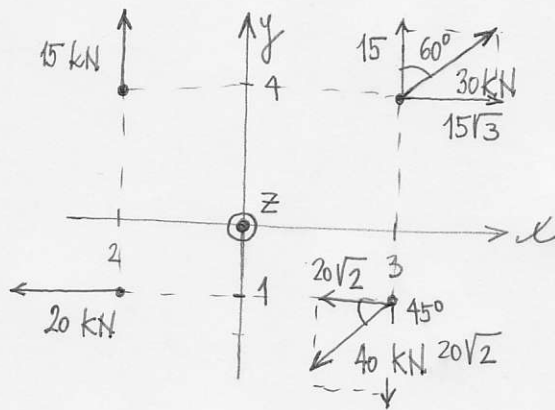


Pr. 1 Určete silovou a momentovou výslednici dané soustavy sil.

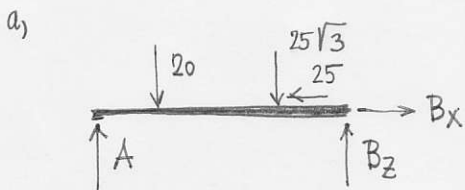
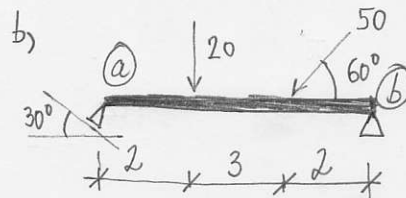
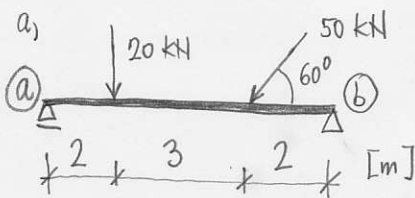


$$\rightarrow : V_x = -20 + 15\sqrt{3} - 20\sqrt{2} = -27,304 \text{ kN}$$

$$\uparrow : V_y = 15 + 15 - 20\sqrt{2} = 1,716 \text{ kN}$$

$$\curvearrowright : M_z = -15 \cdot 2 - 20 \cdot 1 + 15 \cdot 3 - 15\sqrt{3} \cdot 4 - 20\sqrt{2} \cdot 1 - 20\sqrt{2} \cdot 3 = -222,06 \text{ kNm}$$

Pr. 2 Určete reakce daných nosníkových konstrukcí



$$\rightarrow : B_x - 25 = 0 \Rightarrow B_x = 25 \text{ kN} \quad (1)$$

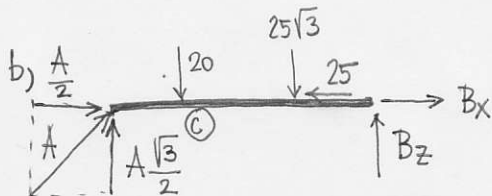
$$\uparrow : A + B_z - 20 - 25\sqrt{3} = 0 \Rightarrow A = 26,658 \text{ kN} \quad (3)$$

$$\curvearrowright : 7B_z - 20 \cdot 2 - 25\sqrt{3} \cdot 5 = 0 \Rightarrow B_z = 36,644 \text{ kN} \quad (2)$$

Kontrola:

$$\curvearrowright : -7A_z + 20 \cdot 5 + 25\sqrt{3} \cdot 2 = 0$$

$$-7 \cdot 26,658 + 100 + 86,603 = -0,003 \checkmark$$



$$\rightarrow : \frac{1}{2} A - 25 + B_x = 0 \Rightarrow B_x = 9,610 \text{ kN} \quad (3)$$

$$\uparrow : A \frac{\sqrt{3}}{2} + B_z - 20 - 25\sqrt{3} = 0 \Rightarrow A = 30,781 \text{ kN} \quad (2)$$

$$\curvearrowright : 7B_z - 20 \cdot 2 - 25\sqrt{3} \cdot 5 = 0 \Rightarrow B_z = 36,644 \text{ kN} \quad (1)$$

