

## Rounding

You can round a number to a specific place value (such as hundreds or tenths) or to a specific number of significant figures. To do this, determine the place to which you are rounding, and then use the following rules.

1. When the leftmost digit to be dropped is less than 5, that digit and any digits that follow are dropped. Then the last digit in the rounded number remains unchanged.
2. When the leftmost digit to be dropped is greater than 5, that digit and any digits that follow are dropped, and the last digit in the rounded number is increased by one.
3. When the leftmost digit to be dropped is 5 followed by a nonzero number, that digit and any digits that follow are dropped. The last digit in the rounded number increases by one.
4. If the digit to the right of the last significant digit is equal to 5 and 5 is followed by a zero or no other digits, look at the last significant digit. If it is odd, increase it by one; if it is even, do not round up.

*Examples:* Round the following numbers to the stated number of significant figures.

8.7645 rounded to 3 significant figures is 8.76.

*Using rule 1*

8.7676 rounded to 3 significant figures is 8.77.

*Using rule 2*

8.7519 rounded to 2 significant figures is 8.8.

*Using rule 3*

92.350 rounded to 3 significant figures is 92.4.

*Using rule 4*

92.25 rounded to 3 significant figures is 92.2.

*Using rule 4*

### PRACTICE PROBLEMS

2. Round each number to the number of significant figures shown in parentheses.
  - a. 1405 m (2)
  - b. 2.50 km (2)
  - c. 0.0034 m (1)
  - d. 12.007 kg (3)

## Operations with Significant Figures

If using a calculator, do all of the operations with as much precision as the calculator allows, and then round the result to the correct number of significant figures. The number of significant figures in the result depends on the measurements and on the operation.

**Addition and subtraction** Round the result to the least precise value among the measurements—the smallest number of digits to the right of the decimal points.

*Example:* Add 1.456 m, 4.1 m, and 20.3 m.

The least precise values are 4.1 m and 20.3 m because they have only one digit to the right of the decimal points.

$$\begin{array}{r} 1.456 \text{ m} \\ 4.1 \text{ m} \\ + 20.3 \text{ m} \\ \hline 25.856 \text{ m} \end{array}$$

*Add the numbers.*

25.9 m

*Round the result to place value of the least precise value.*