

N22

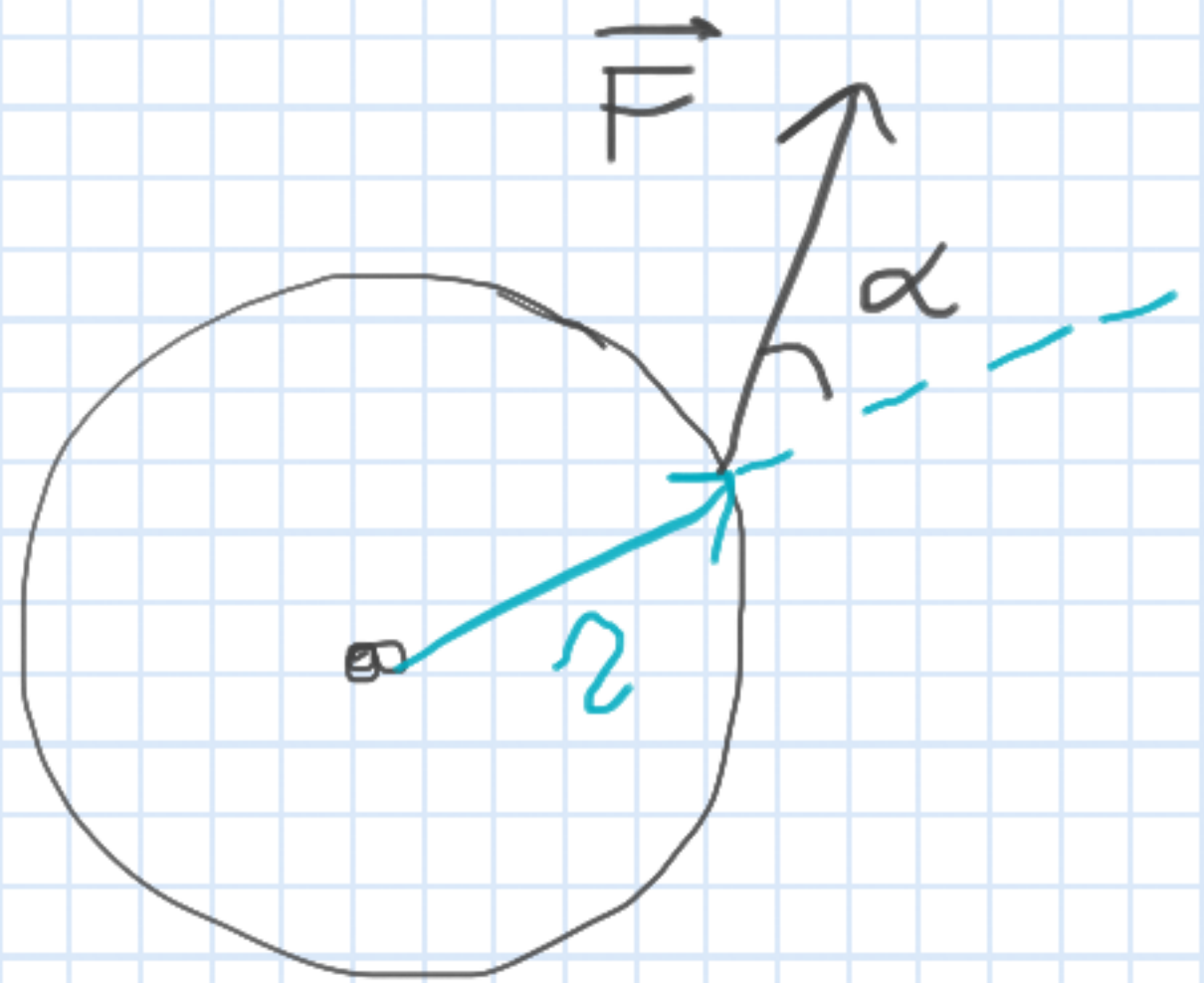
$$F = 8,8 \text{ N}$$

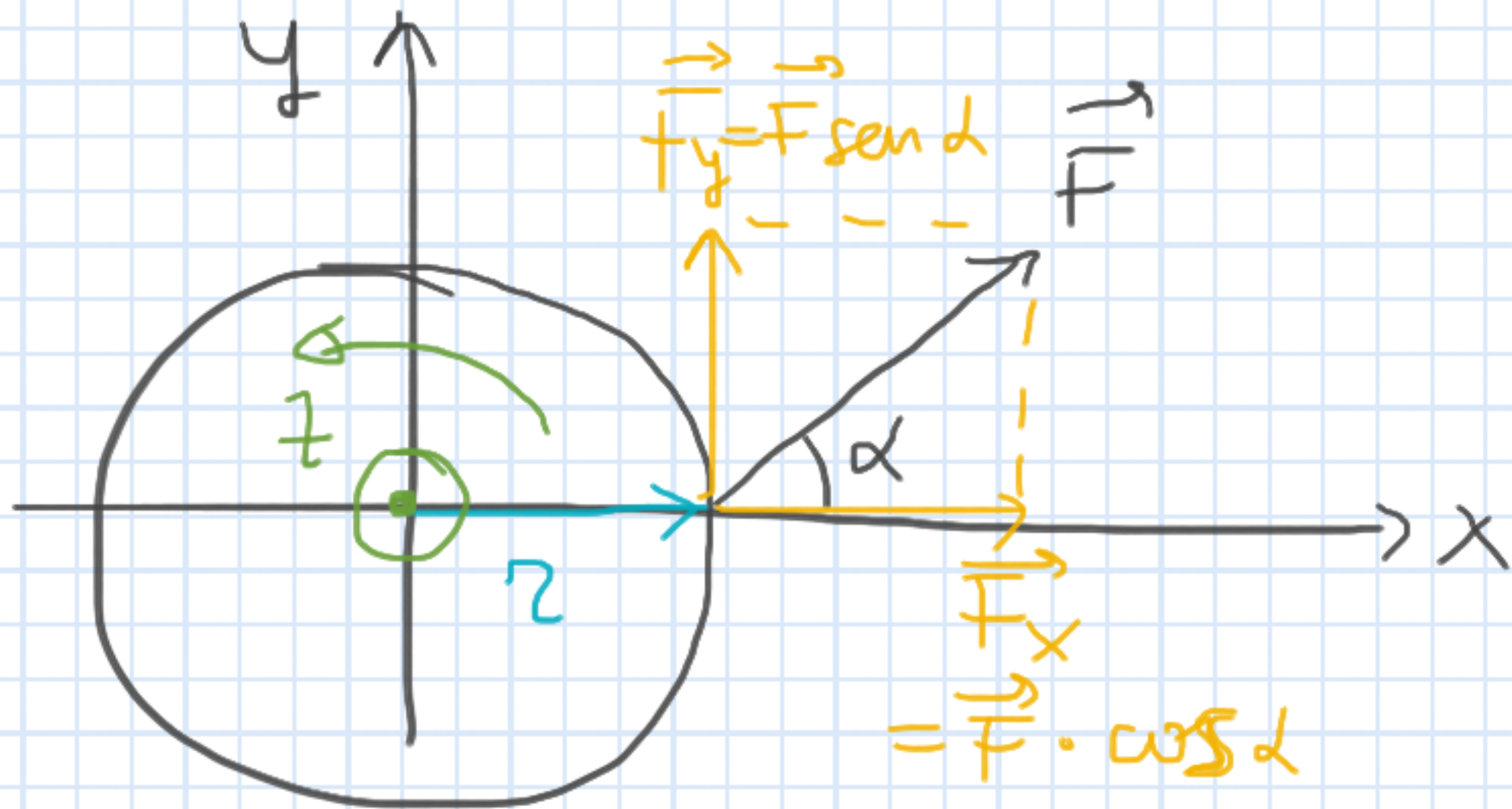
$$r = 0,41 \text{ m}$$

$$\alpha = 22^\circ$$

$$M = r \cdot F \cdot \sin \alpha$$

$$= 0,41 \text{ m} \cdot 8,8 \text{ N} \cdot \sin(22) = 1,35 \text{ N} \cdot \text{m}$$





