Problem Set #1

Part 1 – Read the measurements on the following measuring devices. Include units with your answer.
Read the instruments to the correct level of accuracy.
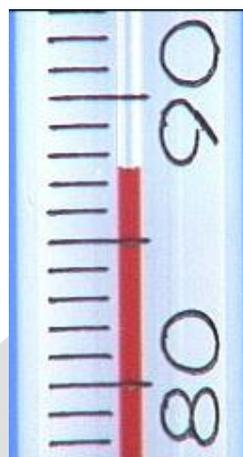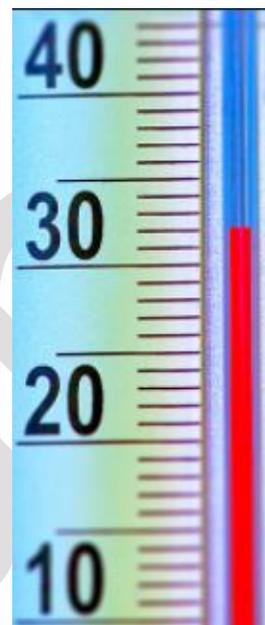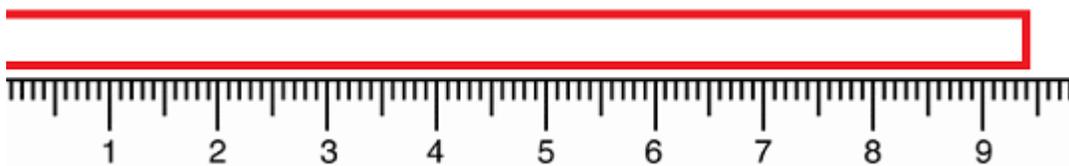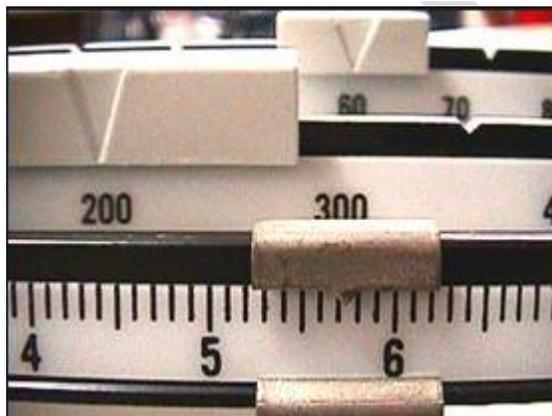
1.   2.   3.   4.

5.

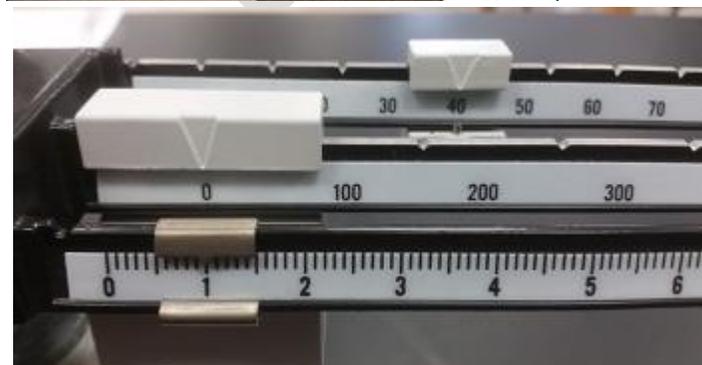6.

7.

Graded Assignments

Part 2 – Determine the number of significant figures in the following measurements.

8. 5.250×10^{23} atoms

9. 0.00278 km

10. 20,650 kJ

Part 3 – Round the following measurements to two (2) significant figures.

11. 4.045×10^{24} atoms

12. 0.006728 mL

13. 9,257 cal

Perform the calculations below. Round your answer to the correct number of significant figures and be sure to include units with your answers.

14. 10.56 cm + 2.35 cm + 209.79 cm =

15. $\dfrac{2.003 \times 10^{7} \text{ km}^{3}}{4.0982 \times 10^{3} \text{ km}^{2}}$ =

16. 2.93×10^{9} cm $\cdot$ 4.03×10^{4} cm $\cdot$ 6.19×10^{2} cm =

Part 4 – Solve the following problem. Round your answer to the correct number of significant figures and be sure to include units with your answers. SHOW YOUR WORK!

17. A student measures the mass of a sample of magnesium to be 43.95 grams. If the density of magnesium is 1.74 g/cm^{3}, what is the volume of the sample?

18. A student determined the density of iron to be 7.75 g/cm^{3}. On the Chemistry Reference Tables, the density of iron is listed as 7.86 g/cm^{3}. What is the student's percent error?

Part 5 – Perform the following unit conversions. Be sure to show your work.

19. 6.402×10^{9} μL = ___ L

20. 0.004839 s = ___ ns

21. 1024 B = ___ MB

Graded Assignments

Thickness of Aluminum Foil

INTRODUCTION

The density of a material is given by the formula D = m / V (Density = mass divided by Volume). From Geometry, it is known that the volume of a rectangular solid is length times width times height (V = l · w · h). It can be assumed that the thickness of the aluminum foil is the height. The density of aluminum can be looked up in a table. Therefore, using substitution and then rearranging the equation, one can solve for the height.

PROCEDURE

1. Select four (4) rectangular pieces of aluminum foil. Each piece should be a different size.

2. Determine the mass of each piece of foil (in grams). Record these measurements in the data table below.

3. Carefully measure the length and the width of each piece of aluminum foil. (Make sure you use the metric side of the ruler!) Record these measurements in the data table also.

4. The accepted thickness of aluminum foil is <u>0.00254 cm</u> for heavy duty aluminum foil. The density of aluminum is <u>2.702 g/cm^3</u>.

DATA TABLE

Trial	Mass (g)	Length (cm)	Width (cm)	Thickness (cm)	Error (cm)	Percent Error
1						
2						
3						
4						
Average						

CALCULATIONS

You must show sample calculations (in detail - for only one of your trials) for (A) thickness, (B) error, and (C) percent error.

NOTE: error = | accepted value – experimental value |

ANALYSIS

Under your sample calculations, write out one potential source of error* in the lab. * Errors in the measuring device or the reading of the measuring device are not acceptable. For example, "we read the ruler incorrectly." would NOT be an acceptable source of error. Your source of error should come from the lab procedure that you followed or assumptions that were made about the materials used.

THIS LAB IS DUE ON:

**CRITERIA IN ORDER TO RECEIVE CREDIT FOR THIS ASSIGNMENT:

* All numbers are clear & legible.   * All numbers are labeled with their correct units.

* Calculations are shown in detail.   * Calculations are shown in a neat and logical order.

* No messy cross-outs or eraser marks.

* Failure to follow these criteria will result in your having to re-submit your lab. It will be considered a late grade when you re-submit. *