1.17.2020

Scientific Notation - a better way of writing really big or really small numbers

written as a # between 1 → 10

$\times 10^{a}$ → # decimal places moved

- if you moved the decimal to the left, the exponent is positive
- if you moved the decimal to the right, the exponent is negative.

Ex. # miles in 1 light year

5.879000000000000 miles

5.879×10^{12} miles

mass of a hydrogen atom in kg

0.000000000000000000000000000001 6736 kg

1.6736×10^{-27}

speed of light

3.00000000 m/s

3.0×10^{8} m/s

Planck's constant

~~0.000000~~

.000 000 000 000 000 000 000 000 000 000 000 000 1 6626 J·s

6.626×10^{-34} J·s

Significant Figures

the number of digits that carry meaning in a measurement.

Rules	Examples	
1. Any nonzero numbers are significant	3248 g 4 s.f.	50 °C 1 s.f.
2. Zeroes b/w 2 numbers (sandwiched) are ALWAYS significant	103 °F 3 sf.	92006 mm 6 s.f.
3. Zeroes before numbers are NEVER significant.	0.0123 kg 3 sf	0.001706 kg 4 sf
4. Zeroes after numbers are significants ONLY IF A DECIMAL POINT IS EXPRESSLY WRITTEN	520 mL 2 sf	520. mL 3 sf
	.520 mL 3 sf	520.00 mL 5 sf
	0.000520 mL 3 sf.	

Practice

1) 30.6010 mL
6 sf

2) 0.900 L
3 sf

3) 0.00002019000 ms
7 sf.

Sig. Figures when multiplying/dividing

Your answer must have the same amount of significant figures as the measurement with the LEAST AMOUNT of significant figures

Ex) 20.0 cm 3sf
× 12 cm 2sf
$\boxed{240\ cm^2}$ 2sf

$\frac{450.\ g}{16.00\ mL}$ 3sf 4sf

= 28.125 g/mL

= $\boxed{28.1\ g/mL}$

1.21.2020

Review multiplying/dividing w/ sig. figures

3sf 5sf $\frac{65.0\ m}{.87605\ s} = 74.19667827\ m/s$

$= 74.2\ m/s$ 3sf

1971 years (4sf) $\times$ $.80$ (2sf) $= 1576.8$ years

1600 years

Adding/Subtracting w/ Sig. Figures

The answer must have the same amount of significant figures AFTER THE DECIMAL POINT as the measurement that has the least amount of significant figures AFTER THE DECIMAL POINT

Ex)

$$\begin{array}{rl} 32.66\ m & 2sf \\ +\ 4.5496\ m & 4sf \\ \hline 37.2096\ m & \end{array}$$

37.21m

$$\begin{array}{rl} 100.00\ °C & 2sf \\ -\ 75.0\ °C & 1sf \\ \hline 25.00\ °C & \end{array}$$

25.0°C

$$\begin{array}{rl} 100.001\ g & 3sf \\ -\ 18\ g & 0sf \\ \hline 82.001\ g & 0sf \end{array}$$

82.g

$$\begin{array}{rl} 0.017693\ mL & 5sf \\ +\ 0.00042\ mL & 2sf \\ \hline 0.018113\ mL & \end{array}$$

0.018mL