

$$21 - 8\bar{z} = 0 \Rightarrow \bar{z} = 2.625 \text{ m}$$

$$M_{\max} = M(\bar{z}) = 33 \times \frac{(-12 \times 0.75 + 21 \times 1.313)}{33} = 18.56$$

oppose:

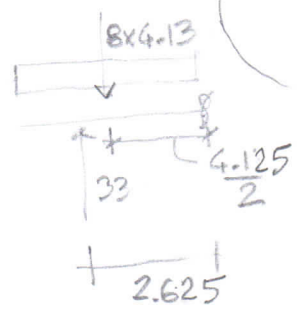
$$M_{\max} = M(\bar{z}) = -12 \times (0.75 + 2.625) + 33 \times 2.625 - 8 \times \frac{2.625^2}{2} = 18.56$$

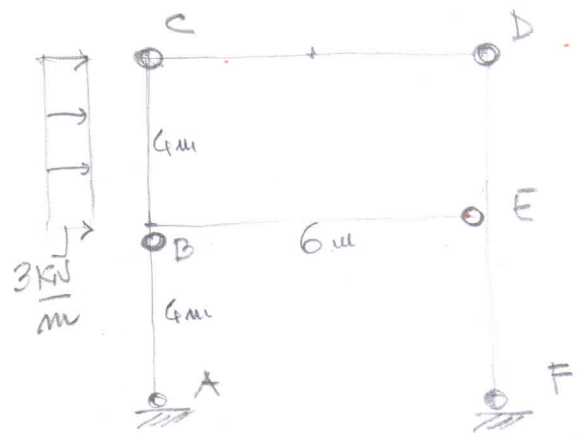
$$-12 \times 3.25 + 33 \times 2.5 = 43.5$$

$$33 \times 2.5 - 8 \times \frac{4^2}{2} = 18.56$$

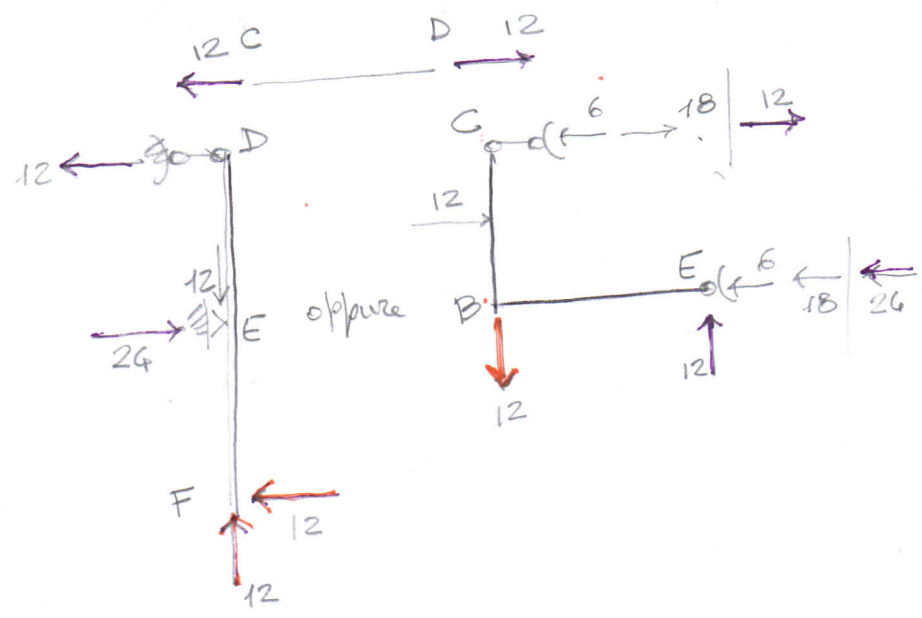
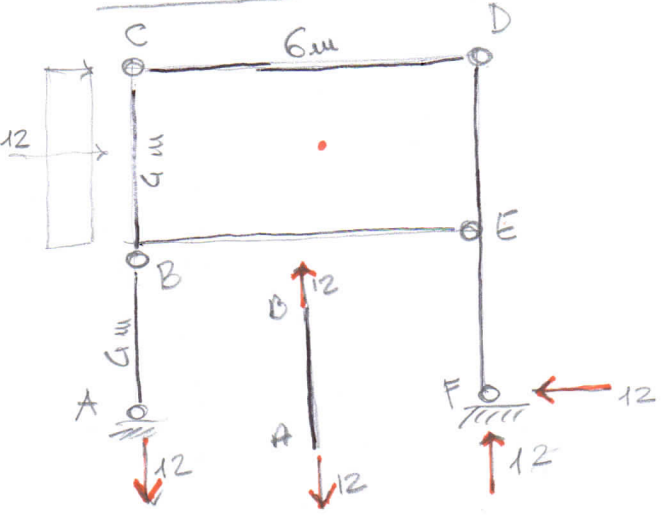
oppose

$$M_{\max} = M(\bar{z}) = 33 \times \left(2.625 - \frac{4.125}{2} \right) = 18.56$$

