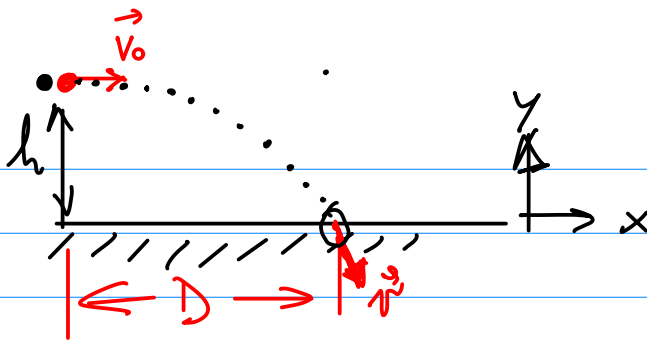


D 7.

4)  $h = 45\text{m}$   
 $v_0 = 250\text{ m/s}$



a)  $\tau = ?$

a)  $h = \frac{g \cdot \tau^2}{2} \Rightarrow \tau^2 = \frac{2h}{g}$

b)  $D = ?$

b)  $x = v_0 \cdot \tau$

$\tau = \sqrt{\frac{2h}{g}} = \sqrt{\frac{90\text{m}}{9.81\text{ m/s}^2}}$

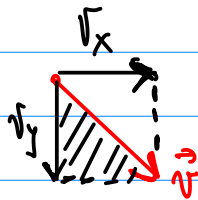
c)  $v = ?$

$D = v_0 \cdot \tau$

$D = 757.5\text{m}$

$\tau = 3.03\text{ s}$

c)



$v^2 = v_x^2 + v_y^2$

$v_x = v_0 = 250\text{ m/s}$

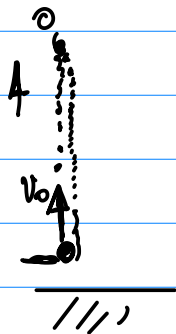
$v_y = g \cdot \tau = g \cdot \tau = \underline{\underline{29.72\text{ m/s}}}$

$v = \sqrt{(250\text{ m/s})^2 + (29.72\text{ m/s})^2}$

$v = 251.76\text{ m/s}$  😊

5)

$v_0 = ?$   
 $t = 3.5\text{ s}$



$\tau = \frac{t}{2} = 1.75\text{ s}$

$v_0 = g \cdot \tau = 17.17\text{ m/s}$

N. Z. K.

$$1) \quad \begin{array}{l} m = 500 \text{ g} \\ F = 100 \text{ N} \\ \hline a = ? \end{array}$$

$$F = m \cdot a \Rightarrow a = \frac{F}{m} = \frac{100 \text{ N}}{0.5 \text{ kg}}$$

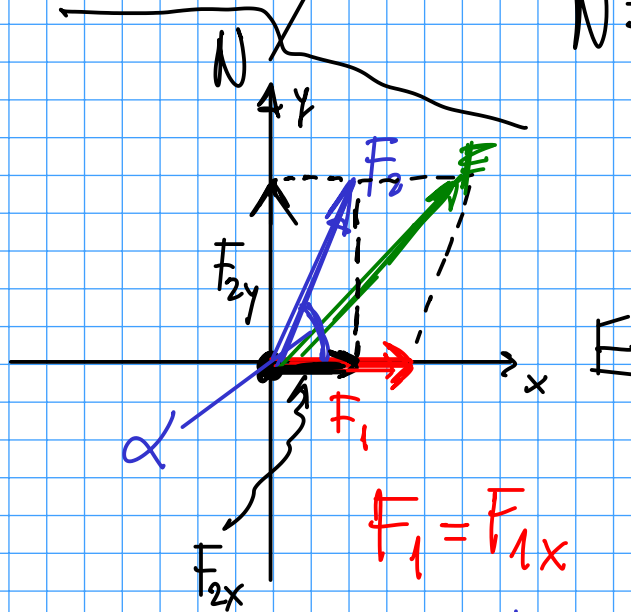
$$a = 200 \frac{\text{m}}{\text{s}^2}$$

$$N = \text{kg} \cdot \frac{\text{m}}{\text{s}^2}$$

$$3) \quad \begin{array}{l} F_1 = 60 \text{ N} \\ m = 1300 \text{ kg} \\ F_2 = 25 \text{ N} \\ \alpha = 67^\circ \end{array}$$

