Unit 1

Math in Physical Science

1.1 Numbers

Generally, in this class, you should give your final answers in decimal form. If it is a fraction that makes sense, like $\frac{4}{5}$, fine, give it as a fraction. If it ends up being some weird fraction like $\frac{85}{217}$, please just use decimal form.

Rounding Decimals

Answers should be rounded to two or three decimal places.

1.2 Scientific Notation

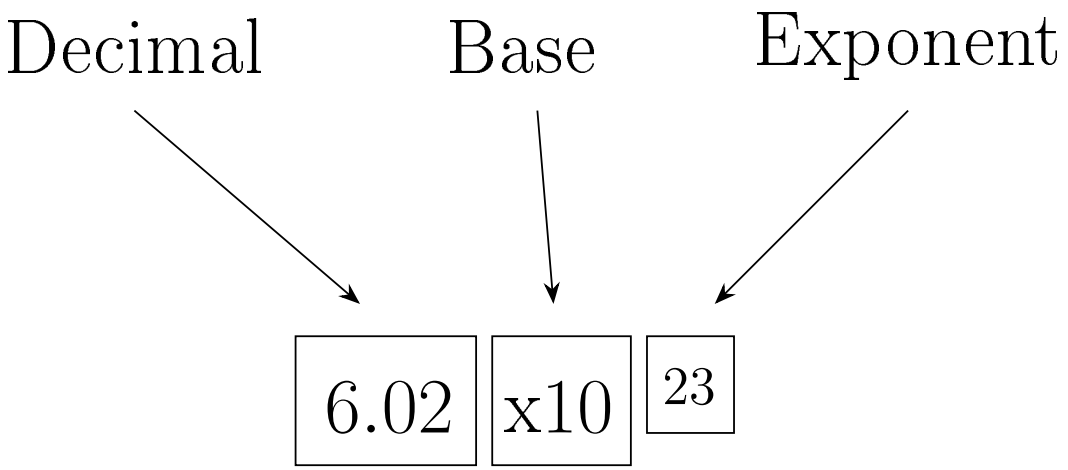
1.2.1 Why

Scientific Notation is just a more convienent way to display really big and really small numbers. For instance, instead of writing

$$6{,}020{,}000{,}000{,}000{,}000{,}000{,}000{,}000$$

over and over in a problem, it is much more convienent to write

$$6.02 \times 10^{23}$$



1.2.2 How to read and write Scientific Notation

1.3 Units

1.4 Examples of solving Math Problems in Physical Science

Now that we have discussed what units are in Math and Science, let's look the general steps you should be doing for all of the math problems in this class. We will use an example problem from near the beginning of the year involving Gas Laws.

Example 1

A balloon is filled with air. The pressure of the balloon is 10 atm to start. This expands it to a starting volume of 2 mL. The balloon is then squeezed to a new pressure of 28 atm. What would be the new volume of the balloon after it is squeezed?

When solving math-based problems in this class, you will *generally* follow the following five steps:

1. Write down the numbers that you are **GIVEN** (with units).
2. Write down the number you are asked to **FIND** (with units.)
   (a) I usually write a ? instead of a number, because we are going to solve for this. We don't know what it is yet!
3. Narrow down your formulas until you have one that allows you to solve for the missing number.

   (a) Look at your list of **GIVENS** and **FINDS** and pick a formula that has the same variables in it as are in the list
      i. For instance, if you are given Pressures and Volumes, and are asked to find a Volume, you should look for a formula involving Pressures and Volumes
         A. This would be Boyle's Law

4. Get the correct version of the formula you chose, so that it reads

$$\boldsymbol{FIND} = \text{...other stuff}$$

   (a) You can do this with algebra (if you have learned that in your math class)
   OR
   (b) Pick the correct "version" of the formula from the list provided by Mr. Vober. Check the wall or your notes for the different "versions".

5. Plug in the **GIVENS** into the matching places in the formula you chose.

6. Solve the math problem

7. Record you final answer, with units.

   (a) The units for the answer will be the same as the same type of number in the **GIVENS**
   (b) Example: You are solving for a mass, and the **GIVEN** mass is measured in $kg \rightarrow$ your answer will also be in kg