Address an email to andrew.aspaas@anokaramsey.edu (spell carefully) from your MetNet email account, and make the subject “Lastname Chem 1020 Homework 2” using your own last name. Answer the following questions in the body of the email message.

1. Give one example each of a physical transformation and a chemical transformation you’ve seen recently at home.

   Physical transformations can be anything where the form of matter changes but not the identity of the matter. So anything like ice melting, water boiling, sugar dissolving, etc. Chemical transformations can be identified by the formation of a new substance, for instance when grilling beef, black carbon forms on the surface, or when two components of epoxy combine they form a new hard substance.

2. How many significant figures are there in the number 0.0003500230100?

   Leading zeroes are never significant, so start counting at the 3. Count all the nonzero digits and the trapped zeroes. Trailing zeroes are only significant if there’s a decimal point in the number. There is a decimal point here so all the trailing zeroes are significant. There are 10 significant figures.

3. Write $6.24 \times 10^{-2}$ in standard notation.

   $10^{-2}$ is a small number so we must move the decimal point in a direction that will make the number smaller. Moving the decimal point 2 places to the left will leave us with $0.0624$, and we have to fill in the empty place with a zero. It is also customary to always have a zero to the left of a decimal number that’s less than 1. So the answer is 0.0624

4. Calculate the volume of an object with a density of 2.25 g/mL and a mass of 3.8 g. Report your answer with the correct number of significant figures and an appropriate unit.

   \[
   \begin{align*}
   d &= \frac{m}{v} \\
   v &= \frac{m}{d} = \frac{3.8 \text{ g}}{2.25 \text{ g/mL}} = 1.68888889 \text{ mL} \\
   v &= \frac{m}{d} = \frac{3.8 \text{ g}}{2.25 \text{ g/mL}} = 1.68888889 \text{ mL} \\
   \end{align*}
   \]

   The answer has 2 sig figs since 3.8 g has 2 sig figs and 2.25 g/mL has 3. The answer is rounded to 2 sig figs, the smaller amount.
5. Use unit analysis and your sheet of common chemistry conversions to convert 493 mL to quarts, and report your answer with the correct number of significant figures.

\[
493 \ \text{mL} \times \frac{1 \ \text{L}}{1000 \ \text{mL}} \times \frac{1.057 \ \text{qt}}{1 \ \text{L}} = 0.521101 \ \text{qt} \rightarrow 0.521 \ \text{qt}
\]

You could have also used \( \frac{10^{-3} \ \text{L}}{1 \ \text{mL}} \) as a conversion factor to go from mL to L.

The answer has 3 sig figs. The 1000 in the mL to L conversion is an exact number and therefore does not limit the number of sig figs the answer is rounded to.