

$$Q = q \cdot 4 = 2 \text{ kN}$$

$$\sum F_{ix} = 0 \Rightarrow R_{ax} = 0$$

$$\sum M_{ia} = 0 \quad (\uparrow)$$

$$F_1 \cdot 1 - Q \cdot 2 + R_{b2} \cdot 4 - F_2 \cdot 5 = 0$$

$$R_{b2} = 3 \text{ kN} \quad (\uparrow)$$

$$\sum M_{ib} = 0 \quad (\uparrow)$$

$$F_1 \cdot 5 - R_{a2} \cdot 4 + Q \cdot 2 - F_2 \cdot 1 = 0$$

$$R_{a2} = 3 \text{ kN} \quad (\uparrow)$$

Kontrol:

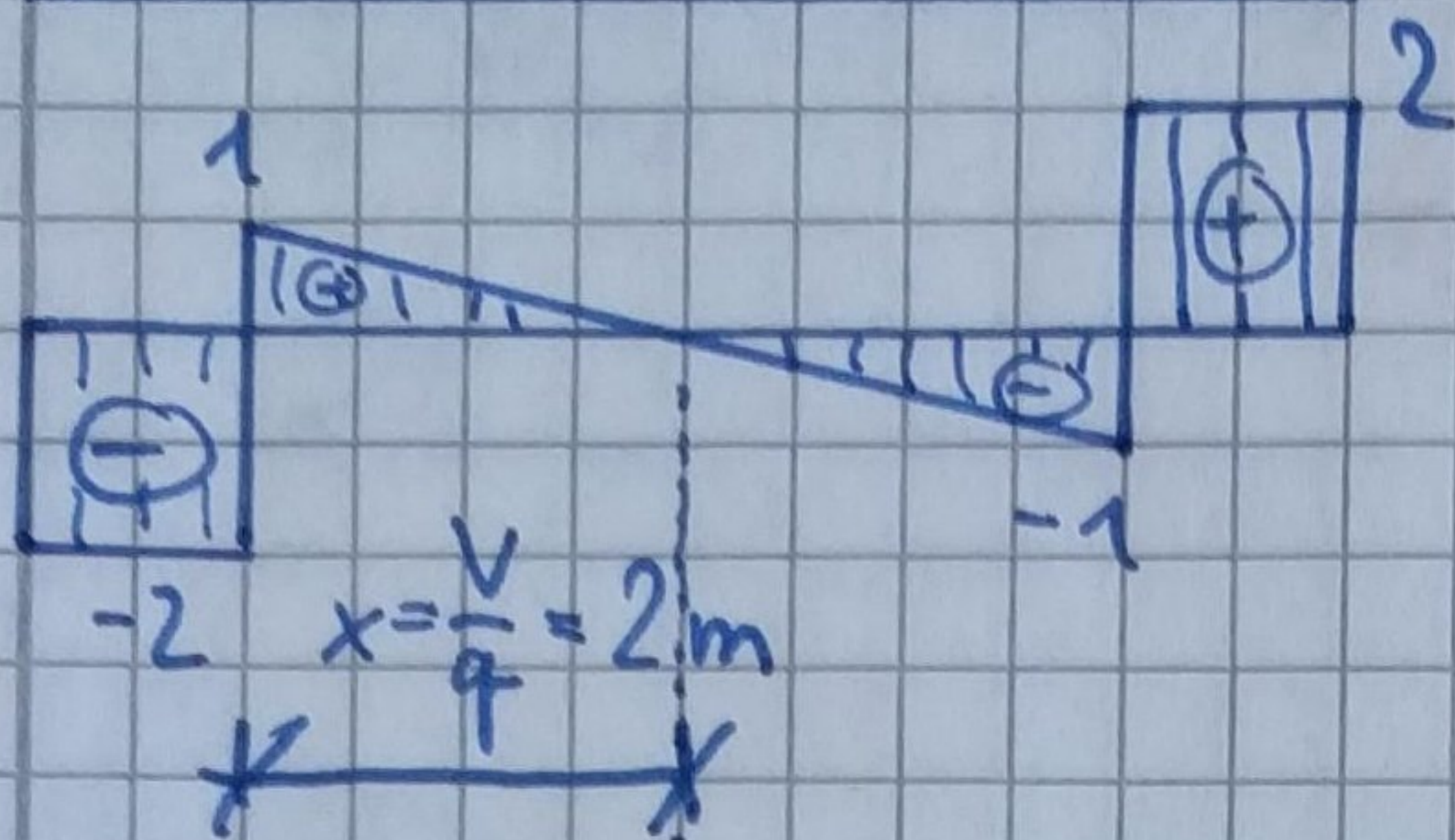
$$\sum F_{iz} = 0: 2 - 3 + 2 - 3 + 2 = 0 \quad \checkmark$$

