

1.

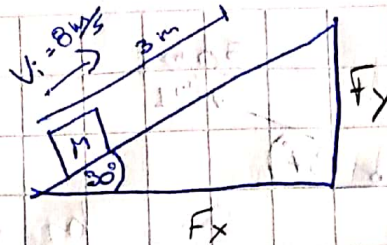
$$m = 5 \text{ [kg]}$$

$$V_i = 8 \text{ m/s}$$

$$d = 3 \text{ m}$$

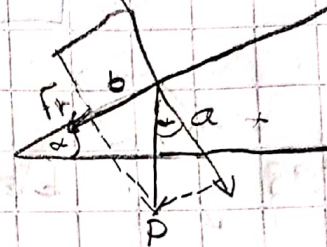
$$\theta = 30^\circ$$

$$F_r =$$



$$F_x = F \cdot \cos 30^\circ$$

$$F_y = F \cdot \sin 30^\circ$$



$$a = F \cdot \cos \theta$$

$$a = m \cdot g \cdot \cos 30^\circ$$

$$a = 5 \cdot 10 \cdot \cos 30^\circ$$

$$a = 43,3 \text{ [N]}$$

$$\sum F_y = 0$$

$$N + a = 0$$

$$N = -a$$

$$N = 43,3 \text{ [N]}$$

$$F_r = \mu \cdot N$$

$$F_r = 43,3 \mu$$

$$b = F \cdot \sin 30^\circ$$

$$b = m \cdot g \cdot \sin 30^\circ$$

$$b = 5 \cdot 10 \cdot \sin 30^\circ$$

$$b = 25 \text{ [N]}$$

$$\sum F_x = m \cdot a$$

$$-b - F_r = m \cdot a$$

$$-25 - 43,3 \mu = 5 \cdot 10,6$$

$$\mu = 0,78$$

$$a = \frac{(V_i)^2}{2d} = \frac{(8 \text{ m/s})^2}{2 \cdot 3 \text{ m}}$$

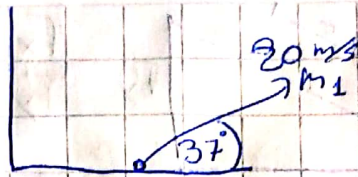
$$a = -10,6 \text{ m/s}^2$$

$$F_r = \mu \cdot N$$

$$F_r = 0,78 \cdot 43,3 \text{ [N]}$$

$$F_r = 33,81 \text{ [N]}$$

2. $V = 8 \text{ m/s}$
 $m_1 = 20 \text{ m/s}$
 $\theta = 37^\circ$



$m_1 = m_2$

antes

Despues

$$m \cdot V = \frac{m}{2} \cdot V_1 \cdot \cos 37^\circ + \frac{m}{2} \cdot V_2 \cdot \cos \theta$$

$$m V = V_1 \cdot \cos 37^\circ + V_2 \cdot \cos \theta$$

$$V - \frac{V_1 \cdot \cos 37^\circ}{2} = \frac{V_2 \cdot \cos \theta}{2}$$

$$2(8 - 10 \cdot \cos 37^\circ) = V_2 \cdot \cos \theta$$

$$0,0273 = V_2 \cdot \cos \theta$$

$$20 \sin 37^\circ = V \sin \theta$$

$$12,04 = V \sin \theta$$

$$\frac{12,04}{0,0273} = \frac{V \sin \theta}{V \cos \theta}$$

$$441,02 = \tan \theta / \text{tg}^{-1}$$

$$\theta = 89,87$$

$$V = \frac{12,4}{\sin 89,87} = 12,04 \left[\frac{\text{m}}{\text{s}} \right]$$

3. ~~314m~~

$$d = 314 \text{ m}$$

$$t = 30 \text{ s}$$

$$R_{\text{Plato}} = 10 \text{ cm}$$

$$R_{\text{Piñon}} = 4 \text{ cm}$$

$$R_{\text{Rueda}} = 40 \text{ cm}$$

a)

$$V = \frac{d}{t} = \frac{314}{30} = 10,46 \text{ m/s}$$

$$a_c = \frac{V^2}{r} = \frac{10,46^2}{0,4 \text{ m}}$$

$$a_c = 26,15 \frac{\text{m}}{\text{s}^2}$$

$$a_c = \omega^2 r$$

$$\frac{26,15}{r} = \omega^2$$

$$\frac{26,15}{40} = \omega^2 / r$$

$$0,80 = \omega$$

$$\Delta \theta = \omega \cdot t + \frac{1}{2} \alpha t^2$$

$$\Delta \theta = 0,80 \cdot 30$$

$$\Delta \theta = 24,2 \text{ rev}$$

b)

$$\omega = \frac{\theta}{t} = 0,8 \frac{\text{rad}}{\text{s}}$$

$$24,2 \frac{\text{rev}}{\text{min}} = \frac{2\pi \text{ rad}}{\text{rev}} \cdot \frac{\text{min}}{60 \text{ s}}$$

c)

$$\omega_1 \cdot R_1 = \omega_2 \cdot R_2$$

$$\omega_2 = \frac{\omega_1 \cdot R_1}{R_2}$$