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 <u>four</u> significant figures

What figures are not?

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

To be unambiguous, use scientific notation…
e.g. 3×10^1 has <u>one</u> significant figures
3.0×10^1 has <u>two</u> significant figures

…or add a decimal point to the end of a number. This makes all written figures significant.
e.g. 30**.** has <u>two</u> significant figures

<u>In lab, the last figure you should record is the first figure with some uncertainty</u>. 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).

<u>Significant Figures and Arithmetic</u>:

(1) Multiplication and Division: The final answer will have <u>as</u> <u>many</u> significant figures as the number in the calculation with the <u>fewest</u> significant figures (that is, the least precise number).

(2) Addition and Subtraction: The final answer's <u>last</u> 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 <u>non</u>-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.