CHEM 255 - Spring 2011

Problem Set #1
Due 2/17/11

1. Write each answer with the correct number of significant figures.

   a. $6.188 + 1.953 + 0.72 + 18.123 =$
   b. $62.52 - 4.8 =$
   c. $27.56 \times 8.7 =$
   d. $87.6 \div 32.4 =$
   e. $\log 37.428 =$

2. A chemist tests tablets for calcium content. Seven replicate samples are analyzed. The results are

Calcium (mg)	Calcium (mg)
10.52	10.52
11.02	10.22
10.12	9.87
9.74	

   a. Calculate the mean of these results
   b. Calculate the standard deviation of these results

3. Suppose that an analysis of Vitamin C tablets gives results that fit a Gaussian curve. The average of the set of analyses is 502.82 mg ascorbic acid, with a standard deviation of 9.35 mg. What percentage of the tablets in the bottle will contain between 497.21 mg and 515.91 mg ascorbic acid?

4. A pharmacist found an old bottle of cough syrup containing Guaifenesin in the back of her store. She wanted to determine if the sample was still good, so she analyzed it along with a fresh bottle. Here are her results.

Guaifenesin in New Bottle (mg)	Guaifenesin in Old Bottle (mg)
98.23	100.57
101.37	101.429
99.08	99.12
	98.24
	99.58

Are the two bottles significantly different at the 98% probability level? Why or why not?

5. A medical examiner determines the amount of propranolol in a subject's body. Just to be sure, he performs the test six times. His results are

Propranolol (mg)
50.83
49.96
54.34
50.67
49.76
50.21

Can he justifiably reject the high data point at the 90% confidence level?

6. In a diabetes test, a technician analyzes a plasma sample for glucose. First a calibration curve is generated.

Glucose (mg/L) in Standard	Instrument Reading
300.0	531
400.0	680
500.0	801
600.0	912
700.0	1069

If an unknown sample gives an instrument reading of 836, what is the concentration of glucose in the plasma sample?

7. Harris Chapter 3, Problem 15

Suggested/Review Problems:

1. Harris Chapter 3, Problem 1
2. Harris Chapter 3, Problem 6
3. Harris Chapter 3, Problem 11
4. Harris Chapter 4, Problem 2
5. Harris Chapter 4, Problem 3
6. Harris Chapter 4, Problem 13
7. Harris Chapter 4, Problem 18
8. Harris Chapter 4, Problem 19
9. Harris Chapter 4, Problem 22
10. Harris Chapter 4, Problem 30