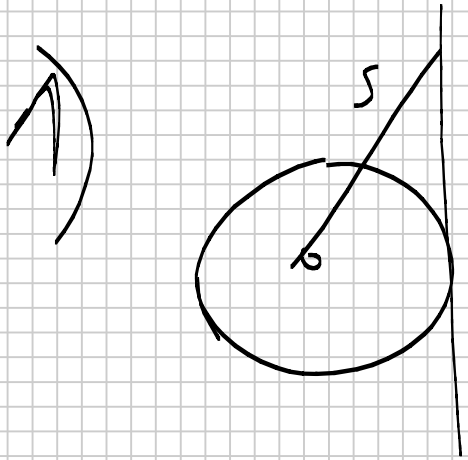
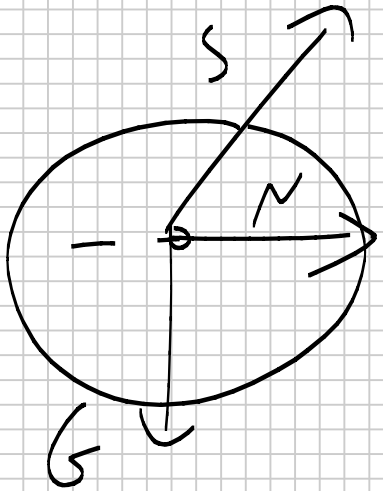
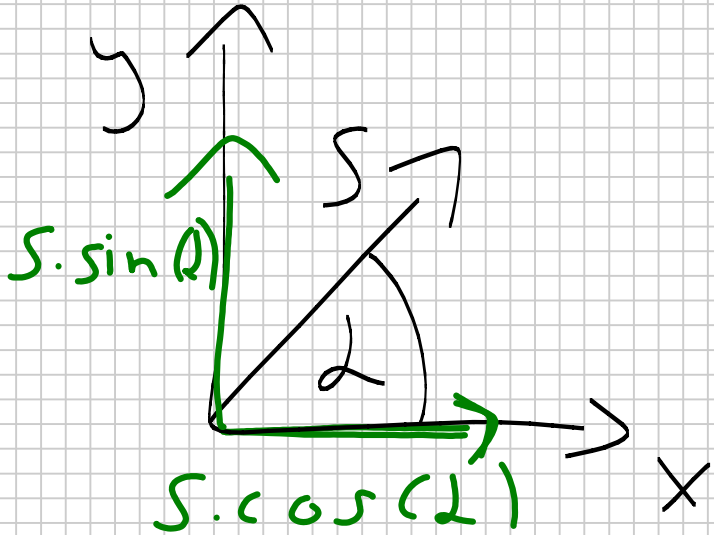
Webinar: Statik
Thema: Zentrale Kräftegruppe

Notiztitel 07.06.2016







$$\sum F_{ix} = 0 \longrightarrow$$

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

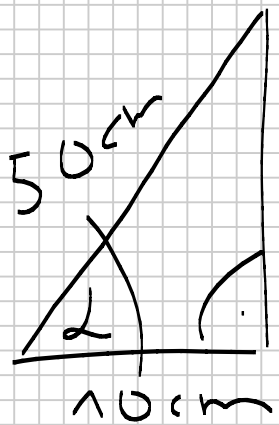
$$\sum F_{ix} = 0: \rightarrow \quad N + S \cdot \cos(\alpha) = 0$$

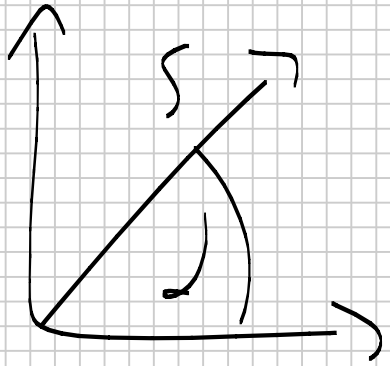
$$N = -S \cdot \cos(\alpha) = -40{,}06\,N$$

