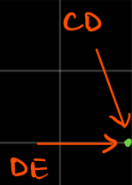
$$\underline{CD = 0}$$

$$\sum F_x = 0$$

$$CD \left(\frac{2}{\sqrt{20}} \right) + DE = 0$$

$$0 + DE = 0$$

$$\underline{DE = 0}$$



Joint E

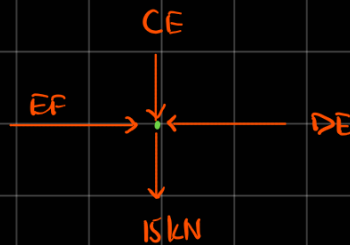
$$\sum F_y = 0$$

$$-CE - 15 = 0$$

$$-CE = 15$$

$$CE = -15 \text{ kN (C)}$$

$$\underline{CE = 15 \text{ kN (T)}}$$



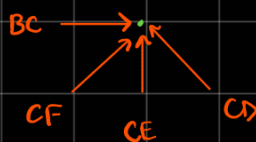
$$\sum F_x = 0$$

$$EF - DE = 0$$

$$\underline{EF = 0}$$

Joint C

$$\sum F_y = 0$$



$$-15 + CF \cos 45 + 0 = 0$$

$$CF = 15\sqrt{2}$$

$$CF = 21.21 \text{ kN (C)}$$

$$\sum F_x = 0$$

$$BC + CF \sin 45^\circ + 0 = 0$$

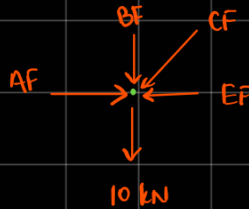
$$BC = -\frac{15\sqrt{2}}{\sqrt{2}}$$

$$= -15 \text{ kN (C)}$$

$$BC = 15 \text{ kN (T)}$$

Joint F

$$\sum F_y = 0$$



$$-BF - 10 - CF \sin 45^\circ = 0$$

$$-BF = 10 + \frac{15\sqrt{2}}{\sqrt{2}}$$

$$BF = -25 \text{ kN (C)}$$

$$BF = 25 \text{ kN (T)}$$

$$\sum F_x = 0$$

$$AF - CF \cos 45^\circ - 0 = 0$$

$$AF = \frac{15\sqrt{2}}{\sqrt{2}}$$

$$AF = 15 \text{ kN (C)}$$

Joint B

$$\sum F_y = 0$$

$$BF + AB \left(\frac{4}{\sqrt{20}} \right) = 0$$



$$AB = \frac{25 \times \sqrt{20}}{4}$$

$$= \frac{25\sqrt{5}}{2}$$

$$\underline{AB = 27.95 \text{ kN (C)}}$$

$$\Sigma F_x = 0$$

$$BG + AB \left(\frac{2}{\sqrt{20}} \right) + 15 = 0$$

$$BG = -15 - \left(\frac{25\sqrt{5}}{2} \times \frac{2}{\sqrt{20}} \right)$$

$$= 15 + 12.5$$

$$= -27.5 \text{ kN (C)}$$

$$\underline{BG = 27.5 \text{ kN (T)}}$$

Joint G

