



# Conversion Assignment

Engineers of all disciplines are constantly required to work with measurements of a variety of quantities—length, area, volume, mass, force, time, temperature, electric current. It is often necessary to express those measurements in different units. For example, when designing a water distribution piping system, it is important to know how much water pressure is lost as the fluid flows through the pipe. The pressure loss depends on the length of the pipe, which is often measured in *miles*. One formula that is sometimes used to calculate pressure loss requires that the pipe length be input in *feet*. Therefore, it is necessary to be able to **convert** miles to feet.

In other situations, you may be forced to work between the SI and U.S. Customary measurement systems. Let's say, for example, that as a U.S. company, your product is manufactured and produced based on U.S. Customary units. However, a European company would like a proposal to incorporate your system into their existing assembly line, the characteristics of which are based on SI units. To provide a proposal for a design that includes your company's U.S. product, you must be able to convert between the two systems.

1. Convert each of the following quantities to the indicated units. Use the appropriate units to express your answer. **SHOW YOUR WORK!**
  - a. 4.567 trillion (4,567,000,000,000) meters to Gigameters
  - b. 14520 milliliters to liters. Report to the nearest hundredth of a liter.
  - c. 43 thousand microseconds to seconds. Report to the nearest thousandth of a second.
  - d. 6.30 yards to feet
  - e. 0.55 feet to inches
  - f. 9 ft 2½ in. to inches. Report answer using fractional inches.
  - g. 3 ft 5 inches to decimal feet. Report to the nearest hundredth of a foot.
  - h. 59.2 cm to inches

2. A village on a Caribbean island was devastated by a hurricane. The supply of fresh water was contaminated when the storm surge washed over the island, inundating the wells. Several tanks of fresh water were delivered to the village. Each tank contains 10.5 hectoliters of water. (SHOW YOUR WORK!)
- How many liters of water does each tank contain?
  - On any given day, one person needs an average of 2.5 liters of water to survive. How many *people* will a tank supply for the day? Hint: Create a conversion factor to convert from liters to people.
  - If the village (which includes people and livestock) requires a total of 430 liters of water each day, approximately how long (in *days*) will one tank provide an adequate supply for the village? Give your answer to the nearest 10th of a day. Hint: Create a conversion factor to convert from liters to days.
  - Convert the result to days and hours. Give your answer to the nearest hour.
3. A European car manufacturer reports that the fuel **efficiency** of the new MicroCar is 28.5 km/L highway and 22.0 km/L city. (SHOW YOUR WORK!)
- What are the equivalent fuel efficiency rates in miles per gallon?
  - If gas costs \$3.50 per gallon, how much would it cost to drive 500 miles in the city in this car (assuming the fuel efficiency rating is accurate)?