$$\vec{r} = (z, 0, 0)$$

$$\vec{F} = (F \cos \alpha, F \sin \alpha, 0)$$

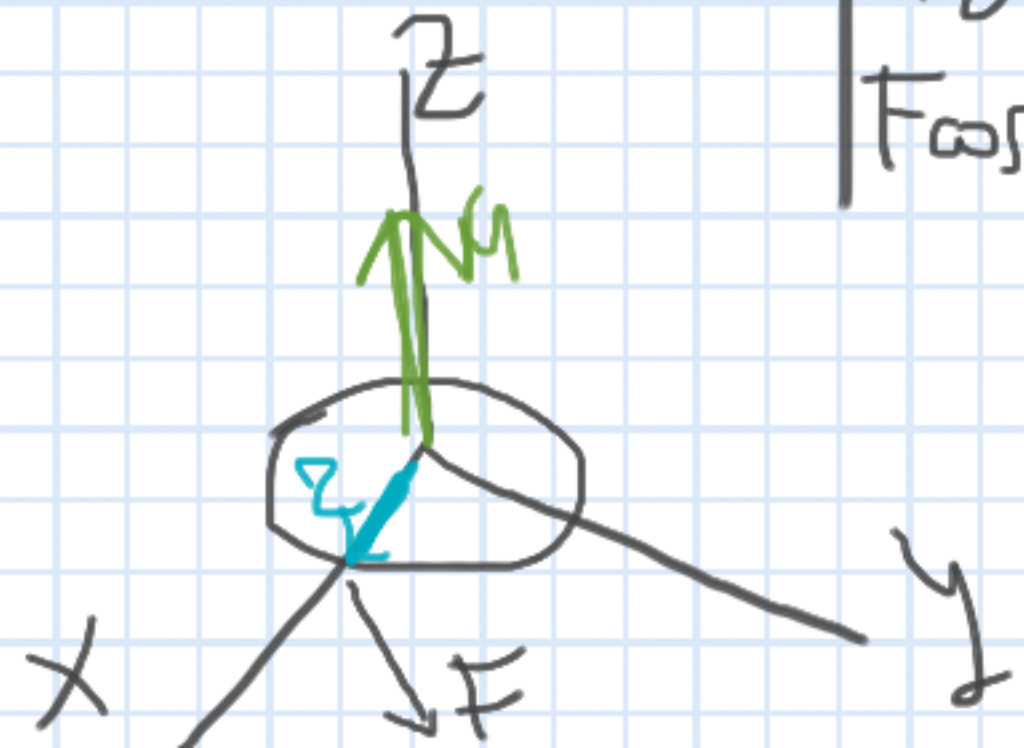
$$\vec{M} = \vec{r} \times \vec{F}$$

$$= (0, 0, z F \sin \alpha)$$

$$= F \cos \alpha \cdot z$$

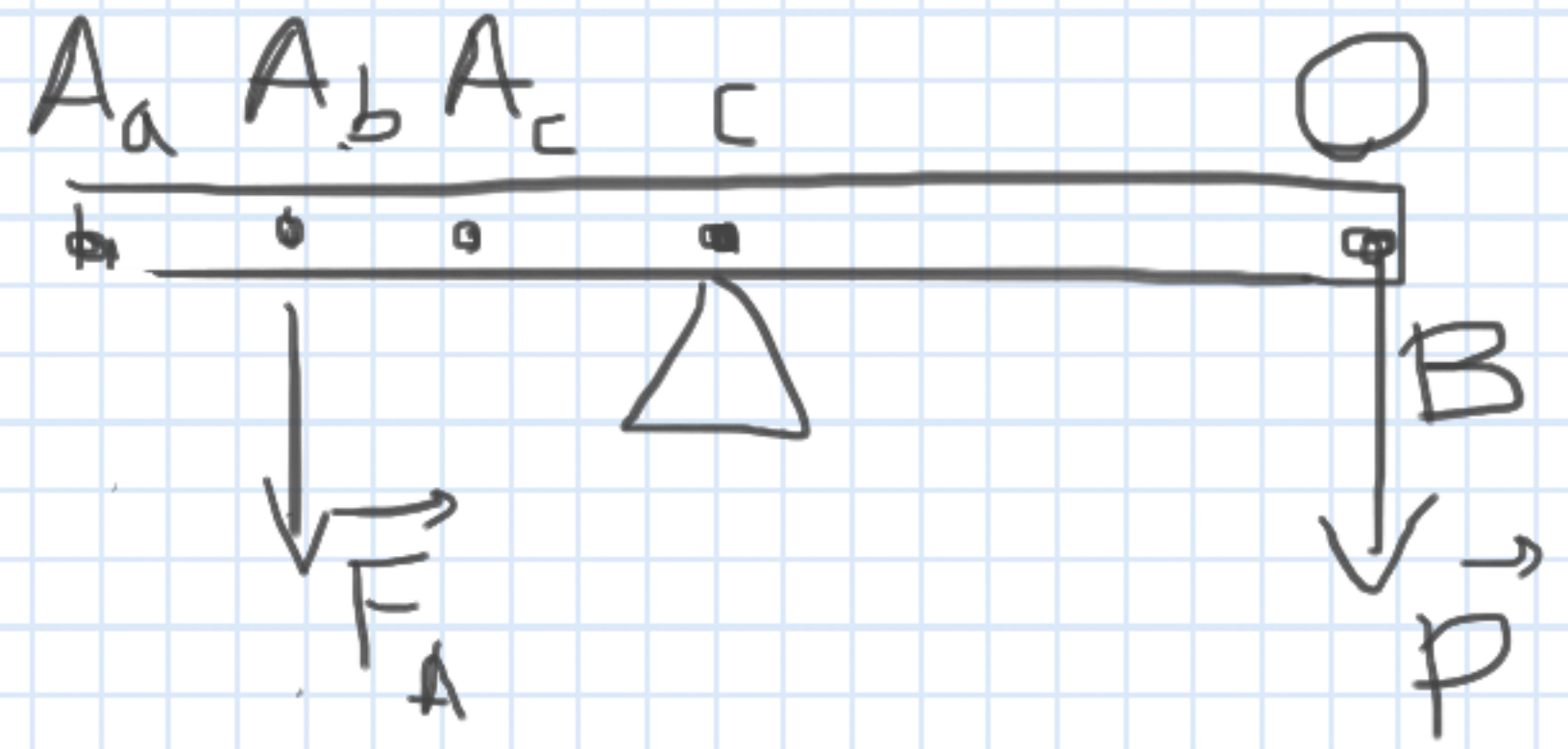
$$\vec{M} = \vec{r} \times \vec{F} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ z & 0 & 0 \\ F \cos \alpha & F \sin \alpha & 0 \end{vmatrix} = \cancel{\vec{i} \cdot 0} - \cancel{\vec{j} \cdot 0} + \vec{k} (z F \sin \alpha)$$