$$M_a = -F_1 \cdot 1 = -2 \text{ kNm}$$

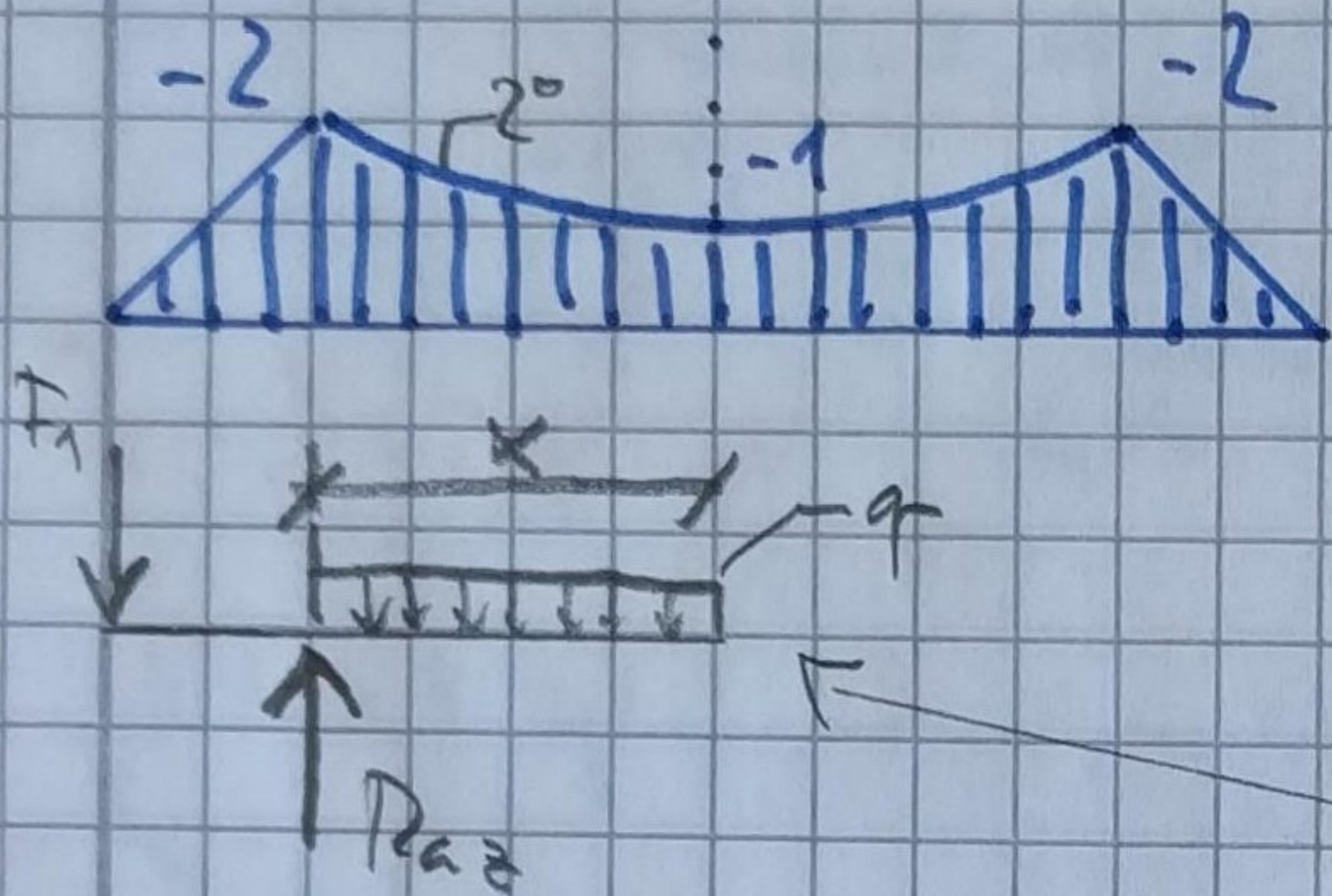
$$M_x = -F_1 \cdot 3 + R_{a2} \cdot 2 - \frac{q \cdot x^2}{2} = -1 \text{ kNm}$$

(N)

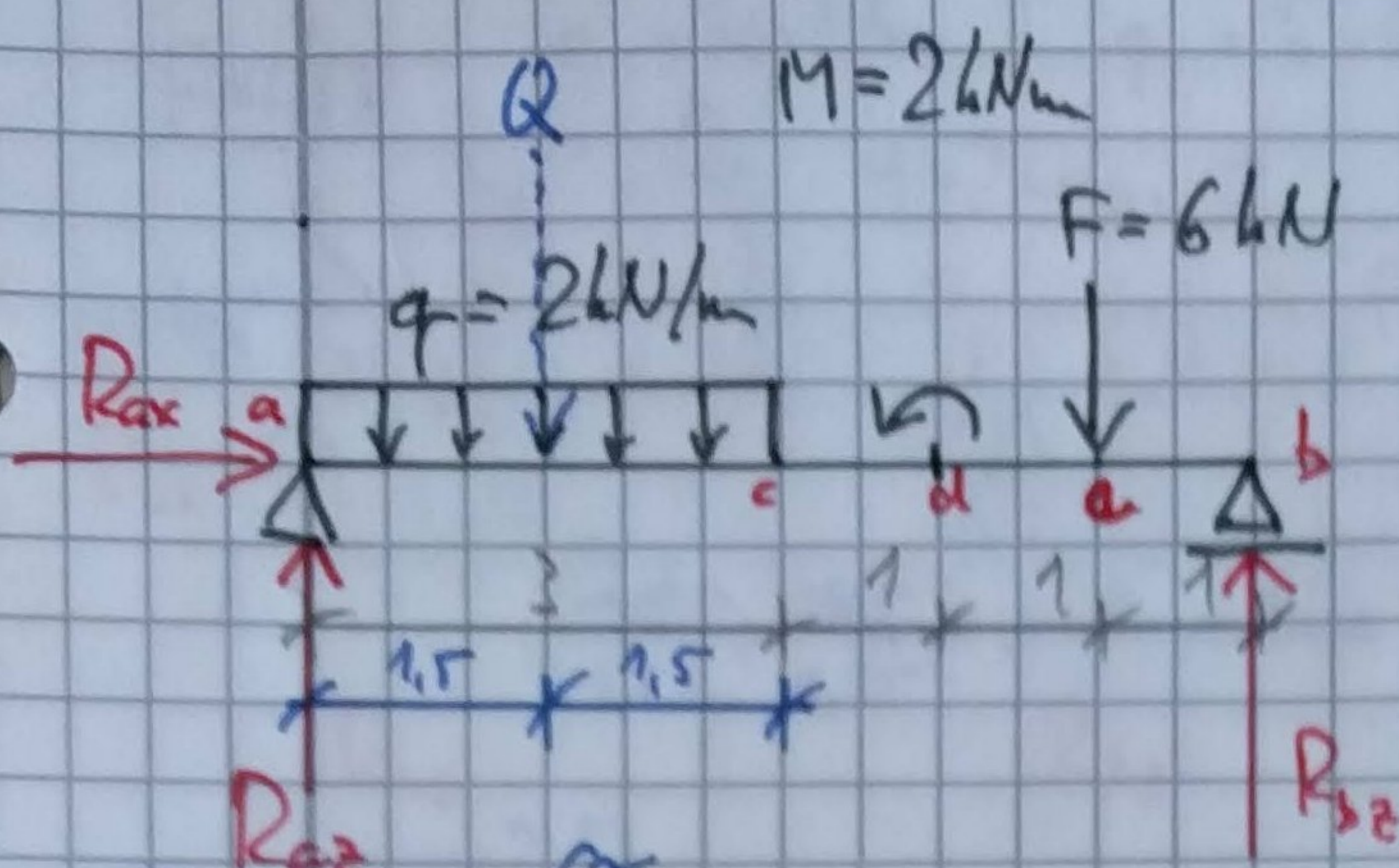
(V)



