

A Practical Guide for Using Significant Figures

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August 2020

The main idea of using significant figures in calculations is relatively simple: Your answer can't be any better (can't be more precise) than your data! However, putting this into practice can be difficult. Use the following rules.

1. Determining the number of significant figures.
 - (a) All non-zero numbers are significant (45.23 mm has 4).
 - (b) Zeros in-between significant numbers are significant (6.07 mm has 3).
 - (c) Zeros to the left of the first non-zero number are not significant because they are just placeholders (0.04 mm has 1).
 - (d) When a number ends in a zero after the decimal point, the zeros after the decimal point are significant (0.20 mm has 2, 60.00 mm has 4).
 - (e) When a number ends in a zero (or zeros) before the decimal point, the zero (or zeros) could or could not be significant. Use scientific notation or overbars to make it clear which numbers are significant ($5\overline{0}00 = 5.0 \times 10^3$ hectares has 2.)
2. Some numbers are exact. They have an infinite number of significant figures.
 - (a) There are 60 minutes in an hour (60 has an infinite number of significant figures).
 - (b) A plant has 7 leaves (7 has an infinite number of significant figures).
3. When adding or subtracting, round the answer so its least significant digit is in the same place as the least significant figure of the data ($5.4 + 4.98 + 6.9111 + 7 = 24$).
4. When multiplying or dividing, round the answer to have the least number of significant digits ($8 \times 542 \times 4\overline{0} = 200,000 = 2 \times 10^5$).