▸ **Rounding off numbers** When you report a calculation, your answer should have no more significant figures than the piece of data you used in your calculation with the fewest number of significant figures. Thus, if you calculate the density of an object with a mass of 12.33 g and a volume of 19.1 cm^3, your answer should have only three significant figures. However, when you divide these quantities using your calculator, it will display 0.6455497—many more figures than you can report in your answer. You will have to round off the number to three significant figures, or 0.646.

Here are some rules to help you round off numbers.

1. If the digit to the immediate right of the last significant figure is less than five, do not change the last significant figure.
2. If the digit to the immediate right of the last significant figure is greater than five, round up the last significant figure.
3. If the digit to the immediate right of the last significant figure is equal to five and is followed by a nonzero digit, round up the last significant figure.
4. If the digit to the immediate right of the last significant figure is equal to five and is not followed by a nonzero digit, look at the last significant figure. If it is an odd digit, round it up. If it is an even digit, do not round up.

Practice Problems

24. Round each number to five significant figures. Write your answers in scientific notation.
- **a.** 0.000 249 950
- **b.** 907.0759
- **c.** 24 501 759
- **d.** 300 100 500

25. Complete the following calculations. Round off your answers as needed.
- **a.** 52.6 g + 309.1 g + 77.214 g
- **b.** 927.37 mL − 231.458 mL
- **c.** 245.01 km × 2.1 km
- **d.** 529.31 m ÷ 0.9000 s

Chapter 1

Practice Problems

1. **a.** qualitative data
b. quantitative data
c. quantitative data
d. quantitative data
e. qualitative data
f. quantitative data

Chapter 2

Practice Problems

1. 100 centigrams
2. 1000 liters
3. 1 000 000 000 nanoseconds
4. 1000 meters
5. 1.9 g/cm^3
6. 1.6 g/mL, or 1.6 g/cm^3
7. 0.862 g/mL, or 0.862 g/cm^3
8. silver
9. 2.2 cm^3
10. 17 g
11. **a.** 327 K
b. 219 K
c. 288 K
12. **a.** −241°C
b. −273°C
c. 8°C
13. **a.** 5×10^4 m/s^2
b. 6.2×10^{-10} kg
c. 2.3×10^{-5} s
d. 2.13×10^7 mL
e. 9.909×10^8 m/s
f. 4×10^{-9} L
14. **a.** 4.62×10^{21}
b. 6.17×10^8
c. 2.280×10^5
d. 1.67×10^{-4}
e. 5.92×10^{-5}
f. 8.198×10^2
15. **a.** 6×10^2 m^2
b. 9×10^{14} km^2
c. 4×10^{-8} mm^2
d. 1×10^3 kg/L
e. 4 m/s
f. 4×10^4 km/s
16. 884 700 cm
17. 1560 mm
18. 11 L
19. 168 hr; 10 080 min
20. 0.783%
21. 2.00%
22. **a.** 6.00%
b. The measurements are extremely precise but not accurate.
23. **a.** 2
b. 4
c. 5
d. 4
24. **a.** 2.4995×10^{-4}
b. 9.0708×10^2
c. 2.4502×10^7
d. 3.0010×10^8
25. **a.** 439 g
b. 695.91 mL
c. 510 km^2
d. 588.1 m/s