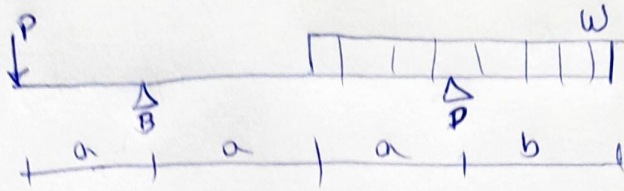
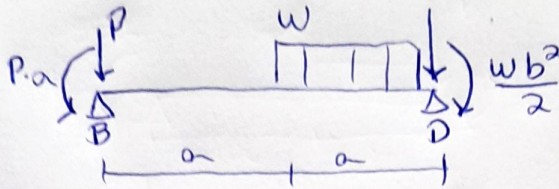


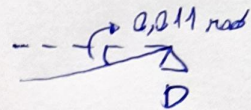
1º)



$$\begin{aligned} a &= 4 \text{ m} \\ b &= 2 \text{ m} \\ w &= 80 \text{ kN/m} \\ P &= 35 \text{ kN} \end{aligned}$$



Ângulo a esquerda de D:

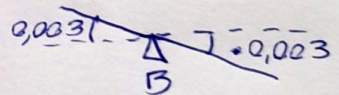


$$\frac{\left(\frac{wb^2}{2}\right) \cdot 2a}{3EI} - \frac{(3w \cdot (a \cdot 2)^3)}{128EI} + \frac{P \cdot a \cdot (2 \cdot a)^3}{6EI} = -0,011$$

Ângulo a direita de B:

$$\frac{P \cdot a \cdot 2 \cdot a}{3EI} - \frac{7w(2a)^3}{384EI} + \frac{\left(\frac{w \cdot b^2}{2}\right) 2 \cdot a}{6EI} = -0,003$$

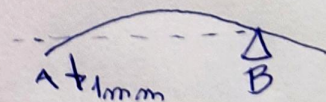
Deflexão em A:



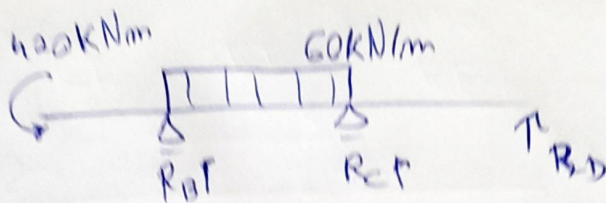
$$0,003 \cdot a - \frac{P \cdot a^2 (3a - a)}{6EI} = -1 \text{ mm}$$



$$0,012 \text{ m} - 0,011 \text{ m} = -0,001 \text{ m}$$



2e)



Equilíbrio:

$$\sum F_y = 0 \therefore R_B + R_C + R_D - 360 = 0$$

$$\sum M_A = 0 \therefore 420 + R_B \cdot 3 - 360 \cdot 6 + R_C \cdot 9 + R_D \cdot 15 = 0$$

deflexão em D = 0

ângulo em C:

$$\theta_C = \theta_{C1} + \theta_{C2}$$

$$\theta_{C1} = \frac{60 \cdot 6^3}{24(2EI)} = \frac{270}{EI}$$

$$\theta_{C2} = \frac{-420 \cdot 6}{12EI} = -\frac{210}{EI}$$

$$\theta_C = \frac{60}{EI}$$

Assim:

$$V_D = \frac{360}{EI} + \frac{R_D \cdot 6^3}{3EI} = 0 \rightarrow R_D = -5 \text{ kN}$$

Das equações de equilíbrio:

$$R_B + R_C + R_D - 360 = 0 \rightarrow R_B + R_C = 365$$

$$3R_B + 9R_C = -420 + 210 + 75$$

$$\text{Assim } R_B = 245 \text{ kN}$$

$$R_C = 120 \text{ kN}$$