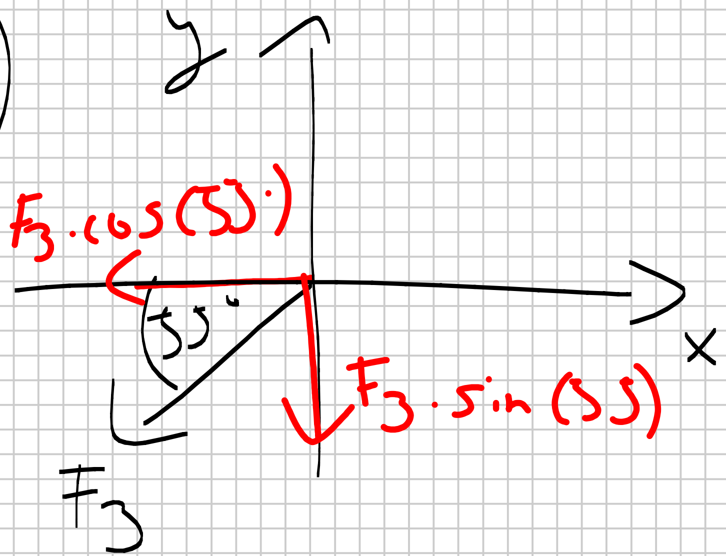
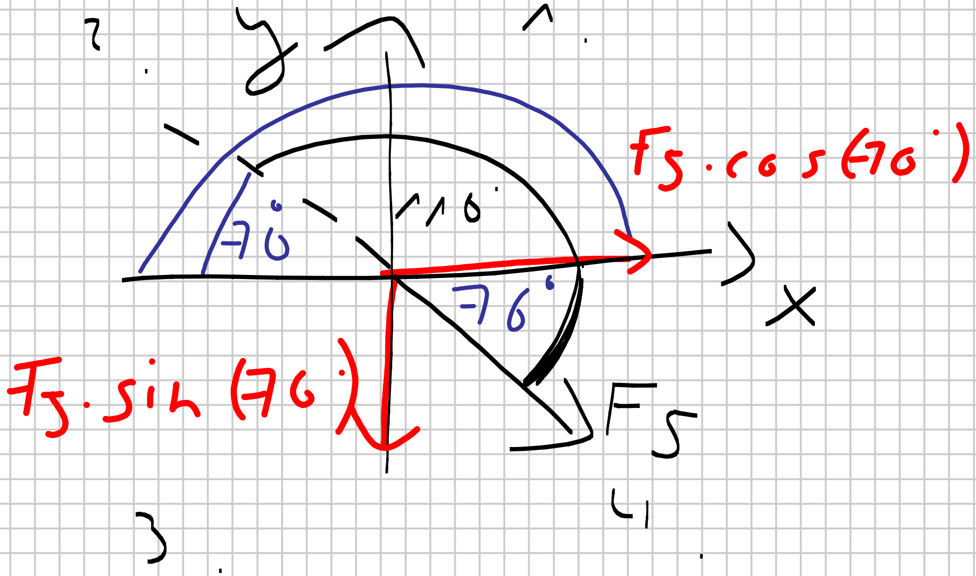
Webinar: Statik
Thema: Allgemeine Kräftegruppe

Notiztitel 28.06.2016

a) 1)





2.)

$$\rightarrow R_x = -F_3 \cdot \cos(55^\circ) + F_5 \cdot \cos(70^\circ)$$

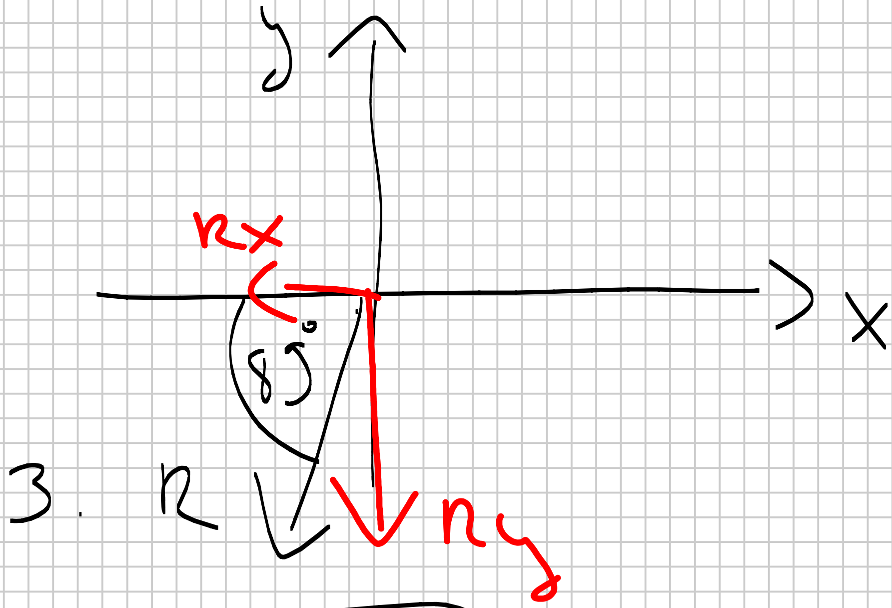
$$R_x = -30N \cdot \cos(55^\circ) + 45N \cdot \cos(70^\circ)$$

