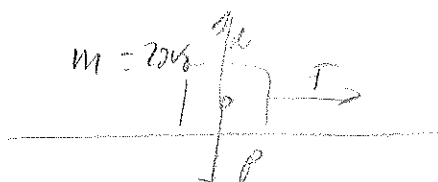
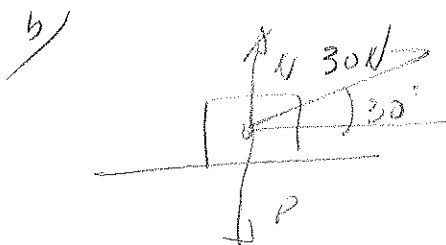


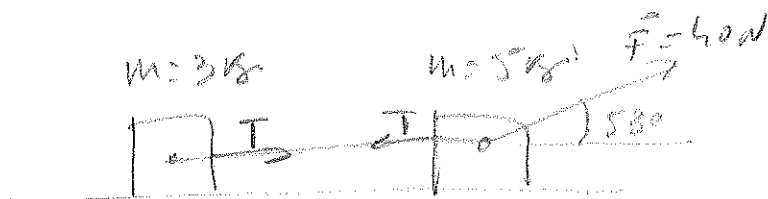
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$$a) \quad F = m \cdot a \Rightarrow a = \frac{F}{m} = \frac{30 \text{ N}}{20 \text{ kg}} = \boxed{1,5 \text{ m/s}^2}$$



$$F = F_x = m \cdot a \Rightarrow a = \frac{F_x}{m} = \frac{F \cdot \cos 30}{m}$$

$$= \frac{30 \text{ N} \cdot 0,866}{20 \text{ kg}} = \boxed{1,3 \text{ m/s}^2}$$

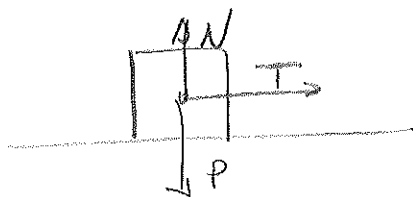
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$$(m_1 + m_2) \cdot a = F_R$$

$$F_x = (m_1 + m_2) a$$

$$a = \frac{F_x}{m_1 + m_2} = \frac{40 \cdot \cos 53 \text{ N}}{5 \text{ kg} + 3 \text{ kg}} = 3 \text{ m/s}^2$$

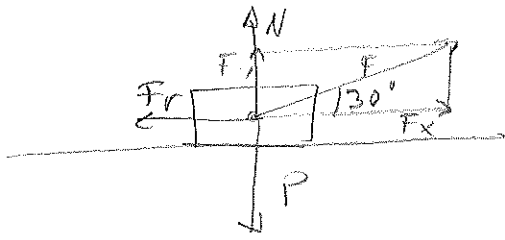
Sobre el cuerpo de 3 kg.



$$F_R = m \cdot a$$

$$T = m \cdot a = 3 \text{ kg} \cdot 3 \text{ m/s}^2 = \underline{9 \text{ N}}$$

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a) $\mu = 0,3$

$$F_x = F_r = \mu \cdot N$$

$$N = P - F_y$$

$$F_x = \mu \cdot (P - F_y)$$

$$F \cdot \cos 30 = 0,3 (35 \cdot 9,8 \text{ N} - F \cdot \sin 30)$$

$$0,87 F = 102,9 \text{ N} - 0,15 F$$

$$(0,87 + 0,15) F = 102,9 \text{ N}$$

$$F = \frac{102,9 \text{ N}}{1,02} = \underline{\underline{101 \text{ N}}}$$

b) $F = 2 \times 101 \text{ N} = 202 \text{ N}$

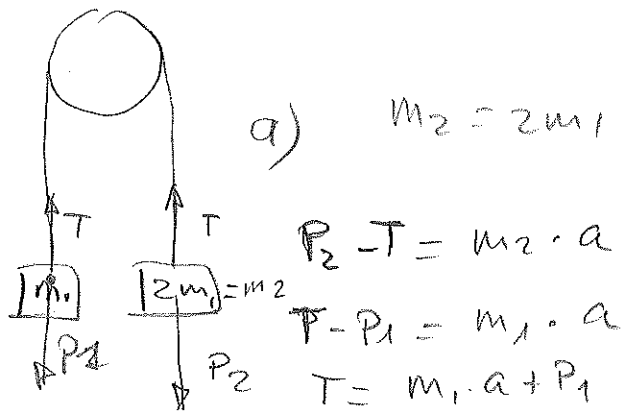
$$F_x - F_r = m \cdot a$$

$$a = \frac{F_x - F_r}{m} = \frac{202 \cdot \cos 30 \text{ N} - 0,25 \text{ N}}{35}$$

