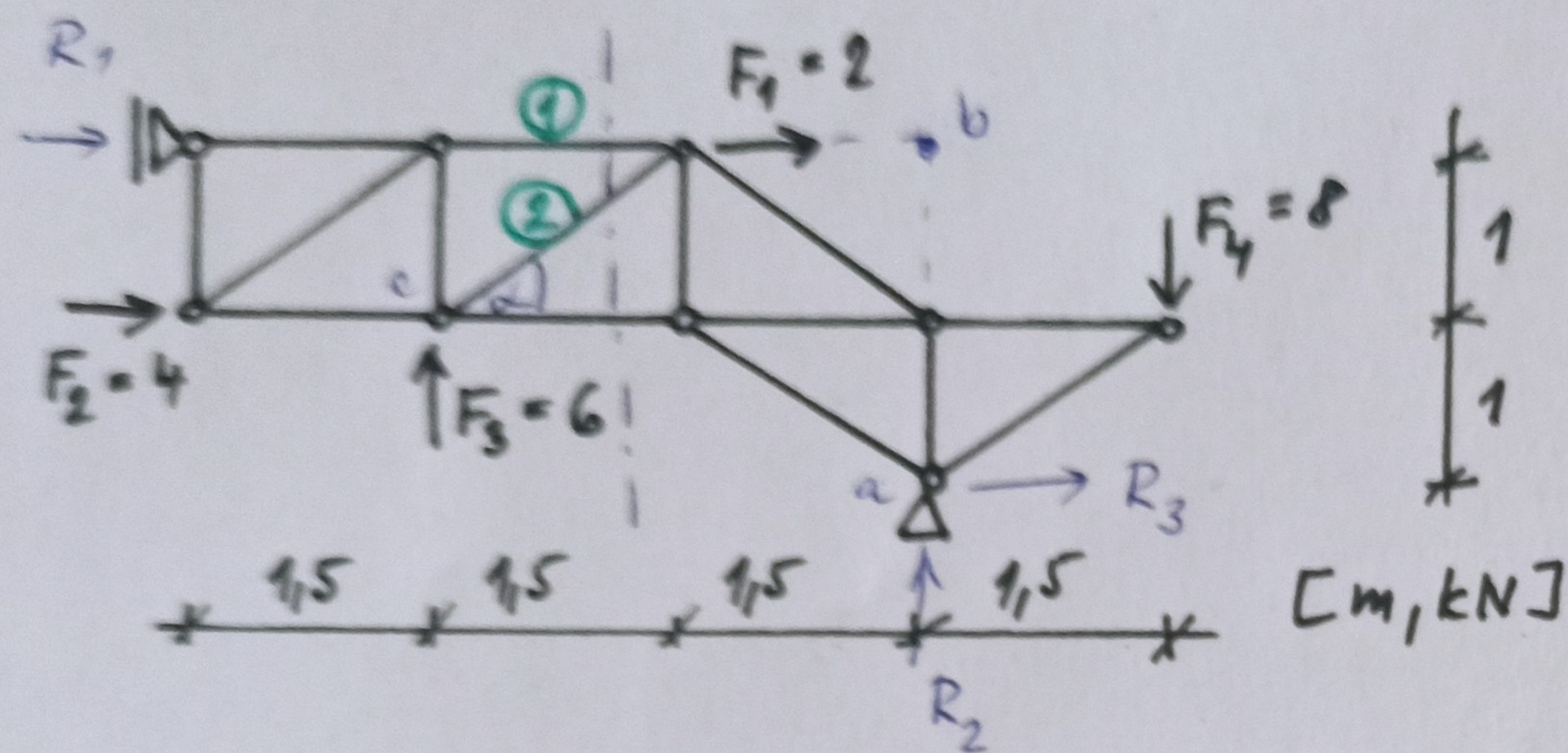




$$\sum M_{ia} = 0 \quad \odot \oplus$$

$$-R_1 \cdot 2 - F_2 \cdot 1 - F_3 \cdot 3 - F_4 \cdot 2 - F_4 \cdot 1.5 = 0$$

$$R_1 = \frac{-4 \cdot 1 - 6 \cdot 3 - 2 \cdot 2 - 8 \cdot 1.5}{2} = \underline{\underline{-19 \text{ kN}}}$$

