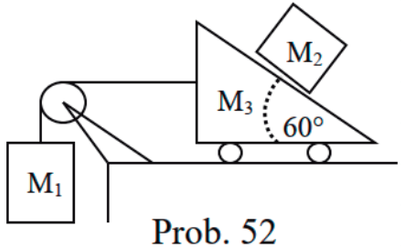
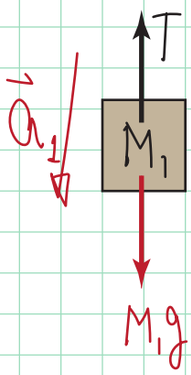
52.- Para el sistema de la figura calcule el valor mínimo de la masa m_1 de modo que le permita a la masa m_2 caer verticalmente. Desprecie todo tipo de fricción. Tome $m_3 = 6$ kg y $\theta = 60°$. **R. 8.2 kg**



Prob. 52

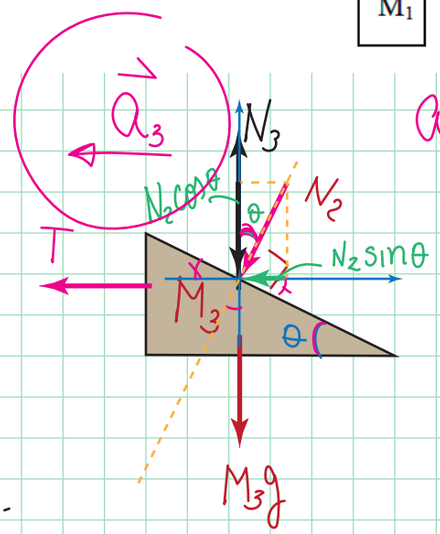
D.C.L. M_1 $\quad a_1 = a$



$\uparrow \sum F_y = M_1 a_1$

$T - M_1 g = -M_1 a$

$T = M_1 (g - a) \ldots$



$a_3 = a_1 = a$

$6a = M_1 (g - a)$

$M_1 = \left(\frac{6a}{g-a}\right)$

D.C.L M_3

$\uparrow \sum F_y = 0$

$N_3 - N_2 \cos\theta - M_3 g = 0$

$N_3 = M_3 g = 6 \cdot 9{,}8 = 58{,}8\ N$

$\rightarrow \sum F_x = M_3 a_3$

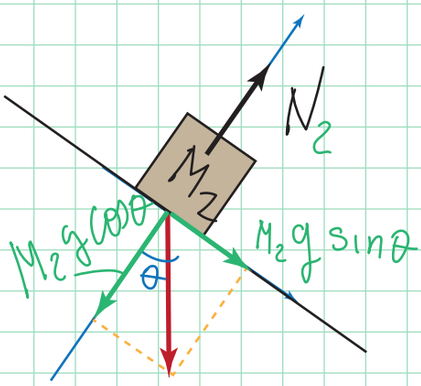
$+T + N_2 \sin\theta = +M_3 a_3 \quad (-1)$

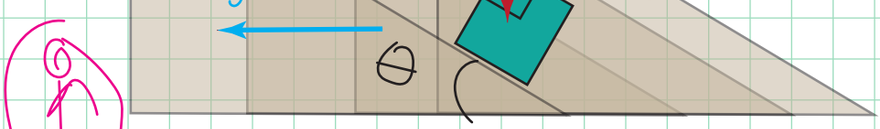
$T + N_2 \sin\theta = M_3 a_3$

$T = M_3 a$

$T = 6a$

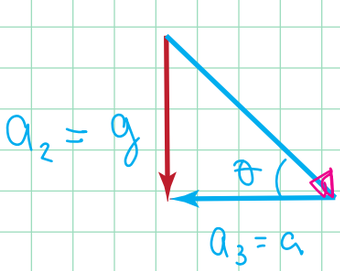
D.C.L. M_2





El M_2 Realiza Caida Libre $= a_2 = g$

$N_2 = 0$

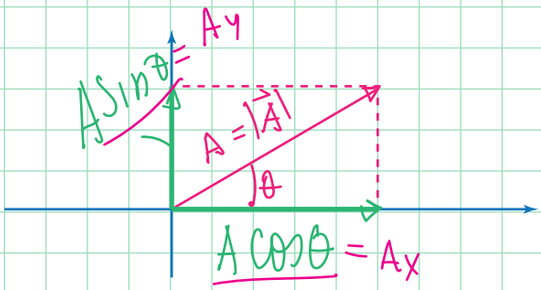


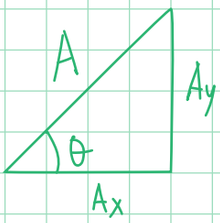
$\tan\theta = \frac{g}{a} \Rightarrow \quad a = \frac{g}{\tan\theta} = \frac{9{,}8}{\text{tg } 60}$

$a = 5{,}66\ m/s^2$

$M_1 = \frac{6 * 5{,}66}{9{,}8 - 5{,}66}$

$M_1 = 8{,}2\ kg$ Sol.





$$\sin\theta = \frac{A_y}{A}$$

$$A_y = A\sin\theta$$

$$\cos\theta = \frac{A_x}{A}$$

$$A_x = A\cos\theta$$