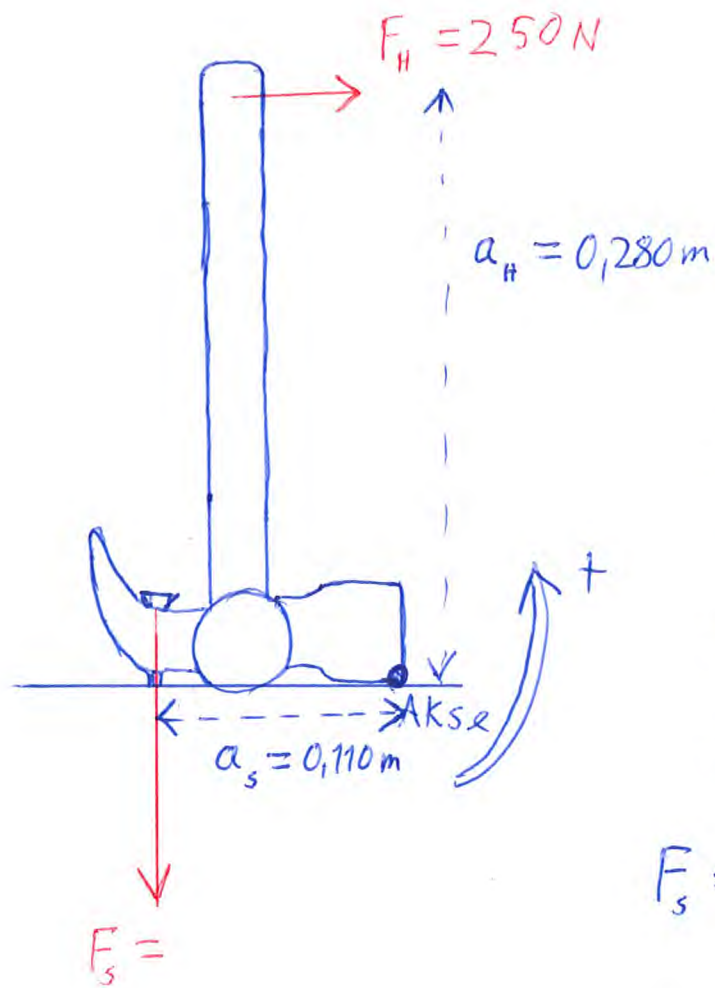


14.305



$$\sum M = 0$$

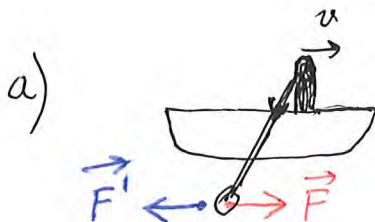
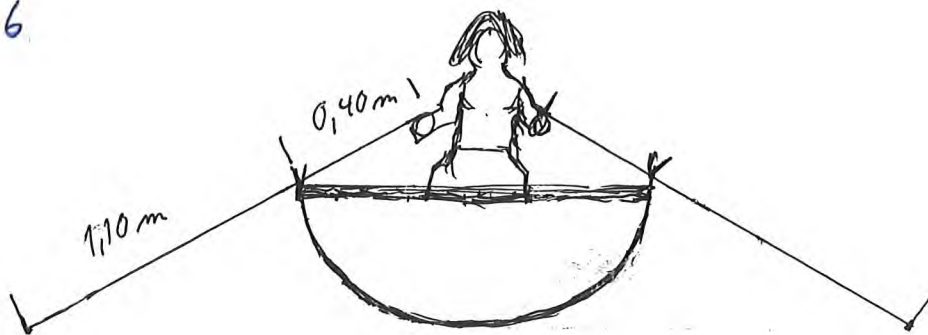
$$F_s \cdot a_s - F_H \cdot a_H = 0$$

$$F_s \cdot a_s = F_H \cdot a_H$$

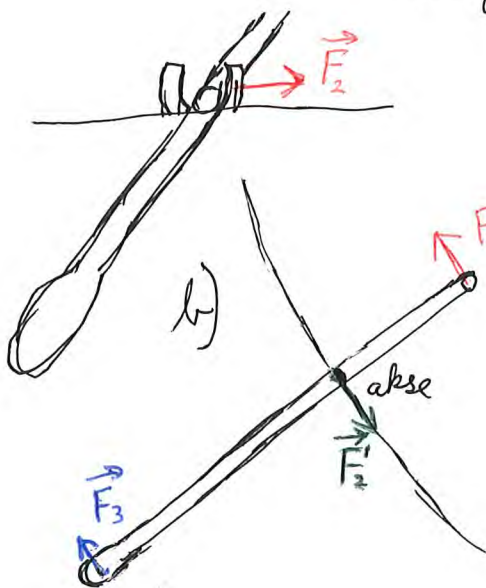
$$F_s = \frac{F_H \cdot a_H}{a_s}$$

$$F_s = \frac{250\text{ N} \cdot 0,280\text{ m}}{0,110\text{ m}} = 636\text{ N} \\ = \underline{\underline{0,64\text{ kN}}}$$

