Significant Figures
Chem1A, General Chemistry I

Significant Figures are a way to express uncertainty in a measurement as well as create a system of rounding that is universally understood.

TO IDENTIFY SIGNIFICANT FIGURES

Non-zero integers are **ALWAYS** significant (3741 = 4 significant figures)

Zeroes are **SOMETIMES** significant (0.**1090** = 4 sig. figs.)
    Leading (to the left) zeroes are **NEVER** significant (0.00**133** = 3 sig. figs.)
    Interior (in the middle) zeroes are **ALWAYS** significant (**4808** = 4 sig. figs.)
    Trailing (to the right) zeroes are **SOMETIMES** significant.
    *If a **decimal point** is written* → significant (**58.0** = 3 sig. figs.)
    *If there is **no** decimal point written* → not significant (**58**0 = 2 sig. figs.)

TO USE SIGNIFICANT FIGURES IN CALCULATIONS

Multiplication & Division: Answer keeps the same **NUMBER** as the factor with the fewest.

0.62 (**2** sig. figs.) x 3101 (4 sig. figs.) = 1922 → 1900 (**2** sig. figs.)
314 (**3** sig. figs.) ÷ 0.10384 (5 sig. figs.) = 3023 → 3020 (**3** sig. figs.)

Addition & Subtraction: Answer keeps the same **PLACE** as the factor with the smallest.

310 (**tens** position) + 6.4 (tenths position) = 316.4 → 320 (**tens** position)
6.487 (thousandths position) – 10.4 (**tenths** position)
                      = -3.913 → -3.9 (**tenths** position)

For **multistep** calculations, track significant figures for each step, but do not round until the very end.

6.43 x 2.8 + 10.56 =
(1) 6.43 (3 sig. figs.) x 2.8 (**2** sig. figs.) = 18.004 (**2** sig. figs.)
(2) 18.004 (**ones** position) + 10.56 (hundredths) = 28.564 (**ones** position) → 29

3.56 – 1.85 x 0.6 =
(1) 1.85 (3 sig. figs.) x 0.6 (1 sig. figs.) = 1.11 (**1** sig. fig.)
(2) 3.56 (hundredths) – 1.11 (**ones** position) = 2.45 (**ones** position) → 2