

G-9	G-9S	G-9S Title
1.1	1.1	OVERVIEW AND ACTIVITIES
1.2	1.1	OVERVIEW AND ACTIVITIES
1.3	1.1	OVERVIEW AND ACTIVITIES
2.1	2.1	OVERVIEW AND ACTIVITIES
2.2	2.2	STATISTICAL QUANTITIES
2.2.1	2.2.1	Measures of Relative Standing
2.2.2	2.2.2	Measures of Central Tendency
2.2.3	2.2.3	Measures of Dispersion
2.2.4	2.2.4	Measures of Association
2.3	2.3	GRAPHICAL REPRESENTATIONS
2.3.1	2.3.1	Histogram
2.3.2	2.3.2	Stem-and-Leaf Plot
2.3.3	2.3.3	Box-and-Whiskers Plot
2.3.4	2.3.4	Quantile Plot and Ranked Data Plots
2.3.5	2.3.5	Quantile-Quantile Plots and Probability Plots
2.3.6	2.3.5	Quantile-Quantile Plots and Probability Plots
2.3.7	2.3.6	Plots for Two or More Variables
2.3.8	2.3.7	Plots for Temporal Data
2.3.9	2.3.8	Plots for Spatial Data
2.4	2.4	PROBABILITY DISTRIBUTIONS
2.4.1	2.4.1	The Normal Distribution
2.4.2	2.4.2	The t-Distribution
2.4.3	2.4.3	The Lognormal Distribution
2.4.4	2.4.4	Central Limit Theorem
3.1	3.1	OVERVIEW AND ACTIVITIES
3.1.1	3.1	OVERVIEW AND ACTIVITIES
3.1.2	3.1	OVERVIEW AND ACTIVITIES
3.2	3.2	METHODS FOR A SINGLE POPULATION
3.2.1	3.2.1	Parametric Methods
3.2.3	3.2.1	Parametric Methods
3.2.4	3.2.1	Parametric Methods
3.2.3	3.2.2	Nonparametric Methods
3.3	3.3	COMPARING TWO POPULATIONS
3.3.1	3.3.1	Parametric Methods
3.3.2	3.3.1	Parametric Methods
3.3.3	3.3.2	Nonparametric Methods
3.3.4	3.3.2	Nonparametric Methods
3.4	3.4	COMPARING SEVERAL POPULATIONS SIMULTANEOUSLY
3.4.1	3.4.1	Parametric Methods
—	3.4.2	Nonparametric Methods
4.1	4.1	OVERVIEW AND ACTIVITIES

G-9	G-9S	G-9S Title
4.1.1	4.1	OVERVIEW AND ACTIVITIES
4.1.2	4.1	OVERVIEW AND ACTIVITIES
4.1.3	4.1	OVERVIEW AND ACTIVITIES
4.2	4.2	TESTS FOR DISTRIBUTIONAL ASSUMPTIONS
4.2.1	4.2.1	Graphical Methods
4.2.2	4.2.2	Normal Probability Plot Tests
4.2.3	4.2.2	Normal Probability Plot Tests
4.2.4	4.2.2	Normal Probability Plot Tests
4.2.5	4.2.3	Coefficient of Skewness/Coefficient of Kurtosis Tests
4.2.6	4.2.4	Range Tests
4.2.7	4.2.5	Goodness-of-Fit Tests
4.2.8	4.2.6	Recommendations
4.3	4.3	TESTS FOR TRENDS
4.3.1	4.3.1	Introduction
4.3.2	4.3.2	Regression-Based Methods for Estimating and Testing for Trends
4.3.3	4.3.3	General Trend Estimation Methods
4.3.4	4.3.4	Hypothesis Tests for Detecting Trends
4.3.5	4.3.5	A Discussion on Tests for Trends
4.3.6	4.3.6	Testing for Trends in Sequences of Data...
4.4	4.4	OUTLIERS
4.4.1	4.4.1	Background
4.4.2	4.4.2	Selection of a Statistical Test for Outliers .
