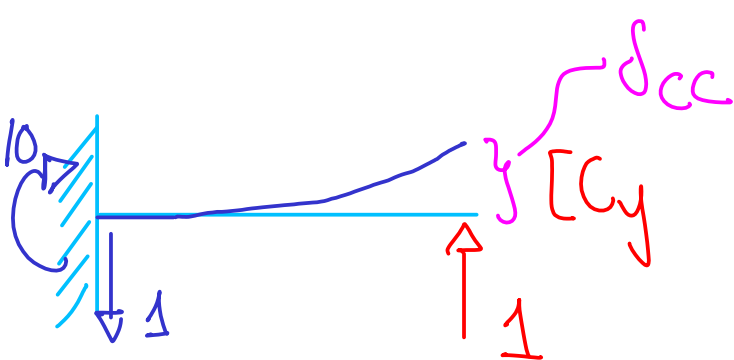
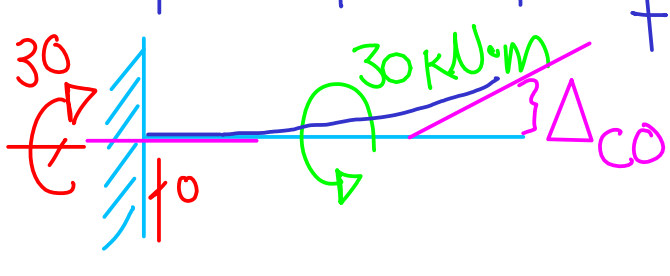
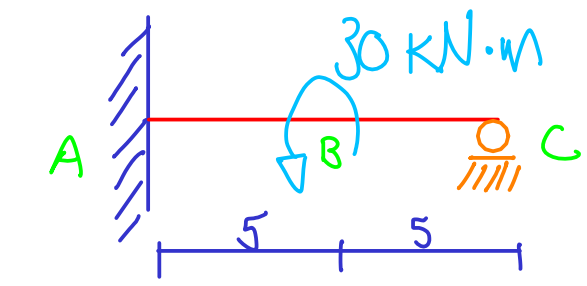
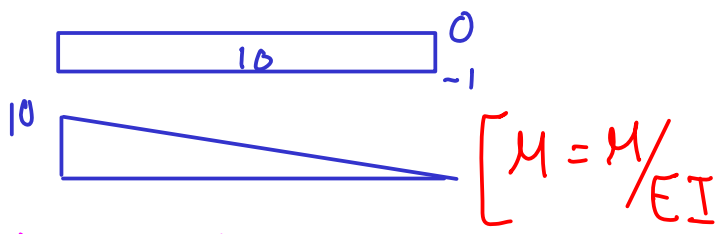
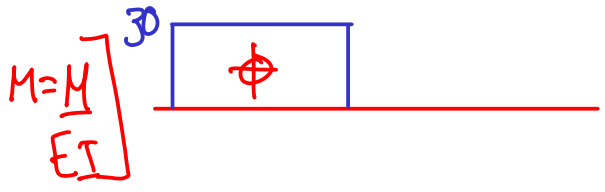


¿R V M? EI constante



AM \leftarrow 7.5



$$t_{C/A} = \Delta_{C0} = \frac{(30)(5)(7.5)}{EI} = \frac{1125}{EI} \uparrow$$

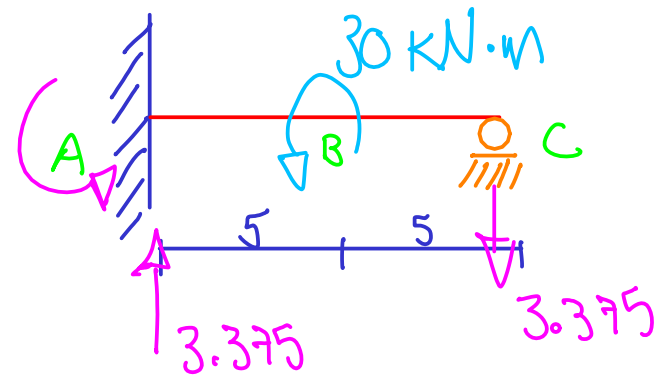
$$t_{C/A} = \delta_{CC} = \frac{1}{2}(10) \left(\frac{10}{EI}\right) \left(\frac{2}{3} \cdot 10\right) = \frac{1000}{3EI} \uparrow$$