$$\sum F_{iz} = 0 \quad \uparrow \oplus \quad F_3 + R_2 - F_4 = 0$$

$$R_2 = -6 + 8 = \underline{\underline{2 \text{ kN}}}$$

$$\sum M_{ib} = 0 \quad \odot \oplus$$

$$F_2 \cdot 1 - F_3 \cdot 3 + R_3 \cdot 2 - F_4 \cdot 1.5 = 0$$

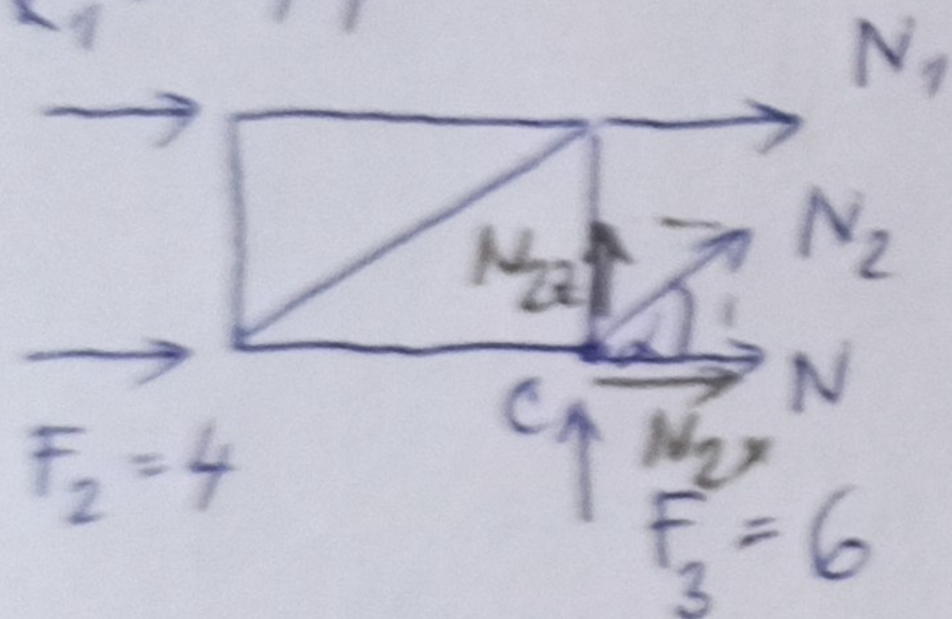
$$R_3 = \frac{-4 \cdot 1 + 6 \cdot 3 + 8 \cdot 1.5}{2}$$