4.4.3	4.4.3	Extreme Value Test (Dixon's Test)
4.4.4	4.4.4	Discordance Test
4.4.5	4.4.5	Rosner's Test
4.4.6	4.4.6	Walsh's Test
4.4.7	4.4.7	Multivariate Outliers
4.5	4.5	TESTS FOR DISPERSIONS
4.5.1	4.5.1	Confidence Intervals for a Single Variance
4.5.2	4.5.2	The F-Test for the Equality of Two Variances
4.5.3	4.5.3	Bartlett's Test for the Equality of Two or More Variances
4.5.4	4.5.4	Levene's Test for the Equality of Two or More Variances
4.6	4.6	TRANSFORMATIONS
4.6.1	4.6.1	Types of Data Transformations
4.6.2	4.6.2	Reasons for Transforming Data
4.7	4.7	VALUES BELOW DETECTION LIMITS
4.7.1	4.7.1	Approximately less than 15% Non-detects -Substitution Methods
4.7.2	4.7.2	Between Approximately 15% -50% Non-detects
4.7.3	4.7.3	Greater than Approximately 50% Non-detects -Test of Proportions
—	4.7.4	Greater than Approximately 90% Non-detects
4.7.4	4.7.5	Recommendations

G-9	G-9S	G-9S Title
4.8	4.8	INDEPENDENCE
5.1	5.1	OVERVIEW AND ACTIVITIES
5.1.1	5.2	PERFORM THE STATISTICAL METHOD
5.1.2	5.3	DRAW STUDY CONCLUSIONS
5.1.2	5.3.1	Hypothesis Tests
5.1.2	5.3.2	Confidence Intervals or Limits
5.1.2	5.3.3	Tolerance Intervals or Limits
5.1.3	5.4	EVALUATE PERFORMANCE OF THE SAMPLING DESIGN
5.2	5.5	INTERPRET AND COMMUNICATE THE RESULTS
5.2.1	G-9R	INTERPRET AND COMMUNICATE THE RESULTS
5.2.2	G-9R	INTERPRET AND COMMUNICATE THE RESULTS
5.2.3	G-9R	INTERPRET AND COMMUNICATE THE RESULTS
5.2.4	G-9R	INTERPRET AND COMMUNICATE THE RESULTS
5.2.5	G-9R	INTERPRET AND COMMUNICATE THE RESULTS
5.2.6	G-9R	INTERPRET AND COMMUNICATE THE RESULTS
Box 1-1	G-9R	Example Applying the DQO Process Retrospectively
Figure 1-1	Figure 1-1	The Data Quality Objective Process
Box 2-1	Box 2-1	Directions for Calculating Percentiles with an Example
Box 2-2	Box 2-2	Directions for Calculating the Measures of Central Tendency
Box 2-3	Box 2-3	Example Calculations of the Measures of Central Tendency
Box 2-4	Box 2-4	Directions for Calculating the Measures of Dispersion
Box 2-5	Box 2-5	Example Calculations of the Measures of Dispersion
Box 2-6	Box 2-6	Directions for Calculating Pearson's Correlation Coefficient with an
Box 2-7	Box 2-7	Dir. for Calculating Spearman's Correlation Coefficient with an Example
Box 2-8	Box 2-8	Directions for Estimating the Serial Correlation Coefficient with a Example
Box 2-9	Box 2-9	Directions for Generating a Histogram
Box 2-10	Box 2-10	Example of Generating a Histogram
Box 2-11	Box 2-11	Directions for Generating a Stem and Leaf Plot.
Box 2-12	Box 2-12	Example of Generating a Stem and Leaf Plot
Box 2-13	Box 2-13	Directions for Generating a Box and Whiskers Plot
Box 2-14	Box 2-14	Example of a Box and Whiskers Plot
Box 2-15	Box 2-15	Directions for Generating a Quantile Plot and a Ranked Data Plot.
Box 2-17	Box 2-15	Directions for Generating a Quantile Plot and a Ranked Data Plot.