$$\Sigma F_y = 0$$



$$\Sigma F_x = 0$$

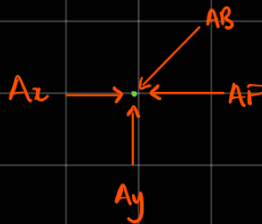
$$G_x - BG = 0$$

$$\underline{G_x = -27.5 \text{ kN}}$$

Joint A

$$\Sigma F_y = 0$$

$$A_y - AB \left(\frac{4}{\sqrt{20}} \right) = 0$$



$$A_y = \left(\frac{25\sqrt{5}}{2} \times \frac{4}{\sqrt{20}} \right)$$

$$\underline{A_y = 25 \text{ kN}}$$

$$\sum F_x = 0$$

$$A_x - AF - AB \left(\frac{2}{\sqrt{20}} \right) = 0$$

$$A_x - \left(\frac{25\sqrt{5}}{2} \times \frac{2}{\sqrt{20}} \right) = 15$$

$$\underline{A_x = 27.5 \text{ kN}}$$

Method of Sections

$$\sum M_A = 0$$

$$10(2) + 15(6) + G_x(4) = 0$$

$$G_x = \frac{-110}{4}$$

$$\underline{G_x = -27.5 \text{ kN}}$$

$$\sum F_x = 0$$

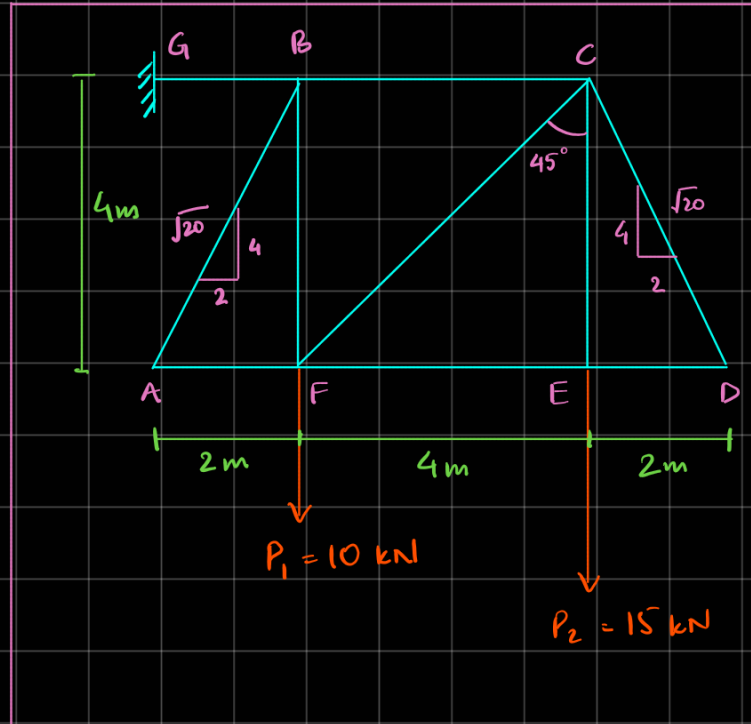
$$A_x - 27.5 = 0$$

$$\underline{A_x = 27.5 \text{ kN}} \text{ (right)}$$

$$\sum F_y = 0$$

$$A_y - 10 - 15 = 0$$

$$\underline{A_y = 25 \text{ kN}} \text{ (upwards)}$$



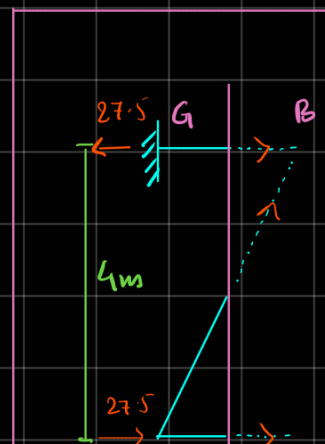
$$\sum M_B = 0$$

$$27.5(4) - 25(2) + AF(4) = 0$$

$$AF = \frac{-60}{4}$$

$$AF = -15 \text{ kN (T)}$$

$$\underline{AF = 15 \text{ kN (C)}}$$



$$\sum M_A = 0$$

$$27 \cdot S(u) - BG(u) \approx 0$$

$$B_G = 27.5 \text{ kN(T)}$$

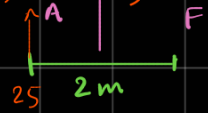
$$\sum F_y = 0$$

$$25 + AB \left(\frac{2}{\sqrt{20}} \right) = 0$$

$$AB = \frac{-25 \pm \sqrt{20}}{4}$$

$$= -27.95 \text{ kN (T)}$$

$$AB = 27.95 \text{ kN (c)}$$



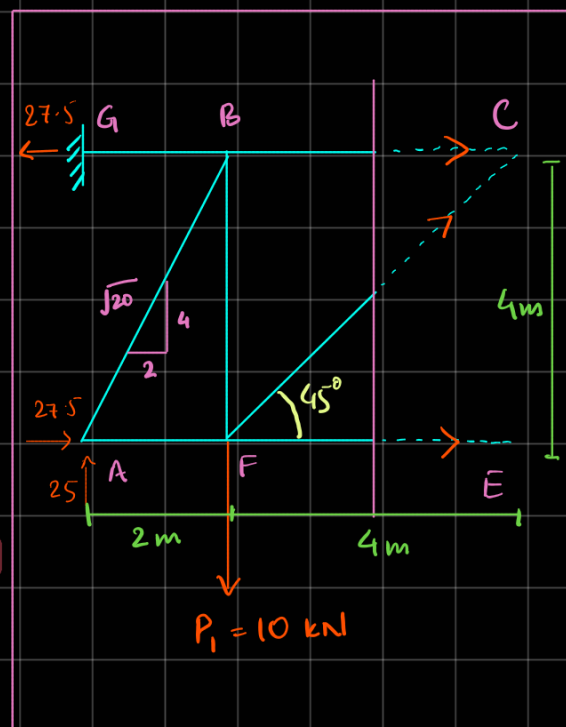
$$\theta = \tan^{-1} \left(\frac{4}{4} \right) = \tan^{-1}(1) = 45^\circ$$

