Exercise 1.9

A certain fuel-efficient hybrid car gets gasoline mileage of 55.0 mpg (miles per gallon). (a) If you are driving this car in Europe and want to compare its mileage with that of other European cars, express this mileage in km/L (L = liter). Use the conversion factors in Appendix E. (b) If this car's gas tank holds 45 L, how many tanks of gas will you use to drive 1500 km?

Solution

Start with the given numbers and go from there.

Part (a)

$$\frac{55.0 \text{ miles}}{1 \text{ gallon}} \times \frac{5280 \text{ ft}}{1 \text{ mile}} \times \frac{1 \text{ mi}}{3.28 \text{ ft}} \times \frac{1 \text{ km}}{1000 \text{ m}} \times \frac{1 \text{ gallon}}{3.788 \text{ L}} \approx 23.4 \ \frac{\text{km}}{\text{L}}$$

Part (b)

$$1500 \text{ km} \times \frac{1 \text{ L}}{23.4 \text{ km}} \times \frac{1 \text{ tank of gas}}{45 \text{ L}} \approx 1.4 \text{ tanks of gas}$$

Note that it's unclear how many significant figures are in 1500. Here it's assumed that the uncertainty is in the hundreds place, that is, there are two significant figures. Scientific notation is needed to be specific.