$$\Delta_{C0} + \delta_{CC} C_y = 0$$

$$\frac{1125}{EI} + \frac{1000}{3EI} C_y = 0$$

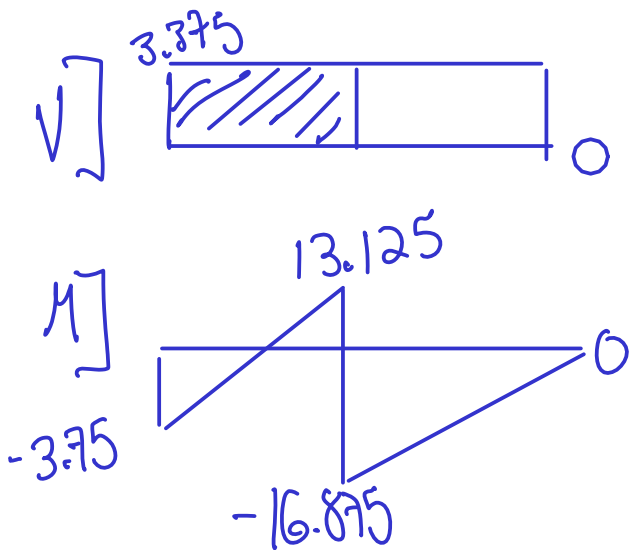
$$C_y = -3.375 \text{ kN} \uparrow$$

$$= 3.375 \text{ kN} \downarrow$$



$$\sum M_A = -M_A - 30 + 3.375(10) = 0$$

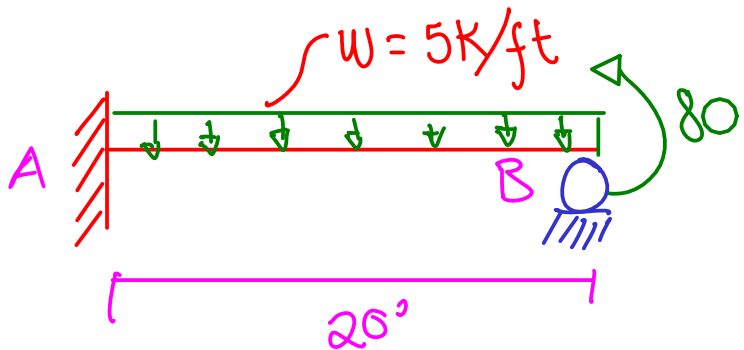
$$M_A = 3.75 \text{ kNm} \downarrow$$



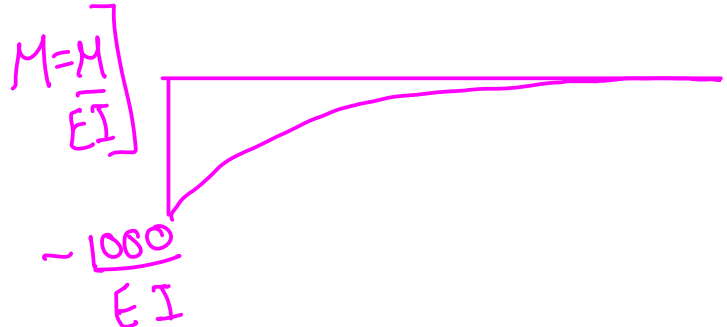
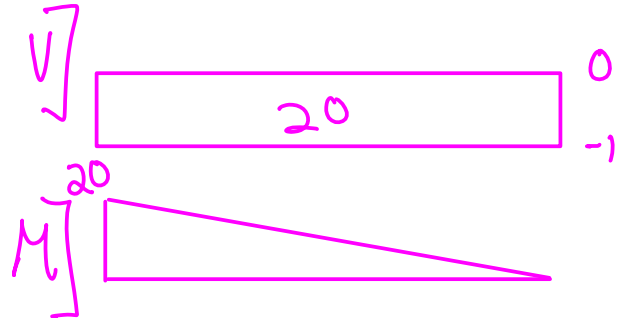
