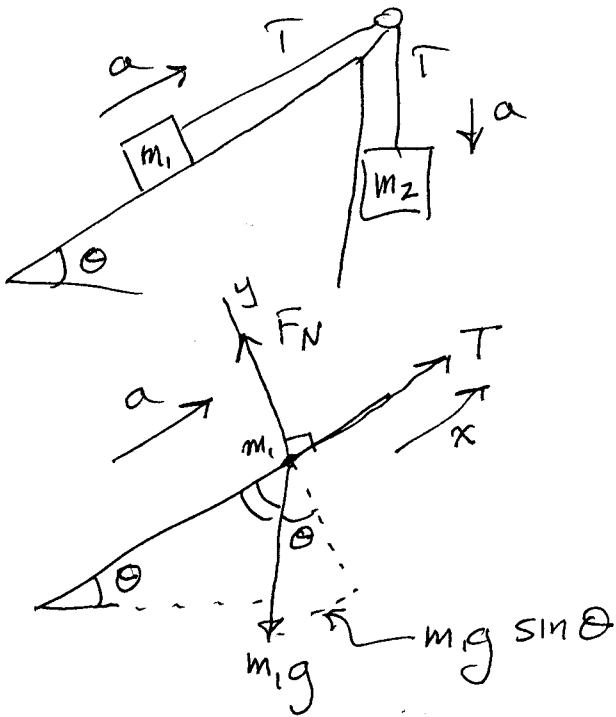


5.



$$\uparrow \sum F = ma$$

$$\boxed{m_2 g - T = m_2 a} \quad (1)$$

$$\rightarrow \sum F_x = m a_x$$

$$\boxed{T - m_1 g \sin \theta = m_1 a} \quad (2)$$

Adding (1) & (2):

$$m_2 g - \cancel{T} + \cancel{T} - m_1 g \sin \theta = m_2 a + m_1 a$$

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

$$\boxed{a = \frac{m_2 - m_1 \sin \theta}{m_2 + m_1} g}$$

If $\theta = 0$, the plane is horizontal (Prob. 3).

Expect $a = \frac{m_2 g}{m_1 + m_2}$.

check: $a = \frac{m_2 - m_1 \sin 0}{m_2 + m_1} g = \frac{m_2 g}{m_2 + m_1} \checkmark$

If $\theta = 90^\circ$, the plane is vertical (Prob. 2)

Expect $a = \frac{m_2 - m_1}{m_2 + m_1} g$

check: $a = \frac{m_2 - m_1 \sin 90^\circ}{m_2 + m_1} g = \frac{m_2 - m_1}{m_2 + m_1} g \checkmark$