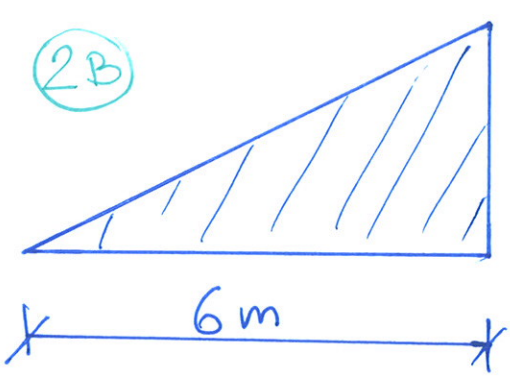
ZADÁNÍ ZKOUŠKY BD001 Č. 2/2022 JE

① (2B)



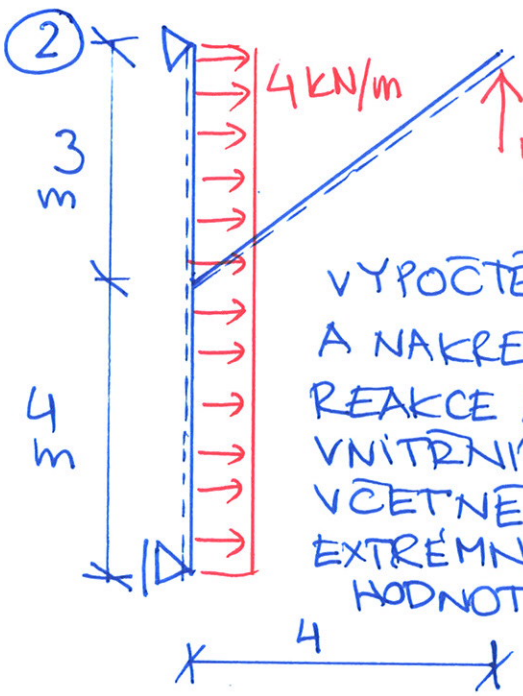
VYPOČTĚTE HLAVNÍ CENTRÁLNÍ MOMENTY OBRAZCE. URČETE OSU, KE KTERÉ JE MOMENT SETRVAČNOSTI MAXIMÁLNÍ.

POMŮCKA

$I_{x_t} = \frac{bh^3}{36}$

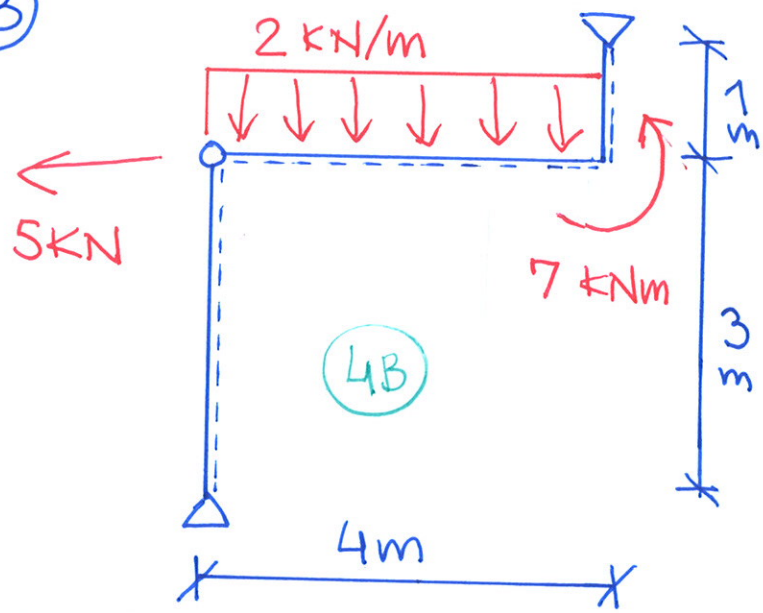
$D_{x_t y_t} = + \frac{b^2 h^2}{72}$

② (3B)