$$R_3 = \underline{\underline{13 \text{ kN}}}$$

$$\text{KO: } \sum F_{ix} = 0 \quad R_1 + F_1 + F_2 + R_3 = 0$$

$$-19 + 2 + 4 + 13 = 0 \quad \checkmark$$

$$R_1 = -19$$



$$\sum M_{ic} = 0 \quad R_1 \cdot 1 + N_1 \cdot 1 = 0$$

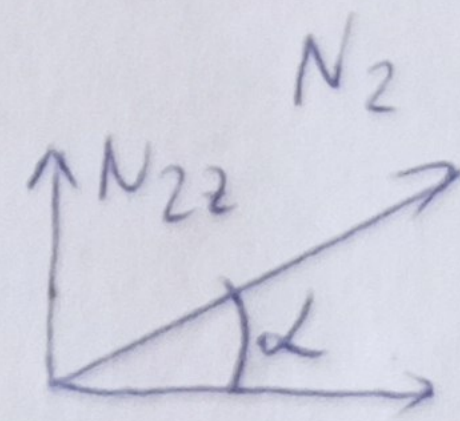
$$\odot \oplus$$

$$\underline{\underline{N_1 = 19 \text{ kN (TAK)}}}$$

$$\sum F_{iz} = 0 \quad F_3 + N_{22} = 0 \Rightarrow N_{22} = -6 \text{ kN}$$

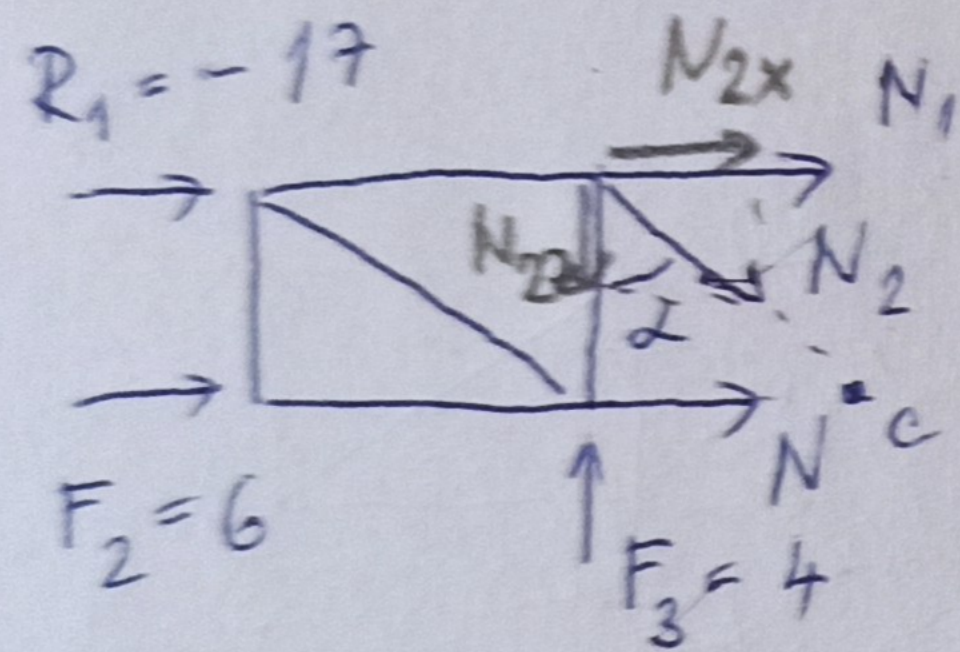
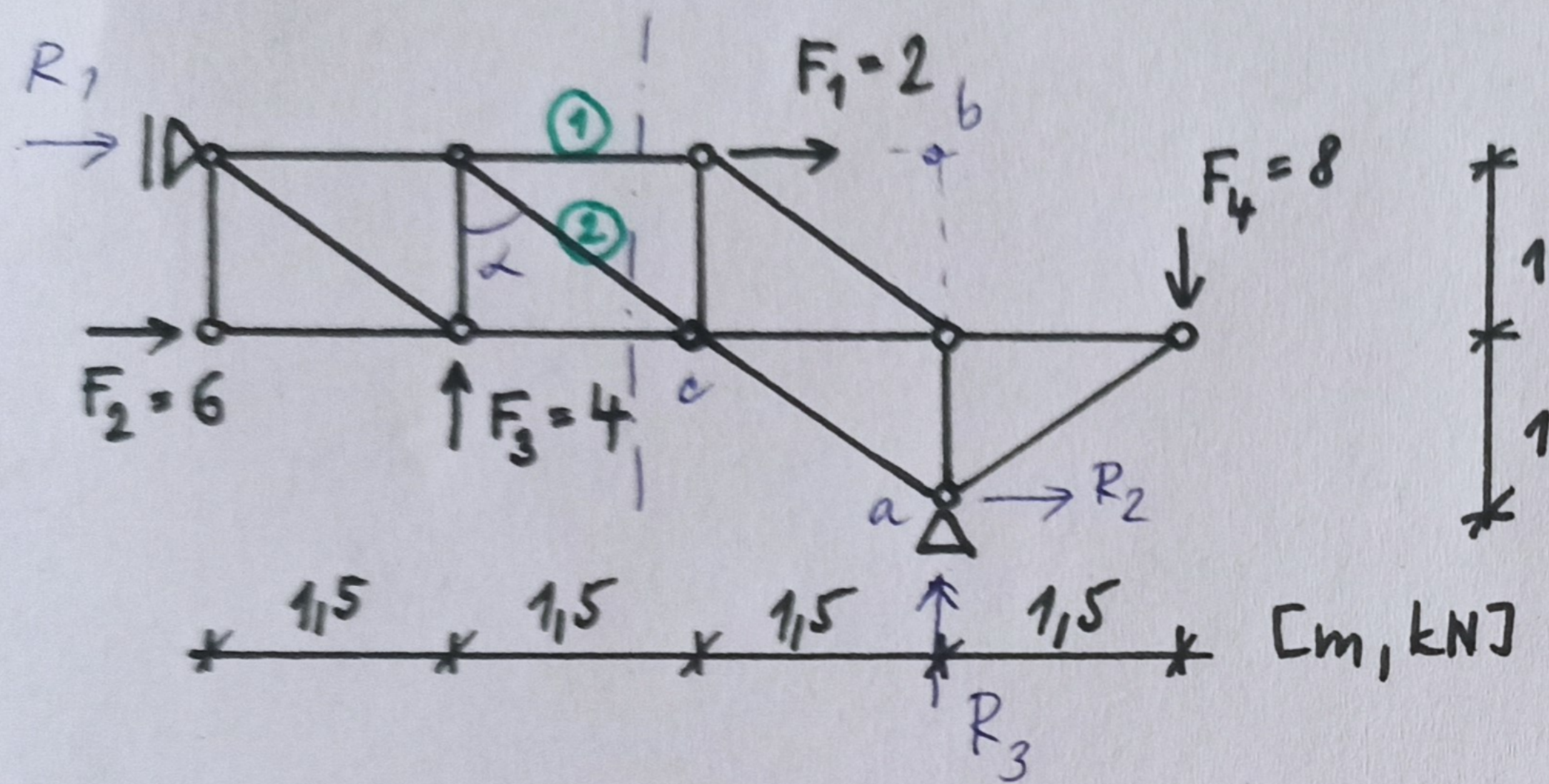
$$\frac{N_{22}}{\sin \alpha}$$