$$= (z F \sin \alpha) \vec{k}$$



N 23

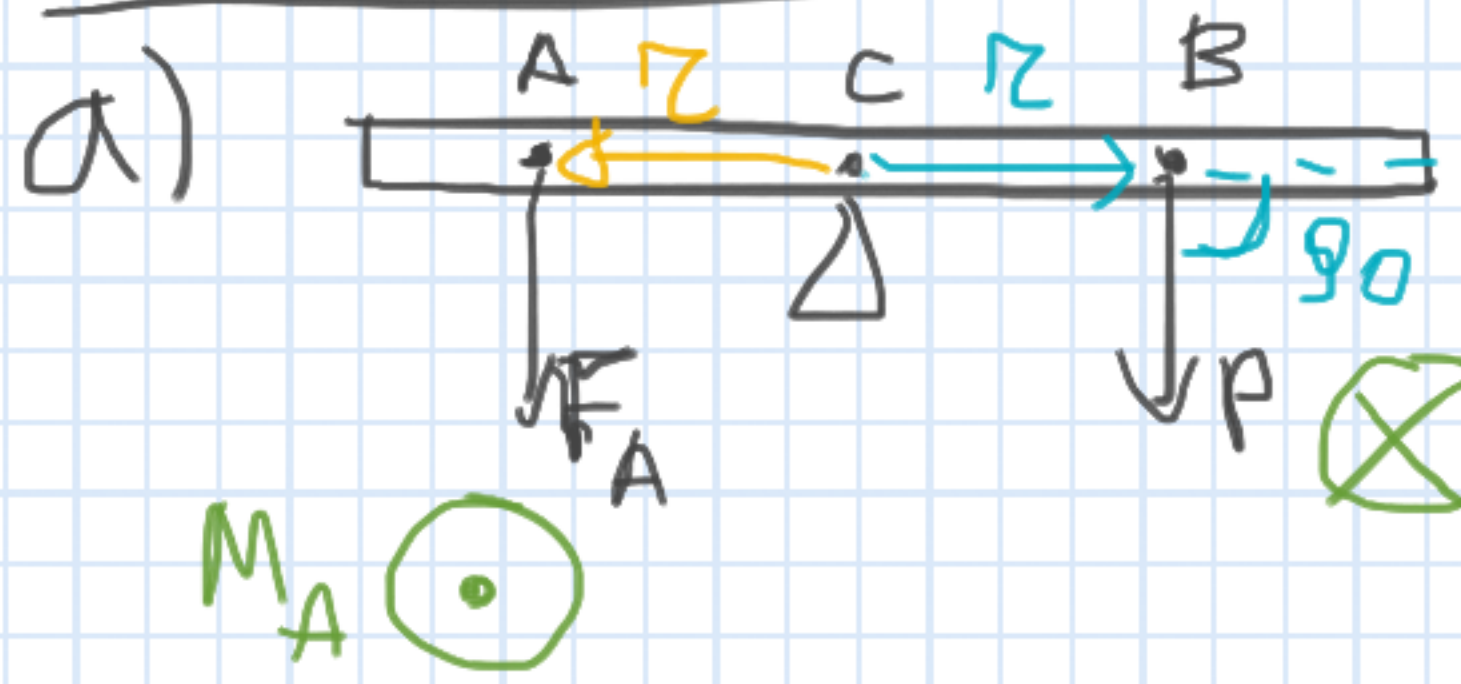
$m = 16 \text{ kg}$
 $CB = 1,5 \text{ m}$
 $F_A = 95 \text{ N}$



