



OPPGAVE 1

a) Lengde av kabel:

$$L_{AB} = \sqrt{12^2 + 20^2} = 23,32 \text{ m}$$

Vertikal kraftlikevekt i A:

$$2 \cdot N_{AB,y} = F$$

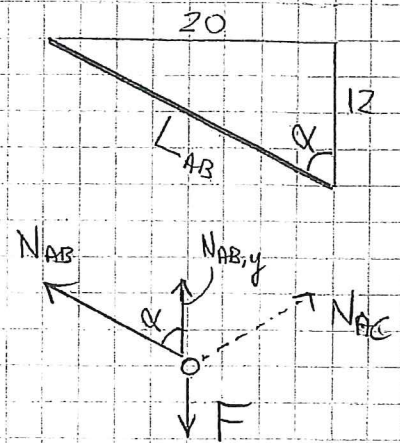
$$\{N_{AB,y} = N_{AC,y}\}$$

$$2 \cdot N_{AB} \cdot \cos \alpha = mg$$

$$\Rightarrow N_{AB} = \frac{1}{2} mg \cdot \frac{1}{\cos \alpha}$$

$$= \frac{1}{2} \cdot \underbrace{140 \cdot 9,8}_{1372 \text{ N}} \cdot \frac{23,32}{12}$$

$$N_{AB} = N_{AC} = 1,33 \text{ kN}$$



SYMMETRI $\Rightarrow N_{AB} = N_{AC}$

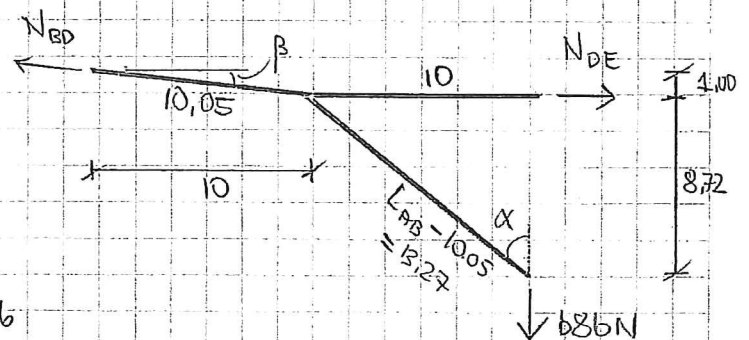
b) Pytagoreas gir
vertikalavstander

FLD av venstre halvdel:

$$\sum F_y = 0 \Rightarrow N_{BD} \cdot \sin \beta = 686$$

$$\Rightarrow N_{BD} = 686 \cdot \frac{10,05}{1,00}$$

$$N_{BD} = 6,89 \text{ kN}$$



Punkt A: $\sum F_y = 0 \Rightarrow N_{AD} \cdot \cos \alpha = 686$

$$\Rightarrow N_{AD} = 686 \cdot \frac{13,27}{8,72}$$

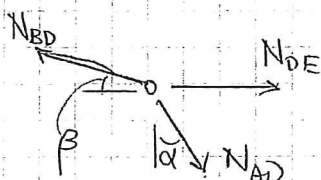
$$N_{AD} = 1,04 \text{ kN}$$

Punkt D: $\sum F_x = 0 \Rightarrow N_{DE} + N_{AD} \sin \alpha = N_{BD} \cos \beta$

$$\Rightarrow N_{DE} = N_{BD} \cos \beta - N_{AD} \sin \alpha$$

$$= 6,89 \cdot \frac{10}{10,05} - 1,04 \cdot \frac{10}{13,27}$$

$$N_{DE} = 6,07 \text{ kN}$$





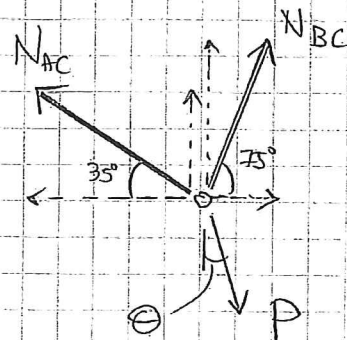
① PPGAVE 2

$$\sum F_x = 0$$

$$\Rightarrow -N_{AC} \cos 35^\circ + N_{BC} \cos 75^\circ + P \sin \theta = 0$$

$$\sum F_y = 0$$

$$\Rightarrow -P \cos \theta + N_{AC} \sin 35^\circ + N_{BC} \sin 75^\circ = 0$$



10 lign. med to ukjente gir:

$$N_{AC} = \frac{\sin 75^\circ \sin \theta + \cos 75^\circ \cos \theta}{\sin 75^\circ \cos 35^\circ + \sin 35^\circ \cos 75^\circ} \cdot P$$

$$N_{BC} = \frac{\cos 35^\circ \cos \theta - \sin 35^\circ \sin \theta}{\sin 75^\circ \cos 35^\circ + \sin 35^\circ \cos 75^\circ} \cdot P$$

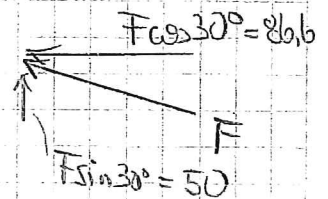
$$\theta = 55^\circ \Rightarrow P \parallel AC \Rightarrow N_{AC} = P \text{ og } N_{BC} = 0$$

$$\theta > 55^\circ \Rightarrow N_{BC} < 0, \text{ dvs. tryk} \Rightarrow \text{UMULIG}$$

