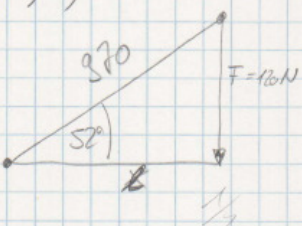


## Lösung der Probe-Prüfung aus dem Unterricht vom 19.3.2013

1) a)

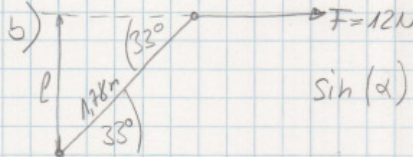


$$\cos(\alpha) = \frac{A}{H} = \frac{l}{970\text{mm}} \quad \Rightarrow$$

$$l = 970\text{mm} \cdot \cos(52^\circ) = \underline{\underline{597,2\text{mm}}}$$

$$M = F \cdot l = 120\text{N} \cdot 0,5972\text{m} = \underline{\underline{71,7\text{Nm}}}$$
  

b)

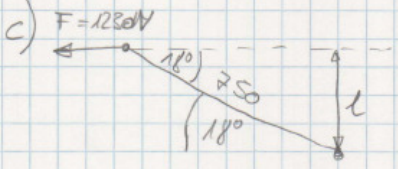


$$\sin(\alpha) = \frac{G}{H} = \frac{l}{1,78\text{m}} \quad \Rightarrow$$

$$l = 1,78\text{m} \cdot \sin(33^\circ) = 0,9695\text{m}$$

$$M = F \cdot l = 12\text{N} \cdot 0,9695\text{m} = \underline{\underline{11,63\text{Nm}}}$$
  

c)

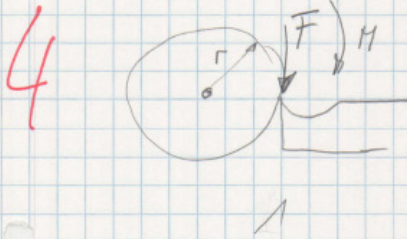


$$\sin(\alpha) = \frac{G}{H} = \frac{l}{750\text{mm}} \quad \Rightarrow$$

$$l = \sin(18^\circ) \cdot 750\text{mm} = 231,76\text{mm}$$

$$M = F \cdot l = 1230\text{N} \cdot 0,23176\text{m} = \underline{\underline{285,07\text{Nm}}}$$

2) geg:  $d = 65 \text{ mm}$      $F = 3200 \text{ N}$   
 ges: Skizze ;  $[M] = \text{Nm}$



$$M = F \cdot r = 3200 \text{ N} \cdot 0,0325 \text{ m} = \underline{\underline{104 \text{ Nm}}}$$

3) geg:  $F_1 = 350 \text{ N}$      $l_1 = 425 \text{ mm}$      $l_2 = 105 \text{ mm}$   
 ges:  $[F_2] = \text{N}$

4

$$M_1^+ = M_2^- \Rightarrow F_1 \cdot l_1 = F_2 \cdot l_2 \Rightarrow F_2 = \frac{F_1 \cdot l_1}{l_2}$$

$$= \frac{350 \text{ N} \cdot 425 \text{ mm}}{105 \text{ mm}} = \underline{\underline{1416,7 \text{ N}}}$$

4) geg:  $m = 6 \text{ kg}$      $l_1 = 90 \text{ mm}$      $l_2 = 10 \text{ mm}$   
 $l_3 = 50 \text{ mm}$      $l_4 = 20 \text{ mm}$

ges:  $([F_2] = \text{N})$      $[F_4] = \text{N}$

$$F_1 = m \cdot g = 6 \text{ kg} \cdot 9,81 \frac{\text{m}}{\text{s}^2} = 58,86 \text{ N}$$

$$M_1 = M_2 \Rightarrow F_1 \cdot l_1 = F_2 \cdot l_2 \Rightarrow F_2 = \frac{F_1 \cdot l_1}{l_2} = \frac{58,86 \text{ N} \cdot 90 \text{ mm}}{10 \text{ mm}}$$

$$F_2 = 529,74 \text{ N}$$

$$F_2 = F_3$$

$$M_3 = M_4 \Rightarrow F_3 \cdot l_3 = F_4 \cdot l_4 \Rightarrow F_4 = \frac{F_3 \cdot l_3}{l_4} = \frac{529,74 \text{ N} \cdot 50 \text{ mm}}{20 \text{ mm}}$$

$$F_4 = \underline{\underline{1324,35 \text{ N}}}$$