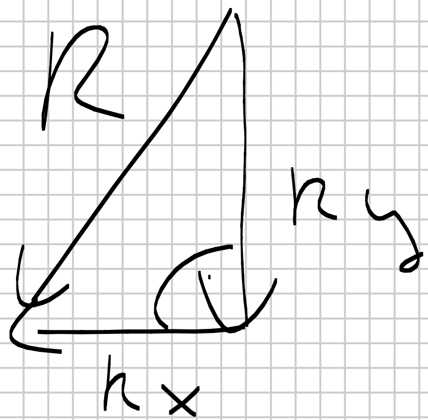
$$\boxed{R_x = -1{,}82N}$$

$$\uparrow R_y = -F_1 - F_2 - F_3 \cdot \sin(55^\circ) - F_4 - F_5 \cdot \sin(70^\circ)$$

$$R_y = -20N - 15N - 30N \cdot \sin(55^\circ) - 16N - 45N \cdot \sin(70^\circ)$$

$$\boxed{R_y = -111{,}86N}$$





3) $R=\sqrt{R_x^2+R_y^2}$

$R=\sqrt{(-1,82N)^2+(-111,85N)^2}=111,87N$

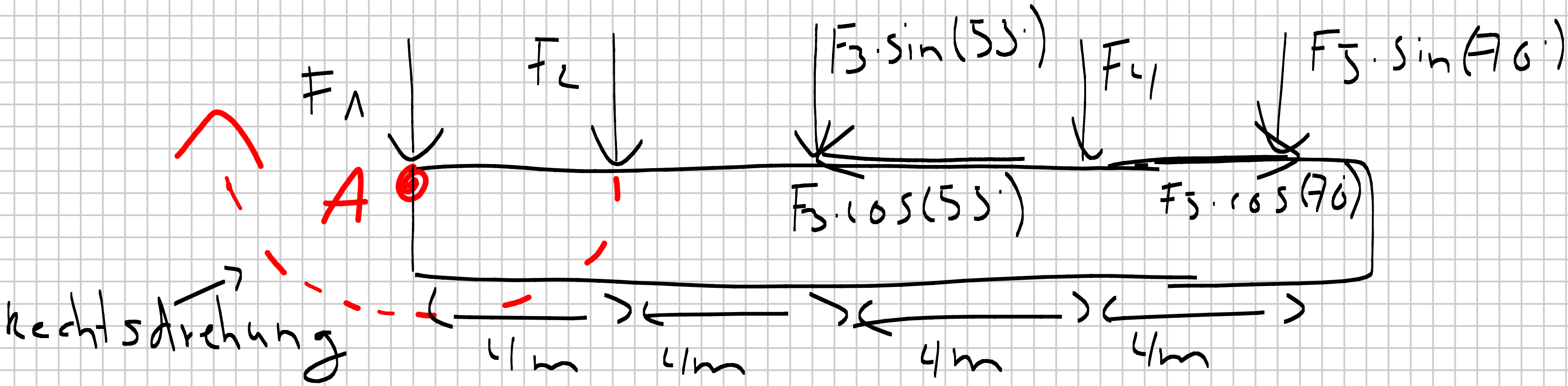
4) $\tan(\alpha) = \frac{R_y}{R_x}$ $\quad \alpha = \tan^{-1}\left(\frac{R_y}{R_x}\right)$

$$\alpha = \tan^{-1}\left(\frac{111{,}86\,N}{-1{,}82\,N}\right) = 89{,}07 \approx 89^\circ$$