14.306



Åra dytter vannet bakover med en kraft \vec{F}' , og i følge Newtons 3. lov vil vannet da dytte åra motsatt vei med en like stor kraft \vec{F} . Eftersom åra er festet til båten via åregaffelen og handa til roeren, vil båten bevege seg samme vei som krafta \vec{F} .



To årer gir $\frac{150\text{ N}}{2} = 75\text{ N}$ per åre.

$$M_1 = M_3$$

$$75\text{ N} \cdot 1,10\text{ m} = F_3 \cdot 0,40\text{ m}$$

$$F_3 = 75\text{ N} \cdot \frac{1,10}{0,40} = 206\text{ N}$$

$$= \underline{0,21\text{ kN}}$$

$$\sum M = 0$$

$$K \cdot \cancel{l} \cdot \sin 15^\circ = L \cdot \cancel{l} \cdot \cos 45^\circ$$

$$b) \sum \vec{F} = 0$$

$$\sum F_y = 0$$

$$F_{Ay} = K_y + L$$

$$F_{Ay} = K \sin 30^\circ + L$$

$$F_{Ay} = 546,4 \text{ N} \cdot \sin 30^\circ + 200 \text{ N} = 473,2 \text{ N} = \underline{0,47 \text{ kN}}$$

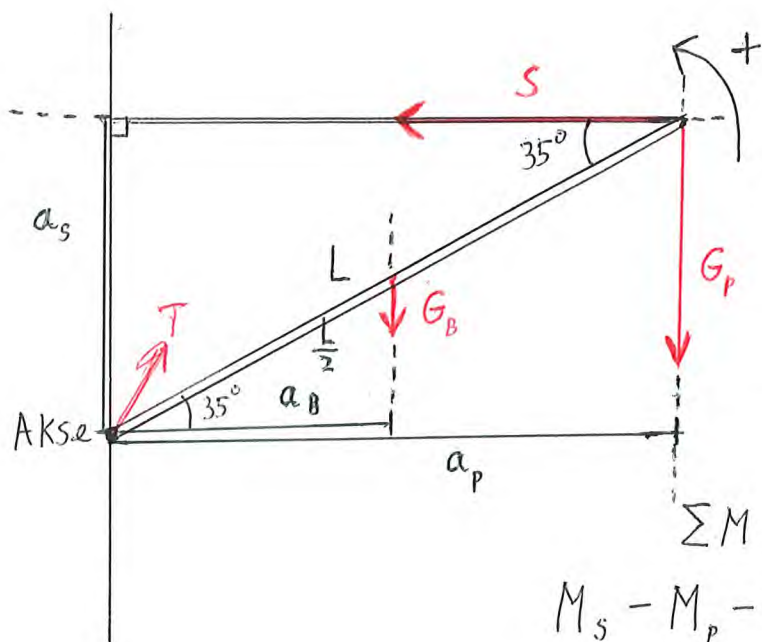
$$\left(\begin{aligned} \tan \gamma &= \frac{F_{Ay}}{F_{Ax}} = \frac{473,2}{473,1} \\ \gamma &= 45^\circ \end{aligned} \right)$$

14.309+

$L = \text{lengde av bom}$

$$m_p = 450 \text{ kg}$$

$$m_B = 75 \text{ kg}$$



Armen a til ei kraft F er korteste avstand fra valgt aksepunkt til linja krafta F ligger på.

$$\sum M = 0$$

$$M_s - M_p - M_B = 0$$

$$S \cdot a_s = G_p \cdot a_p + G_B \cdot a_B$$

$$S \cdot L \cdot \sin 35^\circ = m_p \cdot g \cdot L \cdot \cos 35^\circ + m_B \cdot g \cdot \frac{1}{2} L \cdot \cos 35^\circ$$

