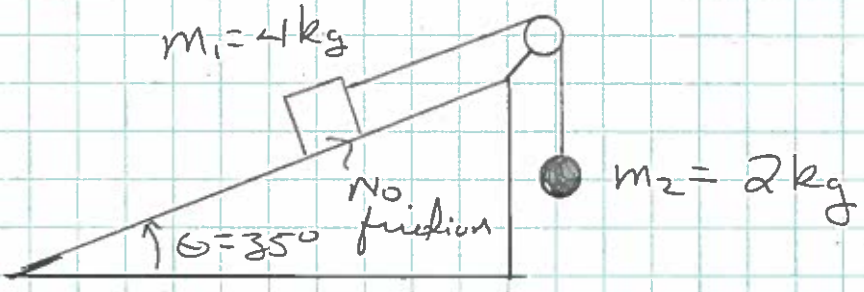
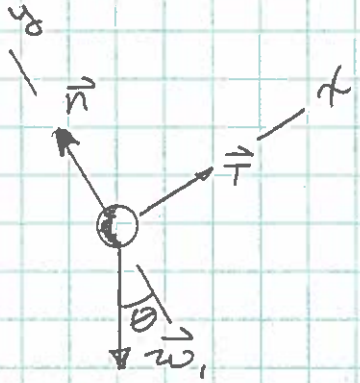
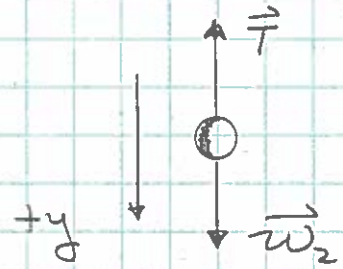


FBD

m_1



m_2



Constraint: $a_{1x} = a_{2y} = a$

b.) Release – find a:

m_1: $\Sigma F_x = T - w_1 \sin\theta = m_1 a_x$ (1)

$\Sigma F_y = n - w_1 \cos\theta = m_1 a_y = 0$

m_2: $\Sigma F_y = w_2 - T = m a_y$ (2)

Constraint: $a_{1x} = a_{2y} = a$

So: $T - m_1 g \sin\theta = m_1 a$ (3)

$m_2 g - T = m_2 a$ (4)

add equns: $-m_1 g \sin\theta + m_2 g = (m_1 + m_2) a$

$$a = \frac{m_2 g - m_1 g \sin\theta}{(m_1 + m_2)} = -0.4807\ m/s^2$$

$\therefore$ moves down incline

c.) From equn (4):

$$T = m_2(g - a) = \underline{20.56\,N}$$