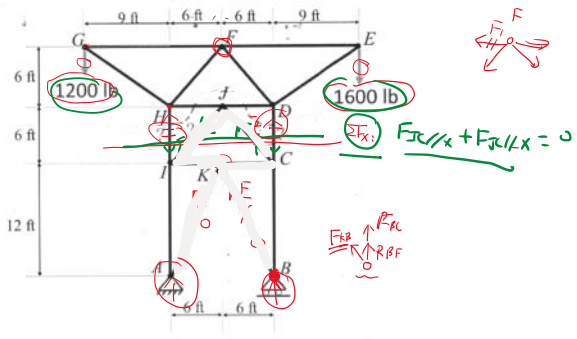
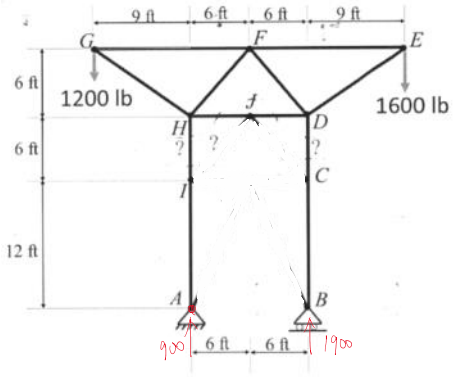
① ② ③ ④

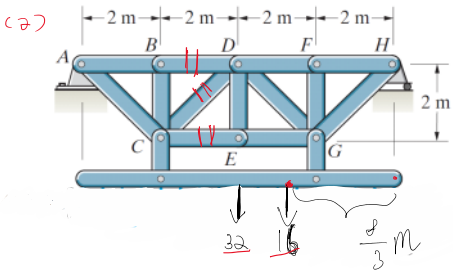


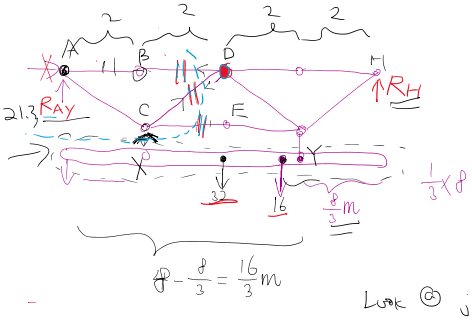
$F_1 = -20$

$\Sigma F_x: \quad F_{JC}\cos\theta + F_{JH}\cos\theta = 0$



(a)





From equilibrium of the whole system:

$\circlearrowleft \quad 32\times 4 + 16\times\left(\frac{16}{3}\right) = 8\cdot R_H$

$R_H = 26.7$

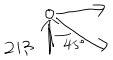
From force equilibrium ΣF_y:

↳ $R_{Ay} = 21.3$

Look @ joint A

$\Sigma F_y = 0$ & $\Sigma F_x = 0$

↳ $F_{AB} = -21.3$



Look @ bottom,

$\Sigma M_y = 0 \Rightarrow F_{CX} = 18.6$

Using method of section cut and use moment

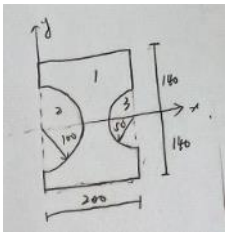
↳ $F_{CE} = 24$ (C)

Use joint C

↳ $F_{CD} = -3.81$

Use joint B

↳ $F_{BD} = -21.3$

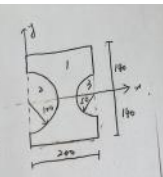


Problem 1

$$\bar{x} = \frac{\bar{x}_1 A_1 + \bar{x}_2 A_2 + \cdots \bar{x}_n A_n}{A_1 + A_2 + \cdots A_n} = \frac{\Sigma \bar{x}_i A_i}{\Sigma A_i}$$

$$\bar{y} = \frac{\bar{y}_1 A_1 + \bar{y}_2 A_2 + \cdots \bar{y}_n A_n}{A_1 + A_2 + \cdots A_n} = \frac{\Sigma \bar{y}_i A_i}{\Sigma A_i}$$

where $i = 1, 2 \cdots n$



	$\bar{x}_i$	$\bar{y}_i$	A_i (+/−)	$\bar{x}_i A_i$	$\bar{y}_i A_i$
□	100	0	28000	$2.8e^6$	0
D	$\frac{4\times100}{3\pi}$	0	-5000π	$-6.67e^5$	0
D	$200 - \frac{4\times50}{3\pi}$	0	-1250π	$-7.02e^5$	0

$$\bar{x} = \frac{\bar{x}_1 A_1 + \bar{x}_2 A_2 + \bar{x}_3 A_3}{A_1 + A_2 + A_3} = \frac{2.8e^6 - 6.67e^5 - 7.02e^5}{28000 - 5000\pi - 1250\pi}$$

$$= 116 \text{ mm}$$

$$\bar{y} = 0$$