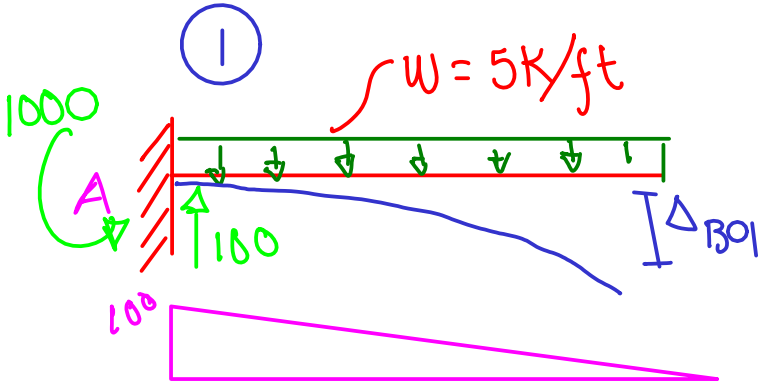
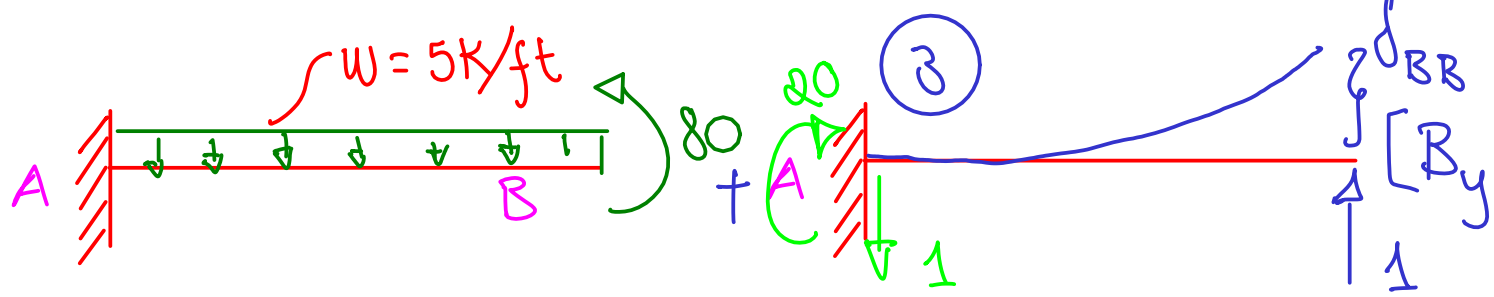
$$-3.75 + 3.375(5) = 13.125$$

$$13.125 - 30 = -16.875$$

$$-16.875 + 3.375(5) = 0$$

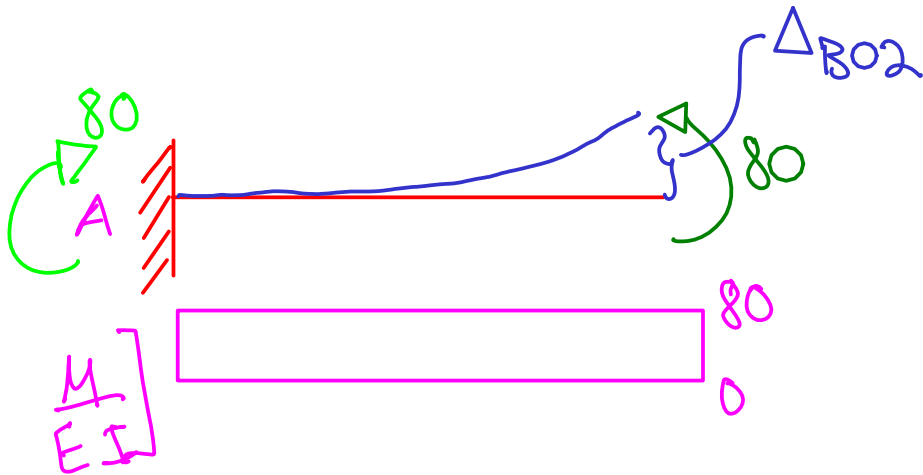


$R \quad V \quad M \quad EI = \text{cte.}$



$$-1000 + \frac{1}{2}(20)(100)(10) = 0$$

(2)



$$\Delta_{B01} = \frac{1}{3}(20) \left(-\frac{1000}{EI} \right) \left(\frac{3}{4} \cdot 20 \right) = -\frac{100,000}{EI}$$