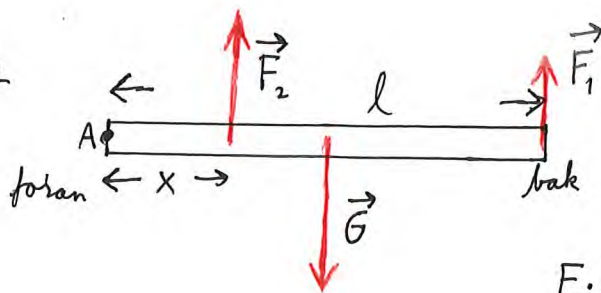
$$S \cdot \sin 35^\circ = (m_p + \frac{1}{2} m_B) \cdot g \cdot \cos 35^\circ$$

$$S = \frac{(m_p + \frac{1}{2} m_B) \cdot g}{\tan 35^\circ}$$

$$S = \frac{(450 + \frac{1}{2} \cdot 75) \text{ kg} \cdot 9,81 \frac{\text{N}}{\text{kg}}}{\tan 35^\circ} = 6829 \text{ N}$$

$$= \underline{\underline{6,8 \text{ kN}}}$$

14.310+



$$\sum M = 0$$

$$F_1 \cdot l - G \cdot \frac{1}{2}l + F_2 \cdot x = 0$$

$$F_1 \cdot l - 3F_1 \cdot \frac{1}{2}l + 2F_1 \cdot x = 0$$

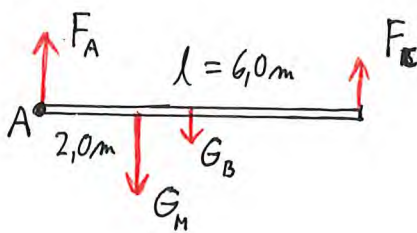
$$l - \frac{3}{2}l + 2x = 0$$

$$2x = \left(\frac{3}{2} - 1\right)l$$

$$x = \frac{\frac{1}{2}l}{2} = \frac{1}{4}l = \frac{1}{4} \cdot 4,0\text{m} = 1,0\text{m}$$

Dus $(4,0 - 1,0)\text{m} = 3,0\text{m}$
fra bakenden.

14.311+



$$m_B = 25\text{kg} \quad m_M = 80\text{kg}$$

$$\sum M = 0$$

$$M_B - M_B - M_M = 0$$

$$F_c \cdot l = m_M \cdot g \cdot \frac{1}{3}l + m_B \cdot g \cdot \frac{1}{2}l$$

$$F_c = \left(\frac{1}{3}m_M + \frac{1}{2}m_B\right)g = \left(\frac{1}{3} \cdot 80 + \frac{1}{2} \cdot 25\right)\text{kg} \cdot 9,8 \frac{\text{N}}{\text{kg}} = 384,2\text{N} = \underline{0,38\text{kN}}$$

$$\sum F = 0$$

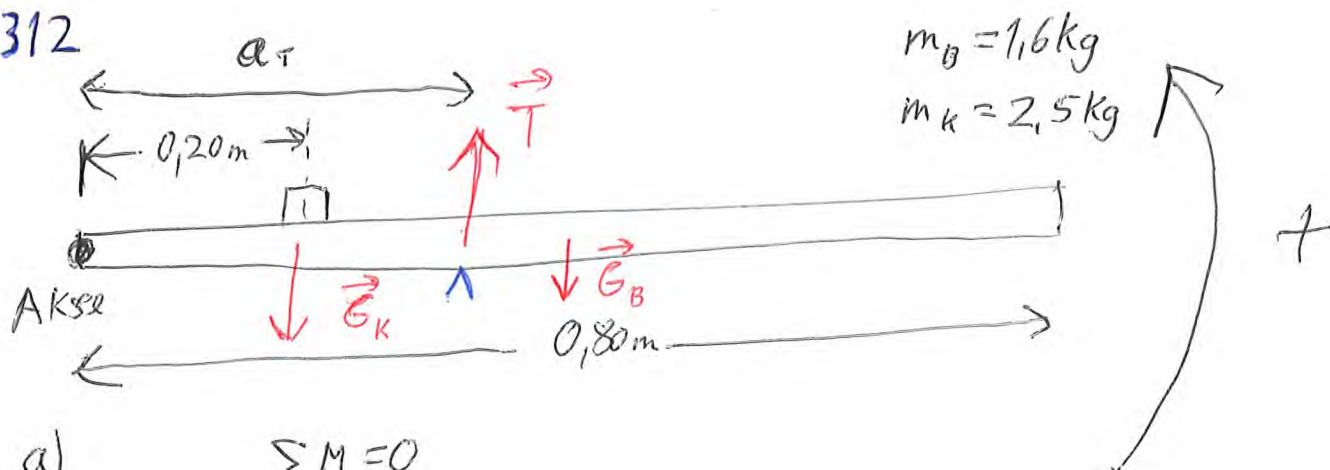
$$F_A + F_c = G_M + G_B$$

$$F_A = G_M + G_B - F_c$$

$$F_A = (m_M + m_B)g - F_c = (80 + 25)\text{kg} \cdot 9,81 \frac{\text{N}}{\text{kg}} - 384,2\text{N}$$