a) $A_C = 3 \text{ m}$

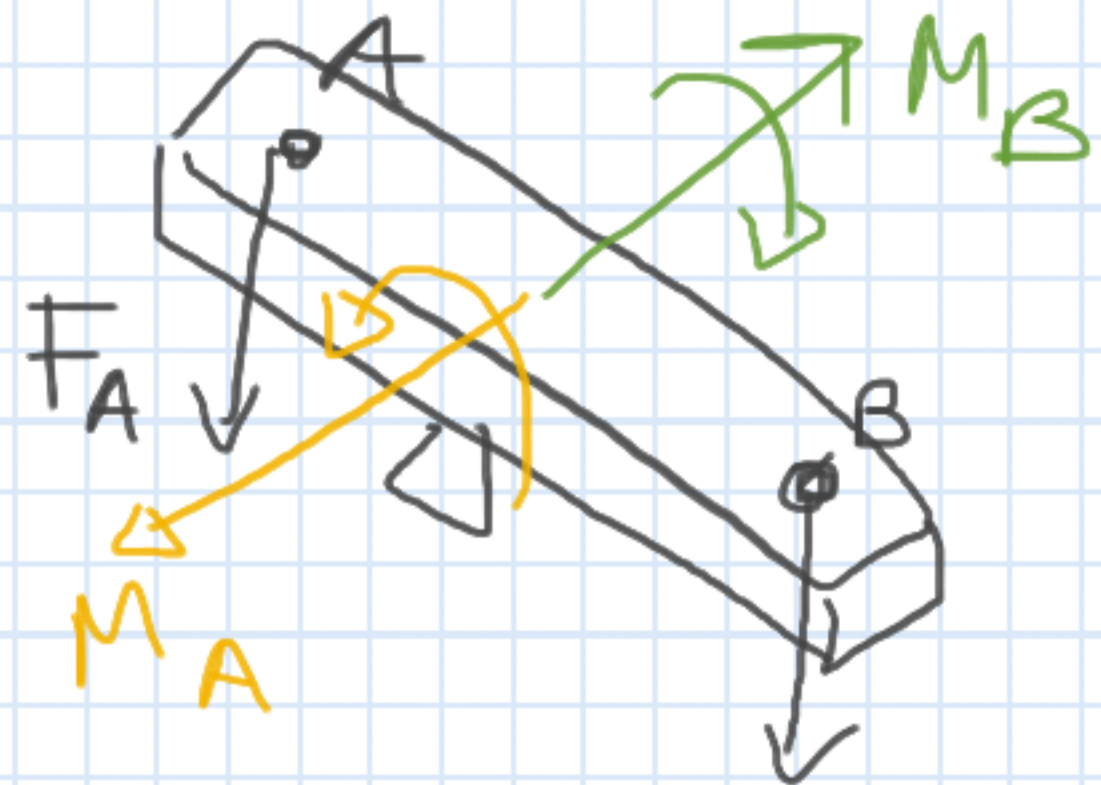
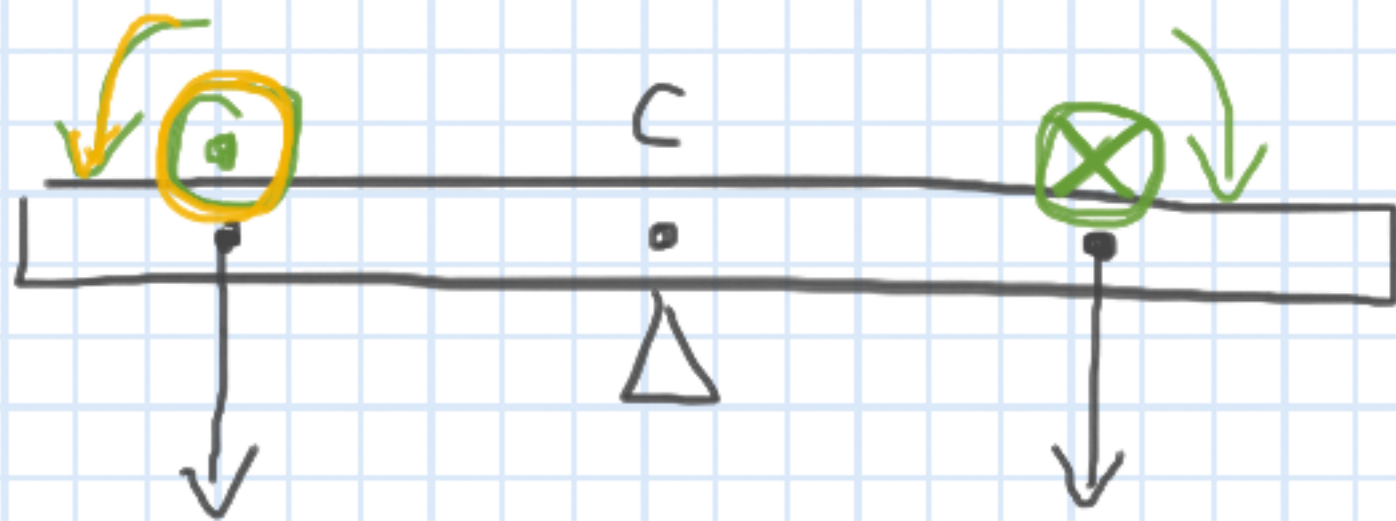
b) $A_C = 2,5 \text{ m}$

c) $A_C = 2 \text{ m}$



$M_B = \pi \cdot P \cdot \sin 90 =$
 $= 16 \text{ kg} \cdot 9,81 \frac{\text{m}}{\text{s}^2} \cdot 1,5 \text{ m}$
 $= 235,44 \text{ N} \cdot \text{m}$
(entrante)

$$M_A = AC \cdot F_A = 3m \cdot 95N = 285 \text{ N}\cdot\text{m}$$



$$M_A = 285 \text{ N}\cdot\text{m} > M_B = 235,44$$

$\hookrightarrow M_A + \text{grande} \rightarrow \text{antioraria}$

$$b) M_A = AC \cdot F_A = 2,5m \cdot 95N = 237 \text{ N}\cdot\text{m} > M_B$$

$\rightarrow \text{antiorario}$

$$c) M_A = AC \cdot F_A = 2m \cdot 95N = 190 \text{ N}\cdot\text{m} < M_B \rightarrow \text{orario}$$

