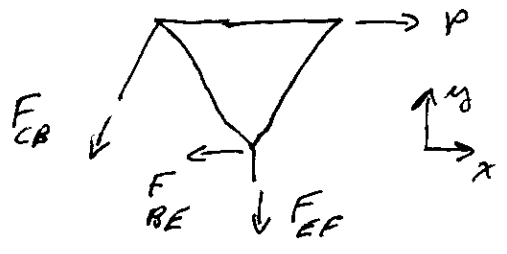
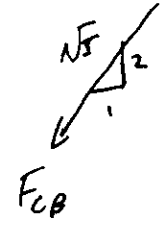


1.



(10)



$$\sum M|_E = 0 \quad - P \cdot \ell + \frac{1}{\sqrt{5}} F_{CB} \cdot \ell + \frac{2}{\sqrt{5}} F_{CB} \cdot \frac{\ell}{2} = 0$$

$$\frac{2}{\sqrt{5}} F_{CB} = P$$

$$F_{CB} = \frac{\sqrt{5}}{2} P$$

(3)

$$= 1.12 P$$

$$\sum F_x = 0 \quad P - F_{BE} - \frac{1}{\sqrt{5}} F_{CB} = 0$$

$$F_{BE} = P - \frac{1}{\sqrt{5}} \left( \frac{\sqrt{5}}{2} P \right)$$

$$F_{BE} = \frac{P}{2}$$

(4)

$$\sum F_y = 0 \quad -F_{EF} - \frac{2}{\sqrt{5}} F_{CB} = 0$$

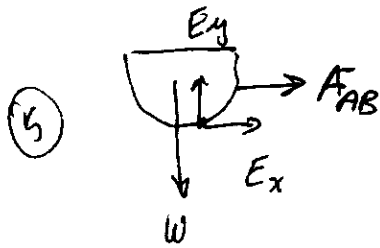
$$F_{EF} = -\frac{2}{\sqrt{5}} \left( \frac{\sqrt{5}}{2} P \right)$$

$$F_{EF} = -P$$

(5)

2. FBD #1

! AB and CD are 2 Force members



$$\sum M|_E = 0$$

$$-0.25 F_{AB} + 0.1 W = 0$$

$$W = 500(9.81)/2$$

↳ two sides

$$= 2453$$

$$F_{AB} = \frac{\frac{1}{10} W}{\frac{1}{4}}$$

$$= 0.4 W$$

$$F_{AB} = 981 \text{ N}$$

$$\sum F_x = 0 \quad E_x + F_{AB} = 0 \quad E_x = -F_{AB}$$

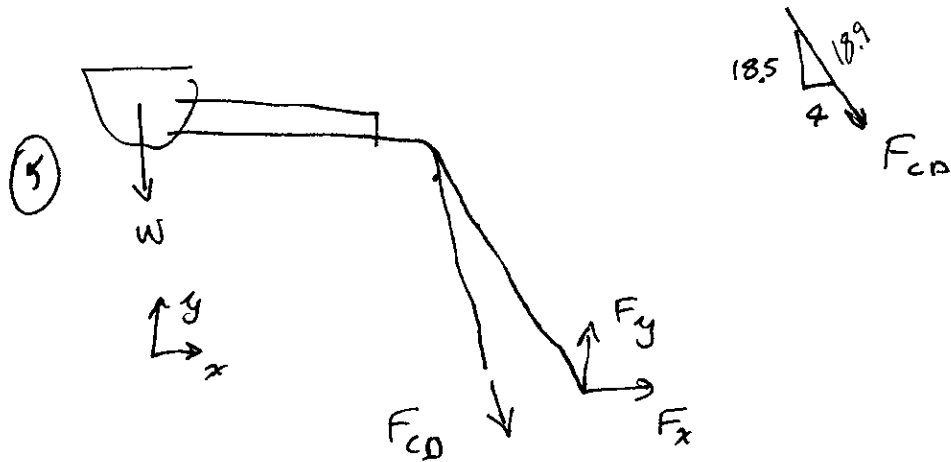
$$E_x = -981 \text{ N}$$

$$\sum F_y = 0 \quad E_y - W = 0 \quad E_y = W$$

$$E_y = 2453 \text{ N}$$

See next page

FBD # 2



$$\sum M/F = 0 \quad -W(2.8) + \frac{4}{18.9} F_{CD}(1.25) - \frac{18.5}{18.9} F_{CD}(0.7) = 0$$

$$F_{CD} = \frac{18.9(2453)(2.8)}{5 - 18.5(0.7)}$$

$$F_{CD} = -16.3 \text{ kN}$$

$\Sigma$

$$\sum F_x = 0 \quad F_x + \frac{4}{18.9} F_{CD} = 0$$

$$F_x = -\frac{4}{18.9} F_{CD}$$

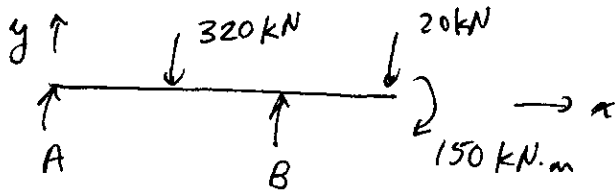
$$F_x = 3.46 \text{ kN}$$

$$\sum F_y = 0 \quad -W + F_y - \frac{18.5}{18.9} F_{CD} = 0$$

$$F_y = \frac{18.5}{18.9} (-16.3) + 2.45$$

$$F_y = -13.5 \text{ kN}$$

3. Find reactions 1<sup>st</sup>.



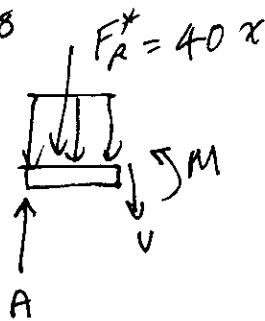
$$\sum M/A = 0 \quad -320(4) + B(8) - 20(11) - 150 = 0$$

$$B = \frac{1280 + 220 + 150}{8}$$

$$= \frac{1650}{8} \Rightarrow B = 206 \text{ kN}$$

$$\sum F_y = 0 \quad A + B = 340 \Rightarrow A = 134 \text{ kN}$$

$0 < x < 8$



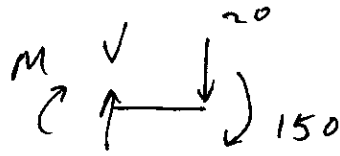
$$\sum F_y = 0 \quad A - F_R^* - V = 0$$

$$V = -40x + 134 \text{ kN}$$

$$\sum M_{cut} = 0 \quad -A \cdot x + F_R^* \frac{x}{2} + M = 0$$

$$M = -\frac{20x^2}{2} + 134x \text{ kNm}$$

$8 \leq x < 11$



$$\rightarrow | \leftarrow (11-x)$$

$$\sum F_y = 0$$

$$V - 20 = 0$$

$$V = 20 \text{ kN}$$

$$\sum M_{\text{cut}} = 0$$

$$-M - 20(11-x) - 150 = 0$$

$$M = 20x - 220 - 150$$

$$M = 20x - 370 \text{ kN}\cdot\text{m}$$