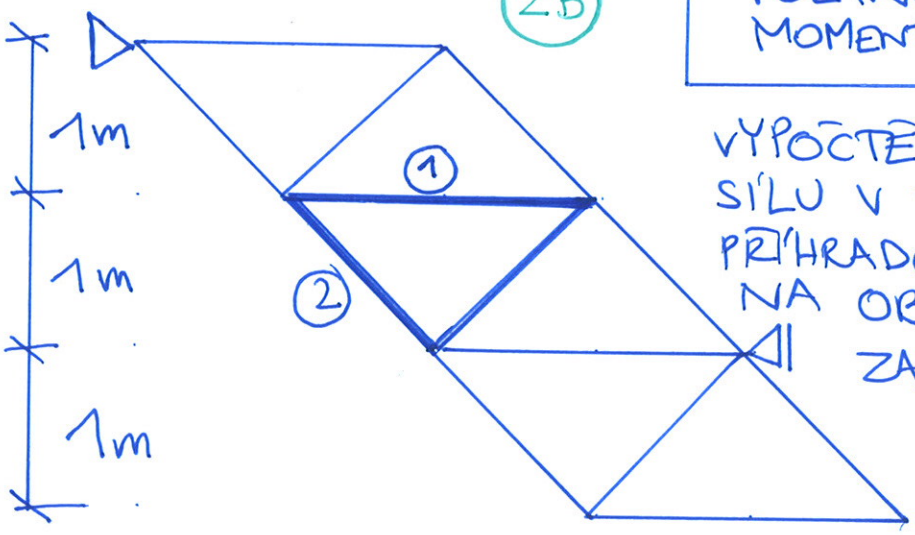
VYPOČTĚTE A NAKRESLETE REAKCE A VNITŘNÍ SÍLY VČETNĚ EXTRÉMNÍCH HODNOT (M)

③ (4B)



VYPOČTĚTE A NAKRESLETE REAKCE A VNITŘNÍ SÍLY VČETNĚ EXTRÉMNÍCH HODNOT MOMENTŮ.

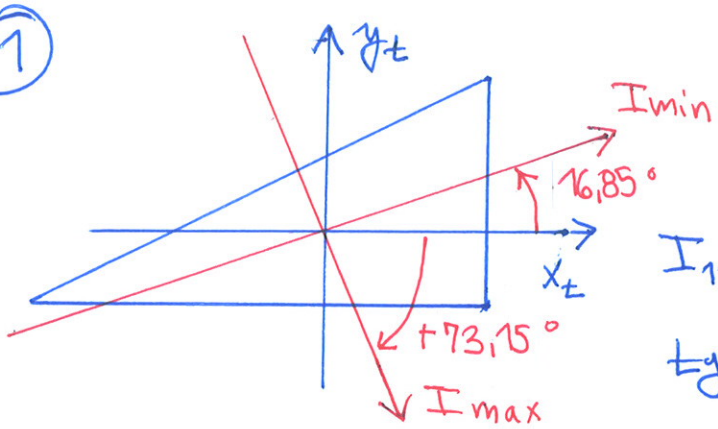
④ (2B)



VYPOČTĚTE NORMÁLOVOU SÍLU V PRUTECH ① A ② PŘÍHRADOVÉ KONSTRUKCE NA OBRÁZKU. SLOVNĚ ZAPIŠTE, ZDA-LI SE JEDNÁ O TLAK NEBO TAH.

