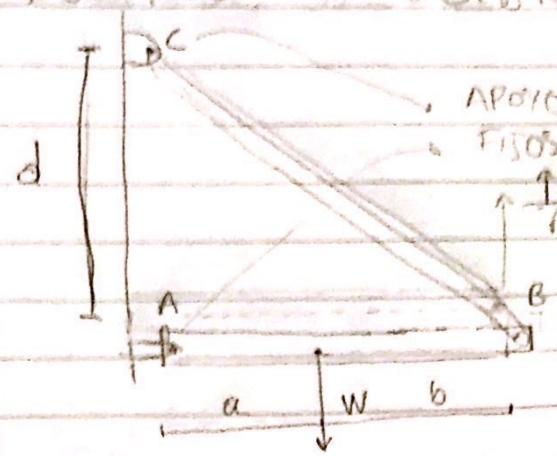
EJEMPLO: EQUILIBRIO

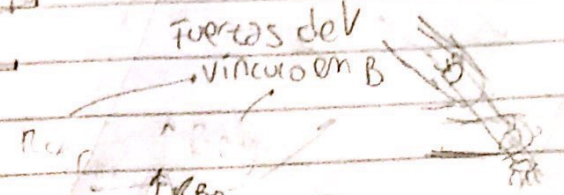


- APOYOS A FIJOS

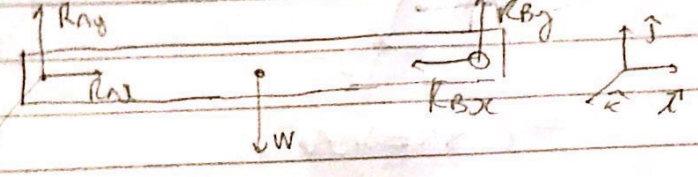
A) DCL barra A-B

B) DCL BARRA C-B

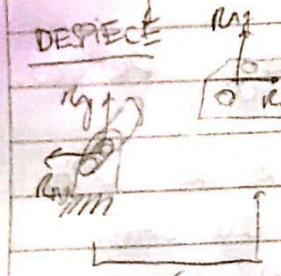
DATOS W, a, b, d



A)



DESPIECE



ECUACIONES DE LA ESTÁTICA:

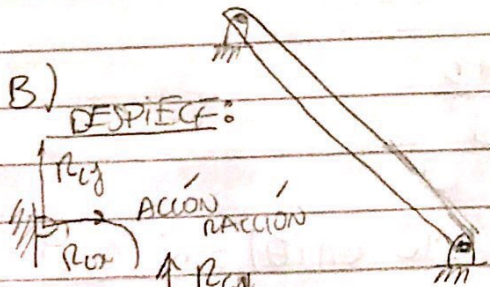
$$\sum F_{\hat{i}} = 0 \rightarrow R_{Ax} - R_{Bx} = 0$$

$$\sum F_{\hat{j}} = 0 \rightarrow R_{By} + R_{Ay} = W$$

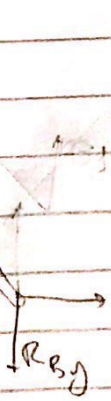
$$\sum M_{\hat{k},A} = R_{By}\cdot(a+b) - W\cdot a = 0$$

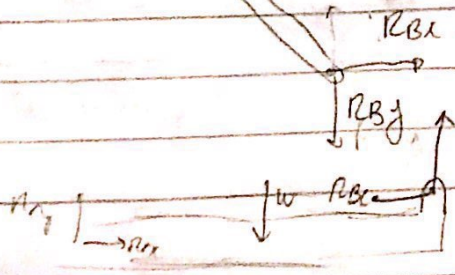
B)

DESPIECE:

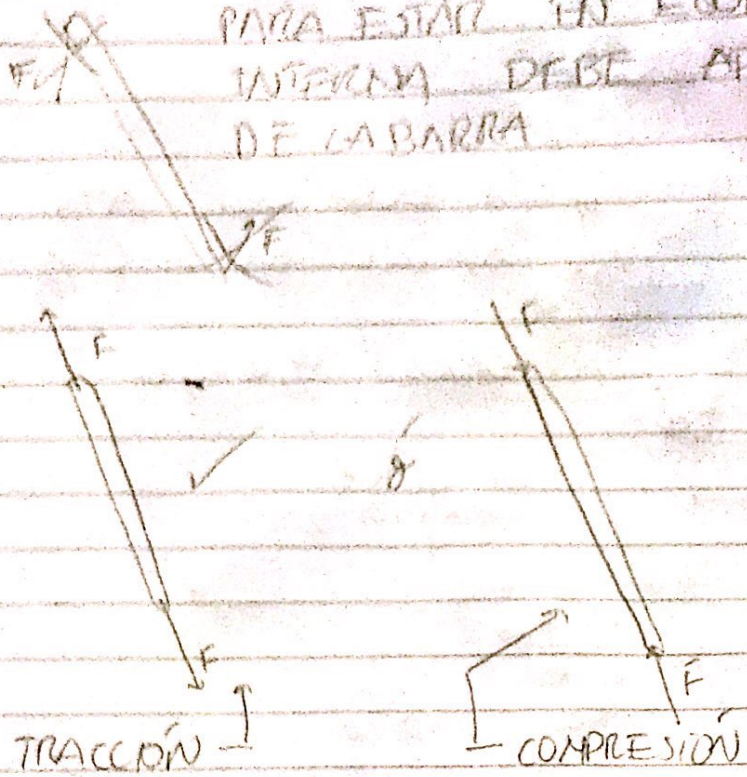


DCL C-B:

