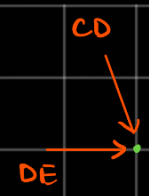
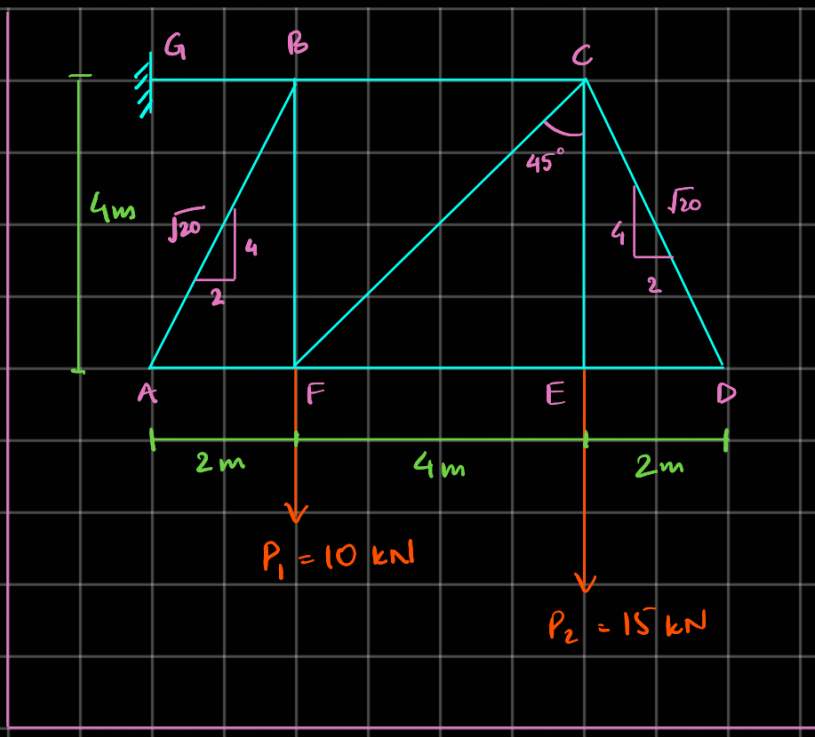
Joint D





$\Sigma F_y = 0$

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

$\boxed{CD = 0}$

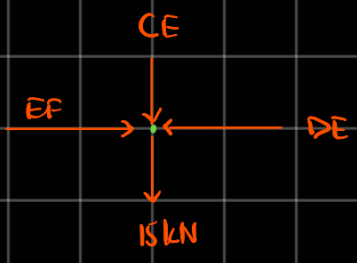
$\Sigma F_x = 0$

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

$0 + DE = 0$

$\boxed{DE = 0}$

Joint E



$\Sigma F_y = 0$

$-CE - 15 = 0$

$-CE = 15$

$CE = -15\ kN\ (C)$

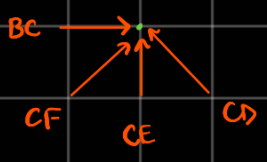
$\boxed{CE = 15\ kN\ (T)}$

$\Sigma F_x = 0$

$EF - DE = 0$

$\boxed{EF = 0}$

Joint C



$\Sigma F_y = 0$

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

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

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

$$\Sigma F_x = 0$$

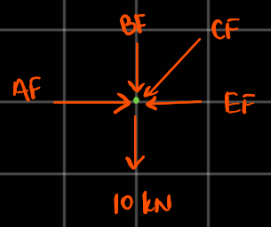
$$BC + CF \sin 45 + 0 = 0$$

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

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

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

Joint F



$$\Sigma F_y = 0$$

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

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

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

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

$$\Sigma F_x = 0$$

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

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

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

Joint B

$$\Sigma F_y = 0$$

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

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

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

AB = 27.95 kN (C)

$$\Sigma F_x = 0$$

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

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

$$= 15 + 12.5$$

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

BG = 27.5 kN (T)