$$\underline{\underline{N_2 = \frac{N_{22}}{\sin \alpha} = \frac{-6}{\frac{1}{\sqrt{3.25}}} = -10.817 \text{ kN (TLAK)}}}$$



$$\sin \alpha = \frac{N_{22}}{N_2}$$

$$\sin \alpha = \frac{1}{\sqrt{1^2 + 1.25^2}} = \frac{1}{\sqrt{3.25}}$$



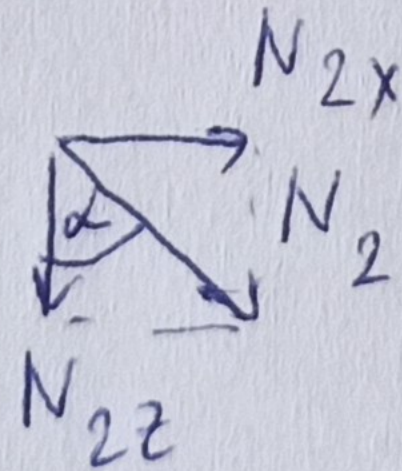
$$\sum M_{ic} = 0: -R_1 \cdot 1 - N_1 \cdot 1 - F_3 \cdot 1,5 = 0$$

$$\odot \quad N_1 = \frac{-(-17) \cdot 1 - 4 \cdot 1,5}{1} = \underline{\underline{11 \text{ kN (TAH)}}}$$

$$\sum F_{iz} = 0: \downarrow \odot \quad -F_3 + N_{2z} = 0$$

$$N_{2z} = 4 \text{ kN}$$

$$N_2 = \frac{4}{\frac{1}{\sqrt{3,25}}} = \underline{\underline{7,211 \text{ kN (TAH)}}}$$



$$\sum M_{ia} = 0: \odot \oplus$$

$$-R_1 \cdot 2 - F_1 \cdot 2 - F_2 \cdot 1 - F_3 \cdot 3 - F_4 \cdot 1,5 = 0$$

$$R_1 = \frac{-2 \cdot 2 - 6 \cdot 1 - 4 \cdot 3 - 8 \cdot 1,5}{2} = \underline{\underline{-17 \text{ kN}}}$$