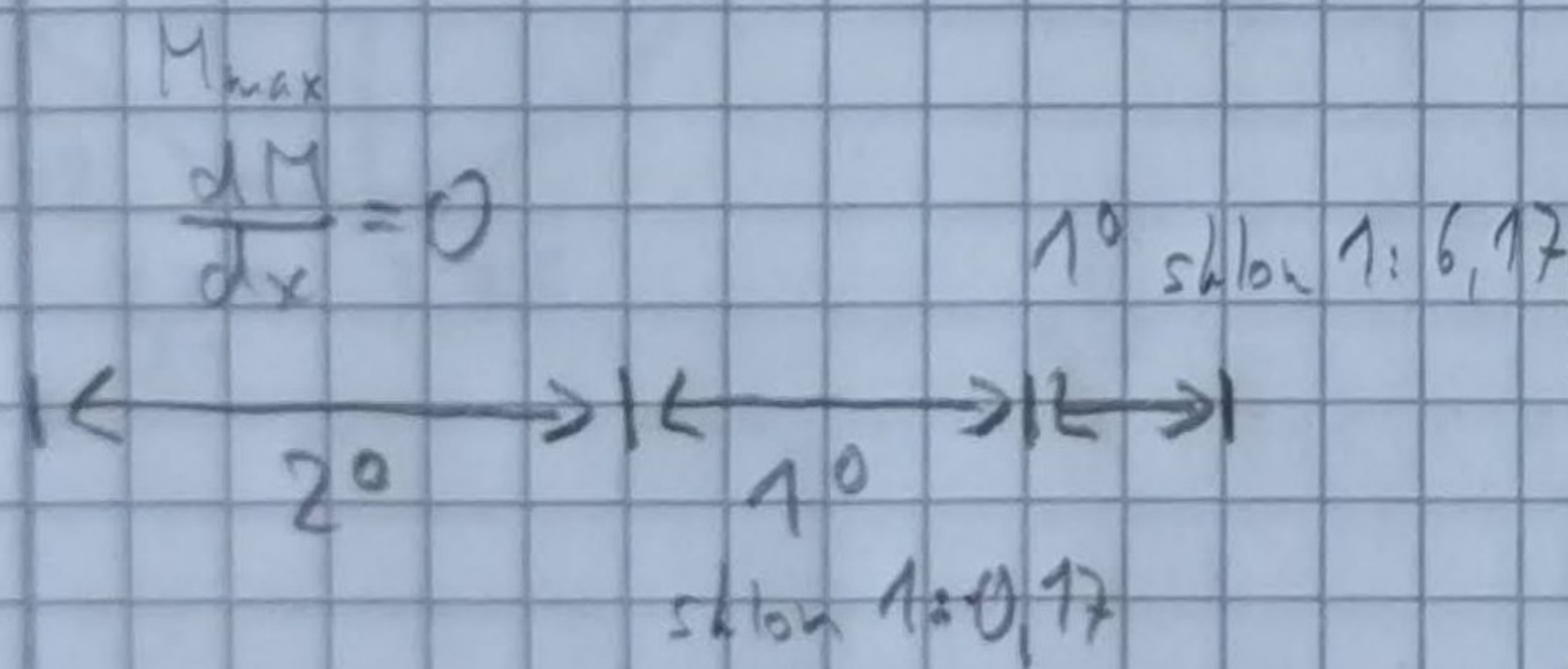
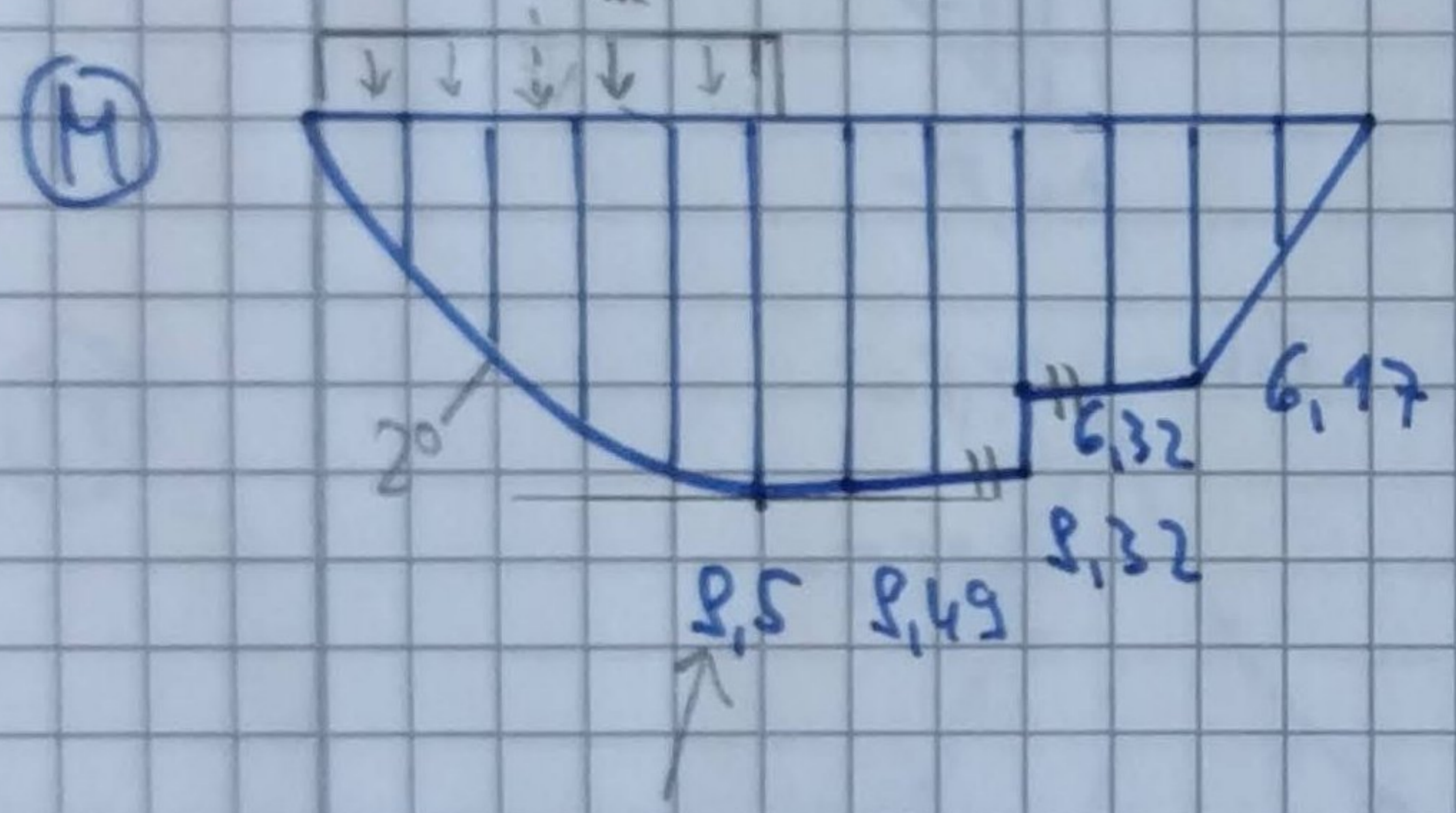