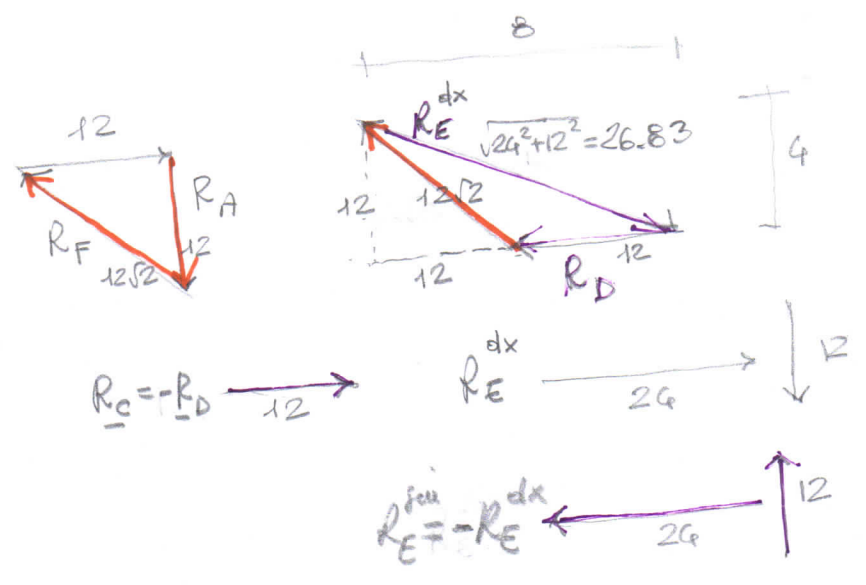
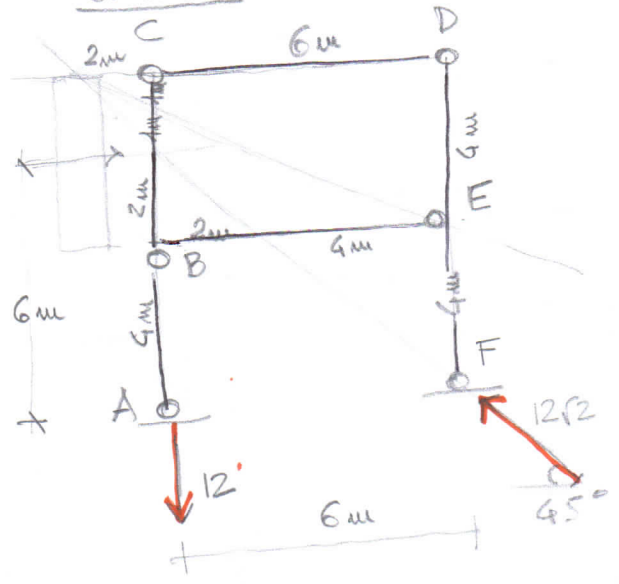


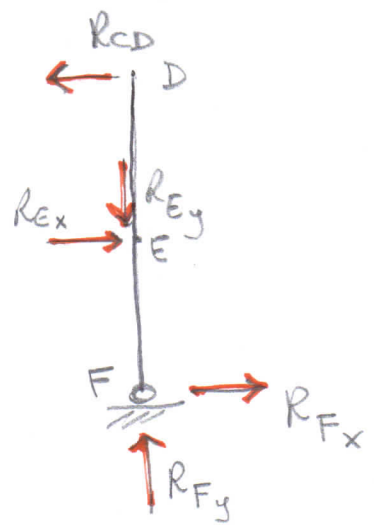
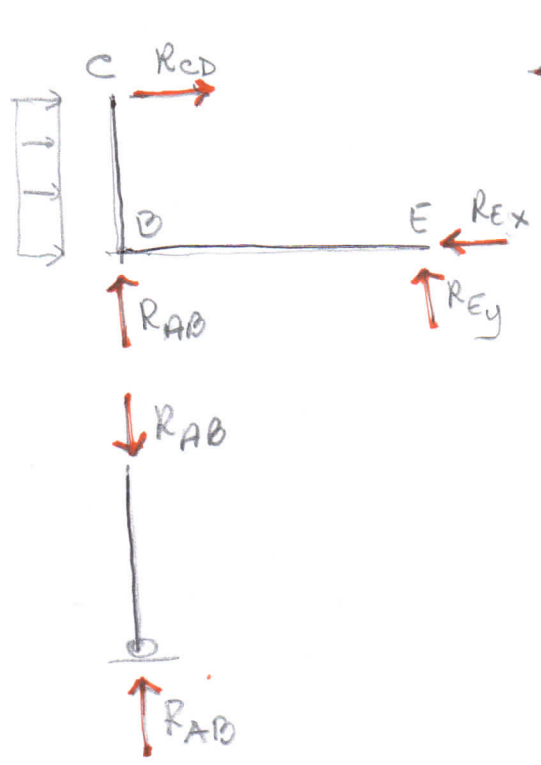