Box 2-16	Box 2-16	Example of Generating a Quantile Plot
Box 2-18	Box 2-16	Example of Generating a Quantile Plot
Box 2-19	Box 2-17	Directions for Constructing a Normal Probability Plot
Box 2-20	Box 2-18	Example of Normal Probability Plot
Box 2-21	Box 2-19	Directions for Generating a Scatterplot and an Example
Box 2-22	Box 2-20	Directions for Constructing an Empirical Q-Q Plot with an Example
—	Box 2-21	Directions for Generating a Time Plot and an Example.
—	Box 2-22	Directions for Constructing a Correlogram

G-9	G-9S	G-9S Title
—	Box 2-23	Example Calculations for Generating a Correlogram
—	Box 2-24	Dir. for Generating a Posting Plot and a Symbol Plot with an Example
Figure 2-1	Figure 2-1	A Histogram of Concentration Frequencies
Figure 2-2	Figure 2-2	A Histogram of Concentration Densities
Figure 2-3	Figure 2-3	Example of a Box-Plot
Figure 2-4	Figure 2-3	Example of a Box-Plot
Figure 2-5	Figure 2-4	Example of a Quantile Plot of Right-Skewed Data
Figure 2-6	—	Normal Probability Paper
Figure 2-7	Figure 2-5	Example of a Scatterplot
Figure 2-8	Figure 2-5	Example of a Scatterplot
Figure 2-9	Figure 2-6	Example of a Coded Scatterplot
Figure 2-10	Figure 2-7	Example of a Parallel-Coordinate Plot
Figure 2-11	Figure 2-8	Example of a Scatterplot Matrix
—	Figure 2-9	Example of an Empirical Q-Q Plot
Figure 2-12	Figure 2-10	Example of a Time Plot
—	Figure 2-11	Example of a Lag Plot
Figure 2-13	Figure 2-12	Example of a Correlogram
—	Figure 2-13	Example of a Four-Plot
Figure 2-14	Figure 2-14	Example of a Posting Plot
Figure 2-15	Figure 2-15	Example of a Symbol Plot
—	Figure 2-16	Example of a Bubble Plot
Figure 2-16	Figure 2-17	Two Normal Curves, Common Mean, Different Variances
Figure 2-17	Figure 2-18	The Standard Normal Curve, Centered on Zero
—	Figure 2-19	Three Different Lognormal Distributions
Box 3-1	Box 3-1	Directions for the One-Sample t-Test
Box 3-12	Box 3-2	Directions for Computing a One-Sample t Confidence Interval or Limit
Box 3-2	Box 3-3	A One-Sample t-Test Example
Box 3-13	Box 3-4	An Example of a One-Sample t Upper Confidence Limit for a Population...
—	Box 3-5	Directions for Computing a One-Sample Tolerance Interval or Limit.
—	Box 3-6	An Example of a One-Sample Upper Tolerance Limit
Box 3-3	Box 3-7	Directions for a One-Sample t-Test for a Stratified Random Sample
Box 3-4	Box 3-8	An Example of a One-Sample t-Test for a Stratified Random Sample
Box 3-8	Box 3-9	Directions for the Chen Test
Box 3-9	Box 3-10	Example of the Chen Test
—	Box 3-11	Dir. for Computing Confidence Limits for the Pop. Mean of a Lognormal..