RESENÍ C. 2/2022 JE

①



$$I_{x_t} = \frac{bh^3}{36} = 4{,}5\ m^4$$

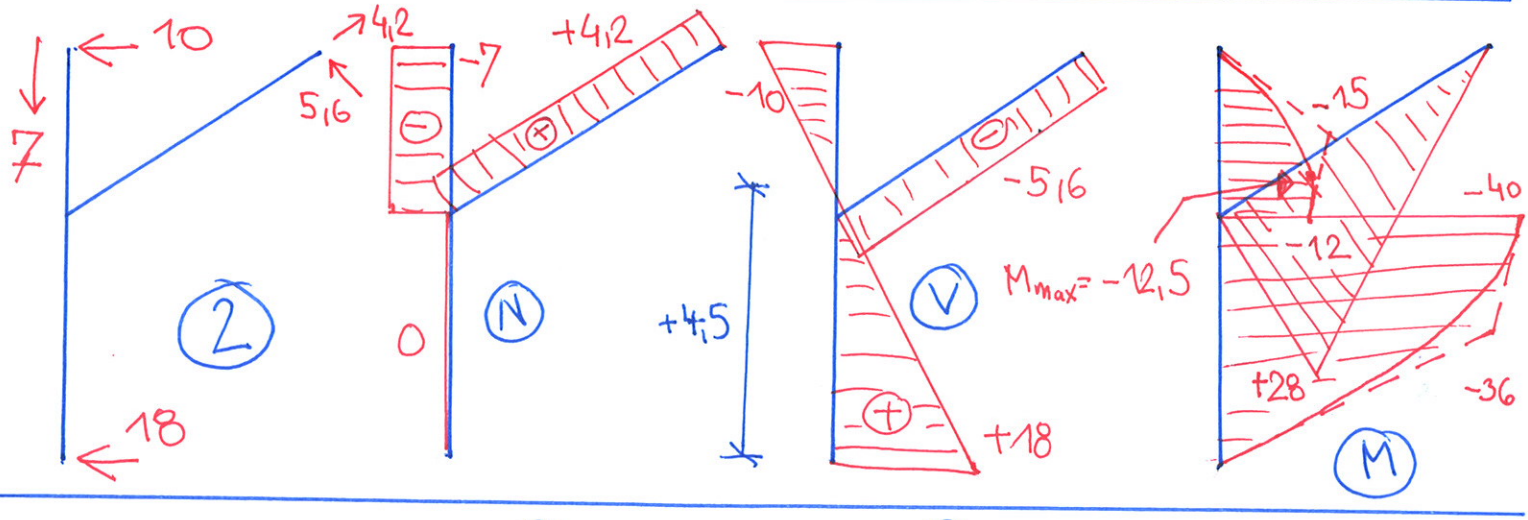
$$I_{y_t} = 18 m^4$$

$$D_{x_t y_t} = 4{,}5 m^4$$

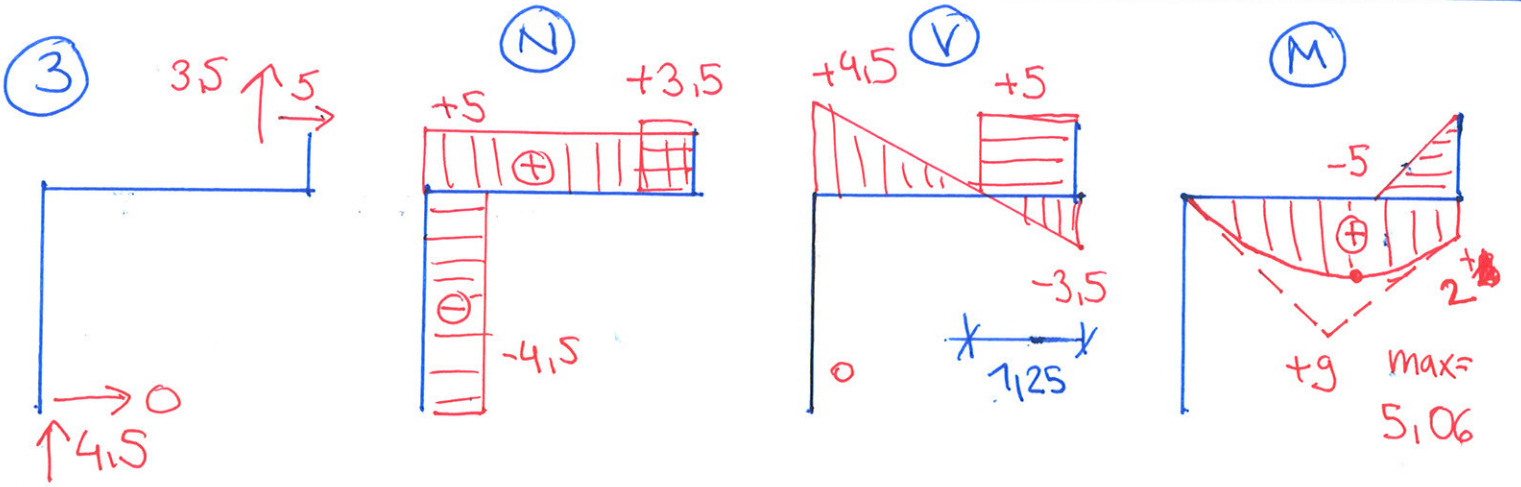
$$I_{12} = 11{,}25 \pm 8{,}112 = \begin{cases} 19{,}362 \\ 3{,}138 \end{cases} m^4$$