5.) $M_R = h \cdot R$

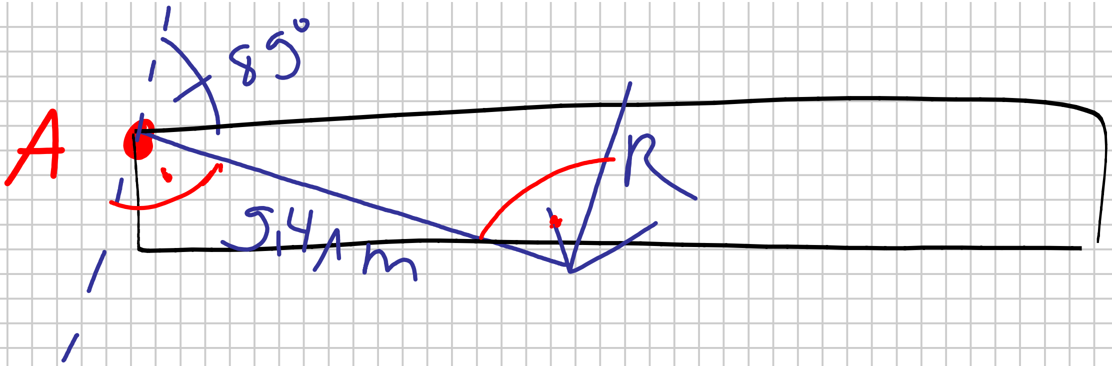
$$\boxed{h = \frac{M_R}{R}}$$

M_R bestimmen!

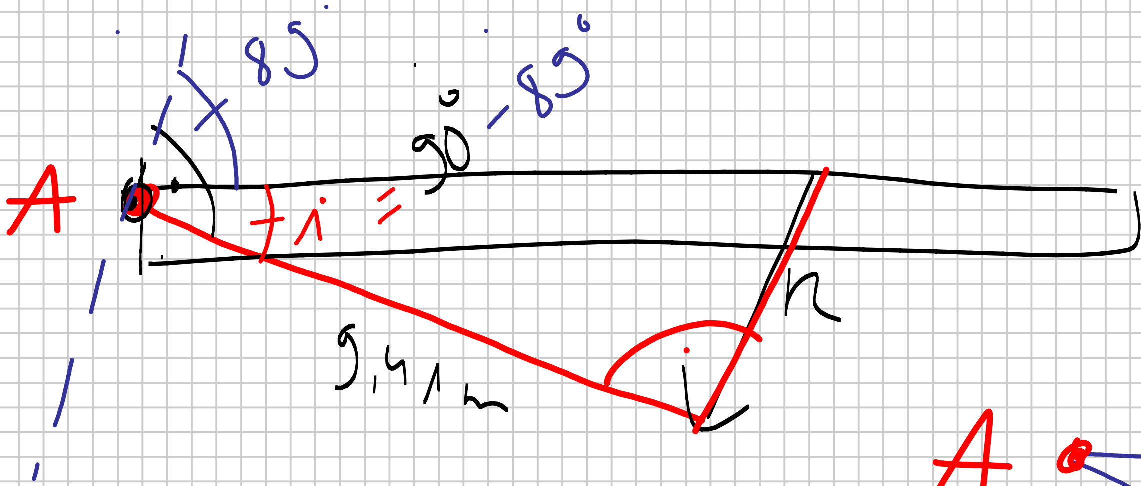


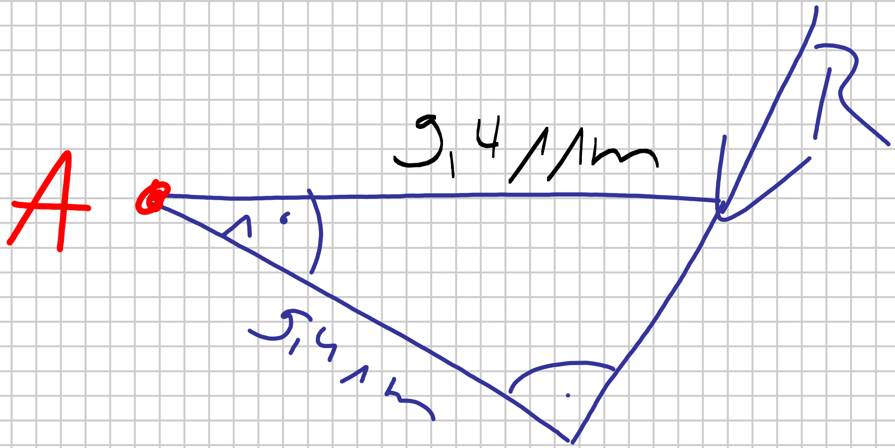
$$\circlearrowleft A: \; M_R = F_1 \cdot 0m - F_2 \cdot 4m - F_3 \cdot \sin(55^\circ) \cdot 8m - F_4 \cdot 12m - F_5 \cdot \sin(70^\circ) \cdot 16m$$