$$\sum F_{iy} = 0: \uparrow \quad -G + S \cdot \sin(\alpha) = 0$$

$$S = \frac{G}{\sin(\alpha)} = 200{,}25\,N$$

$$G = 20\,kg \cdot 9{,}81\,\frac{m}{s^2} = 196{,}2\,N$$



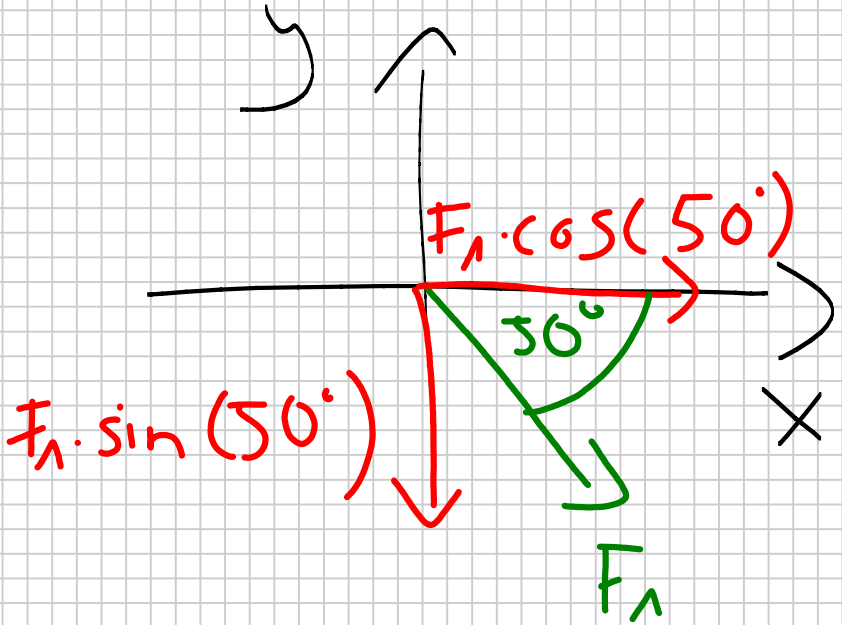


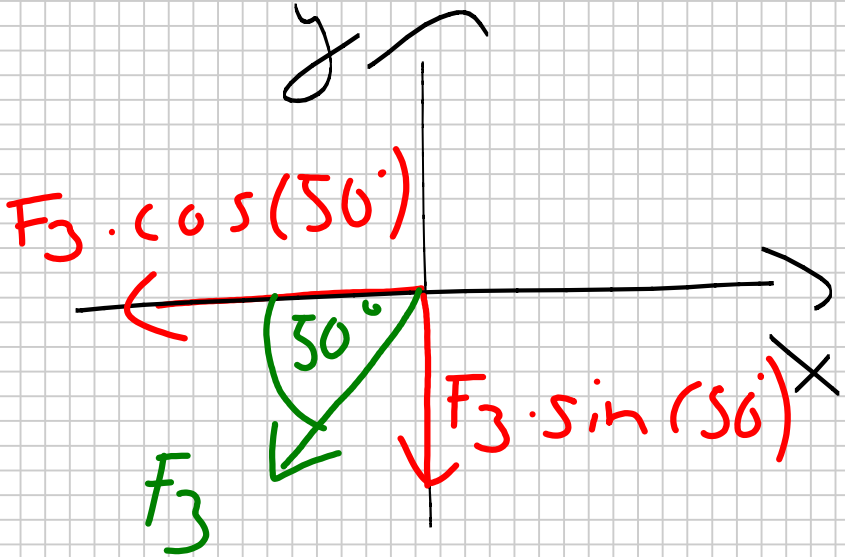
$$\cos(\alpha) = \frac{10\,cm}{50\,cm}$$

$$\alpha = \cos^{-1}\left(\frac{10\,m}{50\,cm}\right)$$

$$\boxed{\alpha = 78{,}46°}$$

2)





$\rightarrow: \quad R_x = \sum F_{ix} \qquad R_x = F_1 \cdot \cos(50°) - F_3 \cdot \cos(50°)$