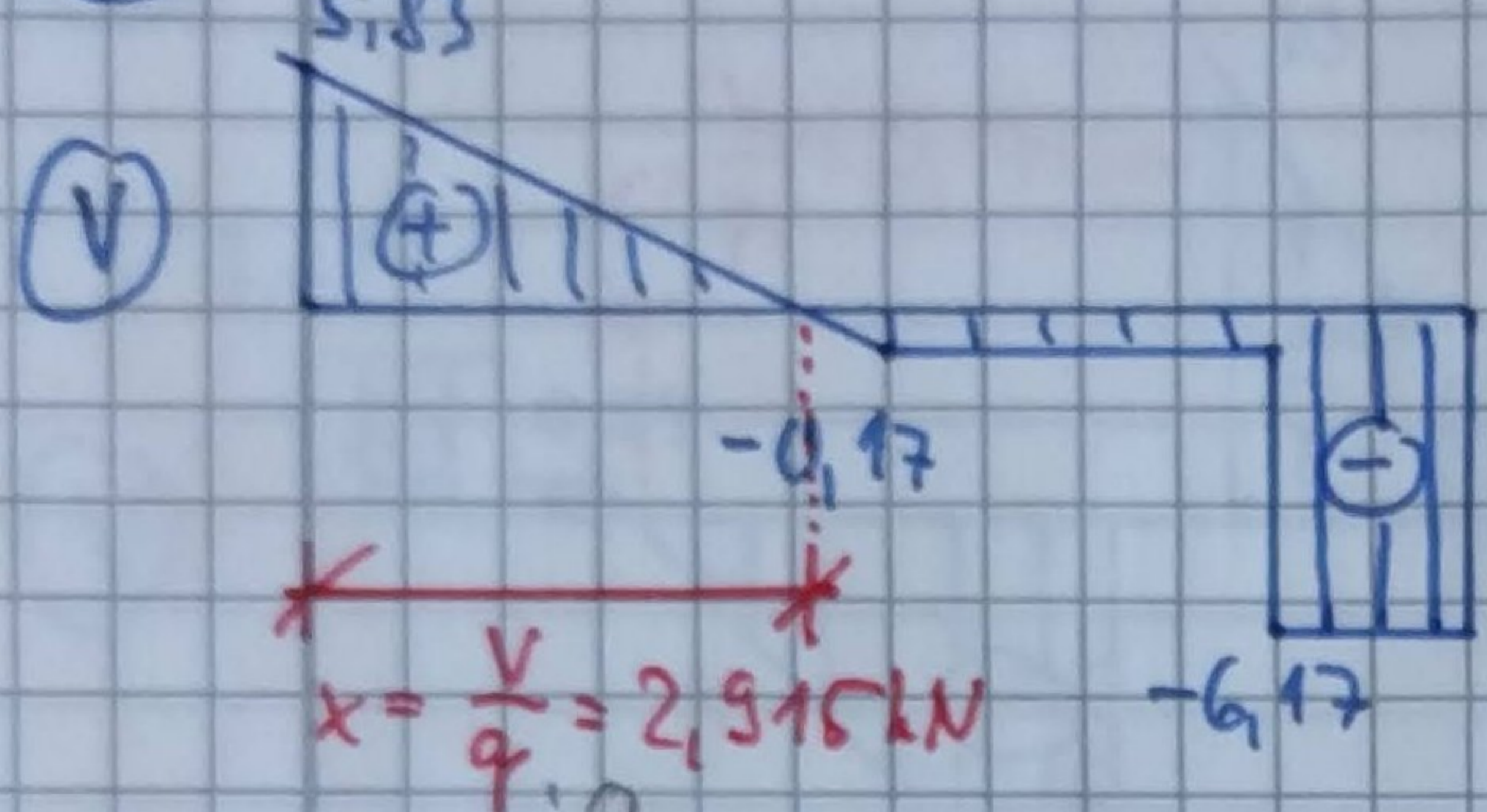
(M)







