

General Chemistry - First Math Skills to Master

Numbers, Notations, Calculations



#1 KNOW YOUR SCIENTIFIC CALCULATOR

Know the special keys for exponential notation [**EE**] or [**EXP**] and change sign [**+/-**]

And sometimes there is a "SCI" scientific display mode available.

#2 LEARN THE RULES FOR SIGNIFICANT FIGURES ("Sig Figs" denote the degree of accuracy)

Starting with the left-most nonzero digit, count it and all remaining digits to the right

8.00 mL (3 sig figs) 15.000 km (5 sig figs) 280 (2 sig figs) 280. (3 sig figs)

Combined examples:

1.00300 mg (6 sig figs) 0.0002050 m (4 sig figs) 6040000. mm (7 sig figs)

#3 KNOW HOW TO CONVERT REGULAR NUMBERS INTO TO EXPONENTIAL NOTATION

Use Scientific Notation:

Uses just 1 digit to left of decimal

$$106.9 = \underline{1.069} \times 10^2 = 1.069E2 \quad (4 \text{ sig figs})$$

$$12000 = \underline{1.2} \times 10^4 = 1.2E4 \quad (2 \text{ sig figs})$$

$$.002370 = \underline{2.370} \times 10^{-3} = 2.370E-3 \quad (4 \text{ sig figs})$$

#4 LEARN HOW TO HANDLE SIGNIFICANT FIGURES WHEN USING ALGEBRA

Algebra notation: $A \times B$ is also written as $A \cdot B$ → Use "Order of Operations" PEMDAS

For addition & subtraction, the number with least accuracy limits the accuracy of the final answer.

For multiplication & division, the number with the fewest significant figures sets the total possible significant figures in the answer.

$$7.250 + 844 = 851 \quad 7.250 \times 844 = \sim 6119 \text{ and then round off} = 6120 \quad (3 \text{ sig figs})$$

#5 KNOW ALGEBRA NOTATION FOR CALCULATION TASKS

$$\frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd}$$

→ Don't use this form: $a/b \times c/d = ac/bd$

$$\frac{a}{b} \times \frac{c}{a} = \frac{c}{b}$$

Note: Here, **A** simply "cancels out" **A**

$$\frac{\cancel{a}}{b} \times \frac{c}{\cancel{a}} = \frac{c}{b}$$

$$\frac{a}{b} \div \frac{c}{d} = \frac{ad}{bc}$$

rearranged as $\frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}$

Rarely written as $\frac{a}{b} / \frac{c}{d} = \frac{ad}{bc}$