

Math Skills

Work

After you study each sample problem and solution, work out the practice problems on a separate sheet of paper. Write your answers in the spaces provided.

PROBLEM 1

A car has two tires of gas. Unfortunately, there is a gas station nearby. If we need more or less of 100 N on the car to make it work. By the time you reach the station, you have about 1.50 × 10⁴ J of work. How far have you pushed the car?

SOLUTION

Step 1: List the given and unknown values.

$$\begin{aligned} \text{Given: } & \text{force, } F = 100 \text{ N} \\ & \text{work, } W = 1.50 \times 10^4 \text{ J} \end{aligned}$$

$$\text{Unknown: distance, } d = ? \text{ m}$$

Step 2: Rearrange the work equation to solve for distance.

$$\text{work} = \text{force} \times \text{distance} \quad W = Fd$$

$$\frac{W}{F} = \frac{Fd}{F} = d$$

Step 3: Insert the known values into the equation, and solve.

$$\begin{aligned} d &= \frac{1.50 \times 10^4 \text{ J}}{100 \text{ N}} = \frac{1.50 \times 10^4 \text{ N} \cdot \text{m}}{100 \text{ N}} \\ d &= 150 \text{ m} \end{aligned}$$

PROBLEM 2

1. How much work is done if a 5.0-N force is used to push a table 2.0 m? If you do 2.0 J of work on the process, how far have you moved the table?

2. A catcher pulls up a baseball from the ground. If the catchers hand force on the ball is 7.0 × 10² N and it is 1.0 × 10² J of work is done to lift the ball, how far does the catcher lift the ball?

3. The smallest hand is the 10 when you hammerhead, which has a mass of only 1.0 g. If the head of a 1.0 × 10² J of work by striking the ground force of 1.0 × 10³ N, how far did it fly?