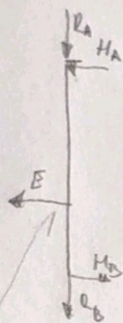


71)

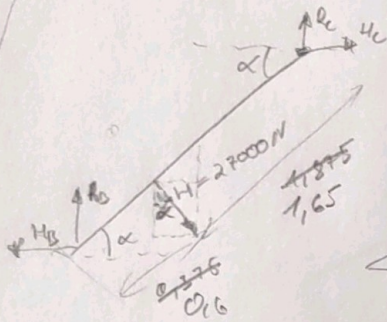
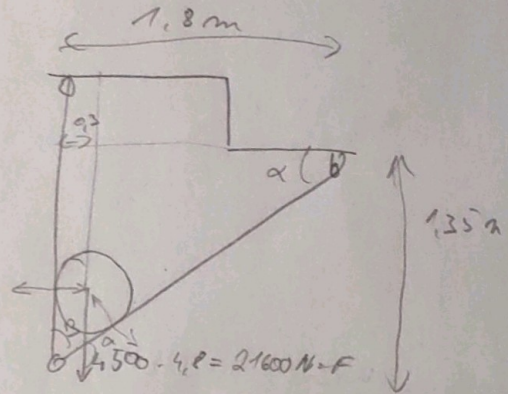
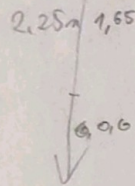


$$\rightarrow \sum F_x = 0: -H_A + H_B - 16210 = 0$$

$$\sum \mathcal{M}_A = -1.65 \cdot 16210 + 2.25 H_B = 0$$

$$H_B = 11890 \text{ N}$$

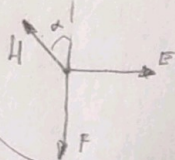
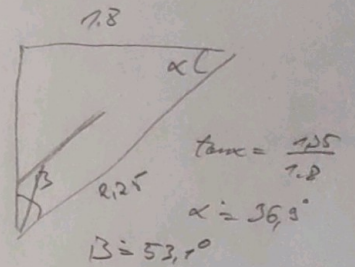
$$H_A = 4320 \text{ N}$$



$$\sum \mathcal{M}_C = +1.65 \cdot 27000 - 11890 \cdot (1.35) - (11890) \cdot R_B = 0$$

$$R_B = 15840 \text{ N}$$

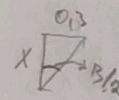
$$R_C = R_B + H \cdot \cos \alpha = 15840 + 27000 \cdot \cos 36.3^\circ = 5760 \text{ N}$$



$$F \cos \alpha = H$$

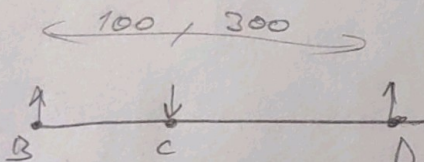
$$H = \frac{21600}{\cos 36.3^\circ} = 27000 \text{ N}$$

$$F = H \sin \alpha = 27000 \cdot \sin 36.3^\circ = 16210 \text{ N}$$



$$x = \frac{0.3}{\tan \frac{\beta}{2}} = 0.6 \text{ m}$$

72)

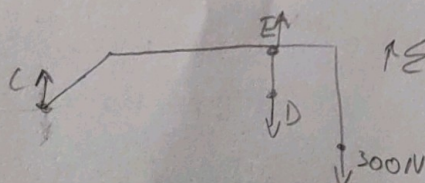


$$\sum \mathcal{M}_C = +300 \cdot 100 + 300 D = 0$$

$$D = 100$$

$$\sum \mathcal{M}_D = C \cdot 300 - 300 \cdot 400 = 0$$

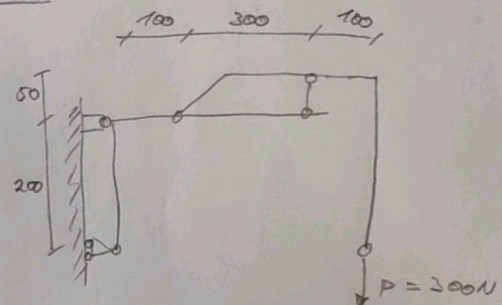
$$C = 400 \text{ N}$$



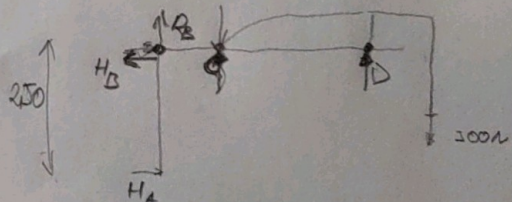
$$\sum F_y = C + E - D - 300 \text{ N} = 0$$