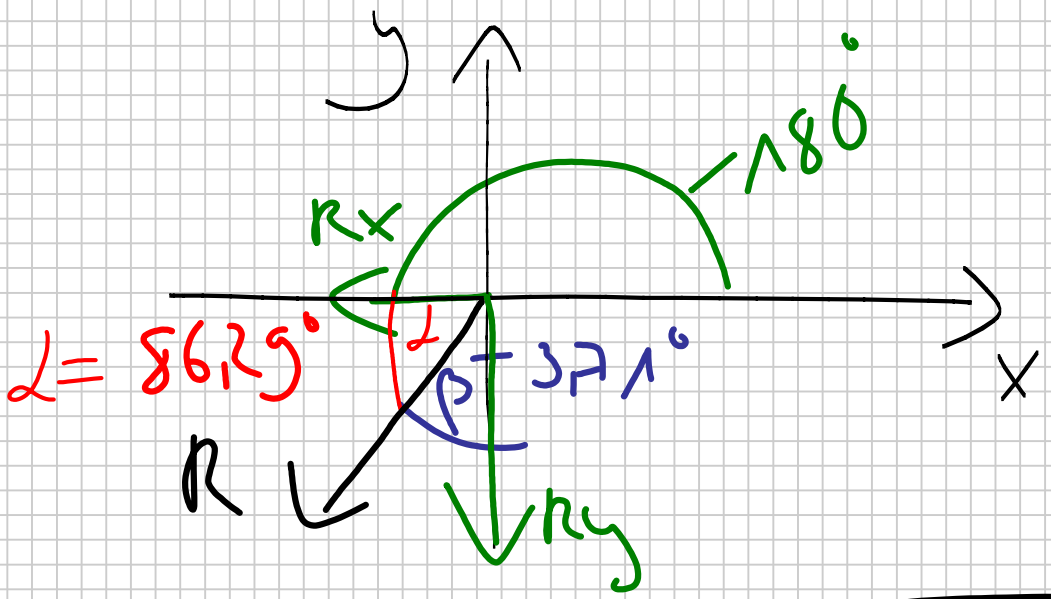
$R_x = 20\,N \cdot \cos(50°) - 25\,N \cdot \cos(50°)$

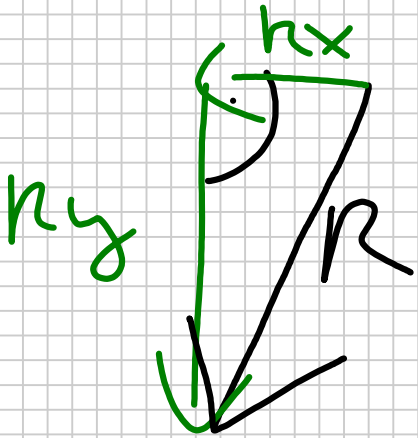
$$\boxed{R_x = -3{,}21\,N}$$

$\uparrow: \quad R_y = \sum F_{iy} \qquad R_y = -F_2 - F_1 \cdot \sin(50°) - F_3 \cdot \sin(50°)$