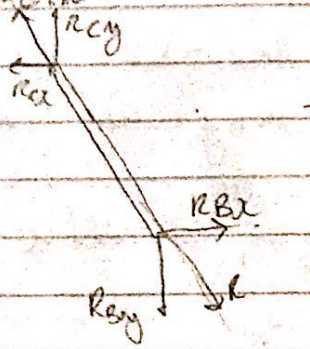




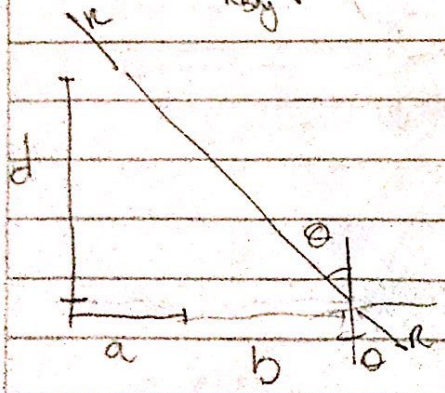
C=B ES UN ELEMENTO A DOS FUERZAS. ESTOS PARA ESTAR EN EQUILIBRIO SU FUERZA INTERNA DEBE APUNTAR EN DIRECCIÓN DE LA BARRA



ENTONCES R_{Cx}, R_{Cy} y R_{Bx} y R_{By} DEBEN CUMPLIR:



DEBEN SUMAR VECTORIALMENTE UNA FUERZA QUE APUNTE EN LA DIRECCIÓN DE LA BARRA. MATEMÁTICAMENTE:

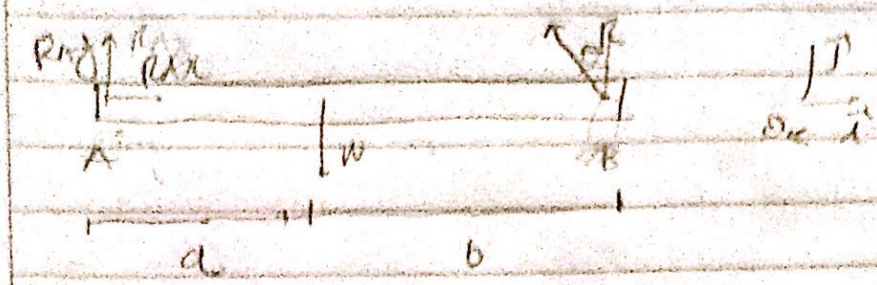


$$\tan(\theta) = \frac{a+b}{d}$$

$$R_{Bx} = R_{Cx} = R\sin(\theta) = \frac{R(a+b)}{\sqrt{(a+b)^2+d^2}}$$

$$R_{Cy} = R_{By} = R\cos(\theta)\ \frac{Rd}{\sqrt{(a+b)^2+d^2}}$$

NUEVO DCL BARRA A-B:



$$\sum F\hat{x} = 0 \rightarrow R_{Ax} = R\,\mathrm{sen}(\theta) \quad (1)$$

$$\sum F\hat{j} = 0 \rightarrow R_{Ay} = R\cos(\theta) \quad (2)$$

$$\sum \vec{M}_{/A} = 0 \rightarrow -W \cdot a + R\cos(\theta)(a+b) = 0 \rightarrow$$

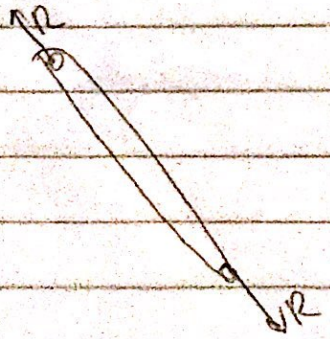
$$R = \frac{W \cdot a}{(a+b)\cos(\theta)} \quad (3) \qquad \checkmark \text{ PATO}$$

SE SUSTITUYE 3 EN (1) Y EN (2)

$$R_{Ax} = \frac{W \cdot a}{a+b} \cdot \frac{\mathrm{sen}(\theta)}{\cos(\theta)} = \frac{W \cdot a}{a+b} \cdot \frac{a+b}{d} = \frac{W \cdot a}{d} \qquad \tan(\theta)$$

$$R_{Ay} = \frac{W \cdot a}{a+b} \cdot \frac{\cos(\theta)}{\cos(\theta)} = \frac{W \cdot a}{a+b} \quad \checkmark$$

NUEVO DCL A C-B:



$$R = \frac{W \cdot a}{a+b} \cdot \frac{d}{\sqrt{(a+b)^2 + d^2}} \qquad \cos(\theta)$$