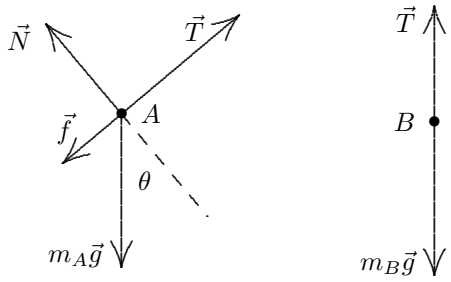
22. The free-body diagrams are shown below. T is the magnitude of the tension force of the string, f is the magnitude of the force of friction on block A, N is the magnitude of the normal force of the plane on block A, $m_A\vec{g}$ is the force of gravity on body A (where $m_A = 10$ kg), and $m_B\vec{g}$ is the force of gravity on block B. $\theta = 30°$ is the angle of incline. For A we take the $+x$ to be uphill and $+y$ to be in the direction of the normal force; the positive direction is chosen *downward* for block B.



Since A is moving down the incline, the force of friction is uphill with magnitude $f_k = \mu_k N$ (where $\mu_k = 0.20$). Newton's second law leads to

$$\begin{aligned} T - f_k + m_A g \sin\theta &= m_A\, a = 0 \\ N - m_A g \cos\theta &= 0 \\ m_B g - T &= m_B\, a = 0 \end{aligned}$$

for the two bodies (where $a = 0$ is a consequence of the velocity being constant). We solve these for the mass of block B.

$$m_B = m_A\,(\sin\theta - \mu_k \cos\theta) = 3.3 \text{ kg} .$$