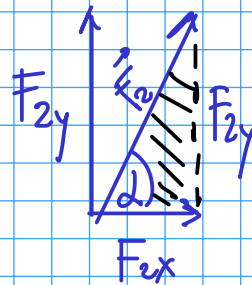
$$a_x = ?$$

$$a_y = ?$$



$$\vec{F} = \vec{F}_1 + \vec{F}_2$$

$$F_1 = F_{1x} \quad (F_{1y} = 0)$$



$$\sin \alpha = \frac{F_{2y}}{F_2}$$

$$\cos \alpha = \frac{F_{2x}}{F_2}$$

$$F_{2x} = F_2 \cos \alpha = 9.77 \text{ N}$$

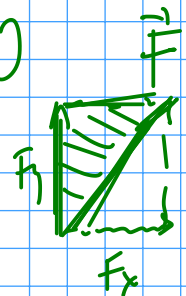
$$F_{2y} = F_2 \sin \alpha = 23.01 \text{ N}$$

$$F_x = F_{1x} + F_{2x} = 60 \text{ N} + 9.77 \text{ N} = 69.77 \text{ N}$$

$$F_y = F_{1y} + F_{2y} = 23.01 \text{ N}$$

$$a_x = \frac{F_x}{m} = \frac{69.77 \text{ N}}{1300 \text{ kg}} = 0.05 \frac{\text{m}}{\text{s}^2}$$

$$a_y = \frac{F_y}{m} = \frac{23.01 \text{ N}}{1300 \text{ kg}} = 0.02 \frac{\text{m}}{\text{s}^2}$$



