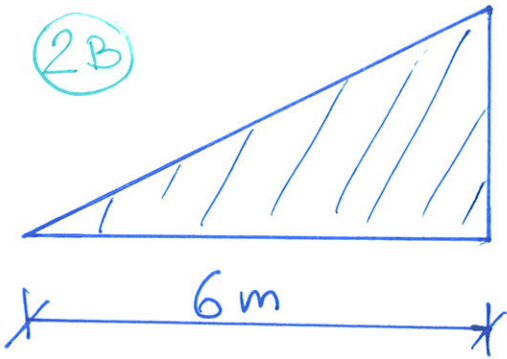


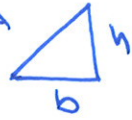
①

2B



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

POUŽIJTE

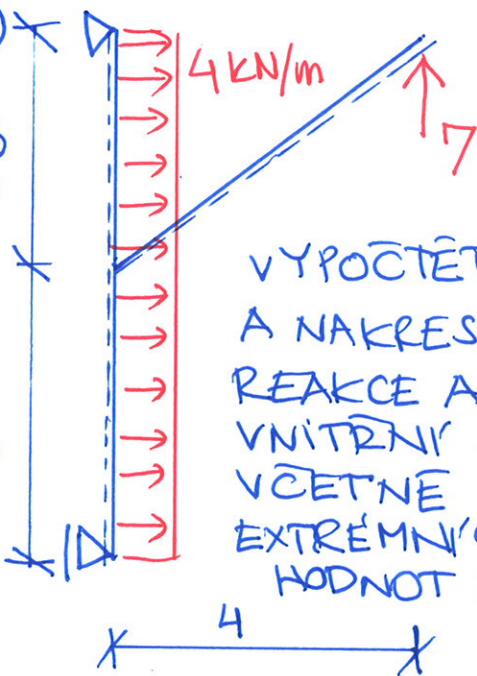


$$I_{x_c} = \frac{bh^3}{36}$$

$$D_{x_c y_c} = + \frac{b^2 h^2}{72}$$

②

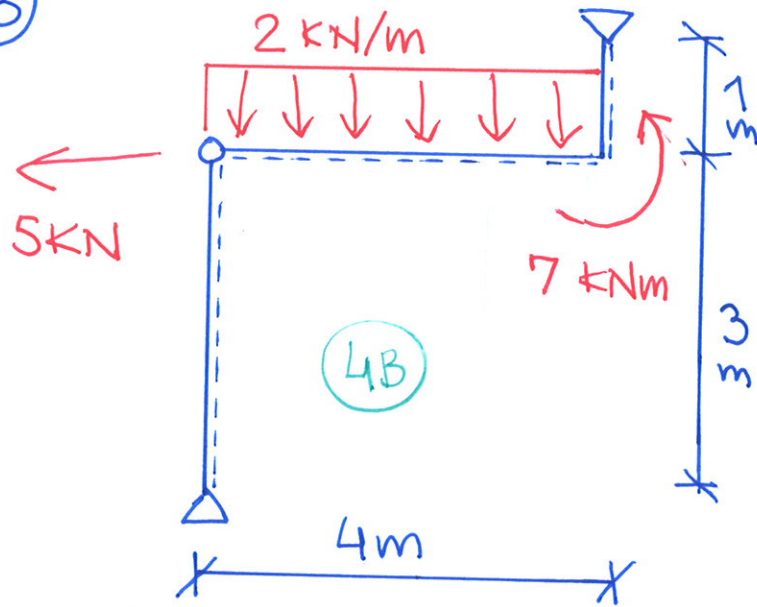
3B



VYPOČTĚTE
A NAKRESLETE
REAKCE A
VNITRNÍ SILY
VČETNĚ
EXTRÉMNIČH
HODNOT (M)

