NAME _____ DATE _____ SECTION _____

INSTRUCTOR _____ GRADE _____

EXPERIMENT 2: REPORT FOR THE DETERMINATION OF THE DENSITIES OF LIQUIDS AND SOLIDS

DATA/RESULTS

A. THE DENSITY OF WATER

	example	trial 1	trial 2
*1. Mass of beaker + water (g)	38.574		
*2. Mass of beaker (g)	27.112		
3. Mass of water (g)	11.462		
*4. Volume of water (mL)	10.00		
5. Density of water (g/mL)	1.146		

B. THE DENSITY OF THE UNKNOWN LIQUID: CALCULATIONS

SAMPLE NUMBER:_____

	example	trial 1	trial 2	trial 3
*1. Mass of beaker + liquid (g)	47.574			
*2. Mass of beaker (g)	34.220			
3. Mass of liquid (g)	13.354			
*4. Volume of liquid (mL)	10.00			
5. Density of liquid (g/mL)	1.335			
6. Average density (g/mL)				

CALCULATIONS

*Numbers (items) with asterisks represent data taken in the lab, while the other numbers (items) were calculated from the lab data.

C. THE DENSITY OF A SOLID

CYLINDER NUMBER (LETTER): _____

	example	trial 1	trial 2
*1. Mass of metal cylinder (g)	21.772		
*2. Volume of water in graduated cylinder (mL)	20.0		
*3. Volume of water in graduated cylinder after addition of cylinder (mL)	27.4		
4. Volume of cylinder by water displacement (mL)	7.4		
5. Density of cylinder (use above volume) (g/mL)	2.9		
*6. Diameter of cylinder (cm)	1.21		
*7. Height of cylinder (cm)	6.72		
8. Volume of cylinder (from dimensions) (cm^3 = mL)	7.73		
9. Density of cylinder (use volume from dimensions) (g/mL)	2.82		

CALCULATIONS

*Numbers (items) with asterisks represent data taken in the lab, while the other numbers (items) were calculated from the lab data.

EXERCISES

1. If the measured volume of the cylinder was lower than the true volume, would the calculated density be higher or lower than the true value?

2. The volume of a sphere is given by $V = \frac{4\pi r^3}{3}$ where r is the radius of the sphere. What is the density in g/mL of a sphere which weighs 2.00 lb and has a radius of 3.50 inches?

3. Consider a stone column 3.00 ft in diameter and 10.00 ft high. What is its mass in pounds if its density is 3.50 g/mL? Show your set-up(s) and the results of the calculations.

4. Suppose that a student performed the experiment and calculations perfectly as directed except that, unknown to the student, the balance was not zeroed but weighed 0.100 g too high throughout the experiment. Would the calculated values for the densities of the unknown liquid and the metal cylinder be correct? That is, would they be equal to, higher than, or lower than the true value. Explain each case in clear and correct English.

5. To what limit of precision can a person read each of the instruments below:

   example: triple beam balance ..... to the nearest 0.1 g

   a) top-loading Mettler balance ..... _____

   b) 50 mL graduated cylinder..... _____

   c) 10 mL pipet ..... _____

6. 25.00 mL of an unknown liquid were measured three times. The mass of each of the 25.00 mL samples were 36.137, 36.241, and 36.098 g. Calculate the density of each sample and the average value of the density.