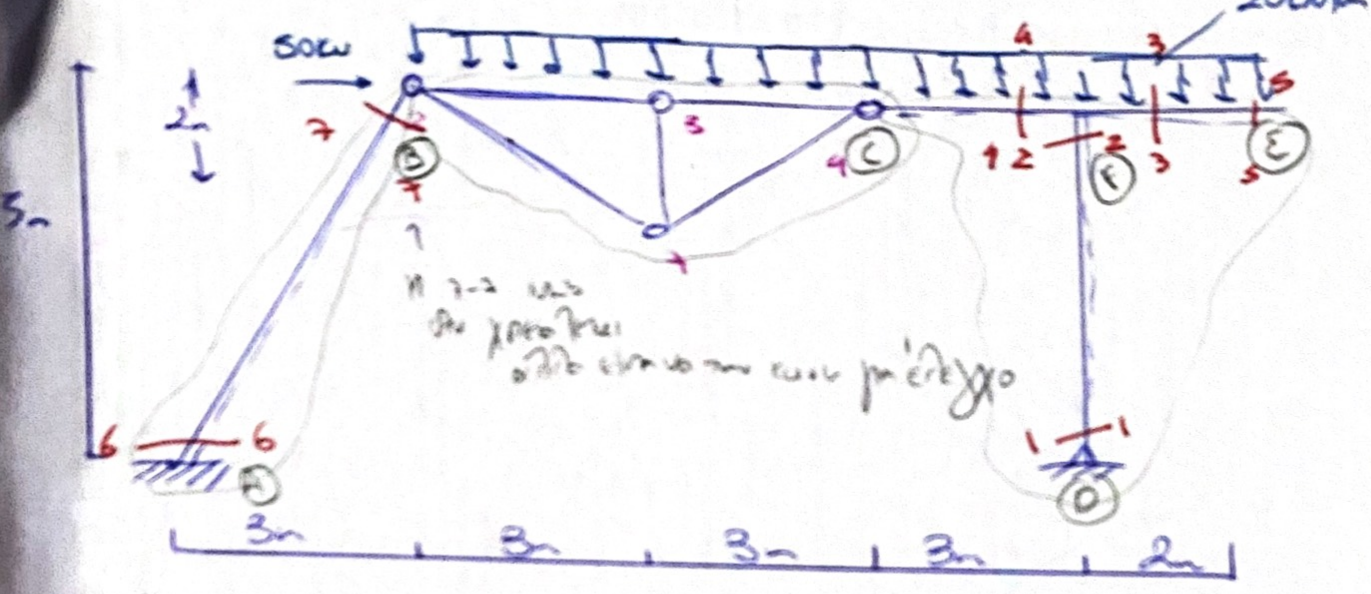
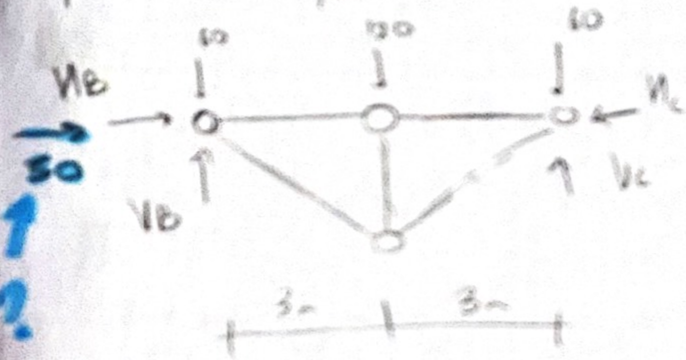
Κανονική 2021-2022



$q\ell/2 = 20 \times 6/2 = 60kN$



$\Sigma F_x = 0 \rightarrow 50 + H_B = H_c$

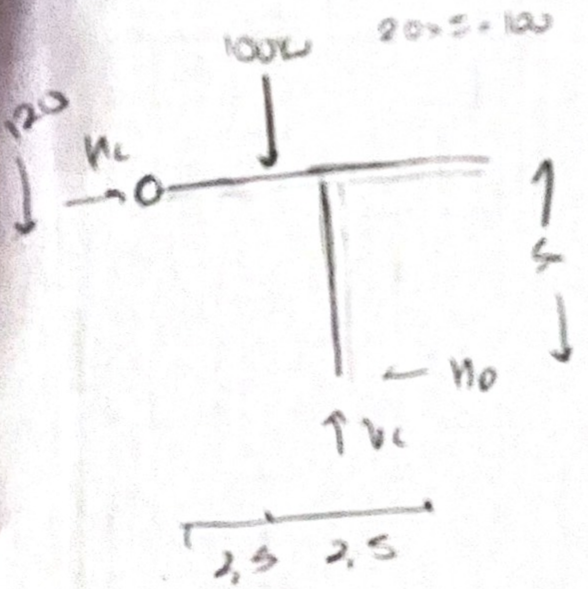
$\Sigma F_y = 0 \rightarrow 60 + 120 + 60 = V_B + V_c$

