

# CHEM 370 Week 4 Activity

Name: \_\_\_\_\_

## Introduction

This assignment covers Chapters 5 of *Analytical Chemistry 2.1* by Harvey involving basic analytical chemistry terms, statistical analysis, and confidence intervals.

***This assignment will be collected for a grade at the beginning of lab on Thursday.*** You will use some of the calculations in lab, and doing them before hand will ensure you have time to get the work completed in lab.

## Preparing Standards

1. You must create quinine standards at *approximately* 100, 75, 40, 20, and 10 ppm from a ~100-ppm stock solution. You can:
  - Use 25 mL volumetric flasks for all your dilutions.
  - Use 1, 2, 3, 4, 5, 10, 15, or 20 mL pipettes for your dilutions (choose whichever works best for each solution).
  - Use multiple dilutions of the same stock or use the technique of serial dilutions (whichever you prefer/works best with the glassware provided).

It is not important that you get *exactly* the concentrations listed above. Use the available glassware to get close to span the range of concentrations listed with *approximately* equal spacing.

**Determine which pipette to use for each standard. Show your calculations and the final concentration for each standard.**

2. The quinine stock solution used for this lab was prepared from quinine sulfate ( $\text{C}_{20}\text{H}_{24}\text{N}_2\text{O}_2 \cdot 0.5\text{H}_2\text{SO}_4 \cdot \text{H}_2\text{O}$ ). Is this a primary or secondary standard?

3. The following data represent a standard curve for fluorescence detection of quinine.

Concentration (ppm)	Signal (arb.)
0.00	2.448
10.12	7.779
20.01	14.105
29.92	19.663
40.06	27.222
50.11	36.858

A linear regression of the data produces:

- $m = 0.6737$
- $b_0 = 1.145$
- $s_r = 1.528$
- $R^2 = 0.9884$

If a sample measured in triplicate provides the signals 15.676, 15.583, and 15.549, what is the concentration of the sample and its 95% confidence interval? Show your work.

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