$$400 + E - 100 - 300 = 0$$

$$E = 0 \text{ N}$$



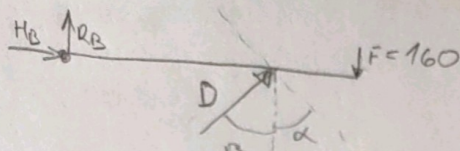
Total rigid body



$$\sum \mathcal{M}_D = H_A \cdot 200 - 300 \cdot 300 = 0$$

$$H_A = 450 \text{ N}, H_B = 360 \text{ N}, R_B = 300 \text{ N}$$

74)



$$\sum \mathcal{M}_B = D \cdot \cos \beta \cdot 8 - 160 \cdot 12 = 0$$

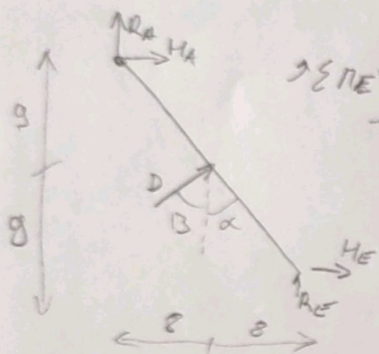
$$D = 361 \text{ N}$$

$$\sum F_y = D \sin \beta + R_B - F = 0$$

$$R_B = -240 + 160 = -80 \text{ N} = R_B$$

$$\sum F_x = D \cos \beta = -H_B$$

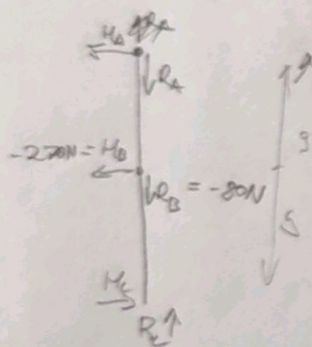
$$H_B = -270 \text{ N}$$



$$\sum \mathcal{M}_E = 8 \cdot 361 \cdot \cos 48,37 + 9 \cdot 361 \cdot \sin 48,37 - 18 \cdot 135 - 16 \cdot R_A = 0$$

$$R_A = 120 \text{ N}$$

$$R_E = 120 \text{ N}$$



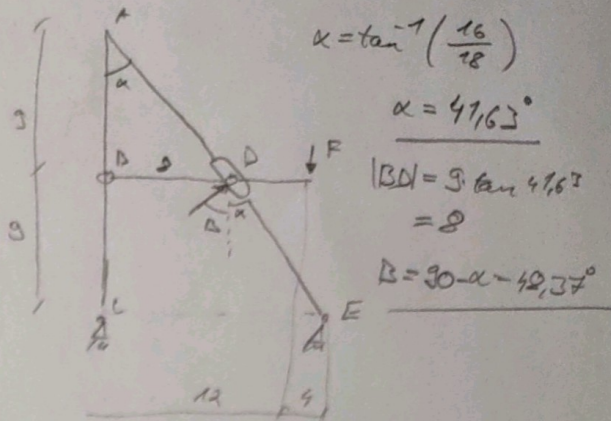
$$\sum \mathcal{M}_A = 18 \cdot H_E - (-270) \cdot 9 = 0, H_E = 135 \text{ N}$$