N27

$$m = 22 \text{ kg}$$

$$L = 2 \text{ m}$$

$$1) \vec{R} = \vec{0}$$

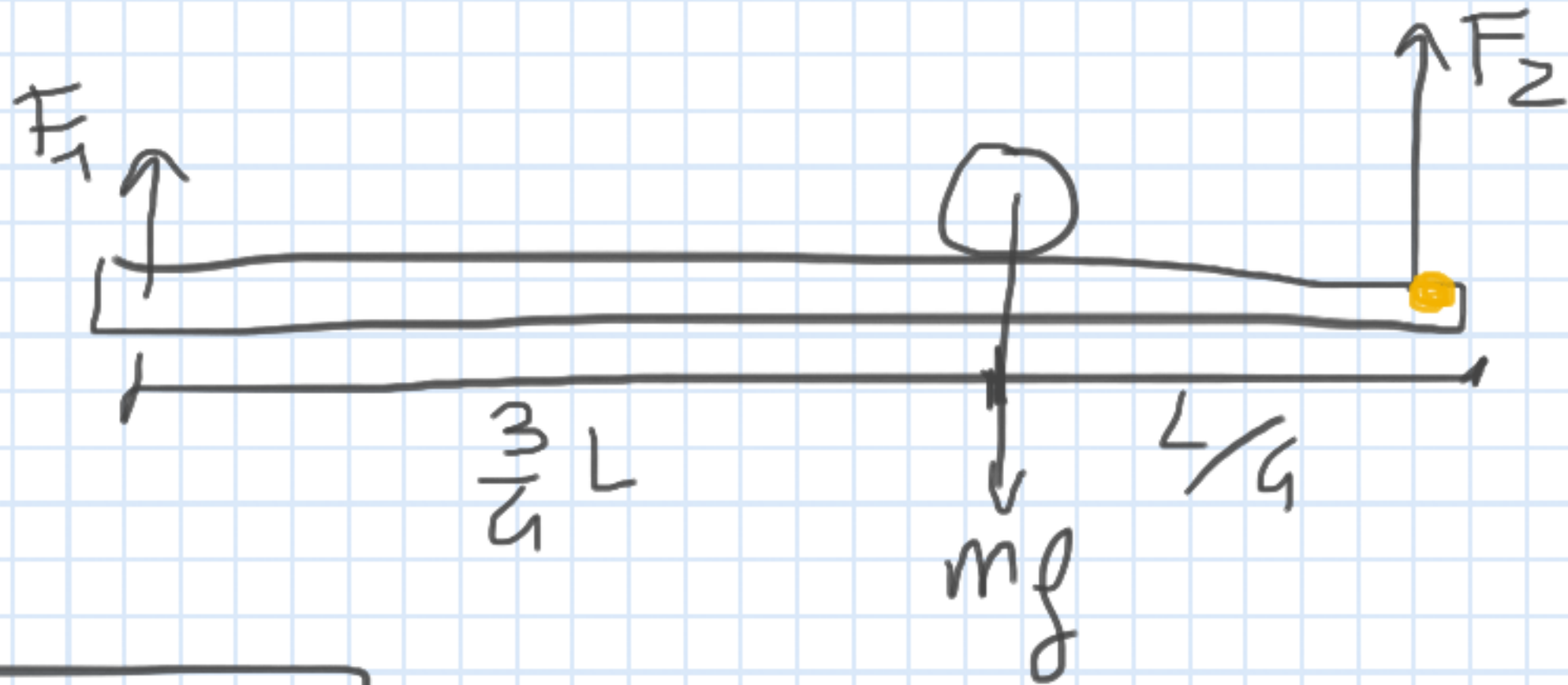
$$F_1 + F_2 - mg = 0$$

$$2) \vec{M}_{\text{tot}} = 0$$

$$M_1 = L \cdot F_1$$

$$M_P = \frac{L}{4} \cdot mg$$

$$M_2 = 0 \cdot F_2$$



$$M_1 - M_P = 0$$

$$LF_1 - \frac{L}{4}mg = 0$$

$$\begin{cases} F_1 + F_2 - mg = 0 \\ LF_1 - \frac{L}{4} mg = 0 \end{cases}$$

$$\hookrightarrow \cancel{L} F_1 = \frac{\cancel{L}}{4} mg = \frac{1}{4} mg = 53,95 \text{ N}$$

