NOTES

LESSON 1.6

GOAL **Compare measurement for precision**

Vocabulary

Precision is the level of detail that an instrument can measure.

Significant digits are the digits in a measurement that carry meaning contributing to the precision of the measurement.

EXAMPLE 1 Compare precision of measurements

Choose the more precise measurement.

a. 14 m; 9 cm **b.** 20.15 gal; 8.2 gal

Solution

a. The units are different. Because a centimeter is a smaller unit of measure than a meter, 9 centimeters is a more precise unit of measure.

b. The units are the same. Because hundredths are smaller than tenths, 20.15 gallons is more precise than 8.2 gallons.

Exercises for Example 1

Choose the more precise measurement.

1. 2 lb; 12 oz **2.** 14 min; 15.5 min **3.** 25 mm; 20 mm

4. 0.002qt; 1.04 qt **5.** 17.33 ft; 17.3 ft **6.** 90 kg; 90.4 kg

There are three rules on determining how many significant figures are in a number:

1. **Non-zero digits are always significant.**
2. **Any zeros between two significant digits are significant.**
3. **A final zero or trailing zeros in the decimal portion <u>ONLY</u> are significant.**

EXAMPLE 2 Identify significant digits

Determine the number of significant digits in each measurement.

a. 250 mi **b.** 3.001 g **c.** 0.0027 cm

Solution

a. The digits 2 and 5 are nonzero digits, so they are significant. The zeros at the end of a whole number are not significant. There are 2 significant digits: **25**0.

b. The digits 3 and 1 are nonzero digits, so they are significant. The zeros are between significant digits, so they are significant. There are 4 significant digits: **3.001**.

c. The digits 2 and 7 are nonzero digits, so they are significant. The zeros are not between significant digits nor are they to the right of both the last nonzero significant digit and the decimal point, so they are not significant. There are 2 significant digits: **0.0027.**

Exercises for Example 2

Determine the number of significant digits in each measurement.

7. 470 m	**8.** 1.006 ft	**9.** 0.03 lb
10. 22,006 yd	**11.** 10.9 cm	**12.** 12.50 mi
13. 109.875 in.	**14.** 6.045 gal	**15.** 0.00725 mm

EXAMPLE 3 **Calculating with significant digits.**

Perform the indicated operation. Write the answer with the correct number of significant digits.

a. 5.25 cm × 7.1 cm **b.** 18.625 qt – 2.5 qt **c.** 16.5 yd^2 ÷ 1.75 yd

Solution

a. 5.25 cm × 7.1 cm = 37.275 cm^2

The least precise measurement is 7.1 centimeters. It has two significant digits. Round the product to two significant digits. The correct product is 37 square centimeters.

b. 18.625 qt – 2.5 qt = 16.125 qt

The least precise measurement is 18 quarts. Its last significant digit is in the ones place. Round the difference to the tenths place. The correct answer is 16.1 quarts.

c. 16.5 yd^2 ÷ 1.75 yd = 9.428571… yd

The least precise measurement is 16.5 square yards. It has three significant digits. Round the quotient to three significant digits. The correct answer is 9.43 yards.

Exercises for Example 3

Perform the indicated operation. Write the answer with the correct number of significant digits.

16. 23.2 km + 16 km	**17.** 7.5 dollars ÷ 2.5 days
18. 5.7 cm × 4.25 cm	**19.** 27.15 mL – 13.1 mL
20. 0.0007 oz + 1 0.002 oz	**21.** 8.4 in. × 0.5 in.
22. 34.68 min – 8.025 min	**23.** 53.775 mm^2 ÷ 5.75 mm