$$= 645,8\text{N} = \underline{0,65\text{kN}}$$

14.312



a)

$$\sum M = 0$$

$$-M_K - M_B + M_T = 0$$

$$-G_K \cdot a_K - G_B \cdot a_B + T \cdot a_T = 0$$

$$\sum F = 0$$

$$T = G_K + G_B$$

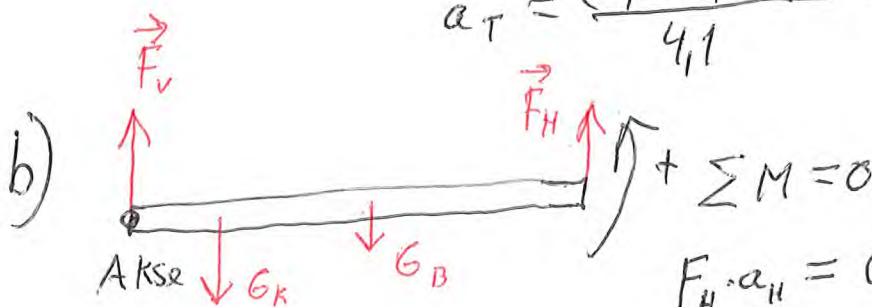
$$T \cdot a_T = G_K \cdot a_K + G_B \cdot a_B$$

$$a_T = \frac{m_K \cdot g \cdot a_K + m_B \cdot g \cdot a_B}{m_K \cdot g + m_B \cdot g}$$

$$a_T = \frac{m_K \cdot a_K + m_B \cdot a_B}{m_K + m_B}$$

$$a_T = \frac{2,5 \text{ kg} \cdot 0,20 \text{ m} + 1,6 \text{ kg} \cdot 0,40 \text{ m}}{(2,5 + 1,6) \text{ kg}}$$

$$a_T = \frac{(2,5 \cdot 0,20 + 1,6 \cdot 0,40)}{4,1} \text{ m} =$$



$$\sum M = 0$$

$$F_H \cdot a_H = G_K \cdot a_K + G_B \cdot a_B$$

$$F_H = \frac{m_K \cdot g \cdot a_K + m_B \cdot g \cdot a_B}{a_H}$$

$$F_H = \frac{2,5 \text{ kg} \cdot 0,20 \text{ m} + 1,6 \text{ kg} \cdot 0,40 \text{ m} \cdot 9,81 \frac{\text{N}}{\text{kg}}}{0,80 \text{ m}}$$

$$m_H = \frac{G}{g} = \frac{F_H}{g} = \underline{1,4 \text{ kg}}$$

$$F_v = G_B + G_K - F_H$$

$$m_v =$$

14.315 $m = 50 \text{ kg}$

a) $\sum F = 0$

$$F_v + F_H = G$$

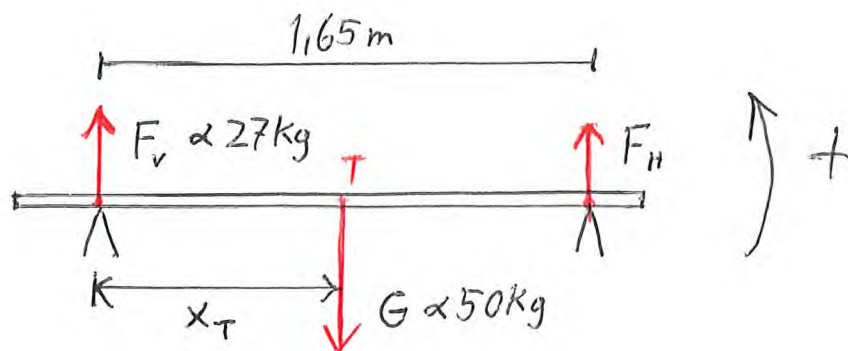
$$F_H = G - F_v$$

$$m_H \cdot g = m \cdot g - m_v \cdot g$$

$$m_H = m - m_v$$

$$m_H = 50 \text{ kg} - 27 \text{ kg}$$

$$\underline{m_H = 23 \text{ kg}}$$



Erstatter kraft med masse ved å dele på omregningsfaktoren g som brukes i ei vekt som egentlig er en kraftmåler.

b) $\sum M = 0$

$$F_H \cdot a_H - G \cdot x_T = 0$$

$$F_H \cdot a_H = G \cdot x_T$$

$$m_H \cdot g \cdot a_H = m \cdot g \cdot x_T$$

$$m_H \cdot a_H = m \cdot x_T$$

$$x_T = \frac{m_H}{m} \cdot a_H$$

$$x_T = \frac{23 \text{ kg}}{50 \text{ kg}} \cdot 1.65 \text{ m} = \underline{0.76 \text{ m}}$$