$$\Delta_{B02} = \left(\frac{80}{EI} \right) (20) (10) = \frac{16,000}{EI}$$

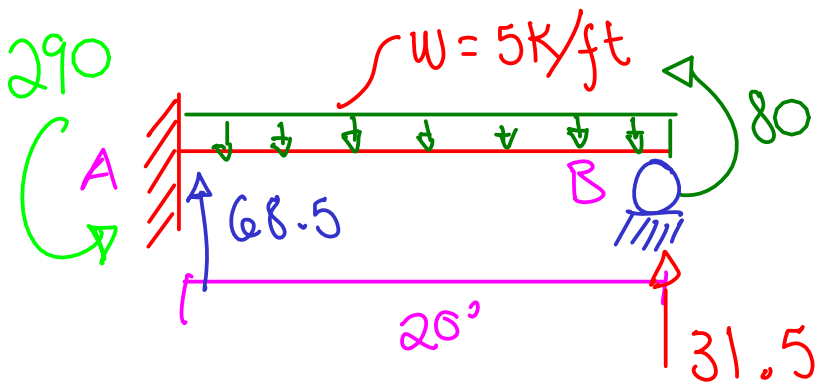
$$\delta_{BB} = \left(\frac{1}{2} \right) (20) \left(\frac{20}{EI} \right) \left(\frac{2}{3} \cdot 20 \right) = \frac{8000}{3EI}$$

Ec. Compatibilidad

$$\Delta_{B01} + \Delta_{B02} + \delta_{BB} B_y = 0$$

$$-\frac{100,000}{EI} + \frac{16,000}{EI} + \frac{8000}{3EI} B_y = 0$$

$$B_y = 31.5 \text{ k} \uparrow$$

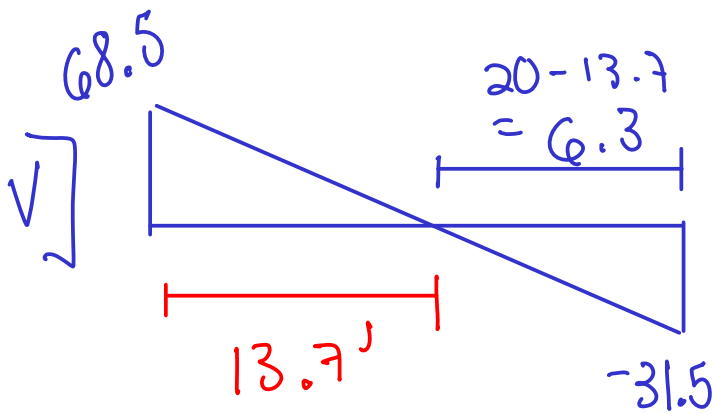


$$\sum F_y = -5(20) + 31.5 + A_y = 0 \quad A_y = 68.5 \text{ k} \uparrow$$

$$\sum M_A = M_A + 5(20)(10) - 80 - 31.5(20) = 0$$

$$M_A = \underline{-290 \text{ C}^\circ}$$

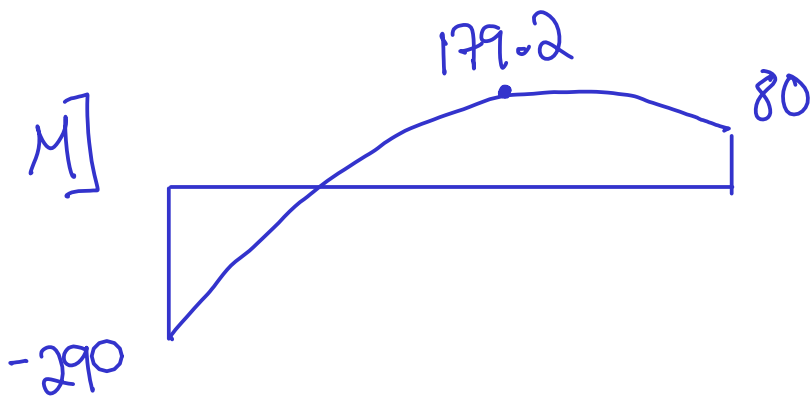
$$M_A = 290 \text{ C}^\circ \downarrow$$