SINTETICO



GRAFICO





$$\begin{aligned}
 &12 + R_{CD} - R_{Ex} = 0 \\
 &R_{AB} + R_{Ey} = 0 \\
 &B) - 12 \times 2 - R_{CD} \cdot 4 + R_{Ey} \cdot 6 = 0 \\
 &- R_{CD} + R_{Ex} + R_{Fx} = 0 \\
 &- R_{Ey} + R_{Fy} = 0 \\
 &F) R_{CD} \cdot 8 - R_{Ex} \cdot 4 = 0
 \end{aligned}$$

equil. CBE $\rightarrow R_{Ex} = 12 + R_{CD}$
 equil. CBE $\rightarrow R_{Ey} = 4 + \frac{2}{3} R_{CD}$
 equil. CBE $\rightarrow R_{AB} = -4 - \frac{2}{3} R_{CD}$

equil. DEF $R_{Fx} = R_{CD} - 12 - R_{CD} = -12$
 equil. DEF $R_{Fy} = 4 + \frac{2}{3} R_{CD}$
 equil. DEF $8 R_{CD} - 48 - 4 R_{CD} = 0 \Rightarrow R_{CD} = 12$

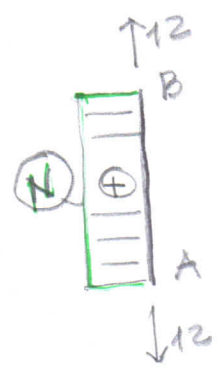
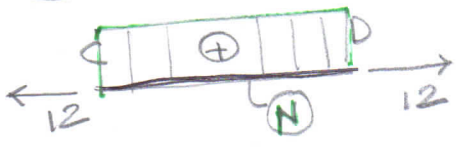
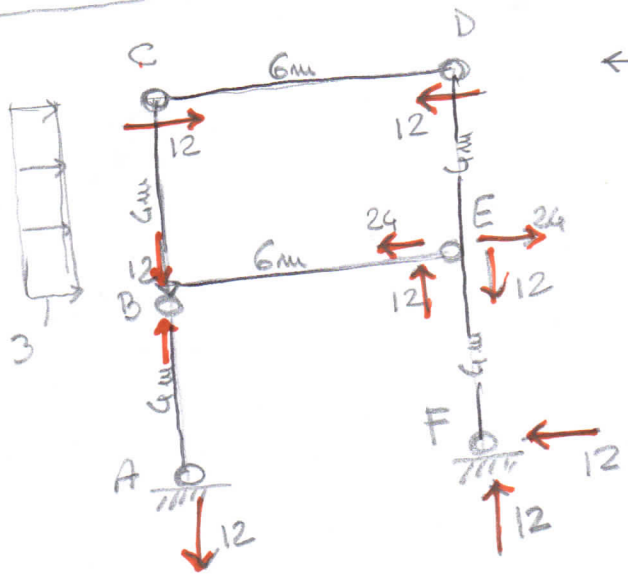
$R_{AB} = -4 - \frac{2}{3} \times 12 \Rightarrow R_{AB} = -12$