$$= \frac{174,9 \text{ N} - 60,5 \text{ N}}{35}$$

$$= \frac{114,4 \text{ N}}{35} \text{ m/s}^2 = 3,27 \text{ m/s}^2$$

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a) $m_2 = 2m_1$

$$P_2 - T = m_2 \cdot a$$

$$T - P_1 = m_1 \cdot a$$

$$T = m_1 \cdot a + P_1$$

$$P_2 - (m_1 a + P_1) = m_2 \cdot a$$

$$m_2 \cdot g - m_1 \cdot a - m_1 \cdot g = m_2 \cdot a$$

$$2 \cdot \frac{m_1}{2} g - m_1 \cdot a - m_1 \cdot g = 2 \cdot \frac{m_1}{2} a$$

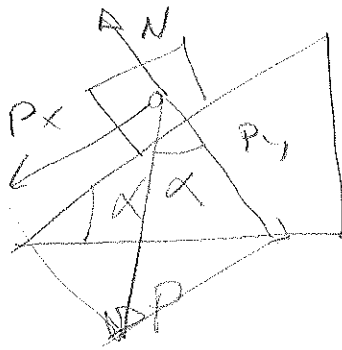
$$2g - g - a = 2a$$

$$g = 3a \Rightarrow a = \frac{g}{3} = \frac{9.8 \text{ m/s}^2}{3} = 3.27 \text{ m/s}^2$$

$$s = \frac{1}{2} a t^2 = \frac{1}{2} 3.27 \cdot 2^2 = 6.54 \text{ m ha recorrido } m_2$$

Como m_1 ha subido también 6,5 m de distancia que los separa es $2 \times 6.54 = 13.08$

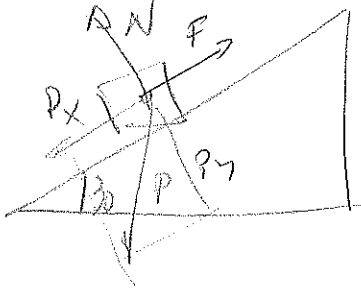
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$$P_x = P \cdot \sin \alpha$$

$$P_y = P \cdot \cos \alpha$$

106/



a/ $F = P_x = P \cdot \sin \alpha$

$$F = 30 \cdot 9,8 \cdot \sin 30 = 147 \text{ N}$$

b/ $\Sigma F = \bar{F}_R = F_x - F = m \cdot a$

$$147 \text{ N} - 80 \text{ N} = 30 \text{ kg} \cdot a$$

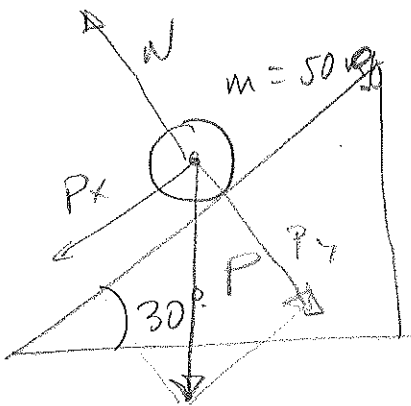
$$67 \text{ N} = 30 \text{ kg} \cdot a$$

$$a = \frac{67}{30} \text{ m/s}^2 = 2,23 \text{ m/s}^2$$

c/

$$v = v_0 + at = 2,23 \text{ m/s}^2 \cdot 3 \text{ s} = 6,7 \text{ m/s}$$

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a/ $F = F_x = mg \cdot \sin 30^\circ$
 $= 0,05 \text{ kg} \cdot 9,8 \text{ m/s}^2 \cdot 0,5$
 $= 0,245 \text{ N}$