$$68.5 - 5(20) = -31.5$$

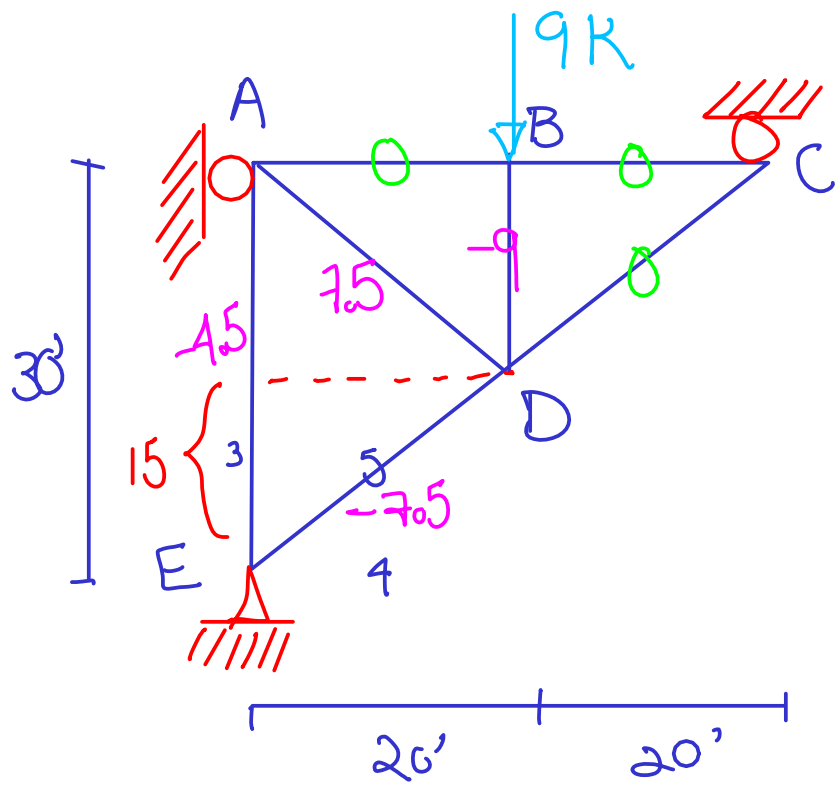
$$68.5 - 5x = 0$$

$$x = 13.7 \text{ ft}$$

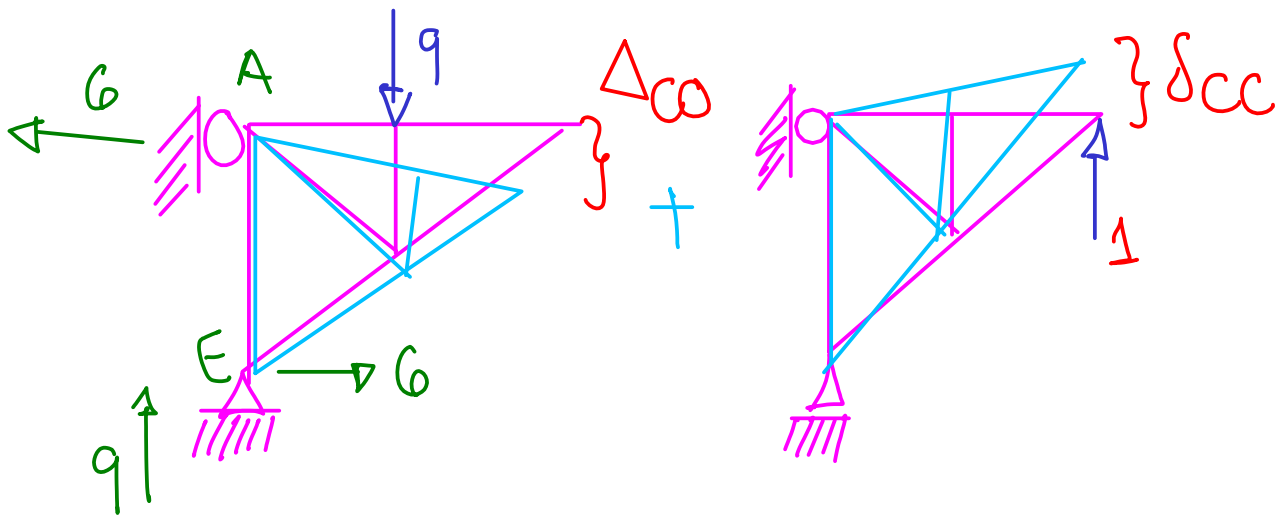
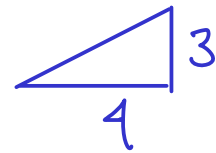


$$-290 + \frac{1}{2}(13.7)(68.5) = 179.2$$

$$179.2 - \frac{1}{2}(6.3)(31.5) = 80$$



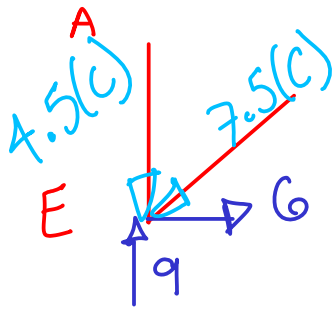
AE = cte.
 ¿Fuerzas en las
 barras & R.?