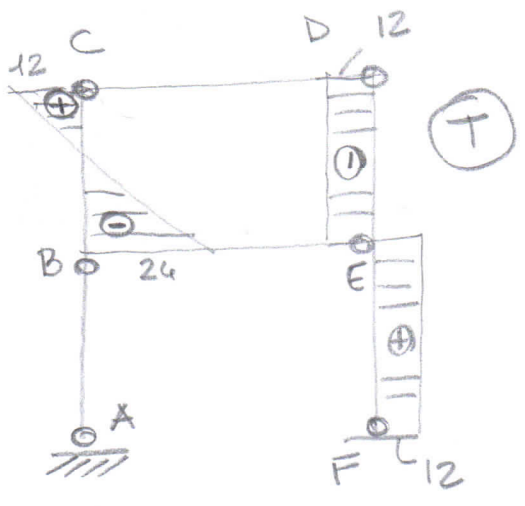
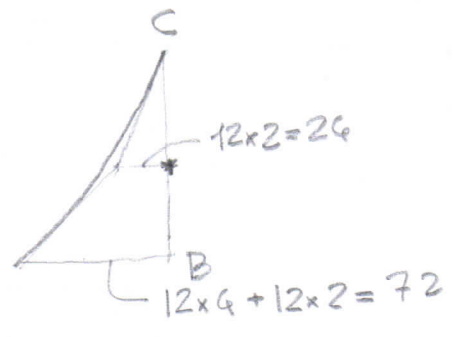
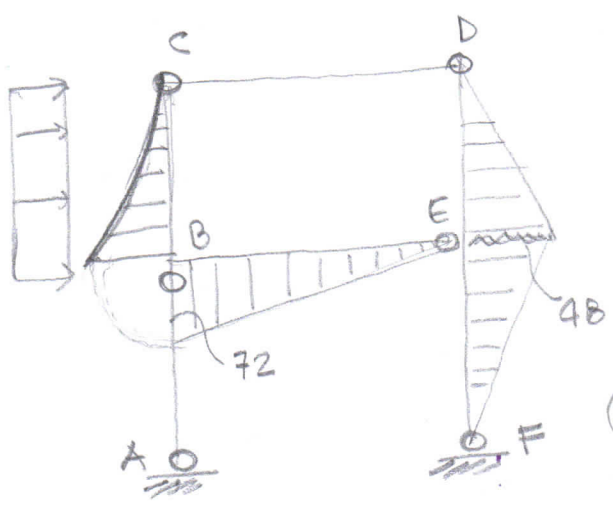
$R_{Ex} = 24$

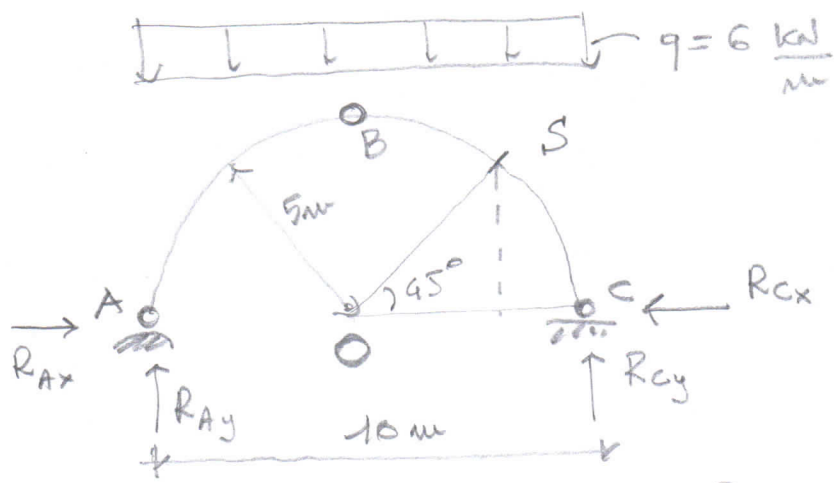
$R_{Ey} = 4 + \frac{2}{3} \times 12 \Rightarrow R_{Ey} = 12$

$R_{Fx} = -12$

$R_{Fy} = 4 + \frac{2}{3} \times 12 \Rightarrow R_{Fy} = 12$







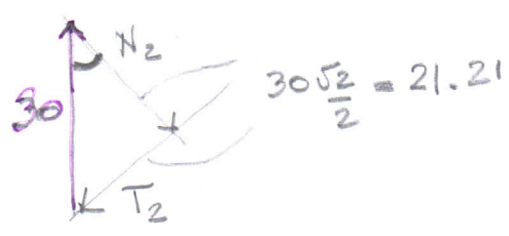
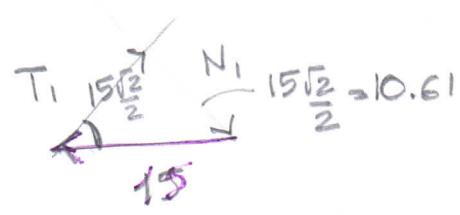
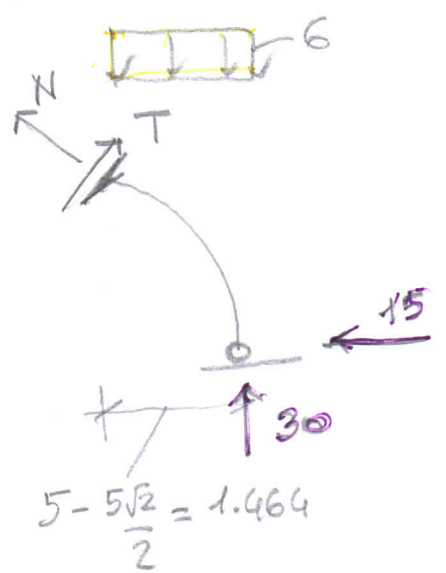
$$R_{Ax} - R_{Cx} = 0 \Rightarrow R_{Cx} = 15$$

