SOLUTION Carry out each mathematical operation. Follow the rules in Table 2-5 and Table 2-6 for determining significant figures and for rounding.

a. The answer is rounded to 2.83 m (for subtraction there should be two digits to the right of the decimal point, to match 5.44 m).

b. The answer is rounded to 38 g (for multiplication there should be two significant figures in the answer, to match 2.4 g/mL).

PRACTICE

1. What is the sum of 2.099 g and 0.05681 g?

Answer
2.156 g

2. Calculate the quantity 87.3 cm – 1.655 cm.

Answer
85.6 cm

3. Calculate the area of a crystal surface that measures 1.34 μm by 0.7488 μm. (Hint: Recall that *area = length × width* and is measured in square units.)

Answer
1.00 μm^2

4. Polycarbonate plastic has a density of 1.2 g/cm^3. A photo frame is constructed from two 3.0 mm sheets of polycarbonate. Each sheet measures 28 cm by 22 cm. What is the mass of the photo frame?

Answer
440 g

Conversion Factors and Significant Figures

Earlier in this chapter, you learned how conversion factors are used to change one unit to another. Such conversion factors are typically exact. That is, there is no uncertainty in them. For example, there are exactly 100 cm in a meter. If you were to use the conversion factor 100 cm/m to change meters to centimeters, the 100 would not limit the degree of certainty in the answer. Thus, 4.608 m could be converted to centimeters as follows.

$$4.608 \text{ m} \times \frac{100 \text{ cm}}{\text{m}} = 460.8 \text{ cm}$$

The answer still has four significant figures. Because the conversion factor is considered exact, the answer would not be rounded. Most exact conversion factors are defined, rather than measured, quantities. Counted numbers also produce conversion factors of unlimited precision. For example, if you counted that there are 10 test tubes for every student, that would produce an exact conversion factor of 10 test tubes/student. There is no uncertainty in that factor.

Scientific Notation

In **scientific notation,** *numbers are written in the form* $M \times 10^n$, *where the factor* M *is a number greater than or equal to 1 but less than 10 and* n *is a whole number.* For example, to write the quantity 65 000 km in