$$\boxed{M_R = -1053{,}18\,Nm}$$



$$h = \frac{M_R}{R} = \frac{1053{,}18\ Nm}{111{,}87\ N} = 9{,}41m$$

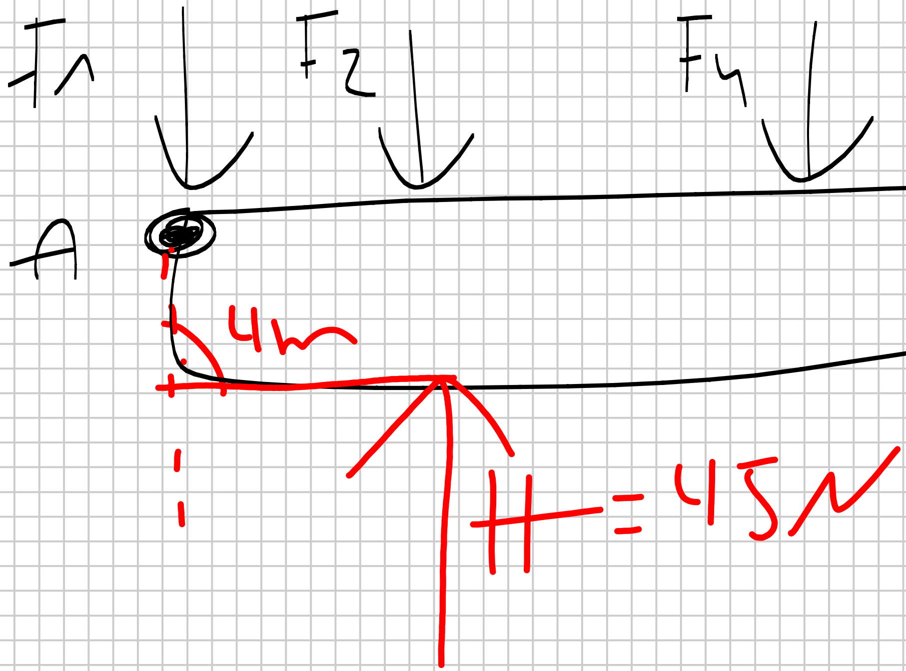


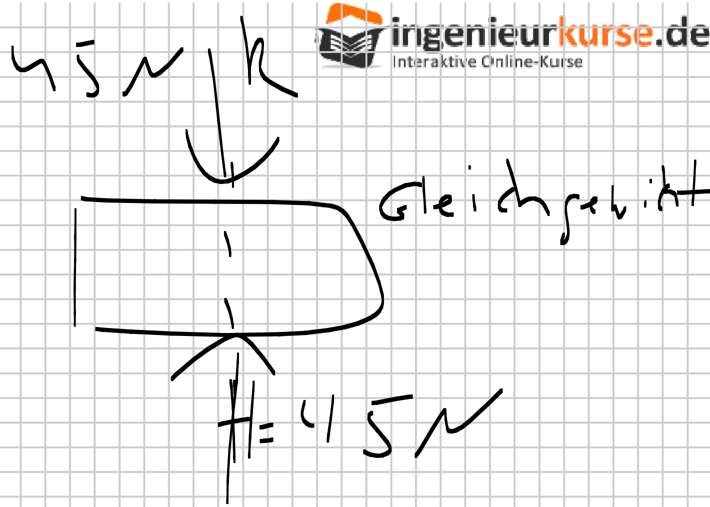


$$\cos(\alpha) = \frac{Ank}{Hypo}$$

$$Hypo = \frac{Ank}{\cos(\alpha)} = \frac{9{,}41\,m}{\cos(1^\circ)} = 9{,}411\,m$$

b)





$$\uparrow: R_y = -F_1 - F_2 - F_4 = -20\,N - 15\,N - 10\,N = \boxed{-45\,N}$$

$$\circlearrowleft A: \quad -F_2 \cdot 4\,m - F_4 \cdot 12\,m + H \cdot x = 0$$

$$X = \frac{F_2 \cdot 4\,m + F_4 \cdot 12\,m}{H}$$

$$X = \frac{15\,N \cdot 4\,m + 10\,N \cdot 12\,m}{45\,N} = 4\,m$$

Haltekraft:

- Selbe Wirkungslinie wie R
- entgegengesetzt gerichtet
- gleiche Größe wie R

Parallele Kräfte

- paralle Wirkungslinien
- gleiche Richtung