

Rules for counting

Subject: Significant Figures

① Nonzero integers always count as significant figures

3456 → 4 sig figs

3.95 → 3 sig figs

② There are three classes of zeros

Ⓐ Leading zeros are zeros that precede all the nonzero digits. These do not count as sig fig

0.048 → 2 sig figs

0.095897 m → 5 sig figs

0.0009 kg → 1 sig fig

Ⓑ Captive zeros are zeros between nonzero digits.

These always count as significant figures

16.07 → 4 sig figs

40.7 L → 3 sig figs

87009 km → 5 sig figs

Ⓒ Trailing zeros are zeros at the right end of the number, contains a decimal point.

They are sig only if the num

9.300 → 4 sig figs

150 → 2 sig figs

85.00 g → 4 sig figs

9.000 000 000 mm → 10 sig figs

2000 m → 1 sig fig

2000. m → 4 sig fig

③ Exact numbers have an infinite number of sig figs

1 inch = 2.54 cm, exactly → ∞ sig figs

9 pencils → ∞ sig figs

Exponential Notation

$$300. \rightarrow 3 \text{ sig figs } (\downarrow 3.00 \times 10^2)$$

Significant Figures in Mathematical Operations

① For multiplication or division, the number of sig figs in the result is the same as the num in the least precise measurement used in the calculation

$$1.342 \times 5.5 = 7.381 \rightarrow 7.4 \text{ 2 sig figs}$$

② For addition or subtraction, the result has the same num of decimal places as the least precise measurement used in the calculation.

①①

$$23.445$$

$$+ 7.83$$

$$\hline 31.275 \rightarrow 31.28 \rightarrow 4 \text{ sig figs}$$

Determine the number of significant figures in each of the following

Ⓐ 804.05 g \rightarrow 5 sig figs

Ⓑ 0.0144030 km \rightarrow 6 sig figs

Ⓒ 1002 m \rightarrow 4 sig figs

Ⓓ 400 mL \rightarrow 1 sig figs

Ⓔ 30 000. cm \rightarrow 5 sig figs

Ⓕ 0.000625000 kg \rightarrow 6 sig figs

Significant Figures in measurement consist of all digits known with certainty plus one final digit which is somewhat uncertain or is estimated.

عدد الأرقام المعنوية = الأرقام المؤكدة منها + الرقم التقدير العشوائي منها

② Suppose the value "seven thousand centimeters" is reported to you. How should the num be expressed if it is intended to contain the following?

Ⓐ 1 sig fig 7000 cm

Ⓑ 4 sig fig 7000. cm

Ⓒ 6 sig fig 7000.00