

39. (a) In 10 min the cart moves

$$\left(6.0 \frac{\text{mi}}{\text{h}}\right) \left(\frac{5280 \text{ ft/mi}}{60 \text{ min/h}}\right) (10 \text{ min}) = 5280 \text{ ft}$$

so that Eq. 7-7 yields

$$W = Fd \cos \phi = (40 \text{ lb})(5280 \text{ ft}) \cos 30^\circ = 1.8 \times 10^5 \text{ ft}\cdot\text{lb} .$$

- (b) The average power is given by Eq. 7-42, and the conversion to horsepower (hp) can be found on the inside back cover. We note that 10 min is equivalent to 600 s.

$$P_{\text{avg}} = \frac{1.8 \times 10^5 \text{ ft}\cdot\text{lb}}{600 \text{ s}} = 305 \text{ ft}\cdot\text{lb/s}$$

which (upon dividing by 550) converts to  $P_{\text{avg}} = 0.55 \text{ hp}$ .