Density of Liquids Lab **Name**_____

Purpose: To determine the density of different liquids algebraically and graphically.

Procedure:

1. Mass a dry, empty 25 mL graduated cylinder to the nearest 0.01 gram, and record it in the data table.
2. Pour exactly 5.0 mL of water into the graduated cylinder *(use a plastic pipet – like an eye dropper – to be exact with your measurement of the volume at the bottom of the meniscus).*
3. Determine the mass of the graduated cylinder and water to the nearest 0.01 gram in your data table.
4. Repeat steps 2-3 for additional volumes of water at 10.0 mL, 15.0 mL, 20.0 mL, and 25.0 mL.
5. After you have finished the water sample, pour the water back into the water beaker. Then, shake dry the graduated cylinder.
6. Repeat steps 1-5 using the alcohol sample.

Observations: Write down observations for each liquid *(water and alcohol).*

Data: Write in the units used for each type of measurement and add a title for Table 1.

Table 1: _____

Substance	Mass of Empty Graduated Cylinder ( )
Water	
Alcohol	

Table 2: Mass of Graduated Cylinder and Liquid at Different Volumes

Substance	Mass at 5 mL ( )	Mass at 10 mL ( )	Mass at 15 mL ( )	Mass at 20 mL ( )	Mass at 25 mL ( )
Water					
Alcohol					

Table 3: Mass of Liquid Only at Different Volumes

Substance	Mass at 5 mL ( )	Mass at 10 mL ( )	Mass at 15 mL ( )	Mass at 20 mL ( )	Mass at 25 mL ( )
Water					
Alcohol					

Table 4: Density of Liquids at Different Volumes

Substance	Density at 5 mL ( )	Density at 10 mL ( )	Density at 15 mL ( )	Density at 20 mL ( )	Density at 25 mL ( )	Average Density ( )
Water						
Alcohol						

Analysis:

1. Show a sample calculation (that shows the formula, substitution, and answer with units) for the "mass of the liquid only" of one trial of one liquid.

2. Show a sample calculation for the density of one trial of one liquid. Show all work (formula, substitution, answer).

3. Show a sample calculation for the average density for one liquid. Show all work (formula, substitution, answer).

4. On a piece a graph paper, plot the mass of the liquid in grams (y-axis) vs. the volume of the liquid in mL (x-axis). Either use different colored pens or pencils, or make a key using different types of data points (circle, square, triangle, etc.). Make a title for the graph, and label each axis with a title and corresponding unit. Also, when making a scale for the data for each axis, do not skip numbers or draw a squiggly zig-zag line to indicate a break in the numbers (make graph a full page). Draw a "best-fit" line through each of the 2 different sets of data (one line for each liquid).

5. Determine the "slope" for each line on the graph. Be sure to show all work. Draw a "hatched/dashed line" from the X-axis and the Y-axis to the points you have selected for the slope of each line (2 different coordinates for each line). Try to pick a place on your line that meets at the corner of a box, but cannot be a data point used from your data table. The formula for slope is: Slope $= (Y_2-Y_1) / (X_2-X_1)$

6. What does the slope of each line represent, specifically in terms of this lab?

7. If you were to put both liquids in the same container, which layer would be on the top and which layer would be on the bottom? Explain.

Conclusion: Write a conclusion statement based on the lab and its results.