

Chapter 1: Rules for Significant Figures

What's a significant figure (or digit)?

- (1) A digit that has been measured experimentally, or
- (2) A digit derived from an experimental measurement.

What figures are significant?

- (1) All non-zero digits
- (2) Zeros between non-zero digits
- (3) Trailing zeros to the right of the decimal point
e.g. 9.950 has four significant figures

What figures are not?

- (1) Place-holding zeros to the right of the decimal place
e.g. 0.00995 has three significant figures
- (2) Place-holding zeros to the left of the decimal place(??)
e.g. 30 has one or two significant figures?

To be unambiguous, use scientific notation...

- e.g.* 3×10^1 has one significant figures
 3.0×10^1 has two significant figures

...or add a decimal point to the end of a number. This makes all written figures significant.

e.g. 30. has two significant figures

In lab, the last figure you should record is the first figure with some uncertainty. This will be, for example, a number that is fluctuating on a display (like on a balance), or a number determined by interpolation between two marked gradations (like on a buret).

Significant Figures and Arithmetic:

- (1) Multiplication and Division: The final answer will have as many significant figures as the number in the calculation with the fewest significant figures (that is, the least precise number).
- (2) Addition and Subtraction: The final answer's last significant figure will be in the same "place" as the last significant figure in the least precise number.
- (3) To avoid rounding errors, any numbers you write down before a final answer should contain at least one non-significant figure. This is commonly written as a subscript.
e.g. if 30 mL has only one significant figure, it can be written as 3_0 mL.