(N)  $\varnothing$



$$Q = q \cdot 3 = 6 \text{ kN}$$

$$\sum M_{ia} = 0 \quad (\downarrow +)$$

$$-Q \cdot 1.5 + M - F \cdot 5 + R_{bz} \cdot 6 = 0$$

$$R_{bz} = 6.17 \text{ kN} \quad (\uparrow)$$

$$\sum M_{ib} = 0 \quad (\uparrow +)$$

$$-R_{az} \cdot 6 + Q \cdot 4.5 + M + F \cdot 1 = 0$$

$$R_{az} = 5.83 \text{ kN} \quad (\uparrow)$$

Kontrola:

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

$$-6.17 + 2 \cdot 3 + 6 - 5.83 = 0 \quad \checkmark$$

$$M_x = R_{az} \cdot x - q \cdot x \cdot \frac{x}{2} =$$

$$= 8.50 \text{ kNm}$$

$$M_c = R_{az} \cdot 3 - q \cdot 3 \cdot \frac{3}{2} =$$

$$= 8.49 \text{ kNm}$$

$$M_{d1} = R_{az} \cdot 4 - q \cdot 3 \cdot 2.5 =$$

$$= 8.32 \text{ kNm}$$

$$M_{d2} = R_{az} \cdot 4 - q \cdot 3 \cdot 2.5 - M =$$

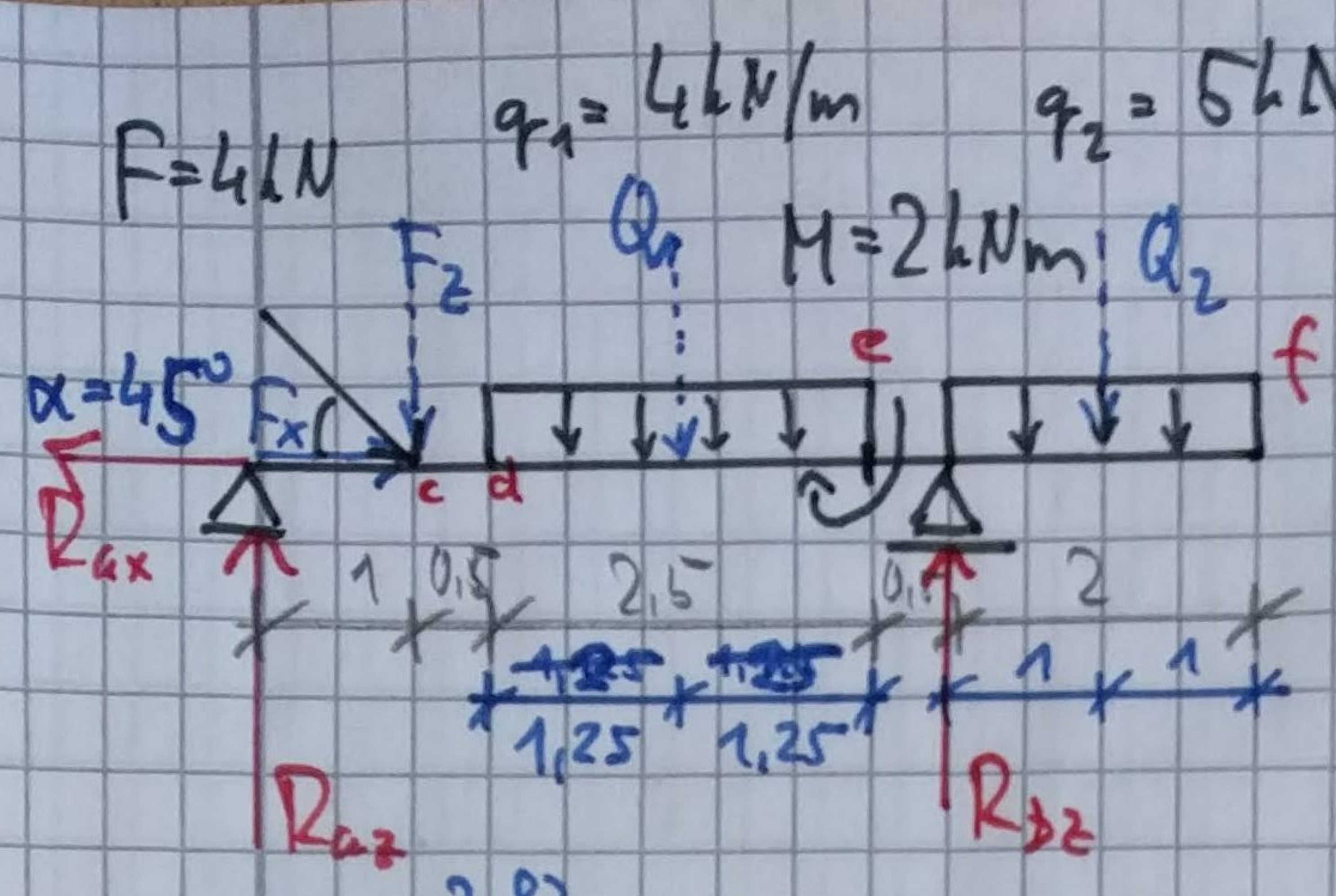
$$= 6.32 \text{ kNm}$$

$$M_e = R_{az} \cdot 5 - q \cdot 3 \cdot 3.5 - M$$

$$= R_{bz} \cdot 1 =$$

$$= 6.17 \text{ kNm}$$



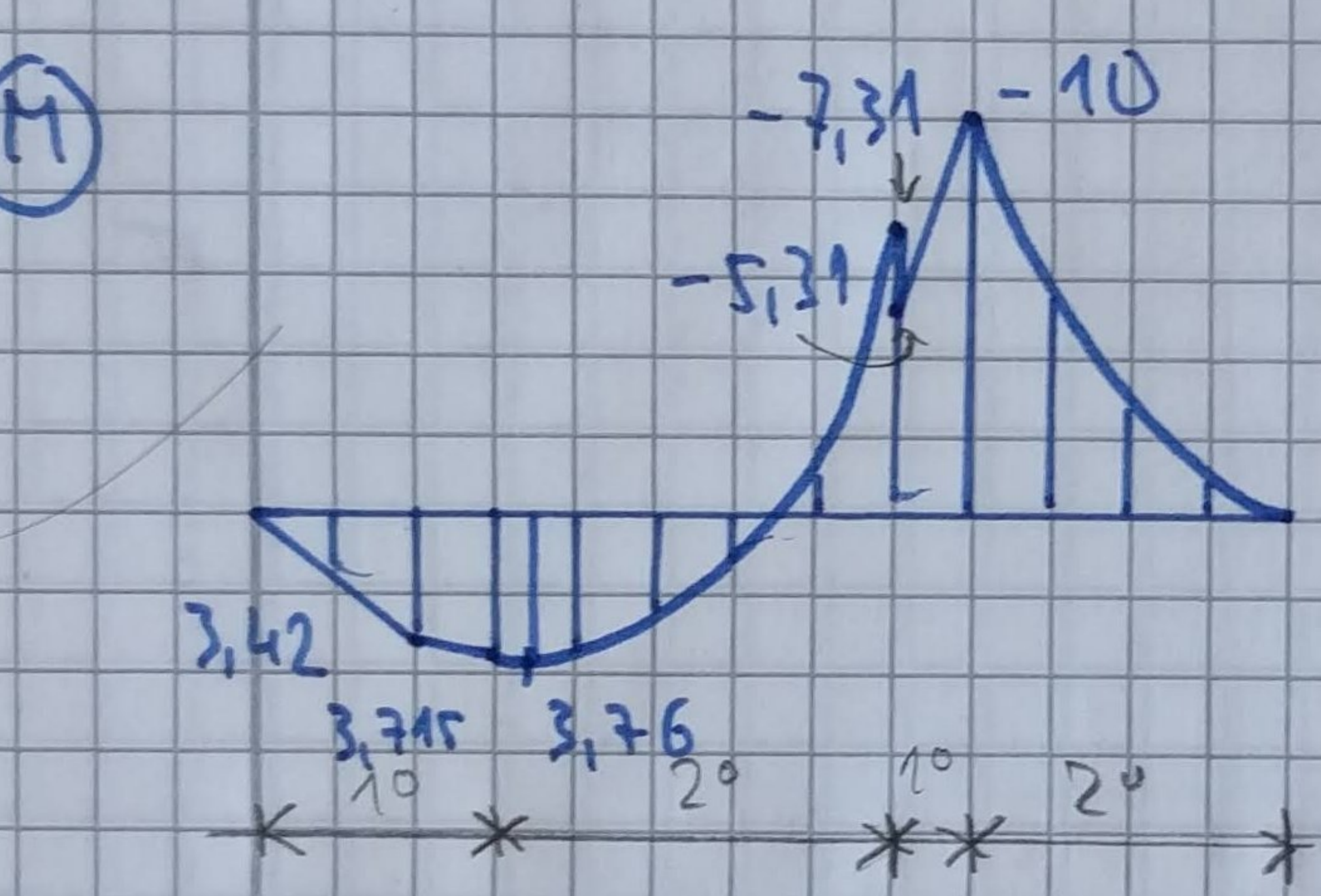
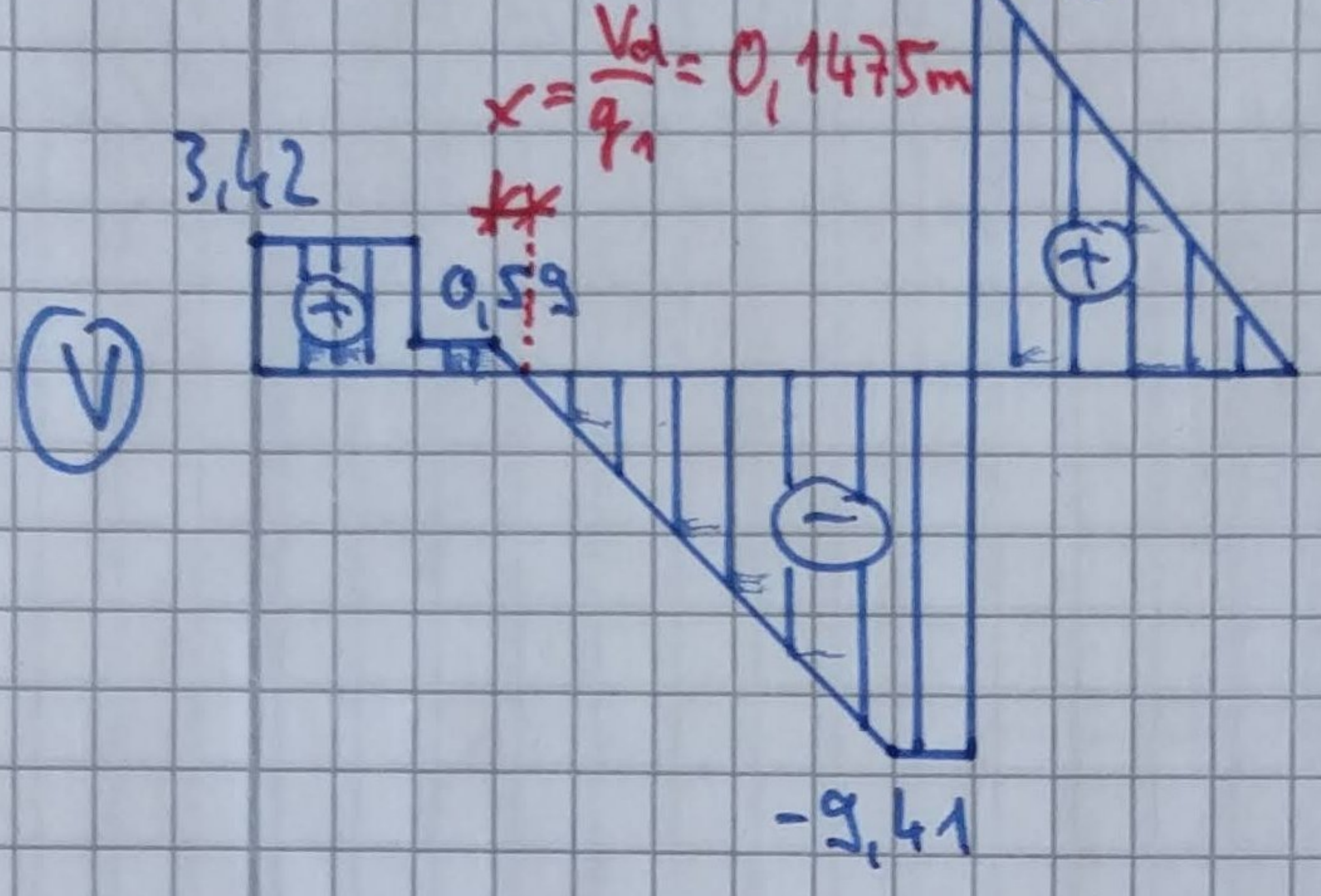
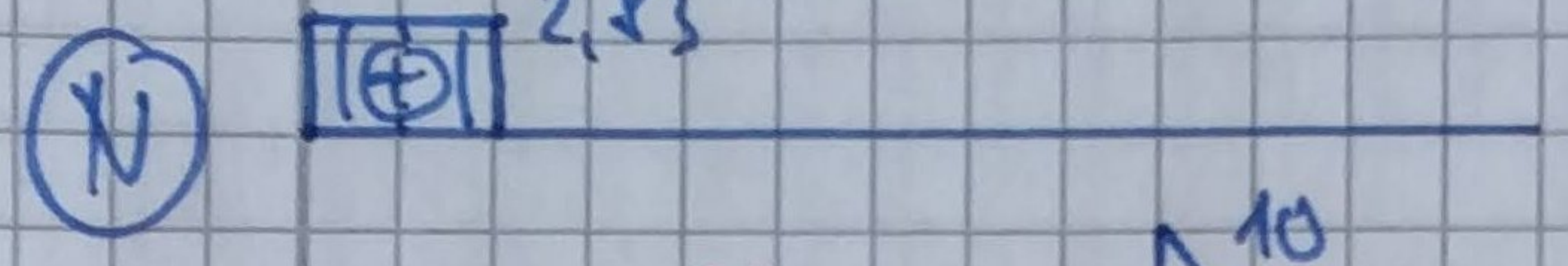