$$tg\alpha = \frac{I_1 - I_x}{-D_{x_t y_t}} \Rightarrow \alpha = -73{,}154$$

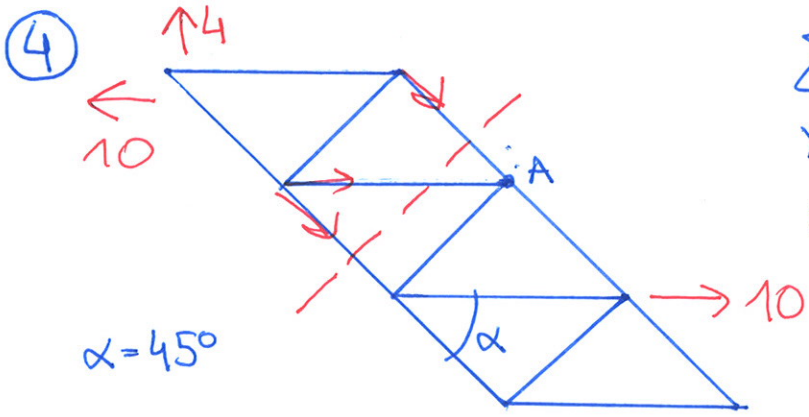
②



③



④



$\sum M_A = 0$

$N_{2y} = 1$

$N_2 \sin\alpha = 1$

$N_2 = \sqrt{2}$

TAH

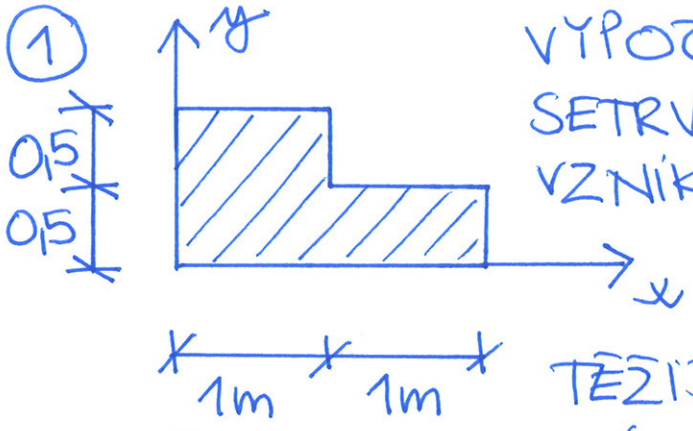
$\sum F = 0$ S=sin C=cos

$4 \cdot 5 - 10c + N_1 c$

$N_1 = 6\,KN$

TAH

ZADÁNÍ ZKOUŠKY BDOO1 Č. 3/2022 JE

① 

VYPOČTĚTE HLAVNÍ MOMENTY SETRVAČNOSTI OBRAZCE VZNIKLÉ ROTACÍ ZAZNAČENÝCH OS x A y, TEDY NE OS PROCHÁZEJÍCÍCH TĚŽIŠTĚM. URČETE OSU KE KTERÉ JE MOMENT SETRVAČNOSTI MAXIMÁLNÍ A ŘEŠENÍ NAKRESLETE.

