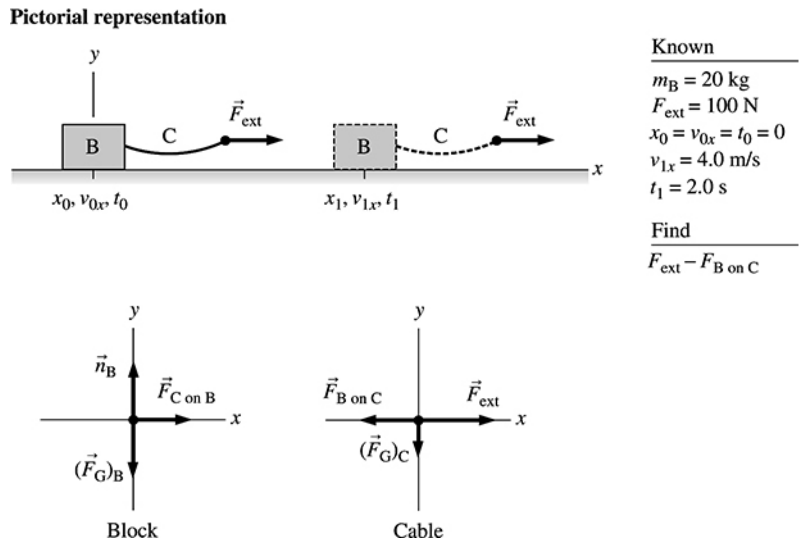
7.20. Model: The block (B) and the steel cable (C), the two objects in the system, are considered particles, and their motion is determined by the constant-acceleration kinematic equations.
Visualize:



Solve: Using $v_{1x} = v_{0x} + a_x(t_1 - t_0)$,

$$4.0 \text{ m/s} = 0 \text{ m/s} + a_x(2.0 \text{ s} - 0 \text{ s}) \Rightarrow a_x = 2.0 \text{ m/s}^2$$

Newton's second law along the x-direction for the block is

$$\sum(F_{\text{on B}})_x = F_{\text{C on B}} = m_B a_x = (20 \text{ kg})(2.0 \text{ m/s}^2) = 40 \text{ N}$$

F_{ext} acts on the right end of the cable and $F_{\text{B on C}}$ acts on the left end. According to Newton's third law, $F_{\text{B on C}} = F_{\text{C on B}} =$ 40 N. The difference in tension between the two ends of the cable is thus

$$F_{ext} - F_{\text{B on C}} = 100 \text{ N} - 40 \text{ N} = 60 \text{ N}$$