$$\sum M_E = 9(20) - A_x(30) = 0 \quad A_x = 6K \leftarrow$$

$$(6)(30) = (9)(20)$$

Nodo E

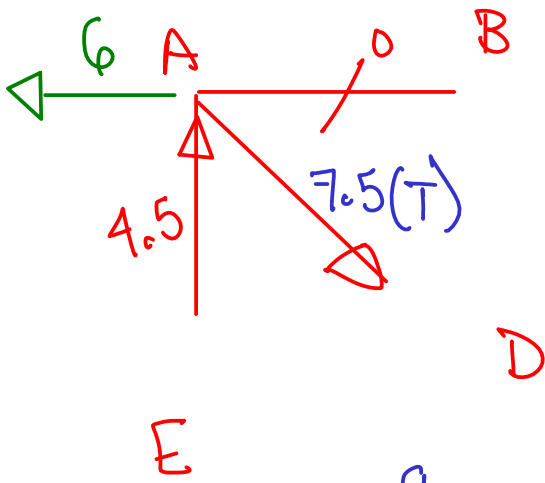


D

$$\sum F_x = 6 - F_{ED} \left(\frac{4}{5} \right) = 0$$

$$F_{ED} = 7.5 (c)$$

$$\sum F_y = -7.5 \left(\frac{3}{5} \right) - F_{AE} + 9 = 0 \quad F_{AE} = 4.5$$

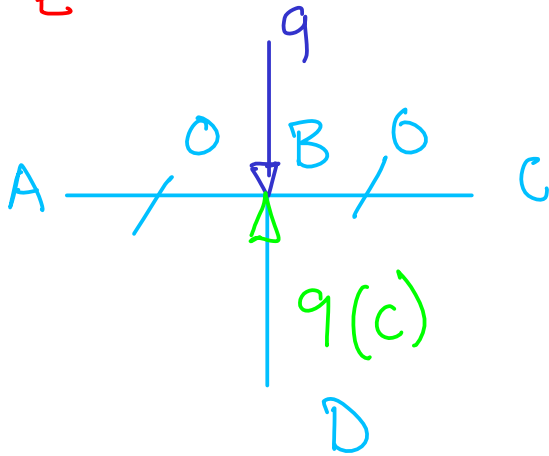


$$\sum F_y = 4.5 - F_{AD} \left(\frac{3}{5} \right) = 0$$

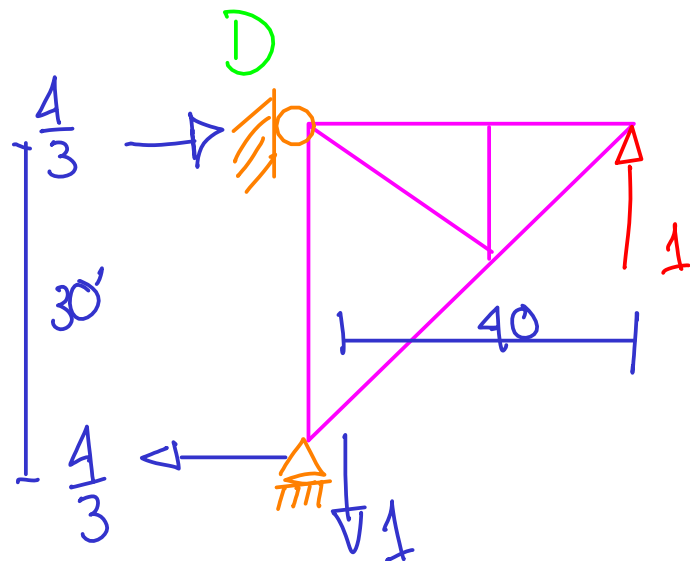
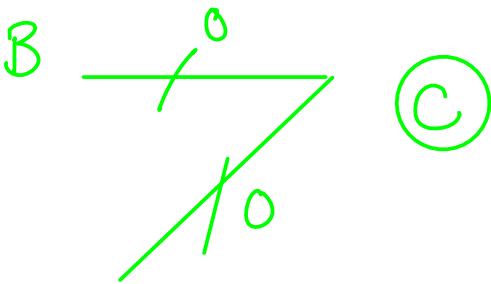
$$F_{AD} = 7.5 (T)$$