2b

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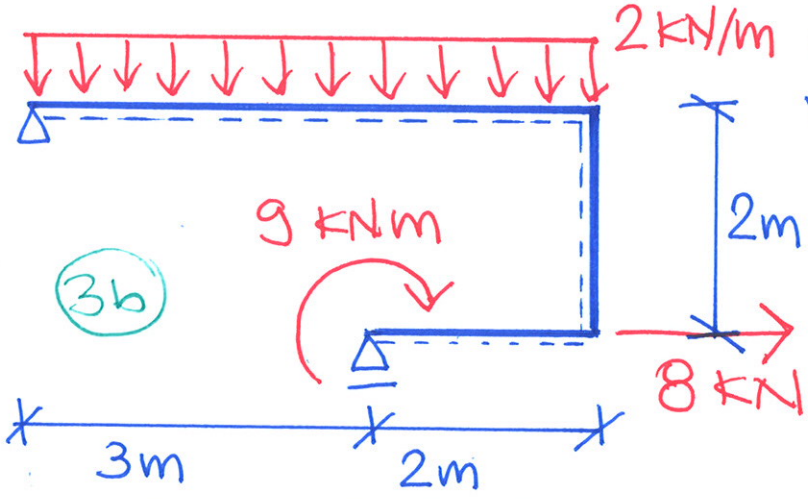
② 

3b

VYPOČTĚTE A VYKRESLETE REAKCE A VNITŘNÍ SÍLY VČETNĚ EXTRÉMNÍCH HODNOT MOMENTŮ.

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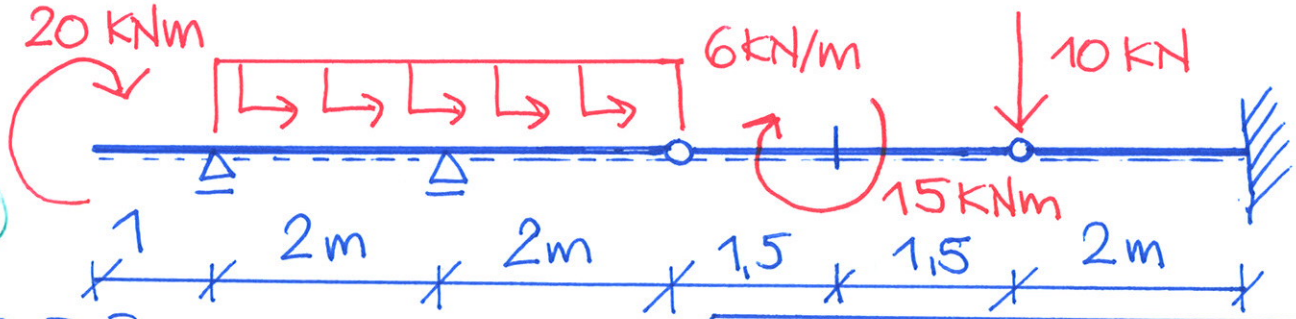
③ 

4b

VYPOČTĚTE A VYKRESLETE

. . . . .

HODNOT MOMENTŮ

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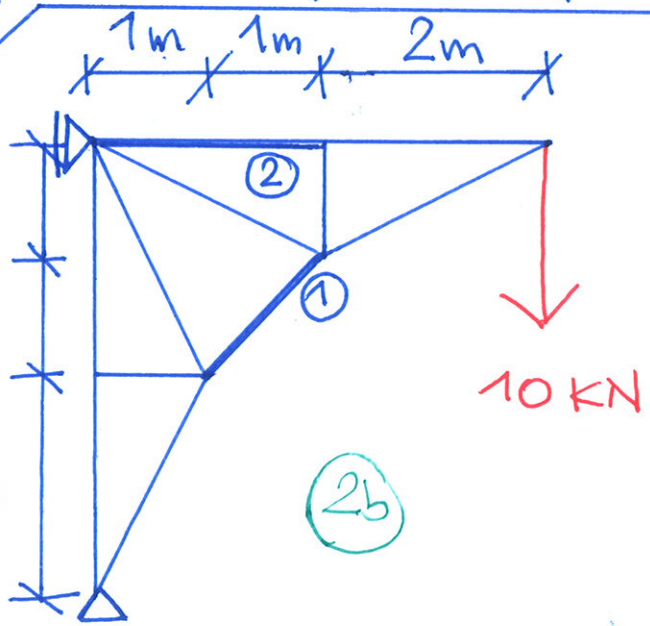
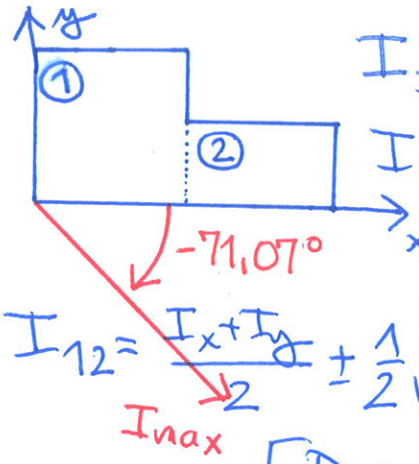
④ URČETE NORMÁLOVOU SÍLU V PRUTECH ① A ② PŘÍHRADOVÉ KONSTRUKCE. SLOVNĚ 2m NAPIŠTE, ZDA-LI SE JEDNÁ O TAH ČI TLAK.