Joint G

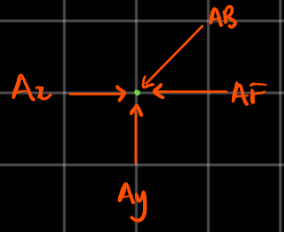
$$\Sigma F_y = 0$$

$$\Sigma F_x = 0$$

$$G_x - BG = 0$$

G_x = - 27.5 kN

Joint A



$$\Sigma F_y = 0$$

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

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

Ay = 25 kN

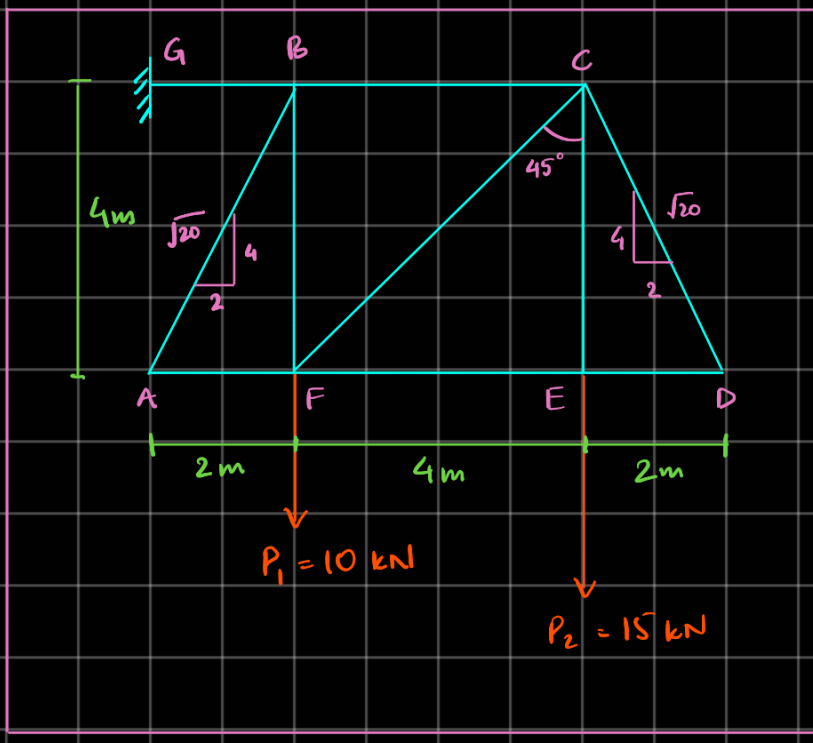
$$\Sigma F_x = 0$$

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

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

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

Method of Sections



$$\Sigma M_A = 0$$

$$10(2) \quad 15(6) + G_x(4) =$$

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

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

$$\Sigma F_x = 0$$

$$A_x - 27.5 = 0$$

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

$$\Sigma F_y = 0$$

$$A_y - 10 - 15 = 0$$

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

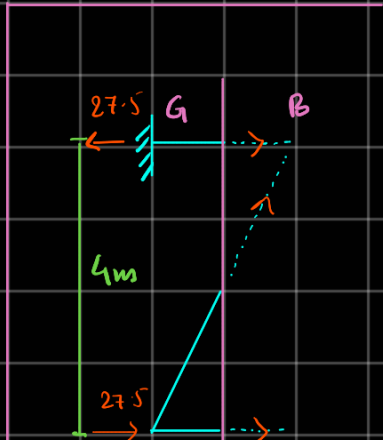
$$\Sigma M_B = 0$$

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

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

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

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



$$\Sigma M_A = 0$$

$$27 \cdot 5\,(4) - BG\,(4) = 0$$

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

$$\Sigma F_y = 0$$

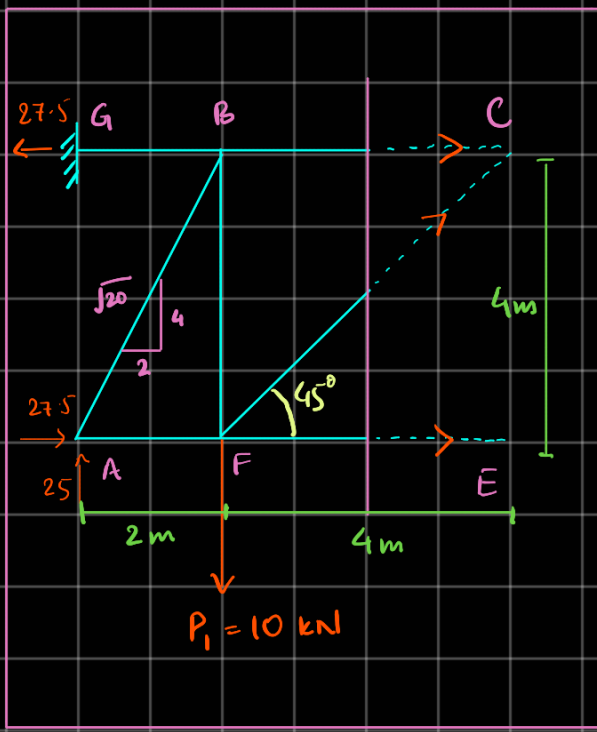
$$25 + AB\left(\frac{2}{\sqrt{20}}\right) = 0$$

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

