

36. We apply Newton's second law first to the three blocks as a single system and then to the individual blocks. The $+x$ direction is to the right in Fig. 5-37.

- (a) With $m_{\text{sys}} = m_1 + m_2 + m_3 = 67.0 \text{ kg}$, we apply Eq. 5-2 to the x motion of the system – in which case, there is only one force $\vec{T}_3 = +T_3 \hat{i}$.

$$\begin{aligned} T_3 &= m_{\text{sys}} a \\ 65.0 \text{ N} &= (67.0 \text{ kg})a \end{aligned}$$

which yields $a = 0.970 \text{ m/s}^2$ for the system (and for each of the blocks individually).

- (b) Applying Eq. 5-2 to block 1, we find

$$T_1 = m_1 a = (12.0 \text{ kg}) (0.970 \text{ m/s}^2) = 11.6 \text{ N} .$$

- (c) In order to find T_2 , we can either analyze the forces on block 3 or we can treat blocks 1 and 2 as a system and examine its forces. We choose the latter.

$$T_2 = (m_1 + m_2) a = (12.0 + 24.0)(0.970) = 34.9 \text{ N} .$$