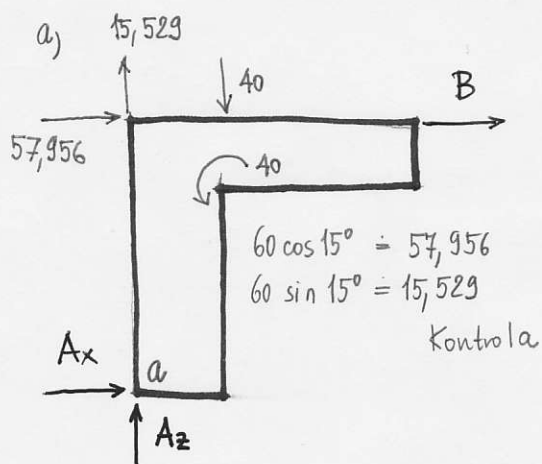
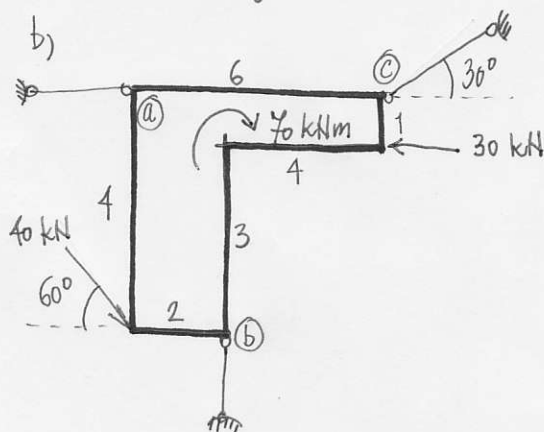
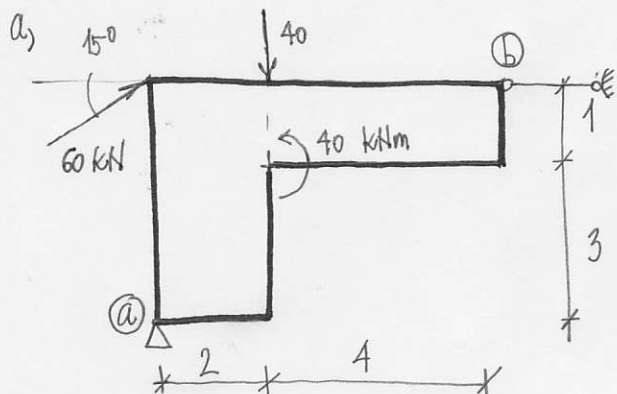
Kontrola:

$$\curvearrowright : -7 \cdot A \frac{\sqrt{3}}{2} + 20 \cdot 5 + 2 \cdot 25\sqrt{3} = 0,003 \checkmark$$

Alternativní kontrola

$$\curvearrowright : -2 \cdot A \frac{\sqrt{3}}{2} + 5 \cdot B_z - 25\sqrt{3} \cdot 3 = 0,002 \checkmark$$

Pr.: 3 Určete reakce ve vnějších vazbách. Výsledek zkontrolujte.

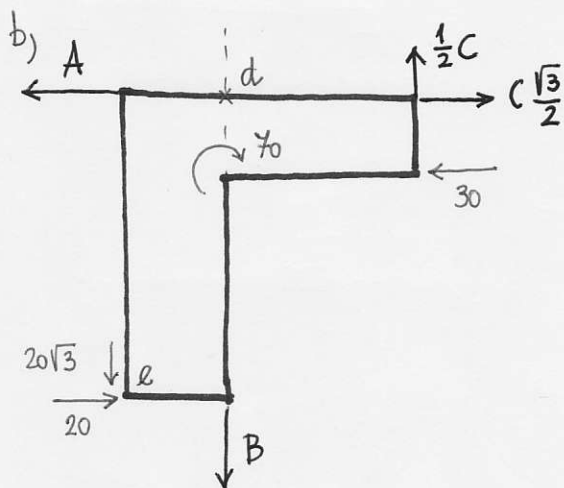


$$\rightarrow : 57,956 + A_x + B = 0 \Rightarrow A_x = +10 \text{ kN} \quad (3)$$

$$\uparrow : A_z + 15,529 - 40 = 0 \Rightarrow A_z = 24,471 \text{ kN} \quad (1)$$

$$\curvearrow a : 40 - 40 \cdot 2 - 57,956 \cdot 4 - 4B = 0 \Rightarrow B = -67,956 \text{ kN} \quad (2)$$

$$\curvearrow b : 40 \cdot 4 + 40 - 15,529 \cdot 6 - 24,471 \cdot 6 + 4 \cdot 10 = 0 \quad \checkmark$$



$$\rightarrow : -A + C \frac{\sqrt{3}}{2} + 20 - 30 = 0 \Rightarrow A = -31,340 \text{ kN} \quad (1)$$

$$\uparrow : -B + C \frac{1}{2} - 20\sqrt{3} = 0 \Rightarrow B = -46,962 \text{ kN} \quad (2)$$

$$\curvearrow a : -70 + 4 \cdot \frac{1}{2} C + 20 \cdot \sqrt{3} \cdot 2 + 20 \cdot 4 - 30 = 0 \Rightarrow C = -24,641 \text{ kN} \quad (1)$$

Kontrola: $\curvearrow e : 4A - 2B + 6 \cdot \frac{1}{2} C - 4 \cdot \frac{\sqrt{3}}{2} C + 3 \cdot 30 - 70 = 0,090 \quad \checkmark$