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

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

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



$$\Sigma M_F = 0$$

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

$$4\,BC = 60$$

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

$$\Sigma M_B = 0$$

$$27 \cdot 5\,(4) - 25\,(2) + CF\,(\sin 45^\circ)\,(4) = 0$$

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

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

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

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

$$\Sigma F_x = 0$$

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

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

$\underline{EF = 0}$

$\Sigma F_y = 0$

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

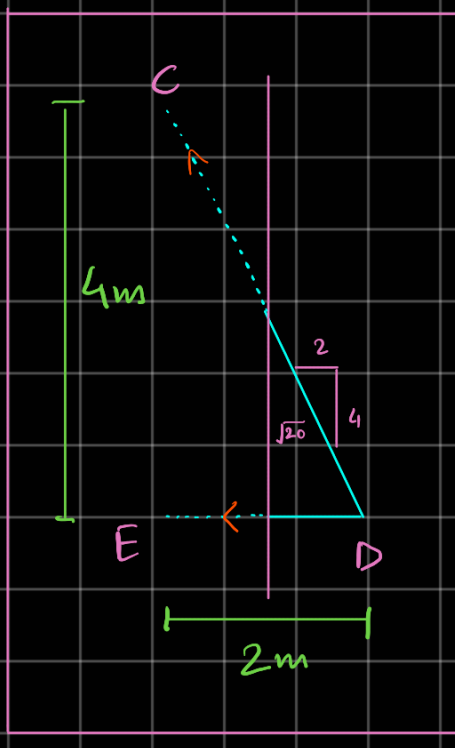
$\underline{CD = 0}$

$\Sigma F_x = 0$

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

$DE - 0 = 0$

$\underline{DE = 0}$

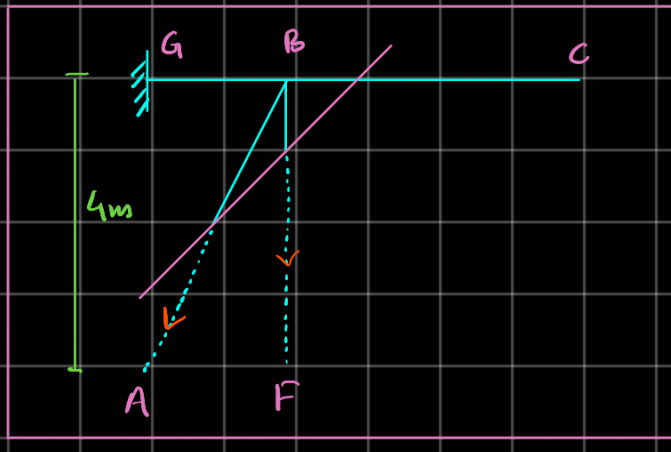


$\Sigma F_y = 0$

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

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

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



$\Sigma F_y = 0$

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

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

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