8)  $\alpha = 30^\circ$   
 $F_1 = F_2 = F = 600 \text{ N}$   
 $R = ?$

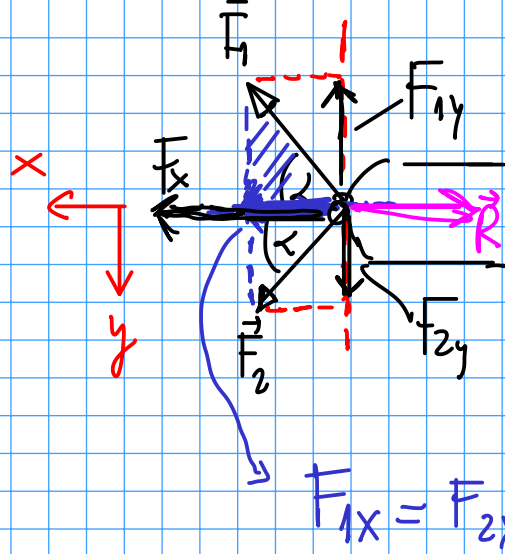


$$\cos \alpha = \frac{F_{1x}}{F_1}$$

$$F_{1x} = F_1 \cdot \cos \alpha$$

$$F_{1x} = 300\sqrt{3} \text{ N}$$

$$F_{2x} = F_{1x} = 300\sqrt{3} \text{ N}$$



$$F_y = 0$$

$$F_{1y} = -F_{2y}$$

$$F_x = F_{1x} + F_{2x}$$

$$F_x = 600\sqrt{3} \text{ N}$$

$$F_x \approx 1040 \text{ N}$$

$$\sum \vec{F} = m \cdot a$$

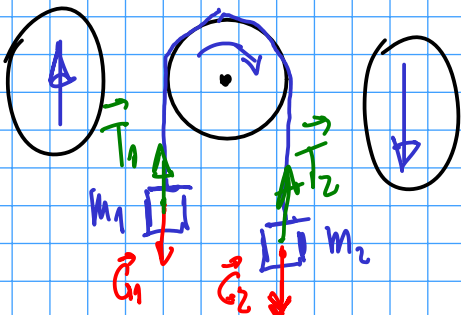
x:  $F_x - R = 0$

$$\underline{\underline{R = F_x = 1040 \text{ N}}}$$

11)  $m_1 : m_2 = 1 : 3$

$$\frac{m_1}{m_2} = \frac{1}{3}$$

$$m_2 = 3m_1$$



$$T_1 = T_2 = T$$

$$a_1 = a_2 = a$$

$$T_1 - G_1 = m_1 \cdot a_1$$

$$\underline{\underline{G_2 - T_2 = m_2 \cdot a_2}}$$

$$G_1 = m_1 \cdot g ; \quad G_2 = m_2 \cdot g$$

$$+ \uparrow \quad T - G_1 = m_1 \cdot a$$

$$G_2 - T = m_2 \cdot a$$

$$G_2 - T + T - G_1 = (m_1 + m_2) \cdot a$$

$$m_2 \cdot g - m_1 \cdot g = (m_1 + m_2) \cdot a$$

$$a = \frac{(m_2 - m_1) \cdot g}{m_1 + m_2}$$

$$a = \frac{3m_1 - m_1}{m_1 + 3m_1} \cdot g$$

$$a = \frac{2}{4} g = \frac{1}{2} g$$

$$\parallel a = 4.905 \text{ m/s}^2 \parallel$$

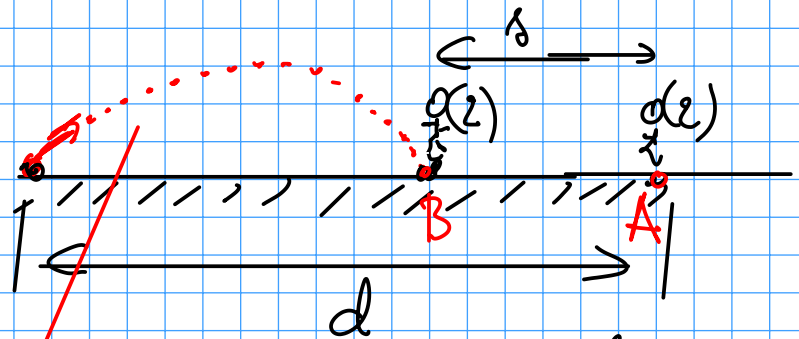
KRISTALJE u RAVNI!

8)

$$\alpha = 37^\circ$$

$$v_0 = 15 \text{ m/s}$$

$$d = 30 \text{ m}$$



$$D = \frac{v_0^2 \sin^2 \alpha}{g}$$

$$D = 22 \text{ m}$$

kosi hitac

$$t = 2 \cdot \tau = 2 \cdot \frac{v_0 \sin \alpha}{g}$$

$$t = 1.84 \text{ s}$$

$$\bar{v} = \frac{s}{t}$$

$$s = d - D = 8 \text{ m}$$

$$\bar{v} = \frac{8 \text{ m}}{1.84 \text{ s}} = 4.3 \text{ m/s}$$

$$g) v_0 = 200 \text{ km/s}$$

$$\alpha = 45^\circ$$

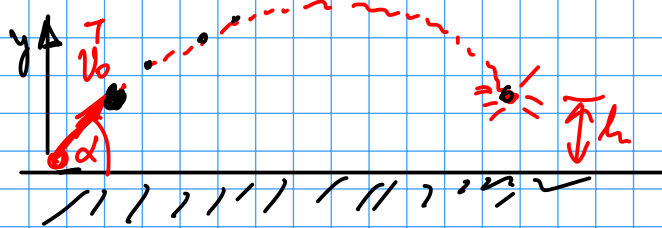
$$h = 10 \text{ m}$$

$$t = ?$$

$$g = 10 \text{ m/s}^2$$

$$ax^2 + bx + c = 0$$

$$x_{1/2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



$$y = v_0 \sin \alpha \cdot t - \frac{gt^2}{2}$$

$$10 \text{ m} = 200 \frac{\text{km}}{\text{s}} \cdot \sin 45^\circ \cdot t - \frac{10 \frac{\text{m}}{\text{s}^2} \cdot t^2}{2}$$

