Exercise 1.53

Using your knowledge of metric units, English units, and the information on the back inside cover, write down the conversion factors needed to convert (**a**) mm to nm, (**b**) mg to kg, (**c**) km to ft, (**d**) in.^{3} to cm^3.

Solution

Part (a)

Starting from millimeters, go to meters. Then go from meters to nanometers. The two necessary conversion factors are

$$\frac{1 \text{ m}}{1000 \text{ mm}} \quad \text{and} \quad \frac{10^9 \text{ nm}}{1 \text{ m}}.$$

Part (b)

Starting from milligrams, go to grams. Then go from grams to kilograms. The two necessary conversion factors are

$$\frac{1 \text{ g}}{1000 \text{ mg}} \quad \text{and} \quad \frac{1 \text{ kg}}{1000 \text{ g}}.$$

Part (c)

Starting from kilometers, go to meters. Then go from meters to centimeters. Then go from centimeters to inches. Then go from inches to feet. The four necessary conversion factors are

$$\frac{1000 \text{ m}}{1 \text{ km}} \quad \text{and} \quad \frac{100 \text{ cm}}{1 \text{ m}} \quad \text{and} \quad \frac{1 \text{ in}}{2.54 \text{ cm}} \quad \text{and} \quad \frac{1 \text{ ft}}{12 \text{ in}}.$$

Part (d)

Starting from cubic inches, go to cubic centimeters. The necessary conversion factor is

$$\left(\frac{2.54 \text{ cm}}{1 \text{ in}} \right)^3.$$