$$H_E = 135 \text{ N}$$

$$\sum F_x = -H_A - (-270) - 135 = 0$$

$$H_A = -135 \text{ N}$$

$$R_E = 40 \text{ N}$$

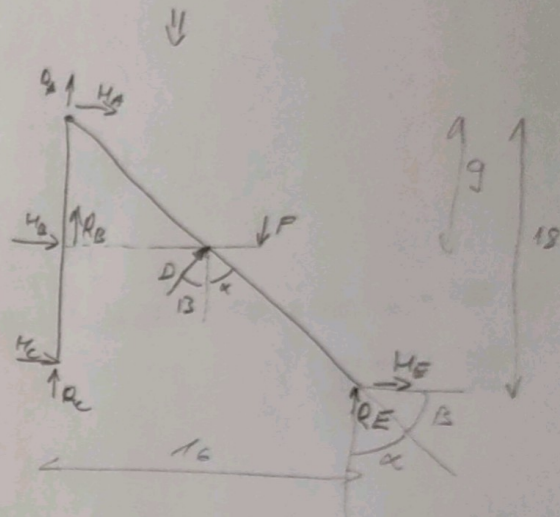


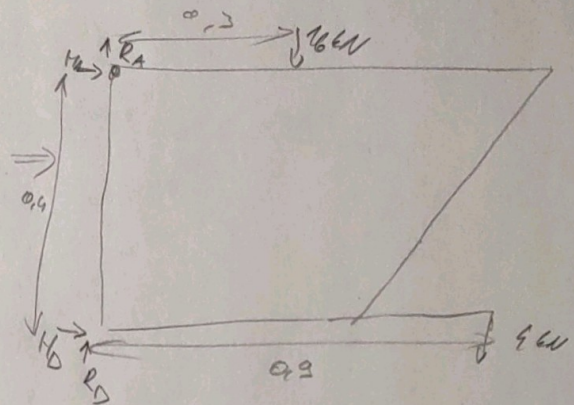
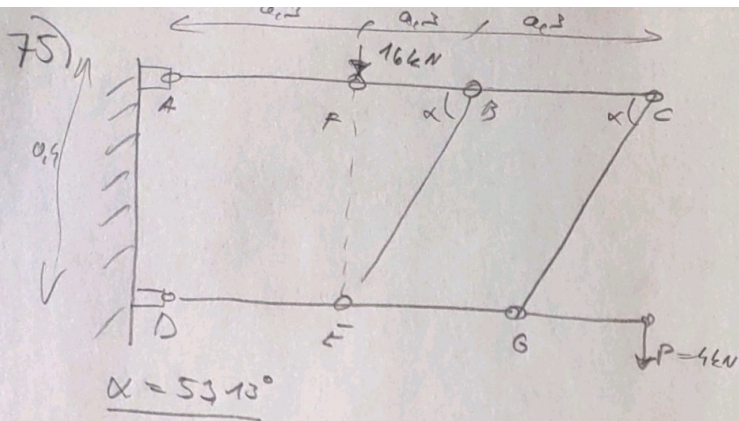
$$\alpha = \tan^{-1} \left(\frac{16}{18} \right)$$

$$\alpha = 41,63^\circ$$

$$BD = 9 \tan 41,63^\circ = 8$$

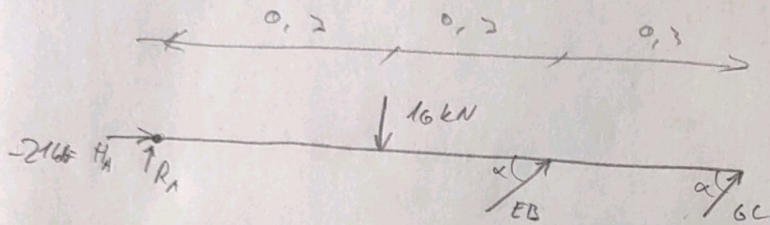
$$\beta = 30 - \alpha - 42,37^\circ$$





$$\sum M_A = -0.9 \cdot 16 - 0.2 \cdot 16 + 0.9 \cdot H_B = 0$$

$$H_B = 21 \text{ N} \Rightarrow H_A = -21 \text{ kN}$$



$$\sum F_x = H_A + EB \cos \alpha + GC \cos \alpha = 0$$

$$EB + GC = \frac{21 \text{ kN}}{\cos 53.13^\circ}$$

$$\sum F_y = R_A + EB \sin \alpha + GC \sin \alpha - 16 = 0$$

$$R_A = (-35 \cdot \sin 53.13^\circ) + 16$$

$$R_A = -12 \text{ kN} \Rightarrow$$

$$\sum F_y = R_A + R_D - 16 - 4 = 0$$

$$R_D = 32 \text{ kN}$$

$$\sum M_A - 0.2 \cdot 16 + 0.6 \cdot EB \sin \alpha + 0.9 \cdot GC \sin \alpha = 0$$

$$0.6 \cdot EB = \frac{0.2 \cdot 16 - 0.9 \cdot GC \sin \alpha}{\sin 53.13^\circ}$$