$\rightarrow V_B + V_c = 240kN$

$\Sigma M_B = 0 \rightarrow (120 \times 3) + (60 \times 0) = 6V_c$

$\rightarrow V_c = 120kN$

Άρα $V_B = 120kN$



$\Sigma F_y = 0 \rightarrow 120 + 100 = V_c \rightarrow V_c = 220kN$

$\Sigma F_x = 0 \rightarrow H_c = H_D$

$\Sigma M_c = 0 \rightarrow (-100 \times 2,5) + (3 \times 220)$

$-5H_D = 0 \rightarrow -250 + 660 - 5H_D = 0$

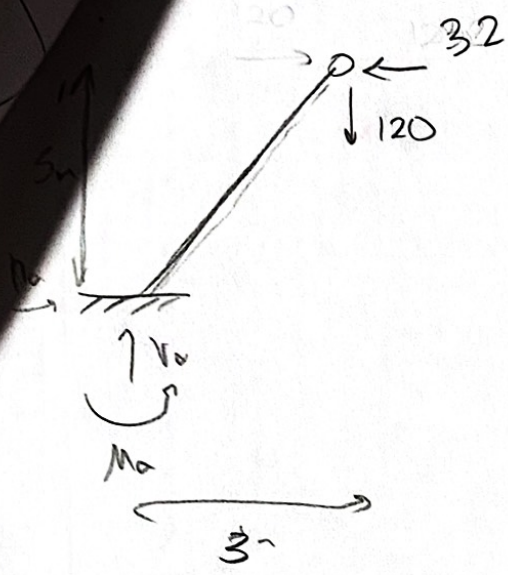
$\rightarrow 410 - 5H_D = 0 \rightarrow H_D = 82kN$

Άρα $H_c = 82kN$

$H_B = 32kN$ $(32 + H_D = 82)$

Απορίες: 1) ΟΚ το αρχετρωμένο

2) πως μετακινούμε ℓ κατανεμημένο?



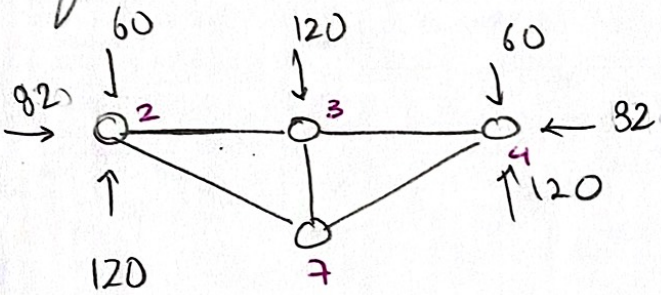
$\Sigma Fx=0 \rightarrow Ha=32\ KN$

$\Sigma Fy=0 \rightarrow Va=120KN$

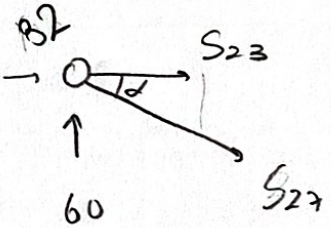
$+\circlearrowleft \Sigma M_A=0 \rightarrow Ma+(32\times 5)-(120\times 3)$

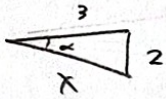
$\rightarrow Ma=+200KNm$

Για το δικτώμα.



