Exercise 3.1   Calculating Work and Power

Objective

At the conclusion of this exercise, you will be able to do the following:

1. Apply trigonometry to determine the X-component of a force vector.

2. Calculate the amount of work being performed on an object.

3. Calculate power output as a function of work and time.

Procedure

Read the section on force, work, and power in Chapter 3, "The Mechanical Advantage," in the *Principles of Engineering* textbook.
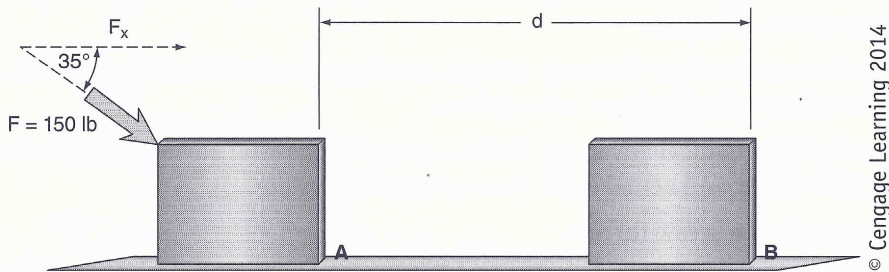

FIGURE 3-2   *Work.*

1. In Figure 3-2, a constant 150-lb force is applied to a box at a 35° angle relative to the horizontal floor, pushing against friction and sliding the box 8 feet across the floor from point A to point B in 10 seconds. Use this information to answer the following questions. Show your math work in the spaces provided.

   a. What is the value of the horizontal component of the force vector?

   $F_x =$ _____

   b. How much work was done to the box?

   $W =$ _____

   c. How much power was exerted, in watts?

   $P =$ _____

Simple Machines

Explore Your World

Locate four different kitchen, gardening, or other tools that use one or more simple machines. For each tool, create a pictorial sketch of the tool that is annotated with:

- Overall dimensions (e.g., overall length and width) of the tool

- A description of the operation of the device

- The type(s) of simple machine(s) that the tool uses

See Figure 3-43 in your textbook for an example of an annotated sketch.