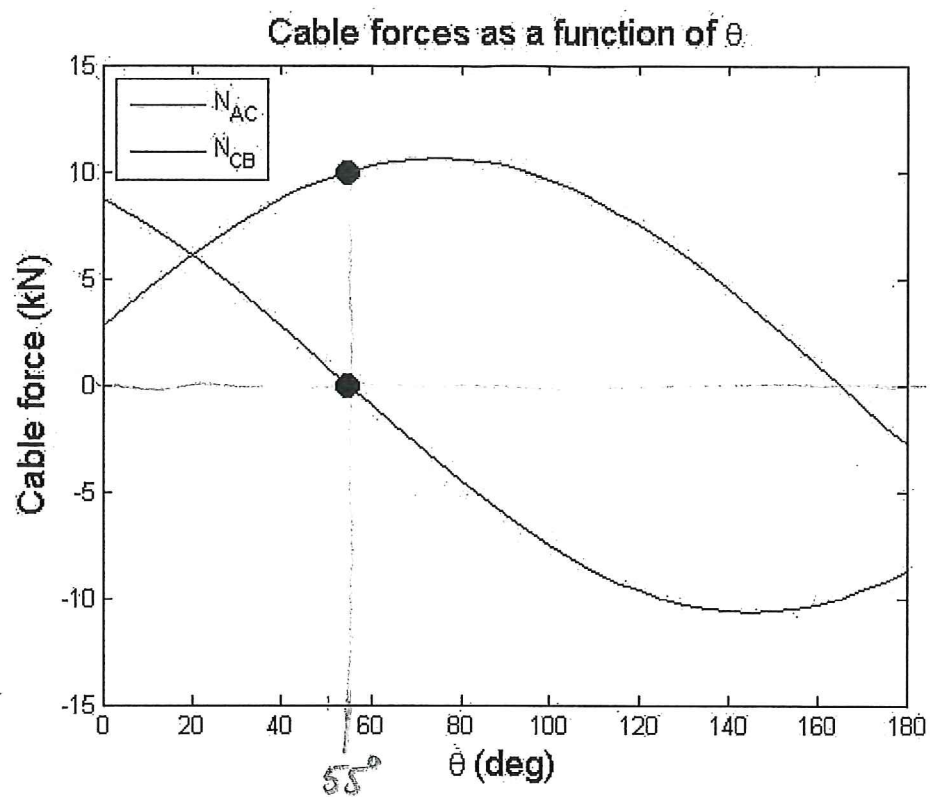
① PPGAVE 5

$$\sum M_A = mg \cdot 0,3 \text{ m} - 86,6 \cdot 1,15 \text{ m} - 50 \cdot 1,5 \text{ m} = 0$$

$\uparrow 9,82$

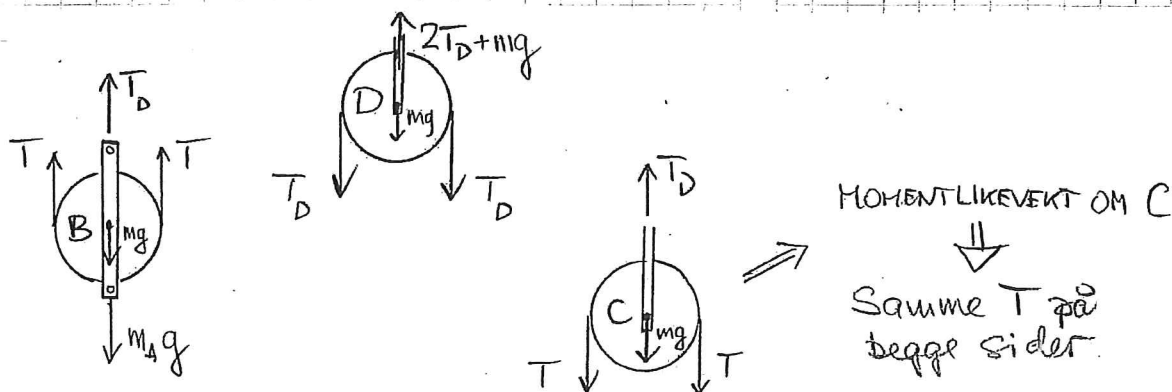


$$\Rightarrow \underline{\underline{m = 59,3 \text{ kg}}}$$





OPPGAVE 3



Trinse C: $T_D = 2T + mg$

Trinse B: $\underbrace{(2T + mg)}_{T_D} + 2T = m_A g + mg$

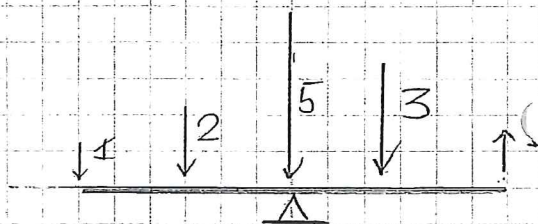
$T = \frac{1}{4} m_A g$

OPPGAVE 4

a) $\sum \vec{M}_A = -1 \cdot 2 - 2 \cdot 1 + 5 \cdot 0 + 3 \cdot 1 - 1 \cdot 2$
 $= -2 - 2 + 0 + 3 - 2$
 $= \underline{\underline{-3 \text{ kNm}}}$

IKKE
LIKEVEKT

NEGATIV $\Rightarrow$ Dreier $\curvearrowright$



b) Må sørge for at kraften 5 kN gir et positivt momentbidrag på 3 kNm

$\sum \vec{M}_{A, \text{tot}} = 0$

$\Rightarrow -3 \text{ kNm} + 5 \cdot a = 0$

$\Rightarrow a = \frac{3 \text{ kNm}}{5 \text{ kN}} = \underline{\underline{0,6 \text{ m}}}$ (mot høyre)