$$\sum M_{ib} = 0: \odot \oplus$$

$$F_2 \cdot 1 - F_3 \cdot 3 + R_2 \cdot 2 - F_4 \cdot 1,5 = 0$$

$$R_2 = \frac{-6 \cdot 1 + 4 \cdot 3 + 8 \cdot 1,5}{2} = \underline{\underline{+9 \text{ kN}}}$$

$$\sum F_{iz} = 0: F_3 + R_3 - F_4 = 0$$

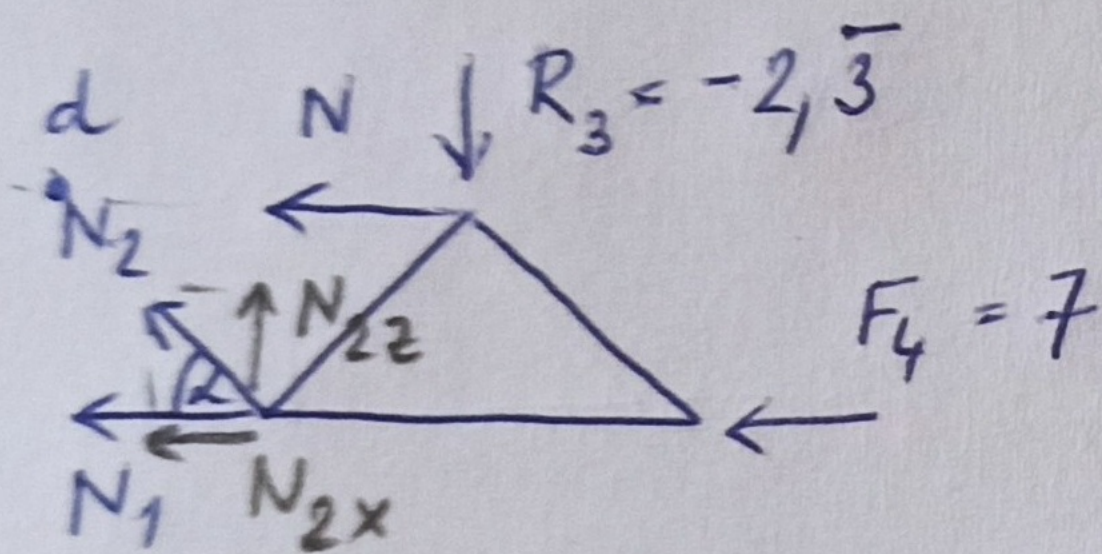
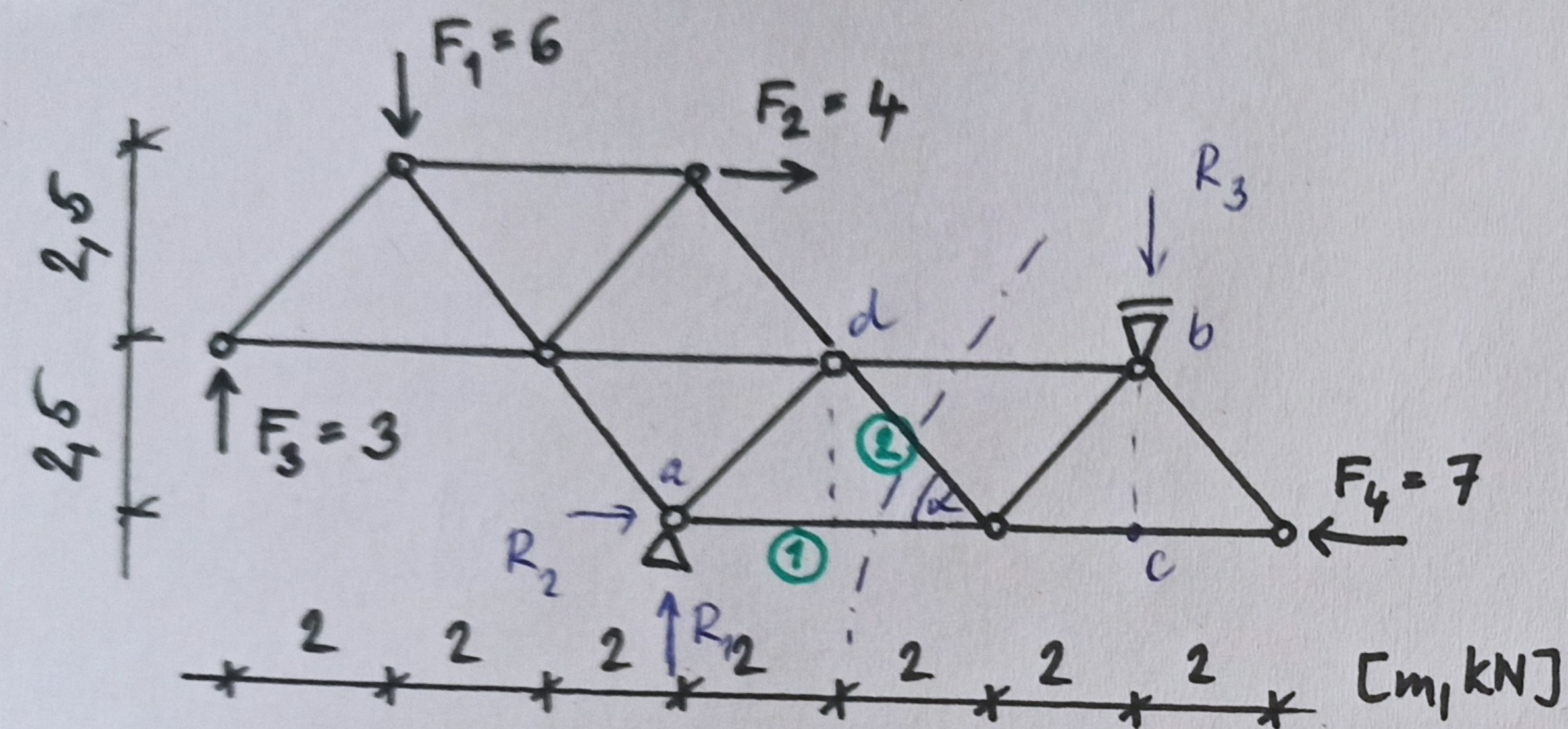
$$R_3 = -4 + 8 = \underline{\underline{4 \text{ kN}}}$$