$$F_2 = mg - F_1 = mg - \frac{1}{4} mg = \frac{3}{4} mg = 161,86 \text{ N}$$

$$1) F_1 + F_2 - mg = 0$$

$$2) M_1 = 0 \cdot \vec{F}_1 = 0$$

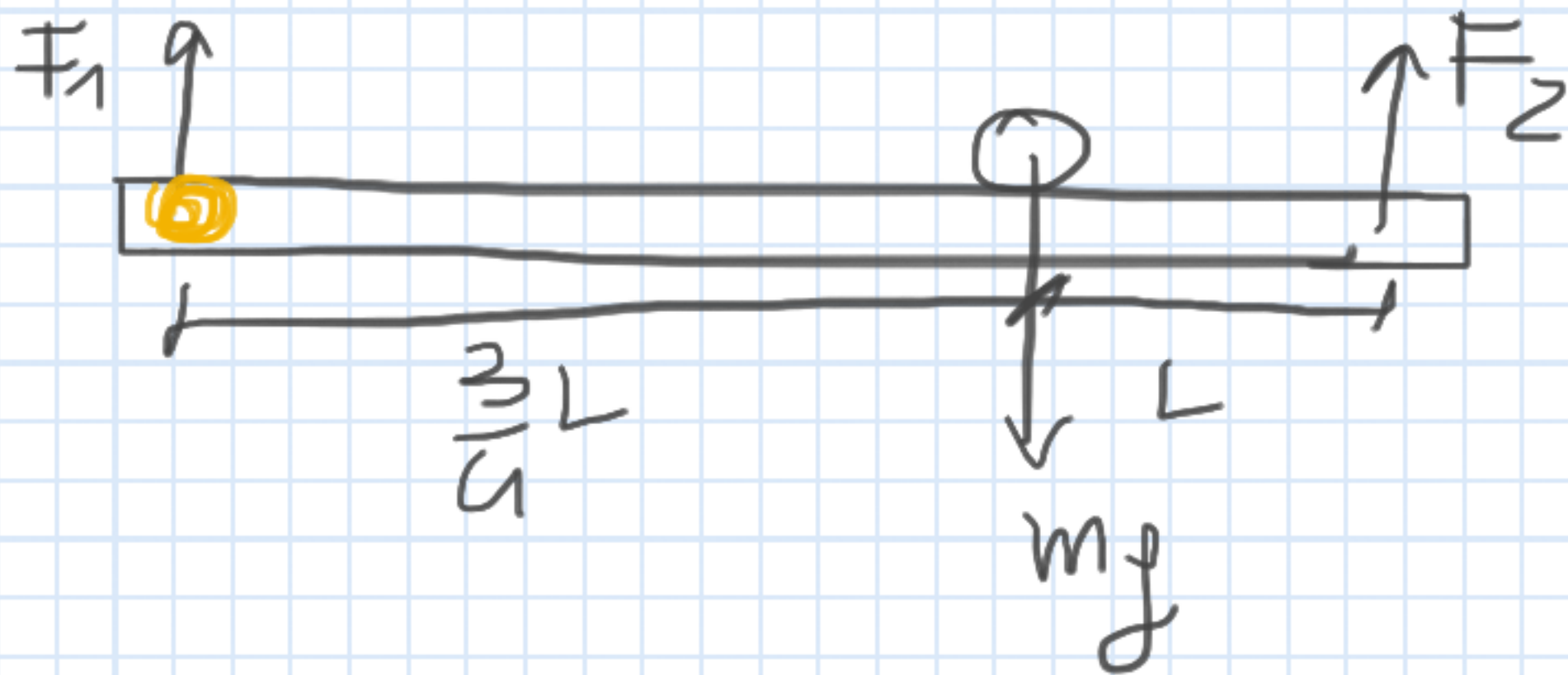
$$M_2 = L \cdot F_2$$

$$M_p = \frac{3}{4}L \cdot mg$$

$$L F_2 - \frac{3}{4}L mg = 0$$

$$\rightarrow F_2 = \frac{3}{4}mg$$

$$F_1 = mg - F_2 = mg - \frac{3}{4}mg = \frac{1}{4}mg$$



N28

$$1) F_1 + F_2 - mg = 0$$

$$2) M_1 = \frac{3}{4} L \cdot F_1$$

$$M_2 = \frac{L}{4} F_2$$

$$M_p = 0 \cdot mg = 0$$

$$M_1 + M_2 = 0$$

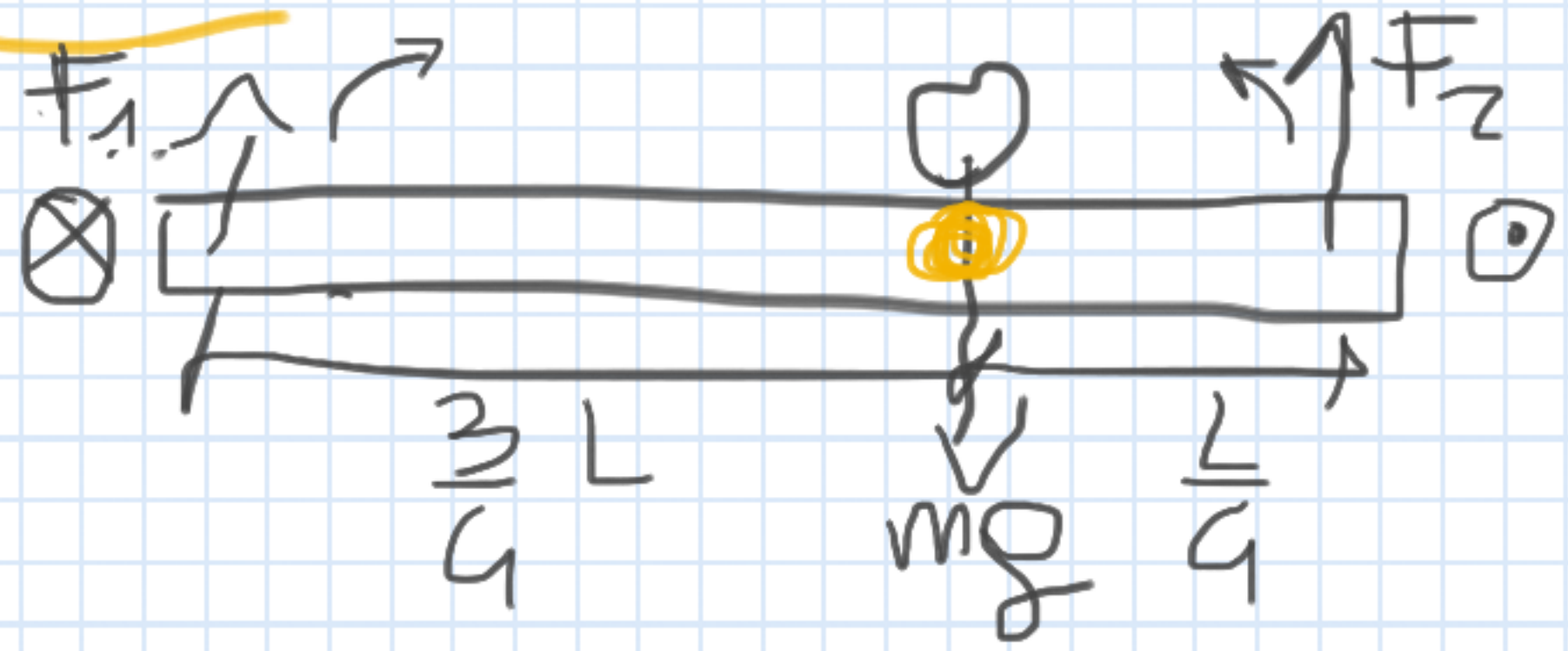
$$\frac{3}{4} F_1 - \frac{L}{4} F_2 = 0$$

