

Lösungen zur Reibung1

28.1

geg.:

Reibungszahl $\mu = 0,15$
Gewichtskraft $F_G = 200N$

ges.:

F_R (Reibungskraft) = ?

Formel:

$$F_R = \mu \cdot F_G$$

$$F_R = 0,15 \cdot 200N$$

$$F_R = \underline{\underline{30N}}$$

28.2

geg.:

Reibungszahl $\mu = 0,18$
Zugkraft $F = 200N$

ges.:

$F_N = ?$

Formel:

$$F = \mu \cdot F_N$$

$$F_N = \frac{F}{\mu}$$

$$F_N = \frac{800N}{0,18}$$

$$F_N = \underline{\underline{4.444N}}$$

28.3

geg.:

$\mu = 0,25$
 $F = 300N$
 $F_G = 15N$

ges.:

$F_N = ?$

Formel:

$$F_N = \frac{F_{gesamt}}{\mu \cdot 2}$$

Lösungen zur Reibung2

$$F_N = \frac{315N}{0,25 \cdot 2}$$

$$F_N = \underline{630N}$$

28.4

geg.:

$$\mu = 0,065$$

$$F_N = 1,2kN = 1.200N$$

$$d = 80mm = 0,08m$$

ges.:

$$F_R = ?$$

$$M = ?$$

Formel:

$$a) F_R = \mu \cdot F_N$$

$$F_R = 0,065 \cdot 1.200N$$

$$F_R = \underline{78N}$$

$$b) M_R = \frac{\mu \cdot F_N \cdot d}{2}$$

$$M_R = \frac{0,065 \cdot 1.200N \cdot 0,08m}{2}$$

$$M_R = \underline{3,12Nm}$$

28.5

geg.:

$$\mu = 0,15$$

$$F_1 = 120N$$

$$d = 150mm = 0,15m$$

$$l_1 = 390mm; l_2 = 60mm$$

ges.:

$$F_R = ?$$

$$M_R = ?$$

$$F_{2(\text{anpress})} = ?$$

Formel:

$$a) F_1 \cdot l_1 = F_2 \cdot l_2$$

$$F_2 = \frac{F_1 \cdot l_1}{l_2}$$

$$F_2 = \frac{120N \cdot 390mm}{60mm}$$

$$F_2 = \underline{780N}$$

$$b) F_R = \mu \cdot F_2$$

$$F_R = 0,15 \cdot 780N$$

$$F_R = \underline{117N}$$

Lösungen zur Reibung3

$$c) M_R = \frac{\mu \cdot F_N \cdot d}{2}$$

$$M_R = \frac{0,15 \cdot 780N \cdot 0,15m}{2}$$

$$M_R = \underline{\underline{8,775Nm}}$$

28.6

geg.:

$$\mu = 0,6$$

$$M_R = 13,5Nm$$

$$d = 90mm = 0,09m$$

ges.:

$$F_N = ?$$

$$F_R = ?$$

$$M_R = \frac{F_R \cdot d}{2}$$

$$F_N = \frac{F_R}{\mu}$$

$$F_R = \frac{M_R \cdot 2}{d}$$

$$F_N = \frac{300N}{0,6}$$

$$F_R = \frac{13,5Nm \cdot 2}{0,09m}$$

$$F_N = \underline{\underline{500N}}$$

$$F_R = \underline{\underline{300N}}$$

28.7

geg.:

$$l = 14m$$

$$h = 4,5m$$

$$F_G = 150N$$

$$\mu = 0,6$$

ges.:

$$\alpha = ?$$

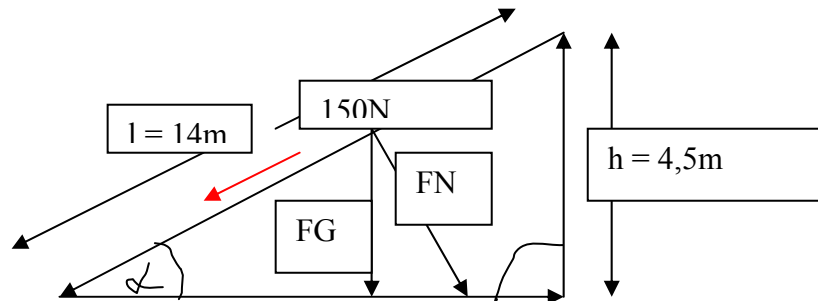
$$F_R = ?$$

$$F_N = ?$$

$$\mu_{\min} = ?$$

$$F_H = ?$$

Lösungen zur Reibung4



Formel:

$$a) \sin \alpha = \frac{\text{Gegenkathete}}{\text{Hypotenuse}}$$

$$\sin \alpha = \frac{4,5m}{14m}$$

$$\sin \alpha = 0,321 = \alpha = \underline{\underline{18,75^\circ}}$$

$$b) \cos \alpha = \frac{F_N}{F_G}$$

$$F_N = \cos \alpha \cdot F_G$$

$$F_N = \cos 18,75^\circ \cdot 150N$$

$$F_N = \underline{\underline{142N}}$$

$$c) F_R = \mu \cdot F_N$$

$$F_R = 0,6 \cdot 142N$$

$$F_R = \underline{\underline{85,2N}}$$

Lösungen zur Reibung5

$$d) \mu_{\min} = \frac{F_H}{F_N}$$

$$F_H = \sin \alpha \cdot F_G$$

$$F_N = \sin 18,75^\circ \cdot 150N$$

$$F_N = \underline{\underline{142N}}$$

$$\mu_{\min} = \frac{48N}{142N}$$

$$\mu_{\min} = \underline{\underline{0,34}}$$

28.9

geg.:

$$\mu = 0,02$$

$$F_G = 50N$$

$$d = 35mm = 0,035m$$

$$l_1 = 220mm; l_2 = 270mm$$

$$l_{\text{gesamt}} = 540mm$$

$$F = 5,8kN = 5800N$$

ges.:

$$F_A = ?$$

$$F_B = ?$$

$$M_{RA} = ?$$

$$M_{RB} = ?$$

Formel:

$$a) F_B = \frac{F \cdot l_1 + F_G \cdot l_2}{l_{\text{gesamt}}}$$

$$F_B = \frac{5.800N \cdot 220mm + 50N \cdot 270mm}{540mm}$$

$$F_B = \underline{\underline{2.387,96N \approx 2.388N}}$$

$$F_A = (F + F_G) - F_B$$

$$F_A = (5.800N + 50N) - 2.388N$$

$$F_A = \underline{\underline{3.462N}}$$

Lösungen zur Reibung6

Formel:

$$\text{b) } M_{\text{RA}} = \frac{\mu \cdot F_A \cdot d}{2}$$

$$M_{\text{RA}} = \frac{0,02 \cdot 3.462\text{N} \cdot 0,035\text{m}}{2}$$

$$M_{\text{RA}} = \underline{\underline{1,2\text{Nm}}}$$

$$M_{\text{RB}} = \frac{\mu \cdot F_B \cdot d}{2}$$

$$M_{\text{RB}} = \frac{0,02 \cdot 2.388\text{N} \cdot 0,035\text{m}}{2}$$

$$M_{\text{RB}} = \underline{\underline{0,8\text{Nm}}}$$