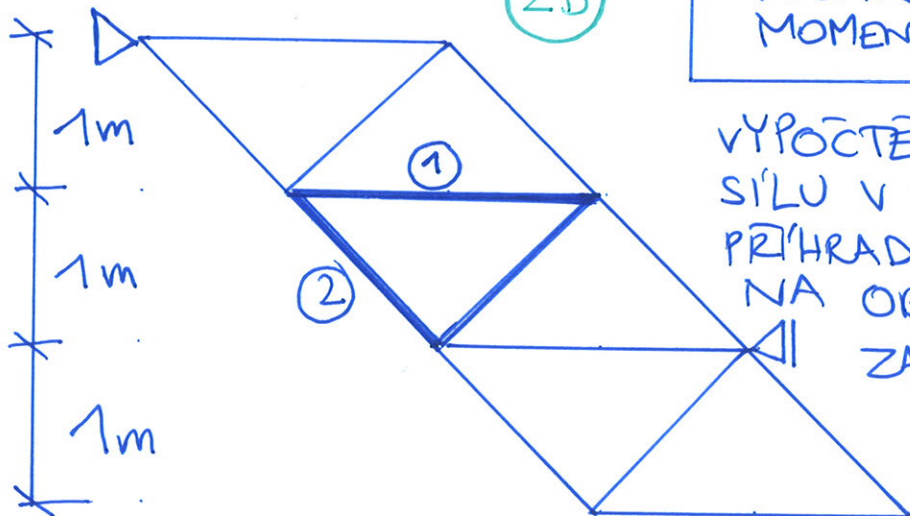
③

4B



VYPOČTĚTE A NAKRESLETE
REAKCE A VNITRNÍ SILY
VČETNĚ EXTRÉMNIČH HODNOT
MOMENTŮ.

2B



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



①

$I_{xz} = \frac{bh^3}{36} = 4,5 \text{ m}^4$
 $I_{yz} = 18 \text{ m}^4$
 $D_{xz} = 4,5 \text{ m}^4$
 $I_{12} = 11,25 \pm 8,112 = \begin{cases} 19,362 \\ 3,138 \end{cases} \text{ m}^4$
 $t_{y\alpha} = \frac{I_1 - I_x}{-D_{xz}} \Rightarrow \alpha = -73,154$

②

N
 V
 M
 $M_{max} = -12,5$

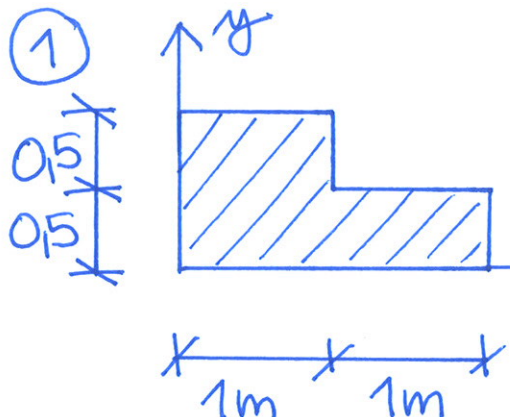
③

N
 V
 M
 $max = 5,06$

④

$\alpha = 45^\circ$
 $\sum M_A = 0$
 $N_2 y = 1$
 $N_2 \sin \alpha = 1$
 $N_2 = \sqrt{2}$
 TAH
 $\sum F = 0$ $\begin{matrix} s = \sin \\ c = \cos \end{matrix}$
 $4 \cdot 5 - 10 \cdot c + N_1 \cdot c$
 $N_1 = 6 \text{ kN}$
 TAH

