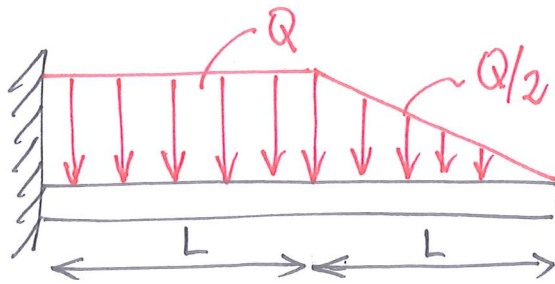


2.4.28

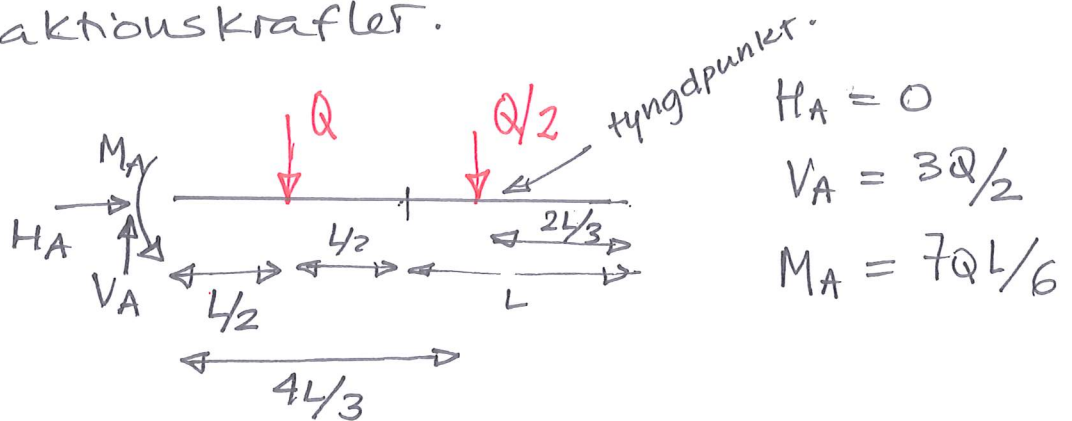
GIVET:



SÖKT: Rita T- och M-diagram

LÖSNING:

1.- Reaktionskrafter.



$$H_A = 0$$

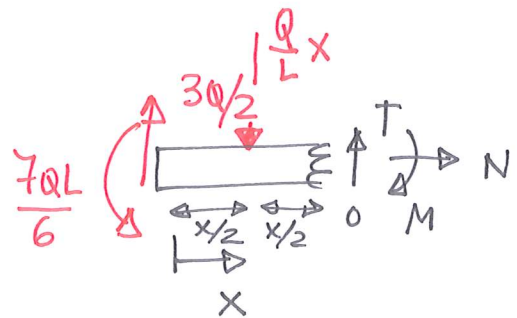
$$V_A = 3Q/2$$

$$M_A = 7QL/6$$

2.- Inremoment / krafter.

ALT. 1:

Del 1: $0 \leq x \leq L$



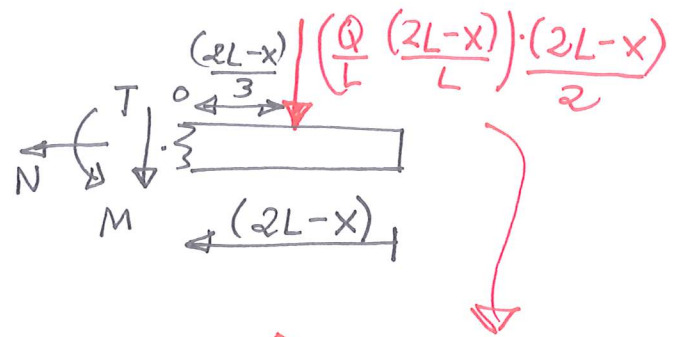
$$\rightarrow \underline{N=0}$$

$$\rightarrow \underline{T = \frac{Qx}{L} - \frac{3Q}{2} = Q\left(\frac{x}{L} - \frac{3}{2}\right)}$$

$$2.0 \quad M = \frac{Qx^2}{2L} - \frac{3Q}{2}x + \frac{7QL}{6} \Rightarrow \underline{\underline{M = Q\left(\frac{x}{L} - \frac{3}{2}\right)x + \frac{7QL}{6}}}$$