$$F_2 = + 3 F_1$$

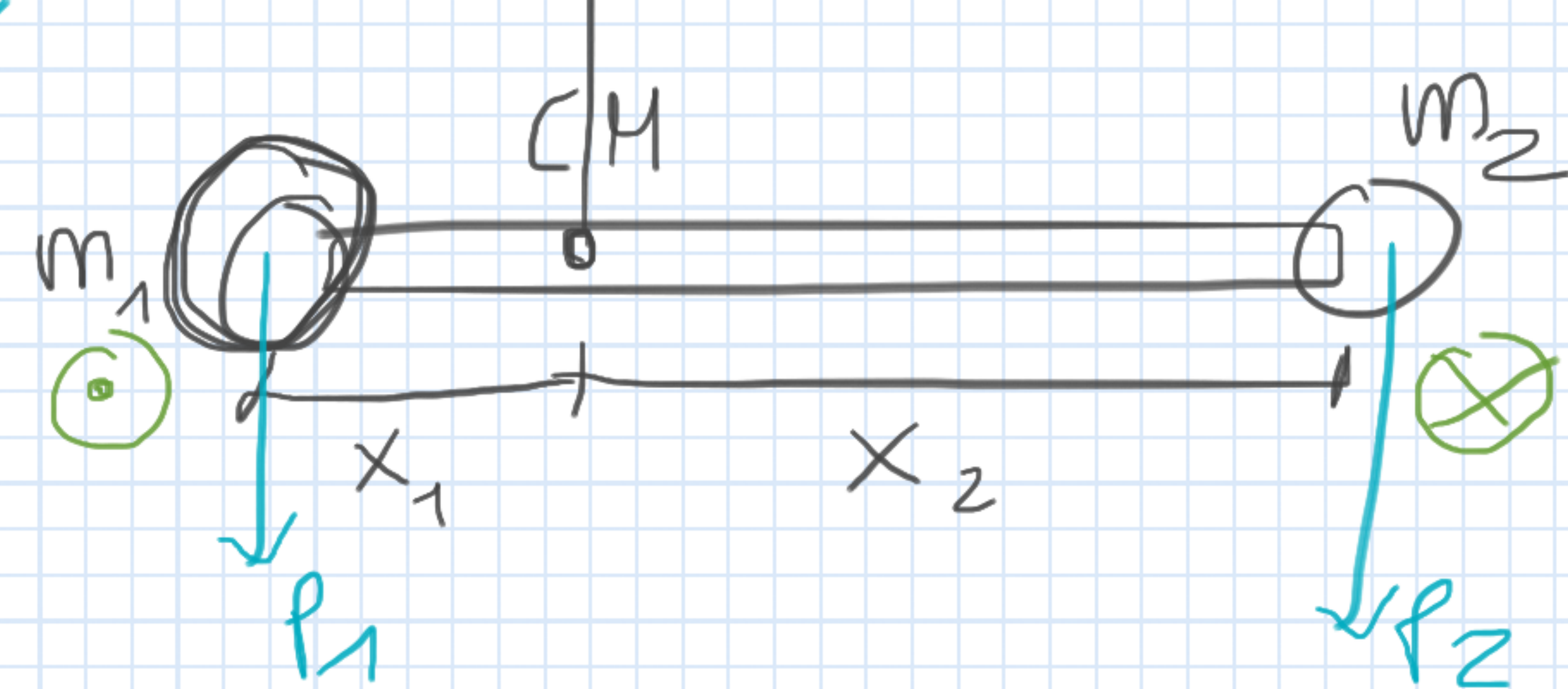
$$F_1 + 3 F_1 = mg$$

$$+ 4 F_1 = mg \rightarrow F_1 = \frac{1}{4} mg$$

$$F_2 = \frac{3}{4} mg$$



N28 ✓
 N30



$$M_1 = x_1 \cdot m_1 \cdot g$$

$$M_2 = x_2 \cdot m_2 \cdot g$$

$$\vec{M}_{TOT} = 0$$

$$x_1 m_1 g - x_2 m_2 g = 0$$

$$x_1 m_1 = x_2 m_2$$

$$x_1 = \frac{m_2}{m_1} x_2$$