$$EB = \frac{6 - 0.9 \cdot GC}{0.6}$$

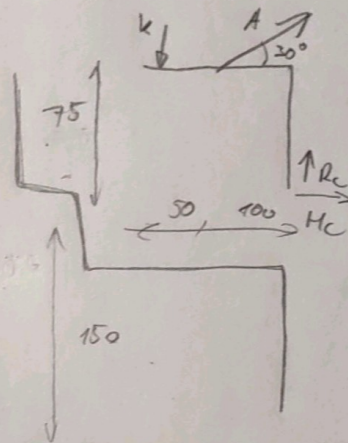
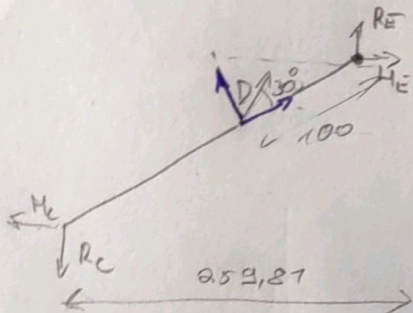
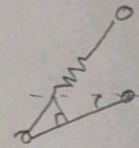
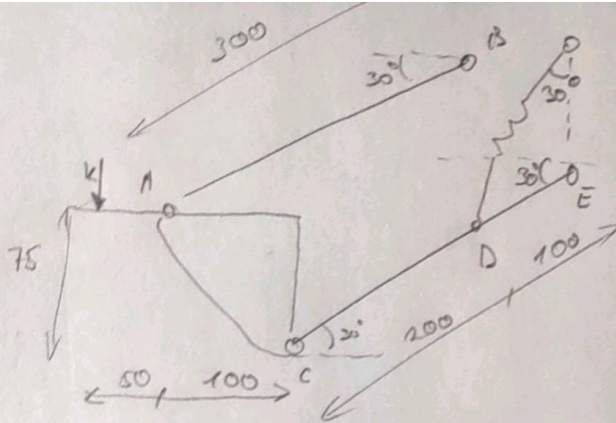
$$6 - 0.9 \cdot GC + GC = 35 \text{ kN}$$

$$10(-1.5 + GC) = 35$$

$$GC = -50 \text{ kN} \Rightarrow$$

$$GC = 85 \text{ kN}$$

78)



$$\sum \mathcal{M}_C = -100 \sin 30^\circ \cdot A - 75 \cos 20^\circ \cdot 150 + 150 \cdot 200 = 0$$

Don't know the reason $\rightarrow 2$

$$A = 130,5 \text{ N}$$

$$\sum F_y = -100 + 200 + 130,5 \sin 30^\circ + R_C = 0$$

$$R_C = +35 \text{ N}$$

$$\sum F_x = H_C = -\cos 30^\circ \cdot A$$

$$H_C = -112,58 \text{ N}$$

$$\sum \mathcal{M}_E = + (135,5) \cdot 259,81 - 112,58 \cdot 150 - D \sin 30^\circ \cdot 100 = 0$$

$$D = 519,6 \text{ N}$$

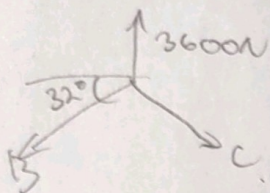
80)

$$A = F = 360 \text{ kg} \cdot 10 =$$

$$= 3600 \text{ N}$$

$$\alpha = \tan^{-1}\left(\frac{360}{240}\right) = 32^\circ$$

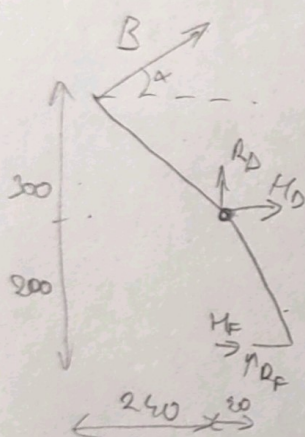
1)



$$\uparrow \sum F_y = 3600 - 2 \cdot B \cdot \sin 32^\circ = 0$$

$$B = 3400 \text{ N}$$

2)



$$\sum \tau_D = -300 \cdot \cos 32^\circ \cdot 3400 - 240 \cdot \sin 32^\circ \cdot 3400 + 20 \cdot R_F + 200 \cdot H_F$$

$$= -1297000$$

$$H_F = 6550 \text{ N}$$

$$\uparrow \sum F_y = \sin 32^\circ \cdot 3400 + R_D + R_F$$

$$\rightarrow \sum F_x = \cos 32^\circ \cdot 3400 + H_D + H_F$$

$$R_F = \frac{3400}{2} = 1700 \text{ N}$$

$$R_D = 0 \text{ N}, H_D = -3400 \text{ N}$$