2b

ŘEŠENÍ Č. 3/2022 JE



$$I_x = \frac{1}{12}(1\cdot 1^3 + 1\cdot 0{,}5^3) + 1(0{,}5)^2 + 0{,}5(0{,}25)^2 = 0{,}375 \text{ m}^4$$

$$I_y = \frac{1}{12}(1^4 + 0{,}5\cdot 1^3) + 1(0{,}5)^2 + 0{,}5(1{,}5)^2 = 1{,}5 \text{ m}^4$$

$$D_{xy} = 1(0{,}5)(0{,}5) + 0{,}5(1{,}5)(0{,}25) = 0{,}4375 \text{ m}^4$$

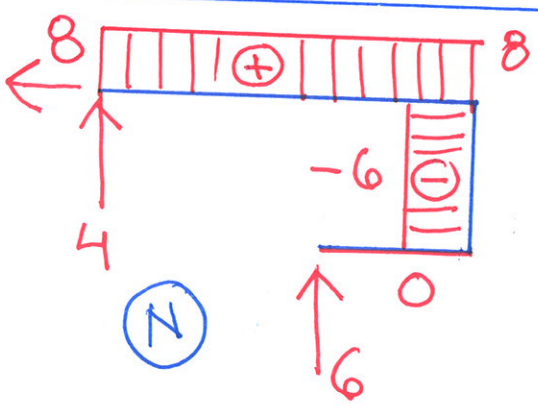
$$I_{12} = \frac{I_x + I_y}{2} \pm \frac{1}{2}\sqrt{(I_x - I_y)^2 + 4D_{xy}^2} = 0{,}9375 \pm 0{,}7126 =$$

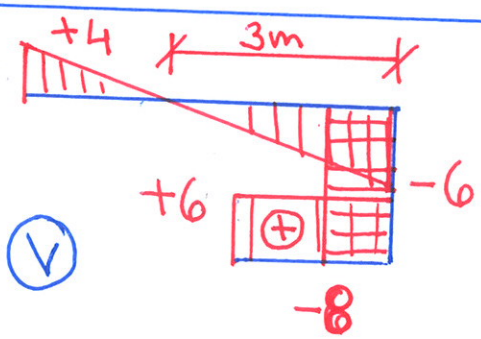
I_{max}

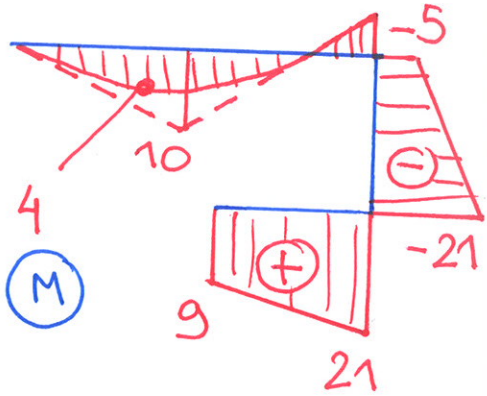
$$= \begin{cases} 1{,}650 \text{ m}^4 \\ 0{,}2249 \text{ m}^4 \end{cases}$$

$$\alpha_0 = \operatorname{atan}\left[\frac{D_{xy}}{I_y - I_{max}}\right] = -71{,}07°$$

