

## Density Problem 2: Density of an unknown solution

A graduated cylinder was filled with an unknown liquid. The mass of the liquid and the graduated cylinder was determined using a centigram balance. Each time that liquid was added to the cylinder, the mass and volume were recorded. The data is listed below.

Volume, mL	9.30	8.20	6.80	5.60	4.37	3.10	2.10
Mass, g	35.59	34.53	33.04	31.9	30.51	29.31	28.33

X <sub>1</sub> for slope	Y <sub>1</sub> for slope	X <sub>2</sub> for slope	Y <sub>2</sub> for slope	X <sub>3</sub> for y-intercept	Y <sub>3</sub> for y-intercept

	<b>NO CALCULATIONS HERE, ANSWERS ONLY.</b>
a) The correct form for the equation for the line is (use the correct variables and units)	
b) The density of the liquid is :	
c) The mass of the empty cylinder	

**INSTRUCTIONS: This is separate from Exp. 2. DON'T TURN THEM IN TOGETHER. YOU WILL HAVE ONE OF THEM MARKED AS LATE.**

Prepare a good graph that best represents the data collected: title, axes labeled, good scale, etc.

Create a calculation section for this assignment showing the calculations for the scale of the x and y axes, the slope, and the y-intercept. This should be separate from the graph. (graph on one page, calculations on a second page)

Fill in this handout. Put answers here but do not show your work here. Attach this page to your assignment.

**Answer the questions in your lab book, after calculations for the graph set up, slope, and y intercept.**

1. What should the volume read on the graduated cylinder when the mass is 30.9g? Are you extrapolating or interpolating? Explain the difference between extrapolation and interpolation.
2. The volume of liquid is 6.50 mL. What mass does this represent?
3. Using the equation to extrapolate, what would the mass be when the volume is 10.40 mL?
4. **ARE YOU READY TO TURN YOUR GRAPH IN?**
  - a) Graph is separate from Exp. 2
  - b) Use good techniques for graphing as discussed in class and the graphing handout.
  - c) All numerical values need units and correct significant figures; this includes the equation for the line.
  - d) On a separate sheet in your lab book, show how you set your scale mathematically and all the calculations listed on this page.
  - e) Use complete sentences to answer questions, as laid out in Handout 5.
  - f) Attach this sheet to your lab papers, filled out.

Order: this sheet, graph, calculations, answers to questions