Del 2

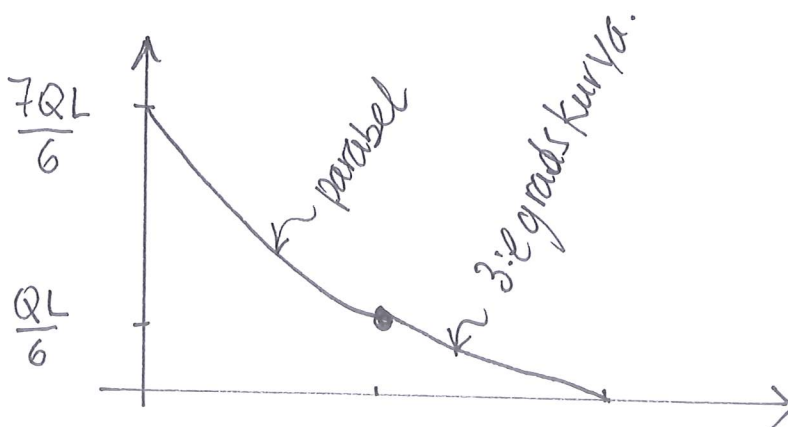
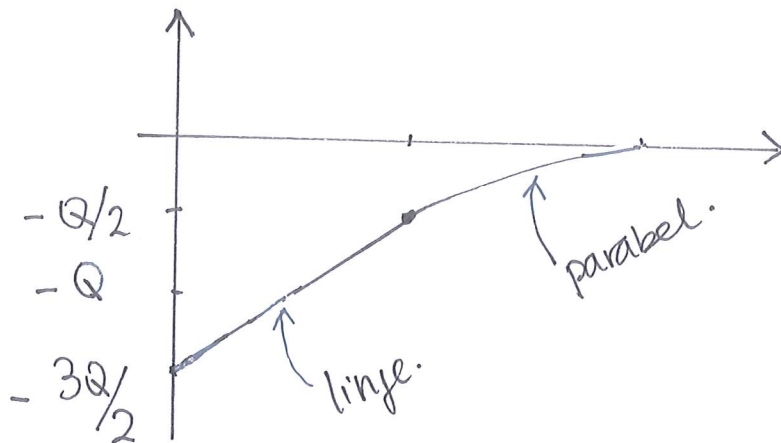
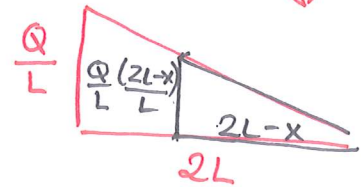
$$L \leq x \leq 2L$$



$$\rightarrow \underline{N=0} \Rightarrow$$

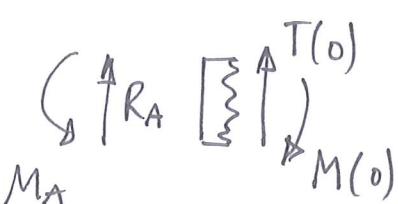
$$\uparrow \underline{T = \frac{-Q}{2L^2} (2L-x)^2}$$

$$\circ \underline{M = \frac{Q}{2L^2} (2L-x)^3 \frac{1}{3} (2L-x) = \frac{Q}{6L^2} (2L-x)^3}$$



ALT 2.

Del 1 : $0 \leq x \leq L$ $\rightarrow \underline{N=0}$ ($\frac{dN}{dx}=0$)

$x=0$  $\begin{cases} M(0) = 7QL/6 & (1) \\ T(0) = -3Q/2 & (2) \end{cases}$

© Tvärkrafter $\frac{dT}{dx} = -q(x)$ där $q(x) = -\frac{Q}{L}$

$$\frac{dT}{dx} = \frac{Q}{L} \quad T = \frac{Q}{L}x + C_1 \quad (2)$$

Randvillkor $T(0) = \frac{Q}{L} \cdot 0 + C_1 = -\frac{3Q}{2} \Rightarrow C_1 = -\frac{3Q}{2}$

$\rightarrow \underline{\underline{T(x) = Q \left(\frac{x}{L} - \frac{3}{2} \right)}}$

© Böjmoment $\frac{dM}{dx} = +T = Q \left(\frac{x}{L} - \frac{3}{2} \right)$

$$M = Qx \left(\frac{x}{2L} - \frac{3}{2} \right) + C_2 \quad (1)$$

Randvillkor $M(0) = 0 + C_2 = \frac{7QL}{6}$

$\rightarrow \underline{\underline{M(x) = Qx \left(\frac{x}{2L} - \frac{3}{2} \right) + \frac{7QL}{6}}}$

Del 2 :

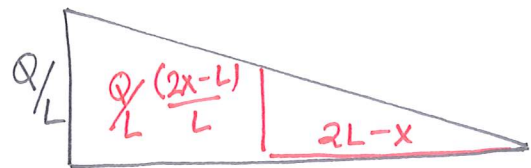
$$L \leq x \leq 2L$$

$$\underline{N=0}$$

$$\text{Randvillkor} \quad \begin{cases} T(2L) = 0 \\ M(2L) = 0 \end{cases}$$

© Tvärkrafter $\frac{dT}{dx} = -q(x)$ där

$$q(x) = -\frac{Q}{L} \frac{(2L-x)}{L}$$



om $y = (2L-x)$. $dy = -dx$

$$\frac{dT}{dx} = \frac{Q}{L^2} y \rightarrow \frac{dT}{dy} = -\frac{Q}{L^2} y \rightarrow T = -\frac{Qy^2}{2L^2} + C_1$$

$\xrightarrow{dy = -dx}$

$$T(x) = -\frac{Q}{2L^2} (2L-x)^2 + C_1 \Rightarrow T(2L) = 0 \quad \underline{C_1 = 0}$$

$$\rightarrow \underline{\underline{T(x) = -\frac{Q}{2L^2} (2L-x)^2}}$$

© Böjmoment. $\frac{dM}{dx} = T \rightarrow$

$$\rightarrow \underline{\underline{M(x) = \frac{Q}{6L^2} (2L-x)^3}}$$