$$\sum F_x = -6 + 7.5 \left(\frac{4}{5} \right) + F_{AB} = 0$$

$$F_{AB} = 0$$



$$F_{BD} = 9 (C)$$

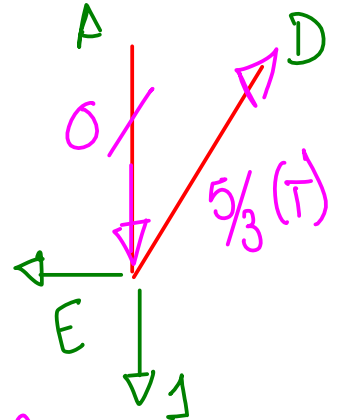


$$40 = 30x$$

$$x = \frac{40}{30} = \frac{4}{3}$$

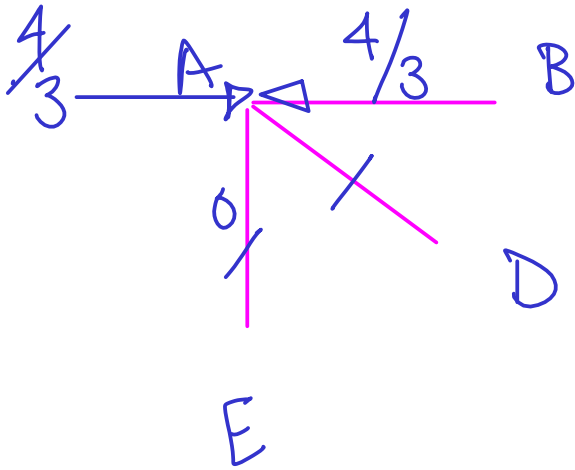
$$\frac{4}{3}$$

Node E



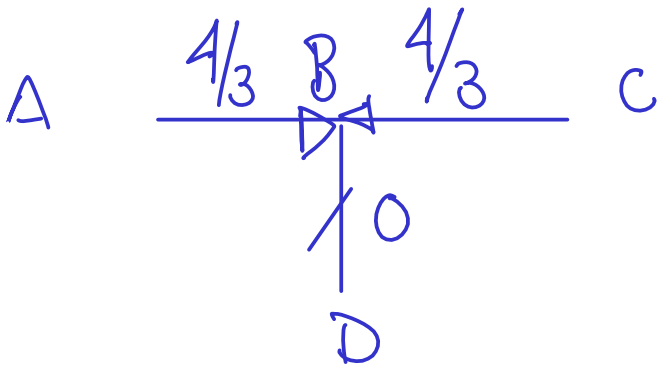
$$\sum F_x = -\frac{4}{3} + F_{ED} \left(\frac{4}{5} \right) = 0 \quad \therefore F_{ED} = \frac{5}{3} (T)$$

$$\sum F_y = -1 - F_{AE} + \frac{5}{3} \left(\frac{3}{5} \right) = 0 \quad F_{AE} = 0$$



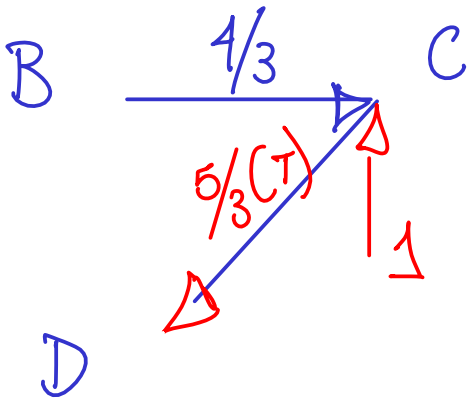
$$F_{AB} = \frac{4}{3} \text{ (c)}$$

$$F_{AD} = 0$$



$$F_{BC} = \frac{4}{3} \text{ (c)}$$

$$F_{BD} = 0$$



$$\sum F_x = \frac{4}{3} - F_{DC} \left(\frac{4}{5} \right) = 0$$

$$= 1 - F_{DC} \left(\frac{3}{5} \right) = 0$$

$$F_{DC} = \underline{\underline{\frac{5}{3} \text{ (t)}}}}$$

| | Fp | Fq | L | L (in) | FpFqL |
|----|-------|-------|-------|--------|-------|
| AB | 0.00 | -1.33 | 20.00 | 240 | 0 |
| BC | 0.00 | -1.33 | 20.00 | 240 | 0 |
| AD | 7.50 | 0.00 | 25.00 | 300 | 0 |
| BD | -9.00 | 0.00 | 15.00 | 180 | 0 |
| DC | 0.00 | 1.67 | 25.00 | 300 | 0 |
| ED | -7.50 | 1.67 | 25.00 | 300 | -3750 |
| AE | -4.50 | 0.00 | 30.00 | 360 | 0 |

