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 ($C_{20}H_{24}N_2O_2 \cdot 0.5\,H_2SO_4 \cdot H_2O$). 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 it's 95% confidence interval? Show your work.