#2





$x^2=2^2+3^2$

$\rightarrow x=3,606$

$\sin\alpha=\frac{2}{3,606}=0,555$

$\cos\alpha=\frac{3}{3,606}=0,832$

$\Sigma Fx=0 \rightarrow 82+S_{23}+S_{27x}=0$

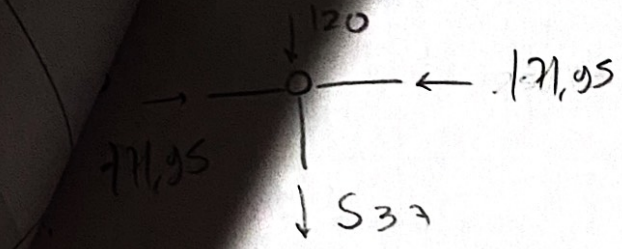
$\Sigma Fy=0 \rightarrow 60=S_{27y} \rightarrow S_{27}=\frac{60}{\sin\alpha}=S_{27}=108,11KN$

Αρα $82+S_{23}+108,11\times\cos\alpha=0$

$\rightarrow 82+S_{23}+89,95=0 \rightarrow S_{23}=-171,95\ KN$

#4 αντίστοιχα λόγω συμμετρίας

$S_{43}=-171,95KN$ κ' $S_{47}=108,11KN$



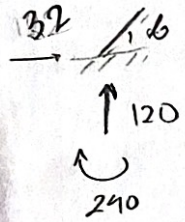
$\Sigma Fx = 0$ V

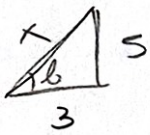
$\Sigma Fy = 0 \Rightarrow S_{37} = -120$ kN

