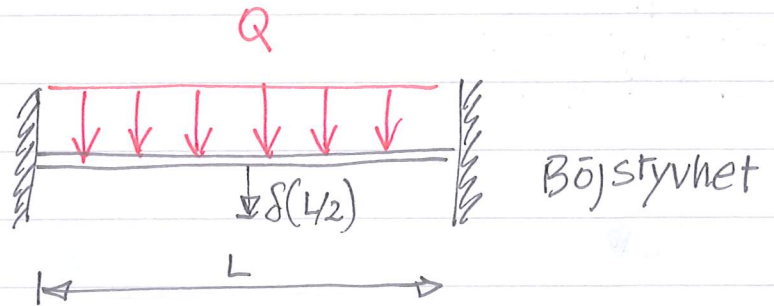


2.4.120

GIVET

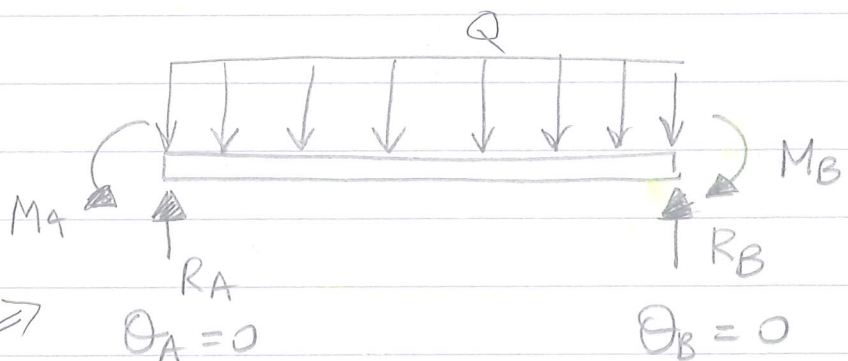


SÖKT: A) änd momenten  $\begin{cases} M_A \\ M_B \end{cases}$

B) nedböjningen i mitten  $\delta(L/2)$

LÖSNING:

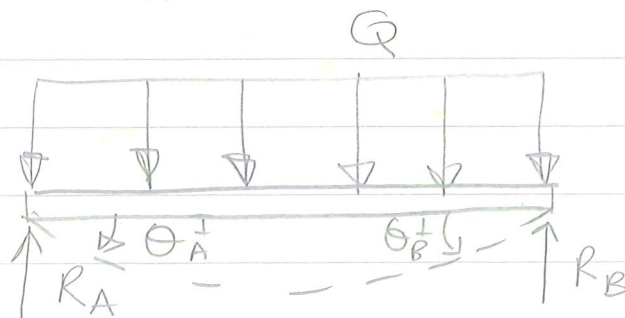
TB. 32.2.



STATISKT  
OBESTÄMT

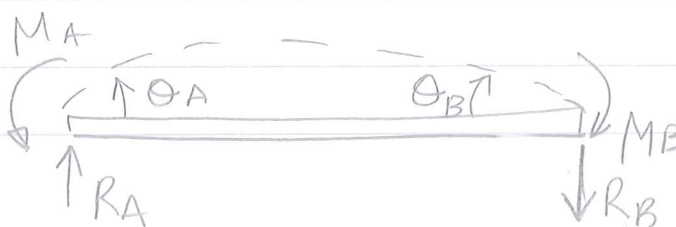
A)

(I)  
(II)



$$R_A^{\text{I}} = R_B^{\text{I}} = \frac{Q}{2}$$

$$\theta_A^{\text{I}} = \theta_B^{\text{I}} = \frac{QL^2}{24EI}$$



$$R_A^{\text{II}} = R_B^{\text{II}} = \frac{M_A - M_B}{L}$$

$$\theta_A^{\text{II}} = \frac{M_AL}{3EI} + \frac{M_BL}{6EI}$$

$$\theta_B^{\text{II}} = \frac{M_AL}{6EI} + \frac{M_BL}{3EI}$$

1.- Räkna ut  $M_A$  och  $M_B$ :

$$(1) \quad \theta_A = \theta_A^I - \theta_A^{\text{II}} = \frac{QL^2}{24EI} - \left( \frac{M_AL}{3EI} + \frac{M_BL}{6EI} \right) = 0$$

( $\theta_A^I$  och  $\theta_A^{\text{II}}$  är definierade åt olika håll.)

$$(2) \quad \theta_B = \theta_B^I - \theta_B^{\text{II}} = \frac{QL^2}{24EI} - \left( \frac{M_AL}{6EI} + \frac{M_BL}{3EI} \right) = 0$$

( $\theta_B^I$  och  $\theta_B^{\text{II}}$  är definierade åt olika håll)

$$(1) \text{ och } (2) \Rightarrow \begin{cases} 2 \text{ ekv} \\ 2 \text{ obok}(M_A, M_B) \end{cases} \Rightarrow \text{L5s.}$$

$$QL - 8M_A - 4M_B = 0$$

$$(QL - 4M_A - 8M_B = 0) \times (-2)$$

$$-QL + 12M_B = 0 \Rightarrow \boxed{M_B = \frac{QL}{12}}$$

$$M_A = \frac{8QL}{812} \Rightarrow \boxed{M_A = \frac{QL}{12}}$$

$\delta^{\text{II}}$  är definierad uppåt.

B)

$$\delta(42) = \delta^{\text{I}}(L/2) - \delta^{\text{II}}(L/2)$$

$$\xi = L/2/L = 1/2$$

$$\delta^{(I)}(L/2) = \frac{5}{384} \frac{QL^3}{EI}$$

$$\delta^{(II)}(L/2) = \frac{L^2}{6EI} \left( \frac{QL}{12} \left( 1 - \frac{3}{4} + \frac{1}{8} \right) + \frac{QL}{12} \left( 1 - \frac{1}{8} \right) \right)$$

$$= \frac{L^2}{6EI} \frac{QL}{12} \left( \frac{3}{4} \right) \left( \frac{1}{4} + \frac{7}{8} \right)$$

$$= \frac{QL^3}{96EI}$$

$$\delta(L/2) = \delta^{(I)} - \delta^{(II)} = \frac{5}{384} \frac{QL^3}{EI} - \frac{4QL^3}{384EI}$$

$$\boxed{\delta(L/2) = \frac{QL^3}{384EI}}$$