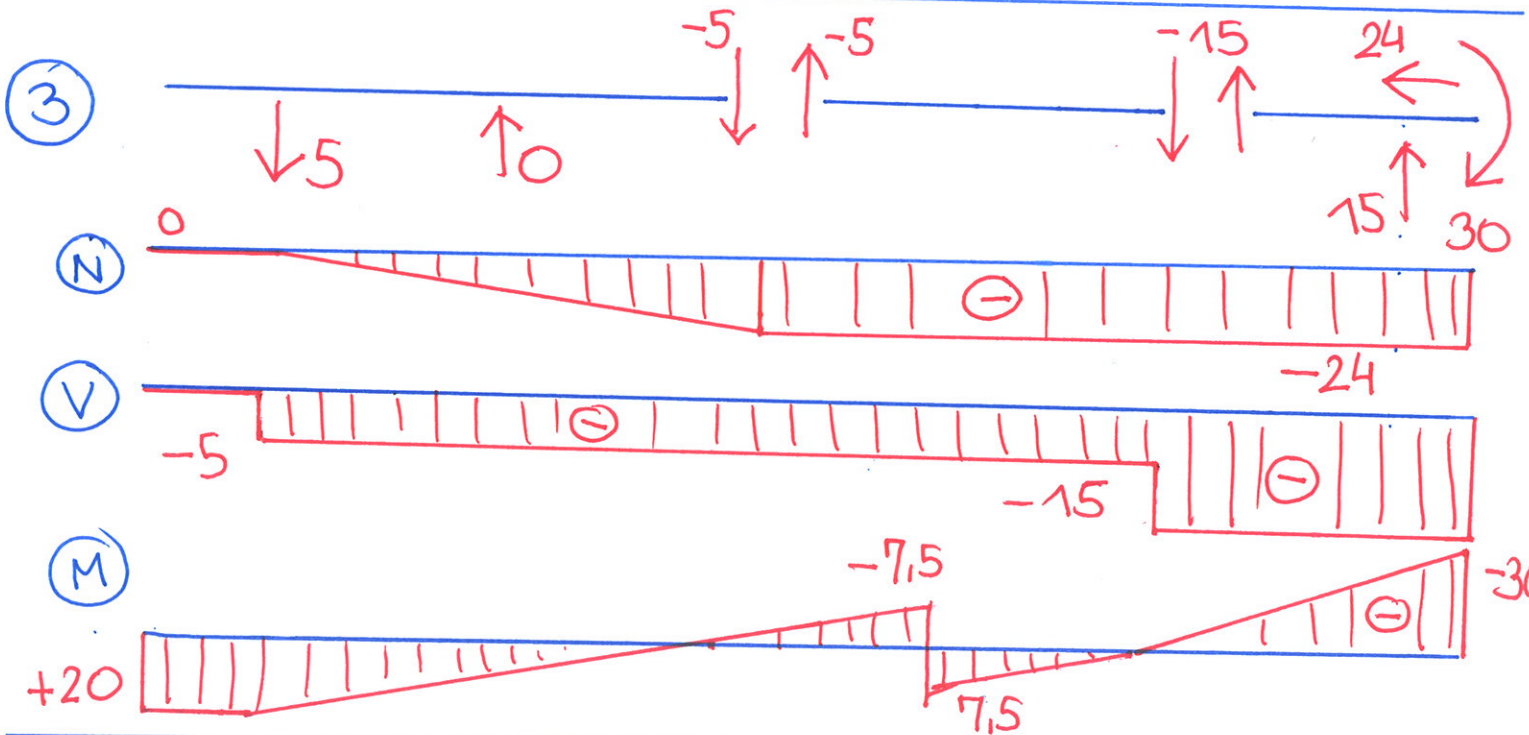
①



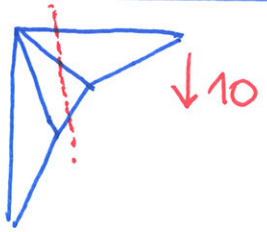




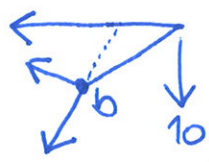
②



④



a)



$$\sum M^a = 0 \Rightarrow 4\cdot 10 + \frac{\sqrt{2}}{2} N_1 (2+1) = 0$$

$$N_1 = -\frac{40}{3}\sqrt{2} = -18{,}86$$

TLAK

$$\sum M^b = 0$$

$$N_2 = 20 \text{ kN}$$ TAH