Μέλος	Εφελκυσμός	Θλιψη
2-3		171,95
3-4		171,95
2-7	109,11	
4-7	108,11	
3-7		120

ΤΟΜΕΣ

6-6

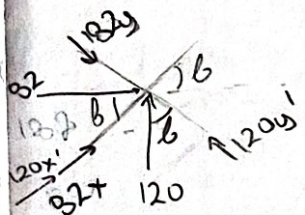




$x^2 = 5^2 + 3^2 \Rightarrow x = \sqrt{34} = 5,831$

$\cos\beta = \frac{3}{5,831} = 0,514$

$\sin\beta = \frac{5}{5,831} = 0,857$

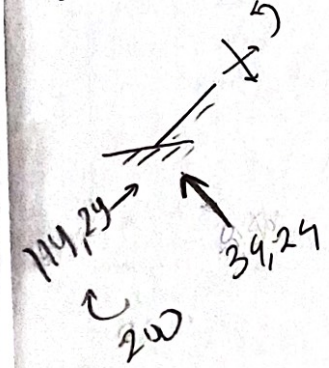


$32y = 32 \times \sin\beta = 27,42$ kN

$32x = 32 \times \cos\beta = 16,45$ kN

$120y' = 120 \times \cos\beta = 61,68$ kN

$120x' = 120 \times \sin\beta = 102,94$ kN

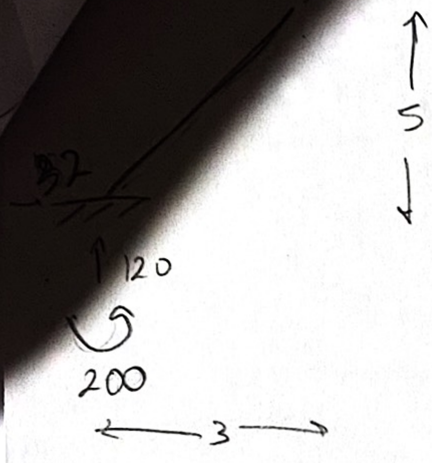


$Q^A = +34,24$ kN $\quad N^A = -114,29$ kN

$M^A = +200$ kNm

$Q_B^r = +34{,}24\ kN$

$N_B^r = -119{,}24\ kN$

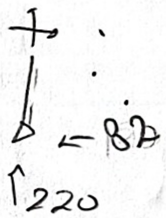


$M_B^r + 200 - (120\times3) + (32\times5) = 0$

$M_B^r + 200 - 360 + 160 = 0$

$\Rightarrow M_B^r = 0$ ✓

1-1



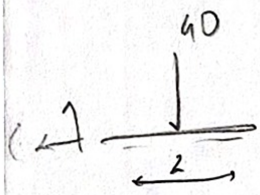
$M_D = 0$, $N_D = -220$, $Q_C = +82$

3-5

C ‡=

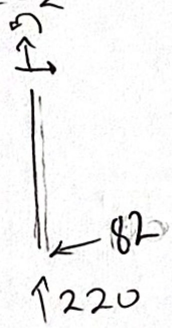
$M_E = 0$, $Q_E = 0$, $N_E = 0$

3-3



$M_F^o = -40$, $Q_F^o = 40$, $N_F^o = 0$

2-2



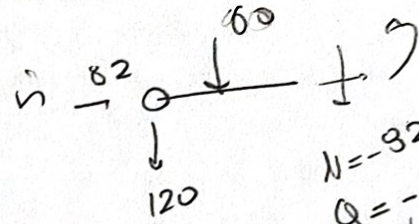
$N_F^r = -220$, $Q_F^r = +82$

$M_F^c = +82\times5 = 410\ kNm$

$N_F^{lo} = -82\ kN$

$Q_F^{o} = -180\ kN$

$M_F^{-} = (-82 \times 5) - (40 \times 1) = 450\ kNm$

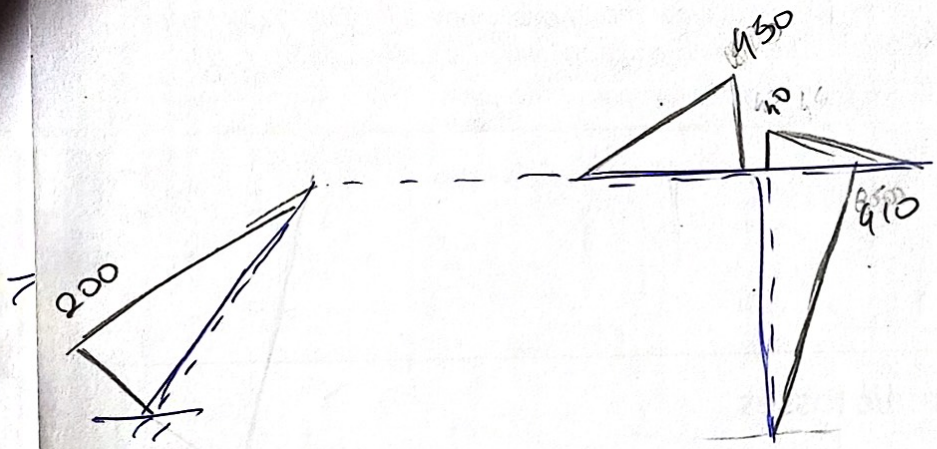


$N = -82$

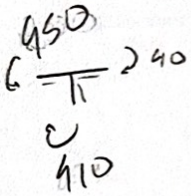
$Q = -180$

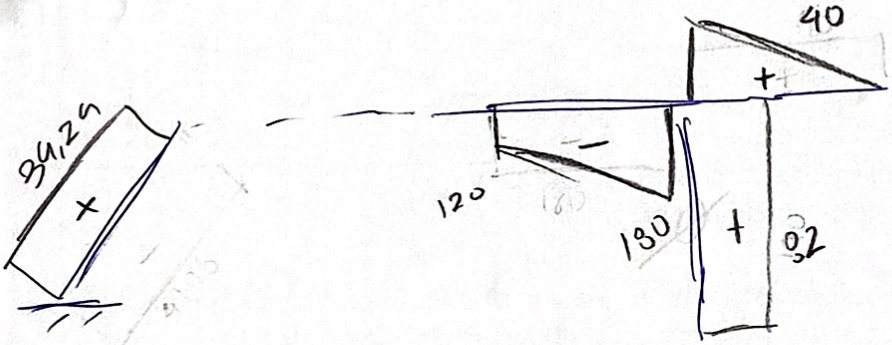
$M = (120 \times 3 + 60 \times 1{,}5) = 450$

M - Q - N

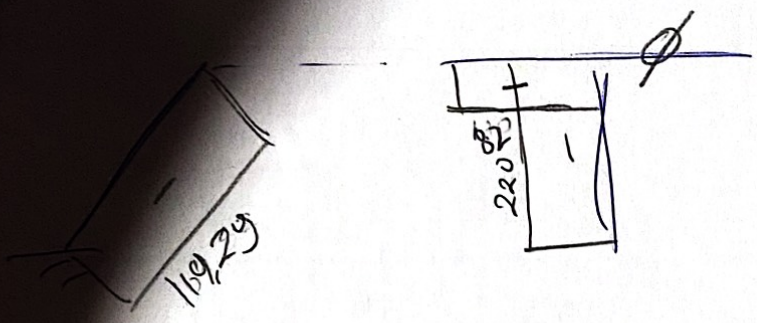


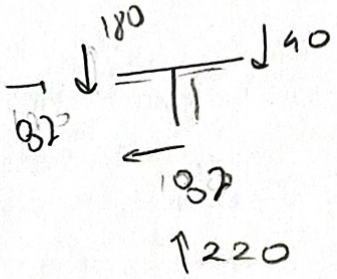
M [kNm]





