1. Error Propagation: A student uses an analytical balance to measure the mass of a sample of $NiSO_4\,6H_20$. He measures the same sample three times and records the following masses: 4.605g, 4.603g, and 4.607g. What is the student's standard deviation and relative percent error for the mass of his sample?

2. Statistical Analysis:
A student wants to make a compelling argument for a new method of measuring fiber in food. The student analyzes 227g of popcorn and finds the samples contain 2.1g, 1.9g, 2.2g, 2.4g, 2.2g of fiber. The current method for analyzing fiber shows the samples to contain 2.5g, 2.3g, 2.2g, 2.0g, 2.1g of fiber. Is there a significant statistical difference between the two methods at a 95% CI? A 227g sample from NIST has a known mass of 2.9g of fiber, is there a significant difference between the student's method and the NIST standard?

3.Internal Standard Q:
A solution was made with 5.00 mL of 0.26g KNO_3 (Formula Weight: 101.103 g/mol) was mixed with 4.00 mL of 0.30g NaCl (Formula Weight: 58.44 g/mol). The initial chromatographic reading gave values of A_{AgNO3}=452 and A_{NaCl}=516. 6.00mL of an unknown solution of $KNO_{3.}$ was spiked with 6.00 ml of 0.8 M NaCl. The solution was diluted to 15.00 mL in a volumetric flask. The final reading gave A_{AgNO3}=530 and A_{NaCl}=610. Find the concentration of KNO_3 in the unknown solution.

4. By means of standard addition, a chemistry student measures a set of samples containing an unknown concentration with a dilution factor of ten. Using a linear regression line, the student comes out with the equation y= 8.3567x + 0.0187. According to this equation, what would the absorbance be for an unknown sample with a concentration of 0.025M? What is the concentration of the unknown used in the experiment?

5.QA/QC:

Low concentrations of analyte near the detection limits gave the following readings in nanoamperes: 6.2, 4.9, 5.5, 5.2, 5.0, 6.0 and 5.8 nA. Blank values had a mean of 0.9 and the slope of the calibration curve is m = 0.298 nA/μM. Find the signal detection limit, detection limit, and the lower limit of quantitation for the analyte.