$$KD: \sum F_x = 0: R_1 + F_2 + F_1 + R_2 = 0$$

$$-17 + 6 + 2 + 9 = 0 \quad \checkmark$$

$$\cos \alpha = \frac{N_{2z}}{N_2} \Rightarrow N_2 = \frac{N_{2z}}{\cos \alpha}$$

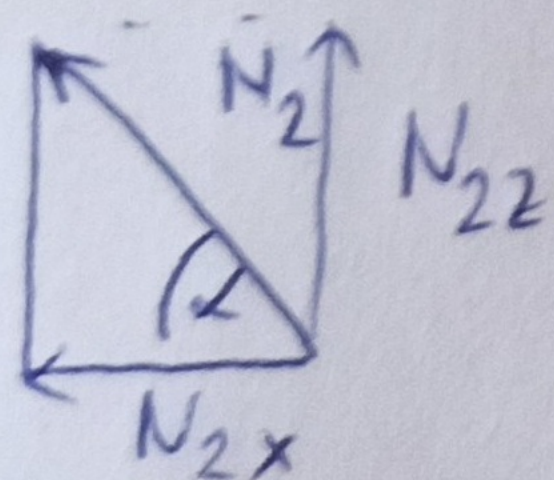
$$\cos \alpha = \frac{1}{\sqrt{1^2 + 1,5^2}}$$



$$\sum M_{id} = 0 \quad \curvearrowright \oplus: -R_3 \cdot 4 - F_4 \cdot 2,5 - N_1 \cdot 2,5 = 0$$

$$\underline{N_1} = \frac{-(-2,3) \cdot 4 - 7 \cdot 2,5}{2,5} = \underline{\underline{-3,26 \text{ kN (TLAK)}}}$$

