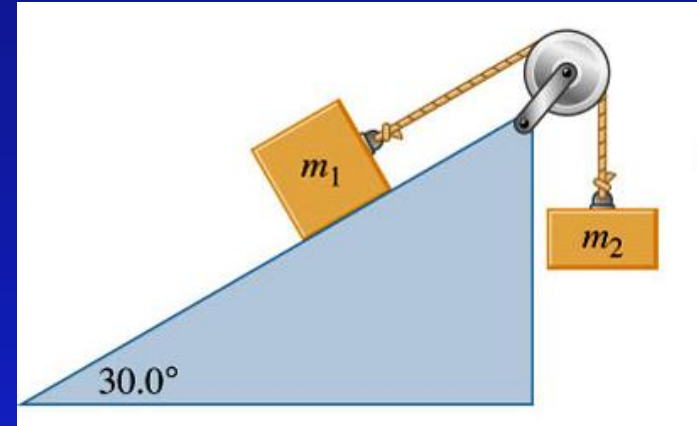


# Pulley, Incline and 2 blocks

A block of mass  $m_1 = 2.6$  kg rests upon a frictionless incline as shown and is connected to mass  $m_2$  via a flexible cord over an ideal pulley. What is the acceleration of block  $m_1$  if  $m_2 = 2.0$  kg?



X – direction  $\Sigma F_x = m a_x$ :

Block 1:

$$T - m_1 g \sin(30) = m_1 a_{1x}$$

$$T = m_1 g \sin(30) + m_1 a_{1x}$$

Y – direction  $F_y = m a_y$ :

Block 2:

$$T - m_2 g = m_2 a_{2y}$$

Note:  $a_{1x} = -a_{2y}$

Combine

$$T - m_2 g = m_2 a_{2y}$$

$$m_1 g \sin(30) + m_1 a_{1x} - m_2 g = m_2 a_{2y}$$

$$m_1 g \sin(30) + m_1 a_{1x} - m_2 g = -m_2 a_{1x}$$

$$m_1 a_{1x} + m_2 a_{1x} = m_2 g - m_1 g \sin(30)$$

$$(m_1 + m_2) a_{1x} = g (m_2 - m_1 \sin(30))$$

$$a_1 = \frac{m_2 - m_1 \sin(30)}{m_1 + m_2} g$$

$$1.49 \text{ m/s}^2$$