$R_y = -15\,N - 20\,N \cdot \sin(50°) - 25\,N \cdot \sin(50°)$

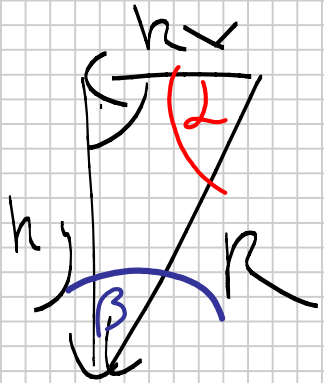
$$\boxed{R_y = -49{,}47\,N}$$





$$R = \sqrt{R_x^2 + R_y^2} = \sqrt{(-3{,}21\,N)^2 + (-49{,}47\,N)^2}$$

$$R = 49{,}57\,N$$

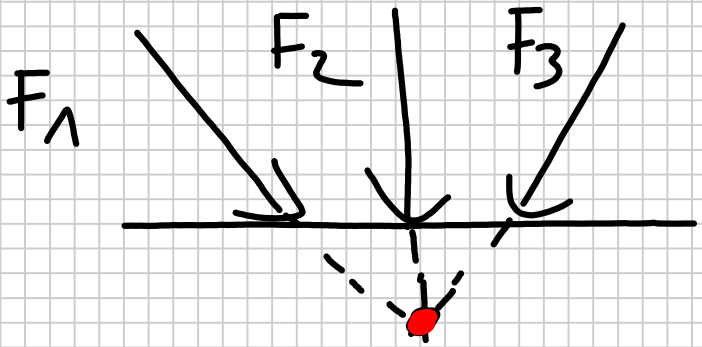


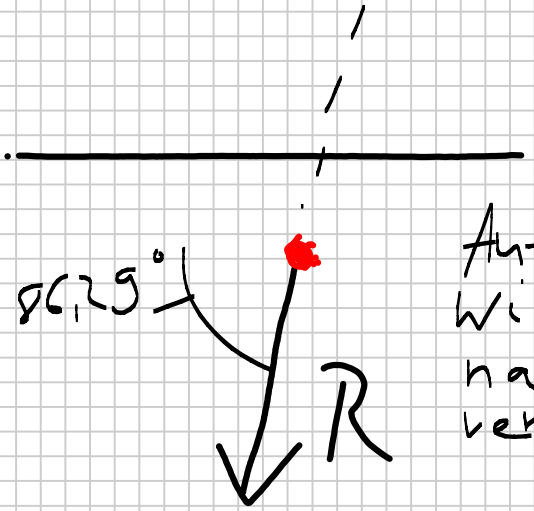
$$\tan(\alpha) = \frac{R_y}{R_x}$$

$$\alpha = \tan^{-1}\left(\frac{R_y}{R_x}\right) = 86{,}29^\circ$$

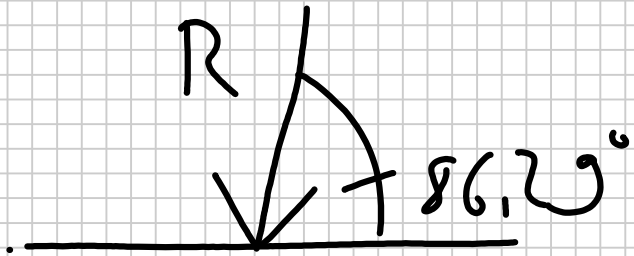
$$\tan(\beta) = \frac{R_x}{R_y}$$

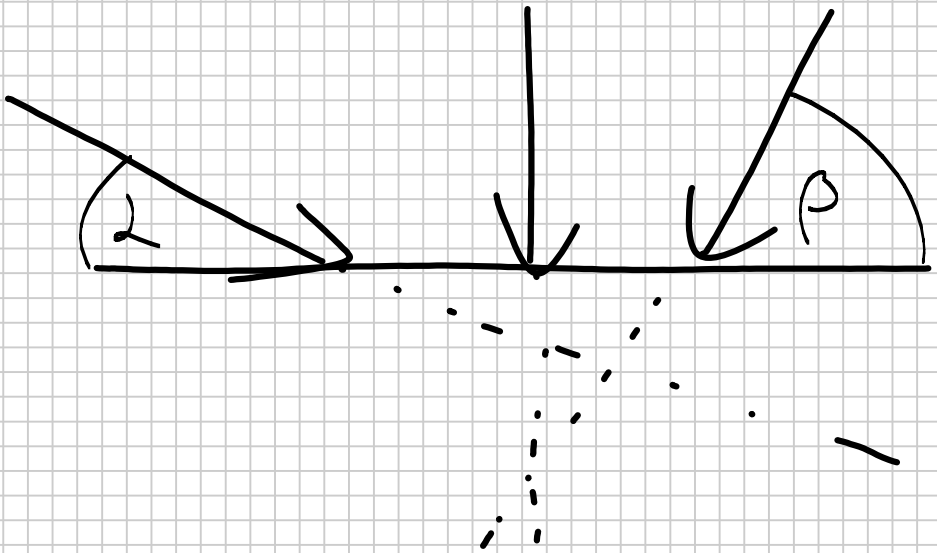
$$\beta = \tan^{-1}\left(\frac{R_x}{R_y}\right) = 3{,}71^\circ$$





Auf der Wirkungslinie nach oben verschieben





$\alpha \neq \beta$

→ kein gemeinsamer Angriffspunkt