$$R_{Ax} + R_{Cx} - 60 = 0 \Rightarrow R_{Cx} = 30$$

$$\Rightarrow R_{Ay} = 30$$

$$c) - R_{Ay} \cdot 10 + 60 \cdot 5 = 0$$

$$R_{Ax} \cdot 5 - R_{Ay} \cdot 5 + 6 \cdot 5 \cdot 2.5 = 0 \Rightarrow R_{Ax} = \frac{-75 + 150}{5} = 15$$

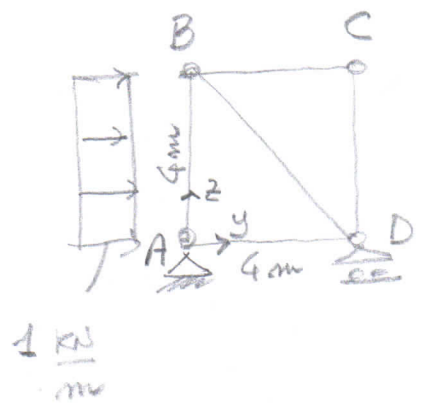


$$T_3 = 6 \times (5 - \frac{5\sqrt{2}}{2}) = 11$$

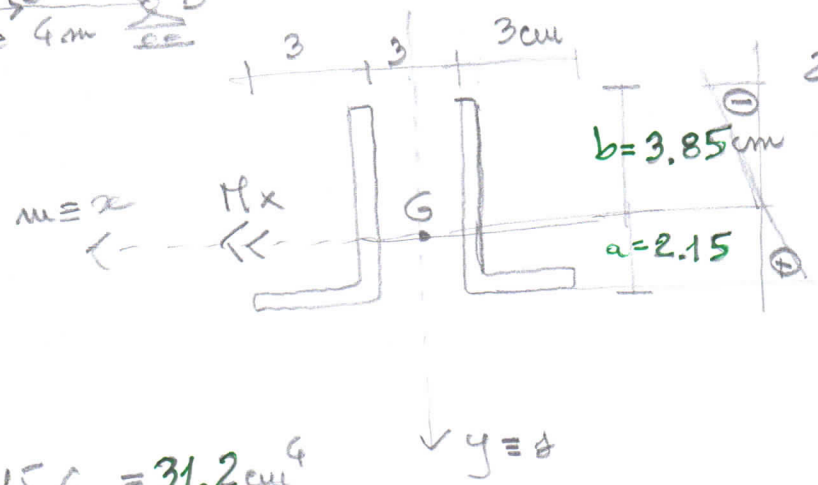
$$N_3 = 30 - 15\sqrt{2} = 8.787$$

$$T_s = 15\frac{\sqrt{2}}{2} - 30\frac{\sqrt{2}}{2} + 30 - 15\sqrt{2} = 30 - 45\frac{\sqrt{2}}{2} = -1.820$$

$$N_s = -15\frac{\sqrt{2}}{2} - 30\frac{\sqrt{2}}{2} + 30 - 15\sqrt{2} = 30 - 75\frac{\sqrt{2}}{2} = -23.03$$



$$M_{max}^{AB} = 1 \times \frac{4^2}{8} = 2 \text{ kNm}$$



$A = 4.29$
 $I_x = 15.6$
 $I_y = 2.60$

$$I_x = 2 \times 15.6 = 31.2 \text{ cm}^4 \quad \downarrow y \equiv z$$

$$I_y = 2 \left[2.60 + 4.29 \times (0.68 + 1.5)^2 \right] = 45.98 \text{ cm}^4$$

$$\sigma_z = \frac{2 \times 10^6}{31.2 \times 10^4} y = 6.410 y$$

$$\sigma_z^{max} = 6.410 \times 21.5 = 138 \text{ N/mm}^2$$

$$\sigma_z^{min} = 6.410 \times (-38.5) = -247 \text{ N/mm}^2$$

$$W_x^{max} = \frac{31.2}{2.15} = 14.51 \text{ cm}^3 \quad W_x^{min} = \frac{31.2}{3.85} = 8.104 \text{ cm}^3$$