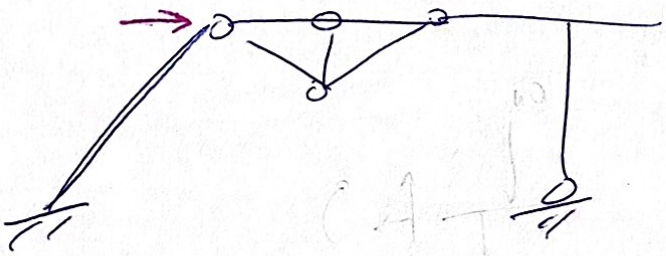
Q [kN]

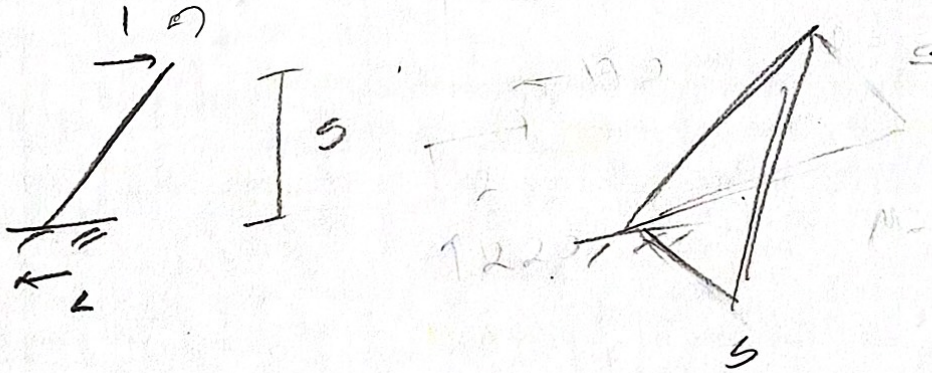




180+40 = 220

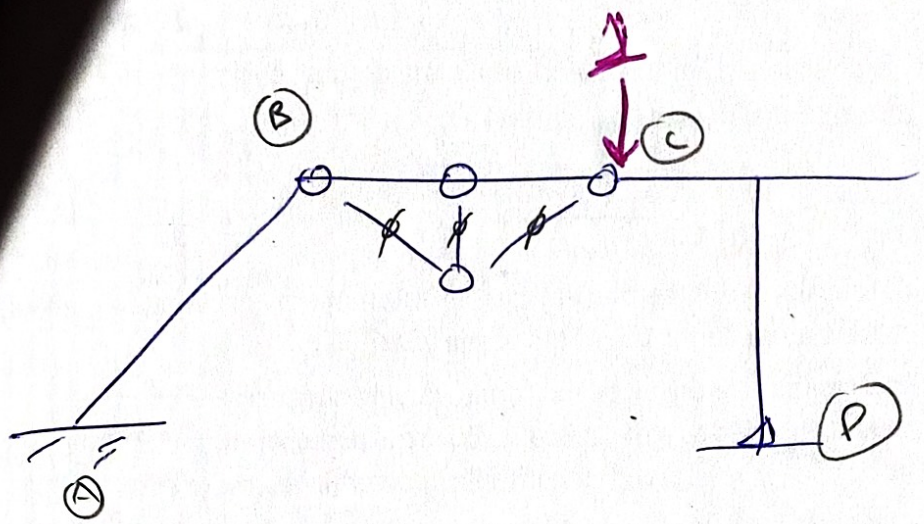
82 = 82.

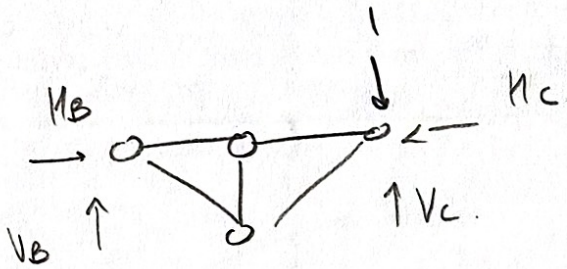




$$\ell \times \left(\frac{1}{3} \cdot \alpha \cdot \alpha\right) = -\left(\frac{1}{3} \times 5 \times 200 \times 5,331\right) = \frac{-1943,7}{100 \times 10^3}$$

