Sig Fig NOTES + WS KEY

December 9, 2021 9:49 PM

"Sig. Figs"

A Short Guide to Significant Figures

NAME: Key **BLOCK:**___

What is a "significant figure"?

- a measured or meaningful digit.
- digits measured or calculated with precision.

Rules for deciding the number of *significant figures* in a measured quantity:

(1) All NON-zero ***are significant***:
1.234 g has 4 significant figures,
1.2 g has 2 significant figures.

(2) Zeroes between nonzero digits ***are significant:*** "sandwich zeros"
1002 kg has 4 significant figures,
3.07 mL has 3 significant figures.

(3) Leading Zeroes: to the left of the first nonzero digits are **NOT *significant***; these zeroes only indicate the position of the decimal point:
0.001 C has only 1 significant figure,
0.012 g has 2 significant figures.

(4) Zeroes to the RIGHT of a decimal in a number ***are significant***:
0.023 mL has 2 significant figures,
0.200 g has 3 significant figures.
→ right
"trailing zeros" in a decimal.

(5) When a number ends in 0 with no decimal, the zeroes are **NOT *significant***:
190 miles is 2 significant figures
50,600 calories is 3 significant figures.
sandwich zero

The use of scientific notation can help with this rule.
For example, depending on whether 3, 4, or 5 significant figures is correct, we could write 50,6000 calories as:
5.06×10^4 calories (3 significant figures)
5.060×10^4 calories (4 significant figures), or
5.0600×10^4 calories (5 significant figures).

*can use scientific notation to help get the correct number of sig. figs.

Rules for mathematical operations using Significant Figures

In carrying out calculations, the general rule is that the accuracy of a calculated result is limited by the least accurate (↓sig. figs) measurement involved in the calculation.

(1) In ***addition and subtraction***, the result is rounded off to the least number of decimal places.

For example: 1 d.p.
100.5 + 23.643 = 124.143 which should be rounded to = 124.1
leave the same (no rounding) (1 d.p.)

(2) In ***multiplication and division***, the result should be rounded off so as to have the same number of significant figures as in the least precise number. (lowest number of sig. figs overall)

For example:
3.0 2 × 12.60 = 38.052 which should be rounded to = 38.1
3 s.f. 4 s.f. 3 s.f.
round up
answer must have 3 s.f.

Assignment #1b: Complete the following worksheet in the space provided below...add to your Physics Book 1

Significant Figures Worksheet

1. Indicate how many significant figures there are in each of the following measured values.

246.32	5	1.008	4	700000	1
107.854	6	0.00340	3	350.670	6
100.3	4	14.600	5	1.0000	5
0.678	3	0.0001	1	320001	6

2. Calculate the answers to the appropriate number of significant figures.

lowest d.p.

32.567 135.0 + 1.4567 169.0237 = 169.0	246.24 238.278 + 98.3 582.818 = 582.8	658.0 23.5478 + 1345.29 2026.8378 = 2026.8

3. Calculate the answers to the appropriate number of significant figures. *you will need to round + (maybe) use scientific notation.

a) 23.7 x 3.8 (2 s.f.) = 90.06 = 9.0×10^1 (4 s.f. → 2 s.f.)

b) 45.76 x 0.25 (2 s.f.) = 11.44 = 11

c) 81.04 x 0.010 (2 s.f.) = 0.8104 = 0.81

d) 6.47 x 64.5 (3 s.f.) = 417.315 = 417

e) 43.678 x 64.1 (3 s.f.) = 2799.7598 = 2.80×10^3

f) 1.678 ÷ 0.42 (2 s.f.) = 3.99523... = 4.0 (round)

g) 28.367 / 3.74 (3 s.f.) = 7.58847... = 7.58 (no rounding)

h) 4278 / 1.006 (4 s.f. / 4 s.f.) = 4252.485 = 4252 (4 sig. figs.)