b/

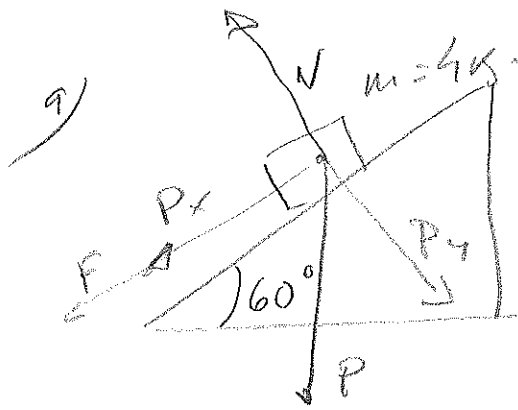
$$F = ma = P_x$$

$$ma = mg \cdot \sin 30^\circ$$

$$a = g \cdot \sin 30^\circ = 0,5 \cdot 9,8 \text{ m/s}^2 = 4,9 \text{ m/s}^2$$

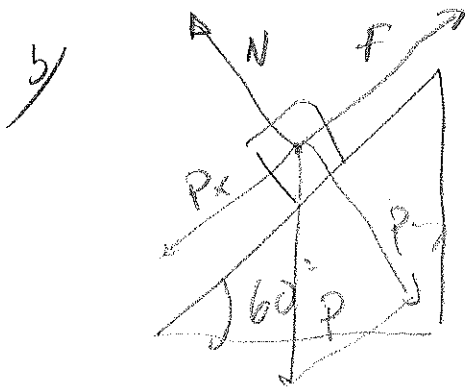
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5



$$P_x = P \cdot \sin 60 = mg \cdot \sin 60$$

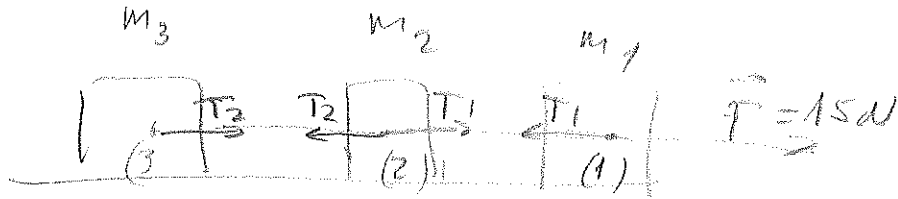
$$\begin{aligned} \sum F_i &= F + P_x = m \cdot a \\ &= 30 \text{ N} + 4 \cdot 9.8 \cdot \sin 60 = 4 \text{ kg} \cdot a \\ &= 64 \text{ N} = 4 \text{ kg} \cdot a \\ a &= \frac{64}{4} \text{ m/s}^2 = 16 \text{ m/s}^2 \end{aligned}$$



$$\begin{aligned} \sum F_i &= P_x - F = m \cdot a \\ 4 \cdot 9.8 \cdot \sin 60 - 30 \text{ N} &= 4 \text{ kg} \cdot a \\ 4 \text{ N} &= 4 \text{ kg} \cdot a \\ a &= \frac{4 \text{ N}}{4 \text{ kg}} = 1 \text{ m/s}^2 \end{aligned}$$

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6



$$m_1 = m_2 = m_3 = 5 \text{ kg}$$

$$\sum F_i = m a$$

$$F + T_1 - T_1 + T_2 - T_2 = m_1 \cdot a$$

$$F = m_1 \cdot a$$

$$15 \text{ N} = (5 + 5 + 5) \cdot a$$

$$a = \frac{15 \text{ N}}{15 \text{ kg}} = 1 \text{ m/s}^2$$

En el cuerpo (3)



$$T_2 = m_3 \cdot a = 5 \text{ kg} \cdot 1 \text{ m/s}^2 = 5 \text{ N}$$

En el cuerpo (2)

$$T_1 - T_2 = m_2 \cdot a$$



$$T_1 = T_2 + m_2 \cdot a = 5 \text{ N} + 5 \text{ kg} \cdot 1 \text{ m/s}^2 = 10 \text{ N}$$