Significant Figures – Study Guide

*section 1.5 in OpenStax*

An **exact** number is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

An example of an exact number is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

What are **significant figures**? Why are significant figures important in science?

**Rules for Significant Figures**

1. The digits 1, 2, 3, 4, 5, 6, 7, 8, 9 are always \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2. Leading zeros are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ significant.

3. Interior zeros are always \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

4. Trailing zeros are \_\_\_\_\_\_\_\_\_\_\_ significant unless \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

How many significant figures are in each of the following measured quantities?

68 cm \_\_\_\_\_\_\_\_ sig. figs 186,000 kg \_\_\_\_\_\_\_\_ sig. figs

1005 in \_\_\_\_\_\_\_\_ sig. figs 2007780 mL \_\_\_\_\_\_\_\_ sig. figs

0.0596 ft \_\_\_\_\_\_\_\_ sig. figs 0.0045020 lb \_\_\_\_\_\_\_\_ sig. figs

When multiplying or dividing measured quantities, what determines the number of significant figures in the result?

*example*: 1.075 x 10.074 x 0.48 = \_\_\_\_\_\_

(*ans. 5.2*)

When adding or subtracting measured quantities, what determines the number of significant figures in the result?

***Watch the video tutorial on*** [Significant Figures](https://www.youtube.com/watch?v=vXuvbRA6Uz8)

*examples*: 1.352 + 0.08 + 12.4471 = \_\_\_\_\_\_ (*ans. 13.88*)

(9.9 x 104) + (4.88 x 102) + (7.60 x 103) = \_\_\_\_\_\_ (*ans. 1.07 x 105)*

**Rounding Numbers**

If the first digit to be dropped is 5 or greater, increase the value of the last retained digit by one (rounding up).

If the first digit to be dropped is less than 5, the last retained digit is unchanged (rounding down).

*examples:* 36.7135 rounded to two significant figures is 37 (rounded up)

36.7135 rounded to four significant figures is 36.71 (rounded down)

Explain the difference between **accuracy** and **precision**.

**End of Chapter 1 Practice Problems**

#45, 47, 49, 51, 53, 55

For detailed solutions to these problems, go to the [OpenStax website](https://openstaxcollege.org/textbooks/chemistry/resources) and download the “Student Answer and Solution Guide.”