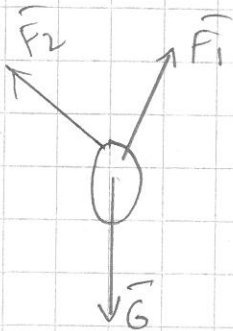


$$\Rightarrow mg \sin \alpha - \mu mg \cos \alpha = ma_x \quad | : m$$

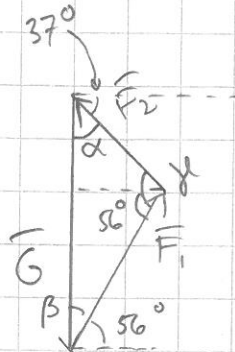
$$\Rightarrow a_x = g \sin \alpha - \mu g \cos \alpha = \dots \approx 3,2 \frac{m}{s^2} > 0$$

$\Rightarrow$ x-akselin suuntaan eli alamäkeen eli kiihtyvää liike

4.20



Vastat ovat tasapainossa $\Rightarrow \sum \vec{F} = \vec{F}_1 + \vec{F}_2 + \vec{G} = \vec{0}$
 $\Rightarrow$ voimien muodostamat kolmiot



$$\alpha = 90^\circ - 37^\circ = 53^\circ$$

$$\beta = 90^\circ - 56^\circ = 34^\circ$$

$$\gamma = 180^\circ - 53^\circ - 34^\circ = 93^\circ$$

$$m = 1,5 \text{ kg}$$

Similans: $\frac{F_1}{\sin \alpha} = \frac{G}{\sin \gamma}$

$$\frac{F_1}{\sin \alpha} = \frac{G}{\sin \gamma} \quad | \cdot \sin \alpha$$

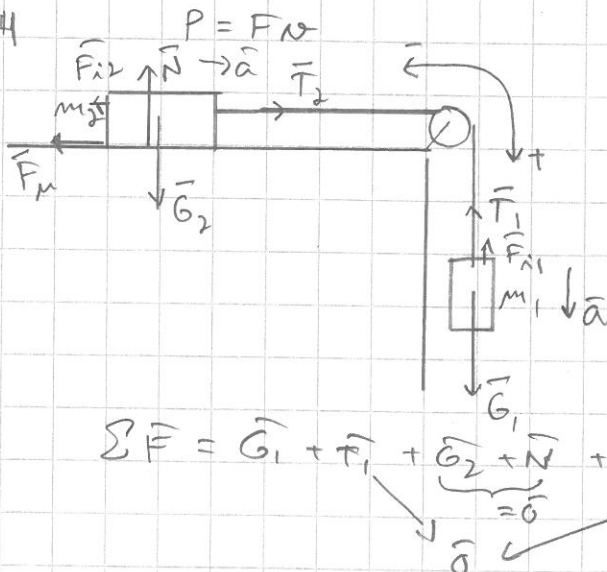
$$\Rightarrow F_1 = \frac{G \sin \alpha}{\sin \gamma} = \frac{1,5 \text{ kg} \cdot 9,81 \frac{m}{s^2} \cdot \sin 53^\circ}{\sin 93^\circ} \approx 12 \text{ N}$$

Similans:

$$\frac{F_2}{\sin \beta} = \frac{G}{\sin \gamma} \quad | \cdot \sin \beta$$

$$\Rightarrow F_2 = \frac{G \sin \beta}{\sin \gamma} = \dots \approx 8,2 \text{ N}$$

4.24



$$m_1 = 3,0 \text{ kg}, m_2 = 1,0 \text{ kg}, \mu = 0,20$$

jätetään ilmanvastuksen pienene (re pieni) huomiotta.

$T_1 = T_2$ (sama naru $\rightarrow$ sama jännitys)

TA I: N III)

N II: $\sum \vec{F} = m \vec{a}$ koko systeemiin

$$\sum \vec{F} = \vec{G}_1 + \vec{F}_1 + \vec{G}_2 + \vec{N} + \vec{F}_N + \vec{T}_2 = (m_1 + m_2) \vec{a}$$

$$\Rightarrow G_1 - F_N = G_1 - \mu N = m_1 g - \mu m_2 g = (m_1 + m_2) a$$

$$\Rightarrow a = \frac{m_1 g - \mu m_2 g}{m_1 + m_2} = \dots \approx 6,5 \frac{m}{s^2}$$

(Molemmilla kappaleilla sama nopeus $\rightarrow$ sama kiihtyvyyden suuruus)