$$Q_1 = 4 \cdot 2,5 = 10 \text{ kN}$$

$$Q_2 = 5 \cdot 2 = 10 \text{ kN}$$

$$F_x = 2,83 \text{ kN}$$

$$F_z = 2,83 \text{ kN}$$



$$\sum F_{ix} = 0 \quad R_{ax} = 2,83 \text{ kN} (\leftarrow)$$

$$\sum M_{ia} = 0 \quad (\downarrow +)$$

$$-F_z \cdot 1 - Q_1 \cdot 2,75 - M + R_{bz} \cdot 4,5 - Q_2 \cdot 5,5 = 0$$

$$R_{bz} = 19,41 \text{ kN} (\uparrow)$$

$$\sum M_{ib} = 0 \quad (\downarrow +)$$

$$-R_{az} \cdot 4,5 + F_z \cdot 3,5 + Q_1 \cdot 1,75 - M - Q_2 \cdot 1 = 0$$

$$R_{az} = 3,42 \text{ kN} (\uparrow)$$

Kontrolle:

$$\sum F_{iz} \stackrel{?}{=} 0 :$$

$$-R_{az} + F_z + Q_1 - R_{bz} + Q_2 = 0 \quad \checkmark$$

$$M_c = R_{az} \cdot 1 = 3,42 \text{ kNm}$$

$$M_d = R_{az} \cdot 1,5 - F_z \cdot 0,5 = 3,715 \text{ kNm}$$

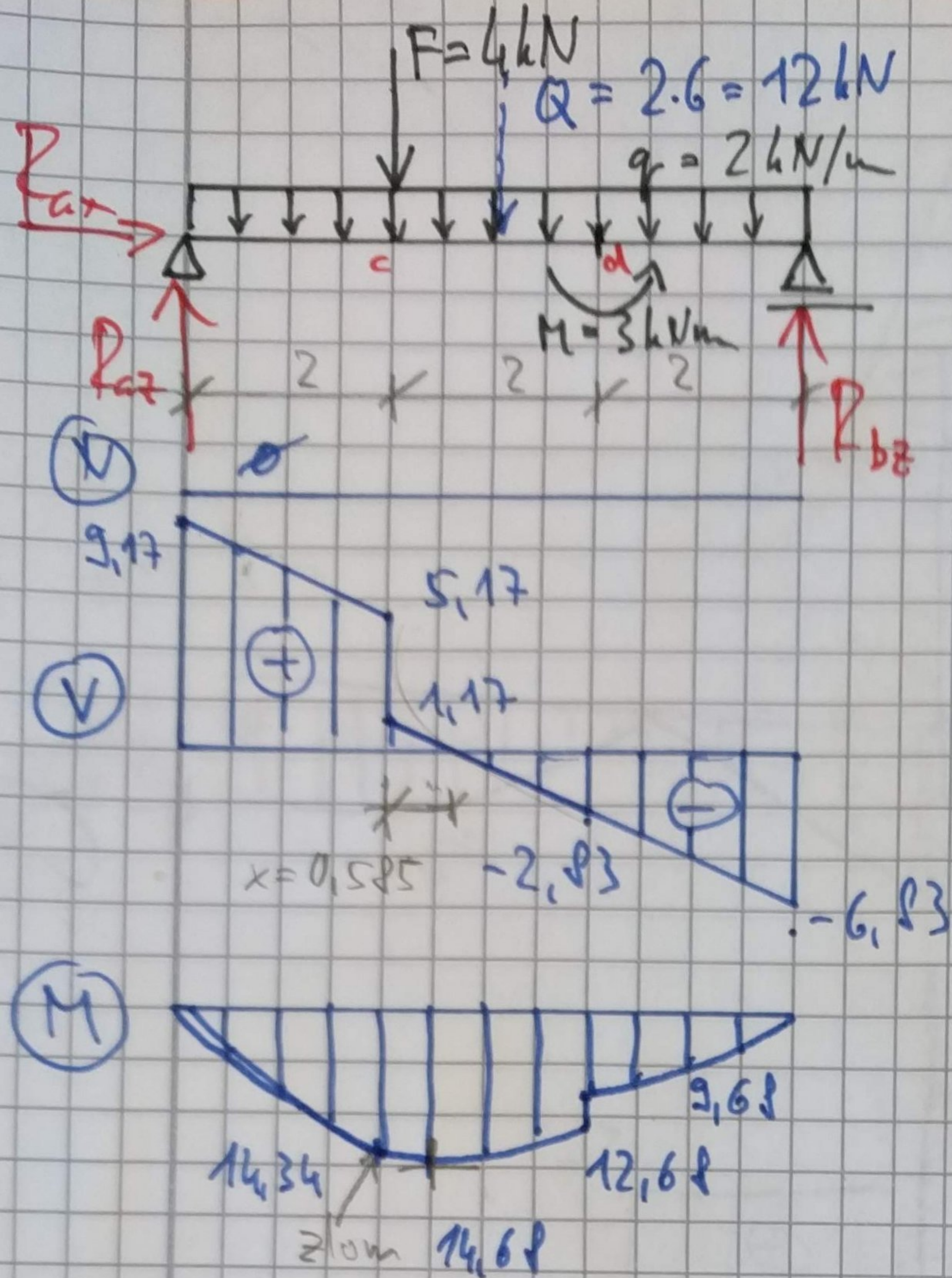
$$M_x = R_{az} \cdot 1,6475 - F_z \cdot 0,6475 - \frac{q_1 \cdot 0,1475^2}{2} = 3,76 \text{ kNm}$$

$$M_{e1} = R_{az} \cdot 4 - F_z \cdot 3 - \frac{q_1 \cdot 2,5^2}{2} = -7,31 \text{ kNm}$$

$$M_{e2} = M_{e1} + M = -5,31 \text{ kNm}$$

$$M_f = -\frac{q_2 \cdot 2^2}{2} = -10 \text{ kNm}$$





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

$$-F \cdot 2 - Q \cdot 3 + M + P_{bz} \cdot 6 = 0$$

$$P_{bz} = 6,83 \text{ kN} (\uparrow)$$

$$\sum M_{ib} = 0 \curvearrowright$$

$$-P_{az} \cdot 6 + F \cdot 4 + Q \cdot 3 + M = 0$$

$$P_{az} = 9,17 \text{ kN} (\uparrow)$$

$$M_c = P_{az} \cdot 2 - \frac{q \cdot 2^2}{2} = 14,34 \text{ kNm}$$

$$M_{d1} = P_{az} \cdot 4 - \frac{q \cdot 4^2}{2} - F \cdot 2 =$$

$$= 12,68 \text{ kNm}$$

$$M_{d2} = M_{d1} - M = 9,68 \text{ kNm}$$

$$M_x = P_{az} \cdot (2+x) -$$

$$- \frac{q \cdot (2+x)^2}{2} - F \cdot x$$

$$= 14,68 \text{ kNm}$$