Rules of figs! (sig figs that is)

In general: if it adds to the precision, it’s significant. If it’s a place-holder, it’s not significant.

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|  | **Significant** | **NOT Significant** |
| 1. All non-zero numbers… |  |  |
| 2. Zeros surrounded by non-zeros… |  |  |
| 3. More than one zero surrounded by non-zeros… |  |  |
| 4. Scientific Notation: all zeros to the left of the x (multiply) sign… |  |  |
| 5. Zeros simultaneously to the right of the decimal point AND at the end of the number…\* |  |  |
| 6. Leading zeros: zeros in front of non-zero digits\* |  |  |
| 7. Trailing zeros: zeros after non-zero numbers without a decimal point\* |  |  |
| 8. zeros at the end of a number but to the left of a decimal |  |  |

**\*Atlantic-Pacific Rule:** "If a decimal point is **P**resent, ignore zeros on the **P**acific (left) side. If the decimal point is **A**bsent, ignore zeros on the **A**tlantic (right) side. Everything else is significant."

If you feel comfortable with scientific notation, the simplest rule for counting significant digits is:

"Convert the number into scientific notation. Any leading or trailing zeros the decimal point bumps past in the conversion will vanish. Everything else is significant." Writing measurements in scientific notation shows that the significant part of the measurement doesn't change when you change units. For example, 2.0 cm = 2.0 × 10-2 m = 2.0 × 101 mm = 2.0 × 104 µm, all with 2 significant digits. See back.

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| **Rule** | **Example** |
| Zeros appearing between nonzero digits are significant | 40.7 L has three sig figs87 009 km has five sig figs |
| Zeros appearing in front of nonzero digits are not significant | 0.095 987 m has five sig figs0.0009 kg has one sig fig |
| Zeros at the end of a number and to the right of a decimal are significant | 85.00 g has four sig figs9.000 000 000 mm has 10 sig figs |
| **Scientific notation** - All digits expressed before the exponential term are signicant. | 5.060 x 10-3 m has **four** sig figs.9.00 x 102 g has **three** sig figs. |
| Zeros at the end of a number but to the left of a decimal may or may not be significant. If such a zero has been measured, or is the first estimated digit, it is significant. On the other hand, if the zero has not been measured or estimated but is just a placeholder, it is not significant. A decimal placed after the zeros indicates that they are significant. | 2000 m may contain from one to four sig figs, depending on how many zeros are placeholders. For measurements given in this text, assume that 2000 has one sig fig.2000. m contains four sig figs, indicated by the presence of the decimal point |

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| **Number** | **Atlantic-Pacific rule** | **Scientific notation rule** |
| **0.001010** | **decimal point Present: ignore zeros on the Pacific side. 4 sig. digits.** | **In scientific notation: 1.010 × 10-3. 4 sig. digits. The decimal point moved past the three leading zeros; they vanished.** |
| **0.30000** | **decimal point Present: ignore zeros on the Pacific side. 5 sig. digits.** | **In scientific notation: 3.0000 × 10-1. 5 sig. digits. The decimal point bumped past the leading zero; it vanished.** |
| **100.0000** | **decimal point Present: ignore zeros on the Pacific side (none!) 7 sig. digits.** | **In scientific notation: 1.000000 × 102. The decimal point moved past two zeros, but they aren't trailing zeros; they're in the middle of the number. 7 sig. digits.** |
| **12303000** | **decimal point Absent: ignore zeros on the Atlantic side. 5 sig. digits.** | **In scientific notation: 1.2303 × 107. The decimal point moved past the trailing three zeros; they vanished. It moved past the zero between the threes, too, but that's not a trailing or leading zero; it stays. 5 sig. digits.** |

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