Exercise 1.2

According to the label on a bottle of salad dressing, the volume of the contents is 0.473 liter (L). Using only the conversions 1 L = 1000 cm^3 and 1 in. = 2.54 cm, express this volume in cubic inches.

Solution

Start from the given quantity, 0.473 L, and arrange the given conversion factors as fractions so that the desired units remain.

$$0.473 \, \cancel{L} \times \frac{1000 \, \cancel{cm}^3}{1 \, \cancel{L}} \times \left(\frac{1 \, \text{in}}{2.54 \, \cancel{cm}} \right)^3 = \frac{(0.473)(1000)(1)^3 \, \text{in}^3}{(1)(2.54)^3} \approx 28.9 \, \text{in}^3$$

This third factor is cubed in order to cancel cm^3 in the second factor. This can be done because every fraction has a value of 1; squaring or cubing makes no difference.