

9/5/2018 # Sig figs = # certain digits + 1

Rules for counting s.f.

1. Non-zero digits ✓ ex: 82 (2 s.f.)
2. Interior zeros ✓ ex: 907 (3 s.f.)
3. Leading zeros ✗ ex: 0.6 (1 s.f.)
4. Trailing zeros ✓ if there's a decimal point visible ex: 3.0 (2 s.f.)
✗ otherwise.

ex: 30^x (1 s.f.) means: 20-40
±1
30. (2 s.f.) means: 29-31
±1
30.0 (3 s.f.) means: 29.9-30.1
±1

19.5 (3 s.f.)

1806.2 (5 s.f.)

0.008 (1 s.f.)

0.0080 (2 s.f.)

800 (1 s.f.)

800. (3 s.f.)

019.050 (5 s.f.)

leading interior trailing

Scientific Notation ... when we use it, the $\times 10^x$ doesn't change #s.f.

ex: $\underbrace{8.0}_{2 \text{ s.f.}} \times \underbrace{10^2}_{\text{ignore}}$ (2 s.f.)

Exact #'s (defined, counted) ~ have no uncertainty!
 $\Rightarrow \infty$ s.f.

ex: $\underbrace{2.54 \text{ cm}}_{\infty \text{ s.f.}} = \underbrace{1 \text{ in}}_{\infty \text{ s.f.}}$ (defined)

In calculations, the least precise # affects the final answer's precision.

1. $\times, \%$

go by fewer #s.f.

ex:

(4s.f.) (3s.f.)

$$3.281 \times 1.94$$

6.7421

0.944088637

need to have 3 s.f.

$$= 0.944 \text{ (3 s.f.)}$$

2. $+, -$

go by first
decimal places

ex :

1.848

(3 d.p.)

① 1.32

(2d.p.)

0.53 (2d.p.)

- calculator says: 0.528

if 1st removed digit is 0, 1, 2, 3, 4 ✓

" ————— " is 5, 6, 7, 8, 9 ~ remove,
but round up last remaining digit.

$\checkmark \checkmark \times$
 $0.5428 \rightarrow \text{3dp.}$
 $0.54 \leftarrow \text{2dp.}$

8.47 $\xrightarrow{\text{2.s.f.}}$ 8.5

✓✓ ✗✗
1804

$8.47 \xrightarrow{2.s.f.} 8.5$
 $1804 \xrightarrow{2.s.f.} \cancel{18}$

Precision + accuracy

if we carry out multiple measurements in a lab

accuracy = how close to "true" value

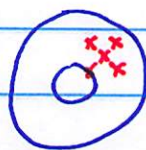
precision = how close to each other

Dartboard analogy:

aiming
for
center



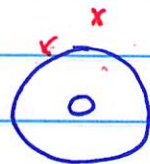
A ✓
P ✓



A x
P ✓



A ✓
P x



✓ A x
P x

Read 1-8.

Chapter 2 ~ Atoms + Elements.

John Dalton, 1808 proposed the "atomic theory"

1. Elements consist of atoms (tiny, indestructible particles)

2. All atoms of an element are same +
diff. to atoms of other elements.



3. Atoms combine in whole # ratios to form compounds



peroxide, 2H:2O



water, 2H:1O

4. Chemical rxns ^{← reactions} are when atoms change the way they
are bound to other atoms.

