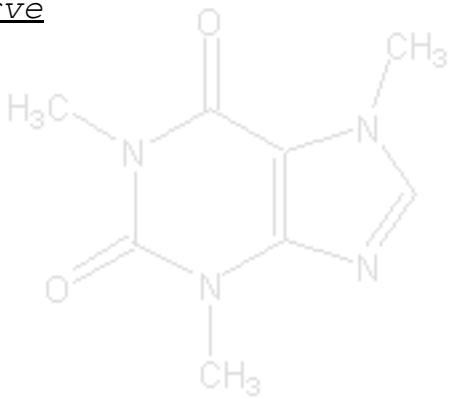


1/14 Instrument Calibration I: 1st Order Calibration Curve

Calibration Curve Handout

- Excel Example Worksheet
- Calibration graphs in instrumental analysis
- Product-moment correlation coefficient
- Regression of y on x
- Calculation of concentration and its random error
- Linest Excel Function (Harris Section 4.7)
- Problem Set 1: "Cadmium Calibration Problem"



1/21 Instrument Calibration II: ANOVA, Regression Calculations, Curvilinear Regression Methods

- Variance, Sum of Squares (SS), and Degrees of Freedom (DOF)
- Total Sum Squares (SS_{tot}), Regression SS (SS_{regr}), Residual SS (SS_{res}), and Coefficient of Determination (R^2)
- Replicate Sum of Squares (SS_{repl}) and Lack of Fit Sum of Squares ($SS_{\text{l/of}}$)
- Curvilinear regression methods
- Calculation of unknown concentrations from nonlinear curves (Harris Box 4-2)
- Problem Set 2: "Sum of Squares Calculation," Sum of Squares Classroom Handout

1/28 Instrument Calibration III: Limits of Detection, the Method of Standard Addition Class Exam

- Limits of detection
- Method of standard additions
- Problem Set 3



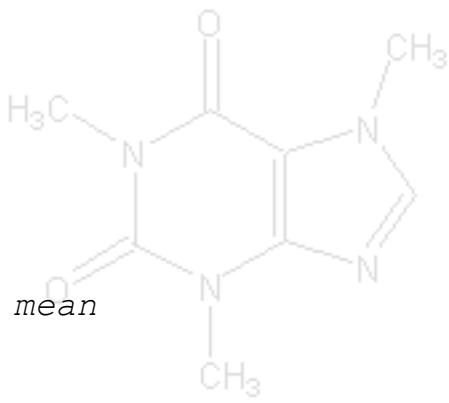
2/4 Instrument Calibration IV: Internal Standard Methods of Quantitation Class Example

- Internal standard (IS) methodology (Harris 5-4)
- Response factor IS methods
- Response ratio IS methods
- Problem Set 4



2/11 Descriptive Statistics I:

- Mean and standard deviation
- Distribution of repeated measurements
- Log-normal distribution
- Sample definition and sampling distribution of the mean
- Confidence limits of the mean for large samples



2/18 Calibration Quiz in Sims 211



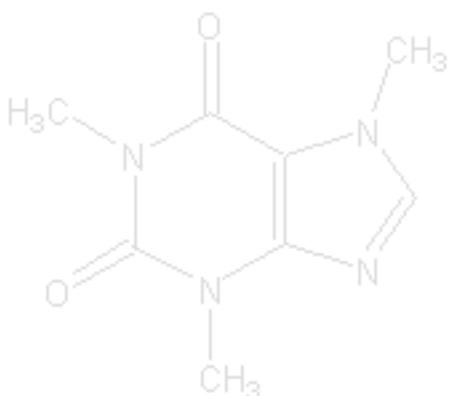
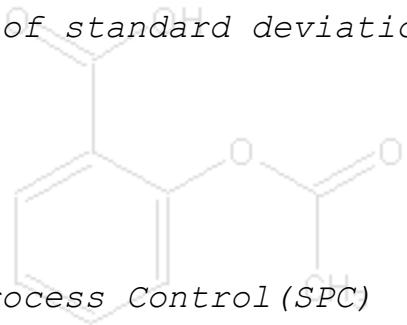
2/25 Inferential Statistics: Class Example Spreadsheet,

- Comparison of experimental mean with known value
- Comparison of two experimental means
- Paired t-test
- One-sided and two-sided tests



- F-Test for the comparison of standard deviations
- Outliers
- Problem Set 5

3/3 Analytical Quality I

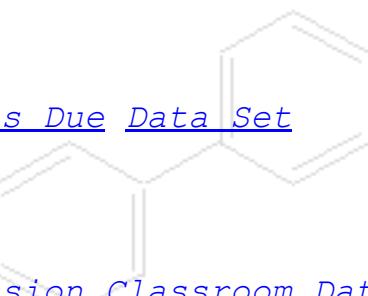


- Overview of Statistical Process Control (SPC)
- Shewhart Control Charts for mean values and ranges

3/10 ANOVA

- PS6 Shewhart Control Charts Due Data Set

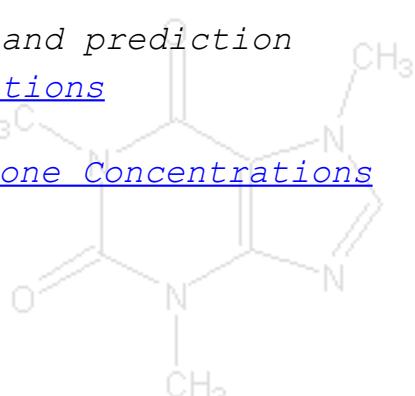
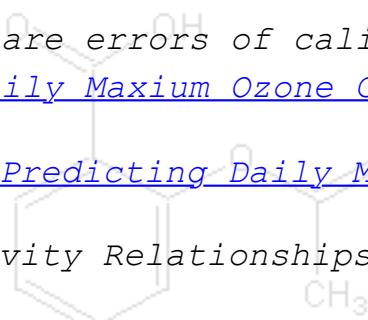
3/24 Multivariate Regression



- Multivariate Linear Regression Classroom Data
- Mathematical models to describe experimental data
- Determining the model
- Predictions, root-mean-square errors of calibration and prediction
- Problem Set: Predicting Daily Maximum Ozone Concentrations

3/31 No Class Problem Set Due: Predicting Daily Maximum Ozone Concentrations

4/7 Quantitative Structure-Activity Relationships (QSAR)



4/14 No Class QSAR Problem Set Due; QSAR Data Set

4/21 Review

4/29 Cumulative Final Examination 3:00 PM