$$\sum M_F = 0$$

$$27 \cdot 5(4) - 25(2) - BC(4) = 0$$

$$4 \text{ BC} = 60$$

$$BC = 15 \text{ kN (T)}$$



$$\sum M_B = 0$$

$$27.5(4) - 25(2) + CF(\sin 45^\circ)(4) = 0$$

$$4F_{CF} = -60\sqrt{2}$$

$$F_{CF} = -15\sqrt{2}$$

$$= -21.21 \text{ kN (T)}$$

$$CF = 21.21 \text{ kN (C)}$$

$$\sum F_x = 0$$

$$-27.5 + 15 + 27.5 + (-15\sqrt{2} \cos 45) + EF = 0$$

$$15 - \frac{15\sqrt{2}}{\sqrt{2}} + EF = 0$$

$$\underline{EF = 0}$$

$$\sum F_y = 0$$

$$CD \left(\frac{4}{\sqrt{20}} \right) = 0$$

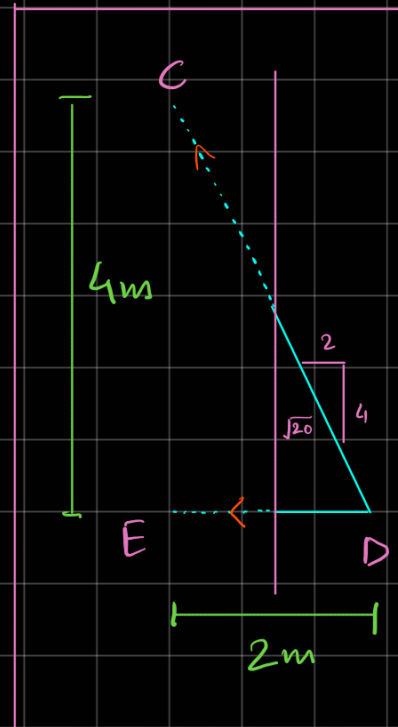
$$\underline{CD = 0}$$

$$\sum F_x = 0$$

$$DE - CD \left(\frac{2}{\sqrt{20}} \right) = 0$$

$$DE - 0 = 0$$

$$\underline{DE = 0}$$

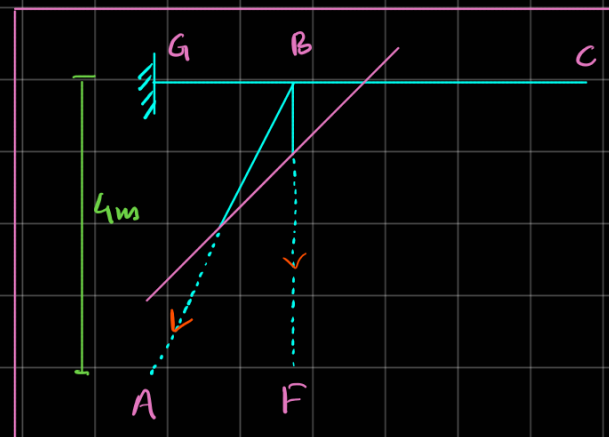


$$\sum F_y = 0$$

$$-AB \left(\frac{4}{\sqrt{20}} \right) - BF = 0$$

$$BF = - \left(\frac{-25\sqrt{20}}{4} \right) \left(\frac{4}{\sqrt{20}} \right)$$

$$\underline{BF = 25 \text{ kN (T)}}$$



$$\sum F_y = 0$$

$$-CF \sin 45 - CE - CD \left(\frac{4}{\sqrt{20}} \right) = 0$$

$$-CE = -\frac{15\sqrt{2}}{\sqrt{2}} + 0$$

$$\underline{CE = 15 \text{ kN (T)}}$$