$$= 0,0107 m$$



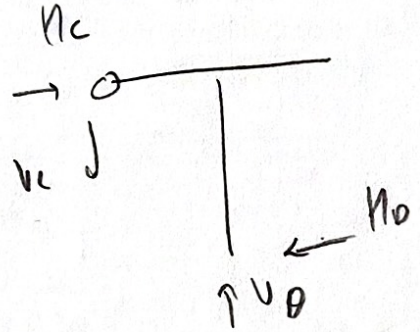


$\Sigma Fx = 0 \Rightarrow HC = HB$

$\Sigma Fy = 0 \Rightarrow VB + VC = 1$

$\Sigma MC = 0 \Rightarrow VB = 0$

$VC = 1$



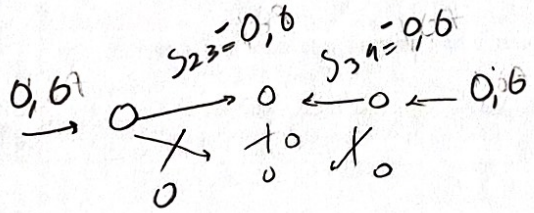
$\Sigma Fx = 0 \Rightarrow HC = HD$

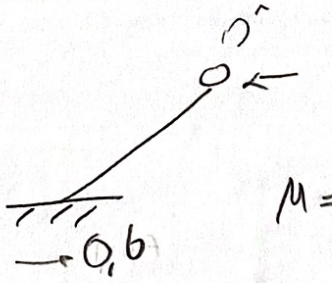
$\Sigma Fy = 0 \Rightarrow VC = VD$

$\Sigma MC = 0 \Rightarrow 5HD = 3VD$

$VC = 1$ Apo $VD = 1$

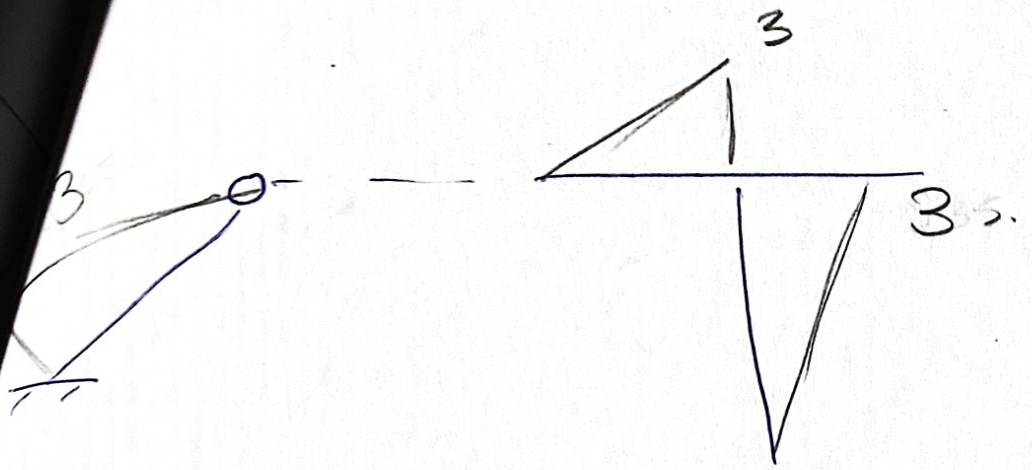
Apo $HD = 0,6$ kN $= HC = HB$

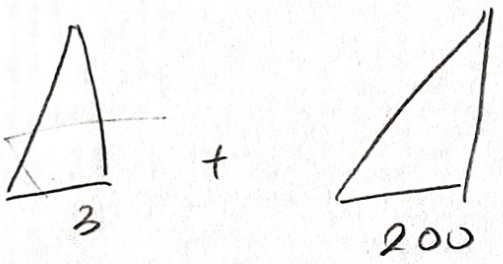




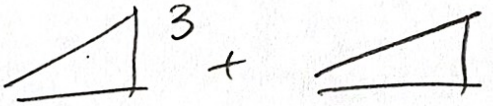
$M = -0,6 \times 5$

$= -3$ kNm





$= -\frac{1}{3} \times 200 \times 3 \times 5,831$ ← включено



$= \frac{1}{3} \times 3 \times 450 \times 3$ ← ℓ

$= \frac{1}{3} \times 3 \times 410 \times 5$ ← ℓ

$= \dots$

$$\int \frac{N\bar{N}}{EA} dx = \frac{(0,6 \times 171,95)}{EA} \times 3 \leftarrow \ell \cdot \quad \times 2$$

$= \dots$