

# Significant digits

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A significant digit is a digit that contributes to the precision of a number. Only in two following situations is a digit not significant:

- *Trailing zeros in a whole number without a decimal point.*

Example: 15**000**, 23**0000**, -1**000**, ...

These zeros are not significant because they indicate the number's magnitude, not precision. Imagine that a city has a population of 15,000 people. You don't take the zeros literally. The true population could be anywhere between 14,500 and 15,499. The zero digits give us an idea how large the population is. These zeros can be absorbed in a scientific notation:  $1.5 \times 10^4$ ,  $2.3 \times 10^5$ ,  $1 \times 10^3$ .

- *Leading zeros of a number.*

Example: **0.003**, **0.00015**, -**0.0021**

These zeros indicate the smallness of the number, not precision. They are used only to locate the position of the decimal point. They can be absorbed in a scientific notation:  $3 \times 10^{-3}$ ,  $1.5 \times 10^{-4}$ ,  $-2.1 \times 10^{-3}$

Example: **00012**, **002.03**

These zeros don't contribute anything to the number.

## More examples:

- 123  
All digits are significant. As a rule of thumb, *all nonzero digits are significant.*
- 1003  
All digits are significant. As a rule of thumb, *all digits lying between two significant digits are significant.*
- 100.00  
All digits are significant. The zeros after the decimal point indicates that the number (or measurement) is known to the nearest hundredth.
- 100.0  
All digits are significant. The zeros after the decimal point indicates that the number (or measurement) is known to the nearest tenth.
- 100.  
All digits are significant. The zeros after the decimal point indicates that the number (or measurement) is known to the nearest one.