$$10 = 100\sqrt{2} \cdot t - 5 \cdot t^2$$

$$5t^2 - 100\sqrt{2} \cdot t + 10 = 0$$

$$t_{1/2} = \frac{100\sqrt{2} \pm \sqrt{20000 - 200}}{10}$$

$$t_{1/2} = \frac{100\sqrt{2} \pm 140.72}{10}$$

$$t_{1/2} = 10\sqrt{2} \pm 14.072$$

$$t_1 = 10\sqrt{2} - 14.072 = 0.03 \text{ s}$$

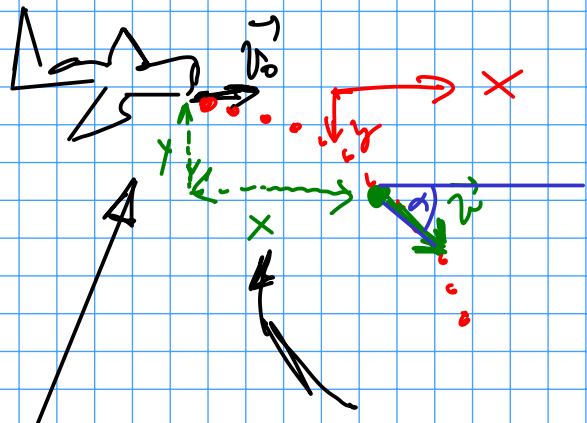
$$t_2 = 10\sqrt{2} + 14.072 = 28.172 \text{ s}$$

$$A) v_0 = 250 \frac{\text{km}}{\text{h}} = 69.44 \text{ m/s}$$

$$t = 10 \text{ s}$$

$$a) x; y = ?$$

$$b) v = ? \quad c) \beta = ?$$

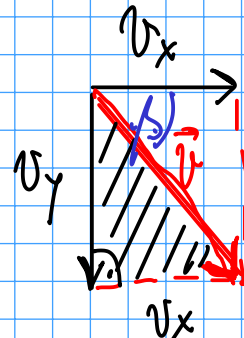


$$a) \quad y = \frac{gt^2}{2} = 490.5 \text{ m}$$

$$x = v_0 t = \underline{\underline{694.4 \text{ m}}}$$

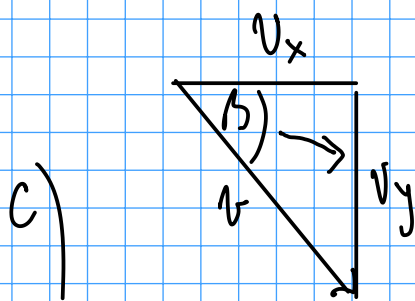
$$b) \quad v_y = g \cdot t = \underline{\underline{98.1 \text{ m/s}}}$$

$$v_x = v_0 = \underline{\underline{69.44 \text{ m/s}}}$$



$$v^2 = v_x^2 + v_y^2$$

$$v = \underline{\underline{120.2 \text{ m/s}}}$$



$$\text{tg } \beta = \frac{v_y}{v_x} = 1.42$$

$$\underline{\underline{\beta = 54.85^\circ}}$$

Newtonovi zakoni kretanja?

$$1) \quad F = m \cdot a$$

$$m = 500 \text{ g} = 0.5 \text{ kg}$$

$$F = 100 \text{ N}$$

$$a = \frac{F}{m} = 200 \text{ m/s}^2$$

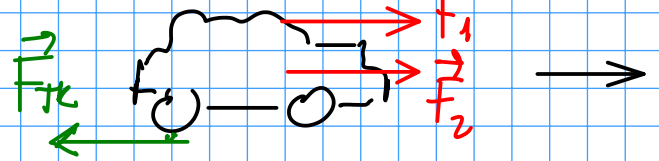
$$2) F_1 = F_2 = 755 \text{ N}$$

$$F_{\text{FR}} = 420 \text{ N}$$

$$m = 1250 \text{ kg}$$

---


$$a = ?$$



$$\sum \vec{F} = m \cdot \vec{a}$$

$$F_1 + F_2 - F_{\text{FR}} = m \cdot a$$

$$a = \frac{F_1 + F_2 - F_{\text{FR}}}{m}$$

$$a = 0.265 \frac{\text{m}}{\text{s}^2}$$

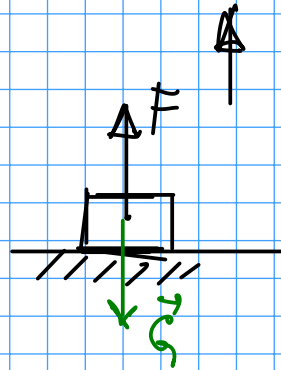
$$4) m = 1 \text{ kg}$$

$$F = 10.81 \text{ N}$$

$$t = 10 \text{ s}$$

---


$$h = ?$$



$$F - G = m \cdot a$$

$$a = \frac{F - G}{m}$$

$$a = 1 \frac{\text{m}}{\text{s}^2}$$

$$s = h = \frac{at^2}{2} = \underline{\underline{50 \text{ m}}}$$