-3750

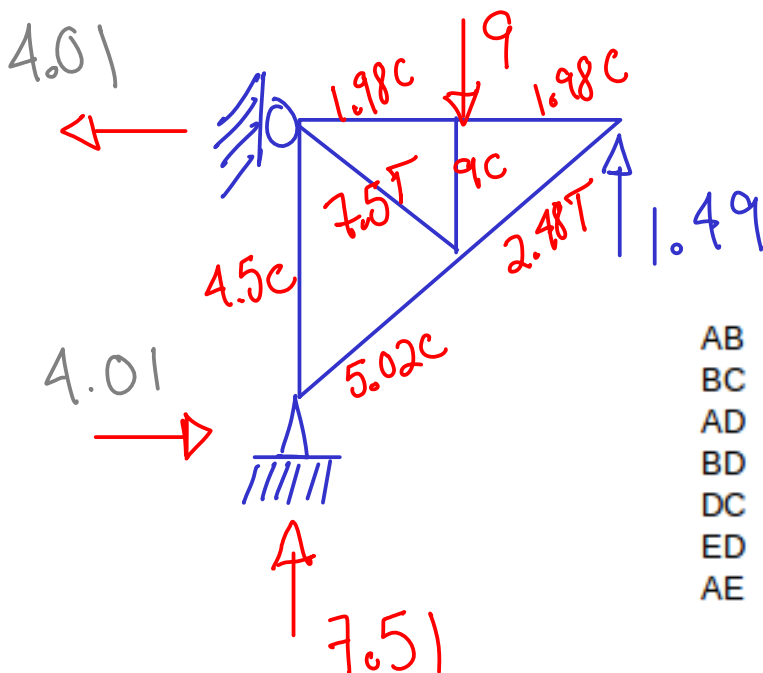
$$\Delta_{CO} + \delta_{CC} C_y = 0$$

$$\Delta_{CO} = \sum \frac{F_p F_q L}{AE} = \frac{-3750}{AE} \uparrow = \frac{3750}{AE} \downarrow$$

| | F _p | F _q | L | L (in) | F _p F _q L |
|----|----------------|----------------|-------|--------|---------------------------------|
| AB | -1.33 | -1.33 | 20.00 | 240 | 426.667 |
| BC | -1.33 | -1.33 | 20.00 | 240 | 426.667 |
| AD | 0.00 | 0.00 | 25.00 | 300 | 0 |
| BD | 0.00 | 0.00 | 15.00 | 180 | 0 |
| DC | 1.67 | 1.67 | 25.00 | 300 | 833.333 |
| ED | 1.67 | 1.67 | 25.00 | 300 | 833.333 |
| AE | 0.00 | 0.00 | 30.00 | 360 | 0 |
| | | | | 2520 | |

$$\delta_{CC} = \sum \frac{F_p F_q L}{AE} = \frac{2520}{AE} \uparrow$$

$$\frac{-3750}{AE} + \frac{2520}{AE} C_y = 0 \quad C_y = 1.49 \text{ K} \uparrow$$



$$A_x = -6 + \frac{1}{3}(1.49) = 4.01$$

| | F _p | F _q | 1.49*F _q | F _p +1.49*F _q |
|----|----------------|----------------|---------------------|-------------------------------------|
| AB | 0.00 | -1.33 | -1.99 | -1.987 |
| BC | 0.00 | -1.33 | -1.99 | -1.987 |
| AD | 7.50 | 0.00 | 0.00 | 7.500 |
| BD | -9.00 | 0.00 | 0.00 | -9.000 |
| DC | 0.00 | 1.67 | 2.48 | 2.483 |
| ED | -7.50 | 1.67 | 2.48 | -5.017 |
| AE | -4.50 | 0.00 | 0.00 | -4.500 |