

CHEM 201 Self Quiz – 2 (Experimental Errors & Statistical Analysis)

1. Identify the number of significant figures:

- a) 3.0800 b) 0.00418
c) 7.09×10^{-5} d) 91,600 e) 0.003005 f) $\log 23.0$

2. Round 62.5347 to four significant figures

3. What are the types of errors (and their characteristics) in a chemical analysis?

4. Two students analyze the sample. Student A makes 6 determinations and obtains $S_A = 0.14$, whereas student B makes 5 determinations and obtains $S_B = 0.05$. Are S_A and S_B significantly different at the 95% confidence level?

5. The following data were obtained from the replicate analysis of a calcite sample: percent CaO = 55.95, 56.00, 56.04, 56.08, and 56.23. The last value appears anomalous. Should this result be retained or rejected?

6. The following results were obtained during the testing of the validity of a method by analyzing a sample that contains 21.20 % Ca (true value, μ): mean= 21.24%, s=0.12, N=10. Is there a significant difference between the mean and μ at the 90% and 99% confidence interval?

7. The following results were obtained in the determination of calcium in serum by two methods, fluorimetry and atomic absorption spectroscopy (AAS). Is there a significant difference in the precision of the two methods?

<u>Calcium, mg/100 mL</u>	
<u>AAS</u>	<u>Fluorimetry</u>
11.4	9.7
10.6	10.2
11.1	12.0
11.7	12.1
10.2	9.8
10.5	10.6
	11.7

8. The results obtained by two analysts for the nitrate content of water samples are as follows:

Analyst 1 – 48.32, 49.01, 49.06, 48.45

Analyst 2 – 48.09, 48.08, 48.25, 48.13, 48.10, 48.19

Using the appropriate test, compare the standard deviations and b) the mean values of the two sets of data.