$$\sum F_{iz} = 0 \quad \downarrow \oplus: R_3 - N_{2z} = 0 \Rightarrow \underline{N_{2z} = -2,3 \text{ kN}}$$



$$\frac{N_{2z}}{N_2} = \sin \alpha = \frac{2,5}{\sqrt{2^2 + 2,5^2}} \Rightarrow \underline{N_2} = \frac{N_{2z}}{\frac{2,5}{\sqrt{10,25}}} = \underline{\underline{-2,988 \text{ kN (TLAK)}}}$$

$$\sum F_{ix} = 0 \quad \rightarrow \oplus$$

$$R_2 + F_2 - F_4 = 0$$

$$\underline{R_2} = -4 + 7 = \underline{\underline{3 \text{ kN}}}$$

$$\sum M_{ia} = 0 \quad \curvearrowright \oplus$$

$$-F_3 \cdot 6 + F_1 \cdot 4 - F_2 \cdot 5 - R_3 \cdot 6 = 0$$

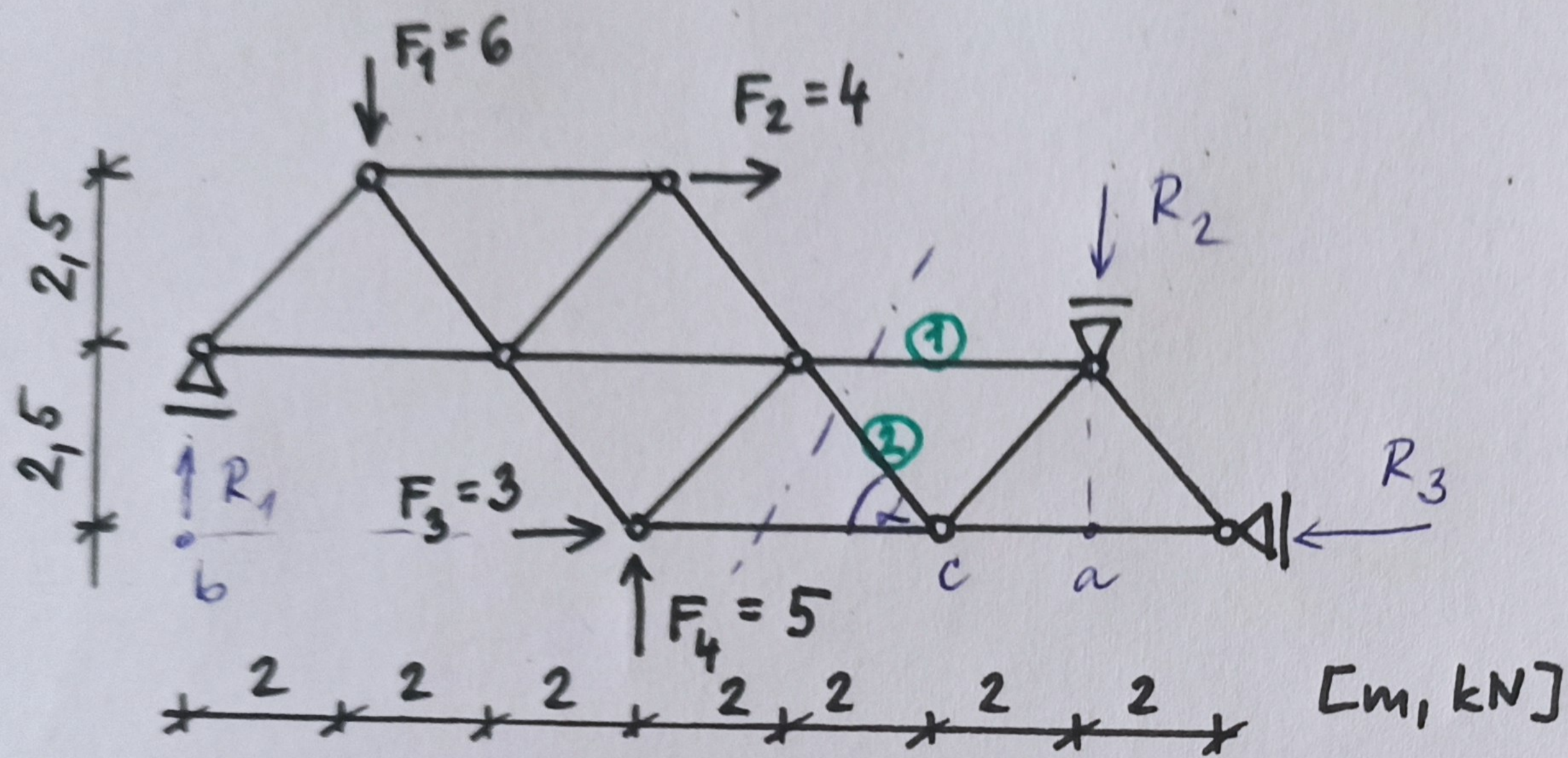
$$\underline{R_3} = \frac{-3 \cdot 6 + 6 \cdot 4 - 4 \cdot 5}{6} = -\frac{7}{3} = \underline{\underline{-2,3 \text{ kN}}}$$