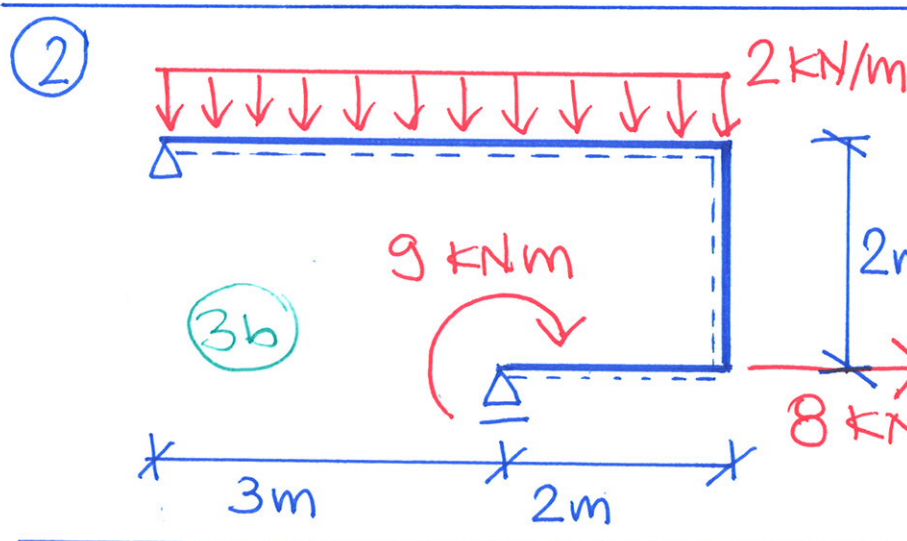
①



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

②b

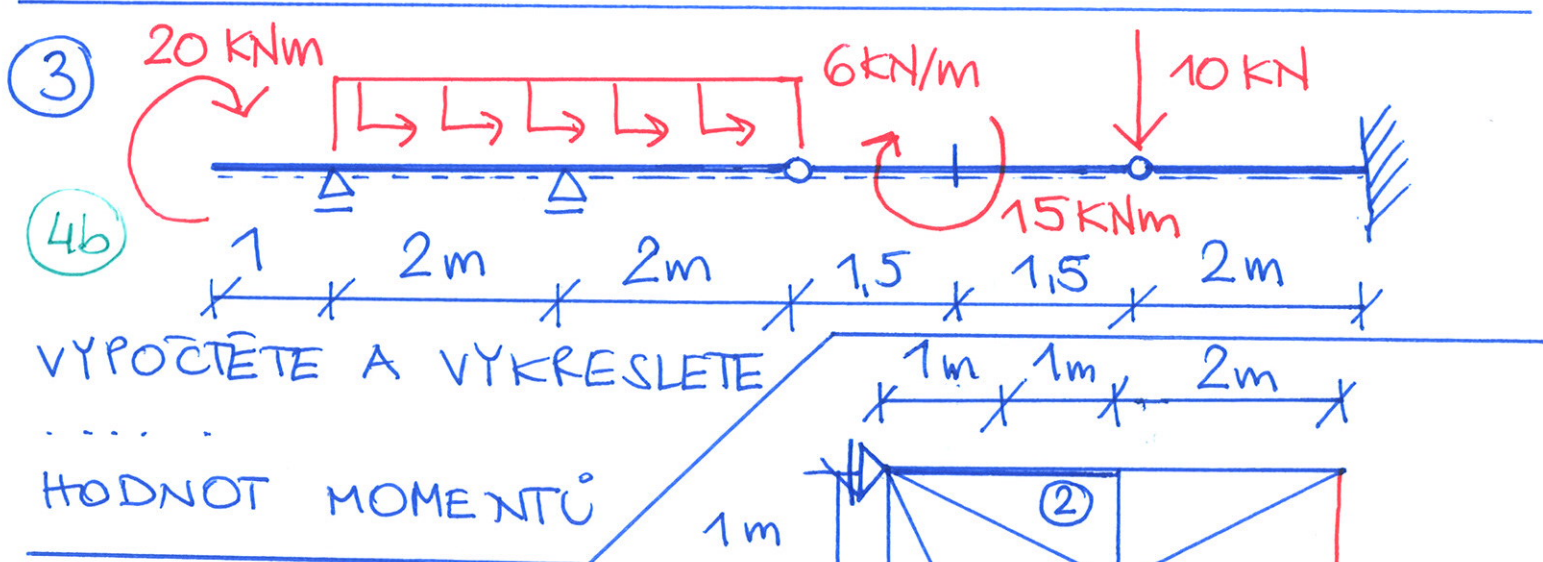
②



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

③b

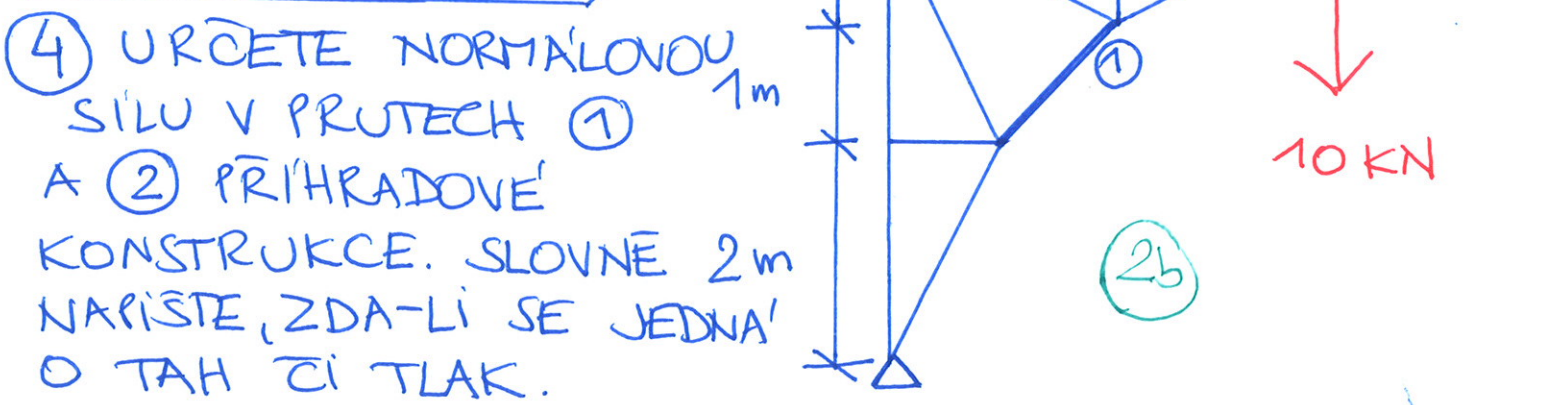
③



VYPOČTĚTE A VYKRESLETE HODNOT MOMENTŮ

④b

④



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

②b

$I_x = \frac{1}{12}(1 \cdot 1^3 + 0.5 \cdot 0.5^3) + 1(0.5)^2 + 0.5(0.25)^2 = 0.375 \text{ m}^4$
 $I_y = \frac{1}{12}(1^4 + 0.5 \cdot 1^3) + 1(0.5)^2 + 0.5(1.5)^2 = 1.5 \text{ m}^4$
 $D_{xy} = 1(0.5)(0.5) + 0.5(1.5)(0.25) = 0.4375 \text{ m}^4$
 $I_{12} = \frac{I_x + I_y}{2} \pm \frac{1}{2} \sqrt{(I_x - I_y)^2 + 4D_{xy}^2} = 0.9375 \pm 0.7126 =$
 $I_{max} = 1.650 \text{ m}^4$
 $I_{min} = 0.2249 \text{ m}^4$
 $\alpha_0 = \arctan \left[\frac{D_{xy}}{I_y - I_{max}} \right] = -71.07^\circ$

(N) Shear force diagram: Horizontal member starts at 8 kN, decreases to 0 at 8m. Vertical member starts at 0, increases to 6 kN at the bottom.
 (V) Axial force diagram: Horizontal member has constant axial force of 8 kN (compression). Vertical member has constant axial force of 6 kN (tension).
 (M) Bending moment diagram: Horizontal member has a parabolic moment distribution from 0 to -24 kNm. Vertical member has a linear moment distribution from 0 to -21 kNm.

(N) Shear force diagram: Starts at 0, drops to -5 kN at 5m, jumps to 5 kN at 10m, drops to -15 kN at 25m, jumps to 9 kN at 30m.
 (V) Axial force diagram: Constant axial force of -5 kN from 0 to 10m, -15 kN from 10 to 25m, and -24 kN from 25 to 30m.
 (M) Bending moment diagram: Starts at +20 kNm at 0, decreases to -7.5 kNm at 10m, jumps to 7.5 kNm at 10m, decreases to -30 kNm at 25m, jumps to -15 kNm at 25m, and increases to 0 kNm at 30m.

$\sum M^a = 0 \Rightarrow 4 \cdot 10 + \frac{\sqrt{2}}{2} N_1 (2+1) = 0$
 $N_1 = -\frac{40}{3} \sqrt{2} = -18.86$
 $\sum M^b = 0$
 $N_2 = 20 \text{ kN}$

IAH
 TRAK