$$\sum M_{ic} = 0 \quad \curvearrowright \oplus$$

$$-F_3 \cdot 12 + F_1 \cdot 10 - R_1 \cdot 6 - F_2 \cdot 5 = 0$$

$$\underline{R_1} = \frac{-3 \cdot 12 + 6 \cdot 10 - 4 \cdot 5}{6} = \frac{2}{3} = \underline{\underline{0,6 \text{ kN}}}$$

$$KO: \sum F_{iz} = 0: 3 - 6 + 0,6 - (-2,3) = 0 \quad \checkmark$$



$$\sum M_{1a} = 0 : \odot (+)$$

$$-R_1 \cdot 12 + F_1 \cdot 10 - F_2 \cdot 5 - F_4 \cdot 6 = 0$$

$$R_1 = \frac{6 \cdot 10 - 4 \cdot 5 - 5 \cdot 6}{12} = \frac{5}{6} = 0,8\bar{3} \text{ kN}$$

$$\sum M_{1b} = 0 : \odot (+)$$

$$-F_1 \cdot 2 - F_2 \cdot 5 + F_4 \cdot 6 - R_2 \cdot 12 = 0$$

$$R_2 = \frac{-6 \cdot 2 - 4 \cdot 5 + 5 \cdot 6}{12} = -\frac{2}{12} = -0,1\bar{6} \text{ kN}$$

$$\sum F_{ix} = 0 \rightarrow \oplus :$$

$$F_2 + F_3 - R_3 = 0$$

$$R_3 = 4 + 3 = 7 \text{ kN}$$

$$KO : \sum F_{iz} = 0 :$$

$$R_1 - F_1 + F_4 - R_2 = 0$$

$$0,8\bar{3} - 6 + 5 - (-0,1\bar{6}) = 0 \checkmark$$

$$\sum M_{1c} = 0 : \odot (+)$$

$$N_1 \cdot 2,5 - R_2 \cdot 2 = 0$$

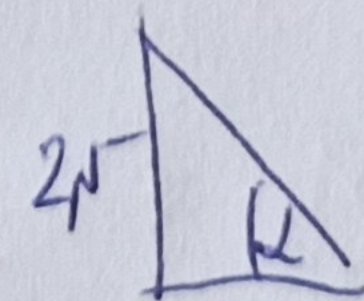
$$N_1 = \frac{-0,1\bar{6} \cdot 2}{2,5} = -0,13 \text{ kN (TLAK)}$$

$$\sum F_{iz} = 0 : \uparrow (+)$$

$$N_{2z} = N_2 \cdot \sin \alpha$$

$$-R_2 + N_{2z} = 0$$

$$-R_2 + N_2 \cdot \frac{2,5}{\sqrt{10,25}} = 0 \Rightarrow N_2 = \frac{-0,1\bar{6}}{(2,5/\sqrt{10,25})}$$



$$\Rightarrow N_2 = -0,213 \text{ kN (TLAK)}$$

$$\sin \alpha = \frac{2,5}{\sqrt{2,5^2 + 2^2}} = \frac{2,5}{\sqrt{10,25}}$$