—	Box 3-12	An Example Using Land's Method
Box 3-10	Box 3-13	Directions for the One-Sample Test for Proportions
—	Box 3-14	Dir. for Computing a Confidence Interval for a Population Proportion
Box 3-11	Box 3-15	An Example of the One-Sample Test for Proportions
—	Box 3-16	Directions for the Sign Test (One-Sample)
—	Box 3-17	An Example of the Sign Test (One-Sample)

G-9	G-9S	G-9S Title
Box 3-5	Box 3-18	Directions for the Wilcoxon Signed Rank Test (One-Sample)
Box 3-7	Box 3-18	Directions for the Wilcoxon Signed Rank Test (One-Sample)
Box 3-6	Box 3-19	An Example of the Wilcoxon Signed Rank Test (One-Sample)
Box 3-14	Box 3-20	Directions for the Two-Sample t-Test (Equal Variances)
—	Box 3-21	Directions for a Two-Sample t Confidence Interval (Equal Variances)
Box 3-15	Box 3-22	An Example of a Two-Sample t-Test (Equal Variances)
Box 3-16	Box 3-23	Directions for the Two-Sample t-Test (Unequal Variances)
—	Box 3-24	Directions for a Two-Sample t Confidence Interval (Unequal Variances)
Box 3-17	Box 3-25	An Example of the Two-Sample t-Test (Unequal Variances)
Box 3-18	Box 3-26	Directions for a Two-Sample Test for Prop.
—	Box 3-27	Dir. for Comp.a Confidence Interval for the Diff. Between Pop...
Box 3-19	Box 3-28	An Example of a Two-Sample Test for Proportions
—	Box 3-29	Directions for the Paired t Test
—	Box 3-30	Directions for Computing the Paired t Confidence Interval
—	Box 3-31	An Example of the Paired t-Test
Box 3-20	Box 3-32	Directions for the Wilcoxon Rank Sum Test
Box 3-21	Box 3-33	An Example of the Wilcoxon Rank Sum Test
Box 3-22	Box 3-34	A Large Sample Example of the Wilcoxon Rank Sum Test
Box 3-23	Box 3-35	Directions for the Quantile Test
Box 3-24	Box 3-36	A Example of the Quantile Test
—	Box 3-37	Directions for the Slippage Test
—	Box 3-38	A Example of the Slippage Test
—	Box 3-39	Directions for the Sign Test (Paired Samples)
—	Box 3-40	An Example of the Sign Test (Paired Samples)
—	Box 3-41	Directions for the Wilcoxon Signed Rank Test (Paired Samples)
—	Box 3-42	An Example of the Wilcoxon Signed Rank Test (Paired Samples)
—	Box 3-43	A Large Sample Example of the Wilcoxon Signed Rank Test
Box 3-25	Box 3-44	Directions for Dunnett's Test
Box 3-26	Box 3-45	An Example of Dunnett's Test
—	Box 3-46	Directions of the Fligner-Wolfe Test
—	Box 3-47	An Example of the Fligner-Wolfe Test
Box 4-1	—	Directions for the Coefficient of Variation Test and an Example
Box 4-2	Box 4-1	Directions for Studentized Range Test
Box 4-2	Box 4-2	Example of the Studentized Range Test
Box 4-3	Box 4-3	Directions for Geary's Test
Box 4-4	Box 4-4	Example of Geary's Test
Box 4-5	Box 4-5	Dir. for the Test for a Corr. Coef. and an Ex. Meas. at Each Time Point
Box 4-6	Box 4-6	Up. Triangular Comp. for Basic Mann-Kendall Trend Test with a Single
Box 4-7	Box 4-7	Directions for the Mann-Kendall Trend Test for Small Sample Sizes
Box 4-8	Box 4-8	An Example of Mann-Kendall Trend Test for Small Sample Sizes
Box 4-9	Box 4-9	Directions for the Mann-Kendall Test Using a Normal Approximation

G-9	G-9S	G-9S Title
Box 4-10	Box 4-10	An Example of Mann-Kendall Trend Test by Normal Approximation.
Box 4-11	Box 4-11	Data for Multiple Times and Multiple Stations
Box 4-12	Box 4-12	Testing for Comparability of Stations and an Overall Monotonic Trend
Box 4-13	Box 4-13	Directions for the Wald-Wolfowitz Runs Test
Box 4-14	Box 4-14	An Example of the Wald-Wolfowitz Runs Test
Box 4-15	Box 4-15	Directions for the Extreme Value Test (Dixon's Test)
Box 4-16	Box 4-16	An Example of the Extreme Value Test (Dixon's Test)
Box 4-17	Box 4-17	Directions for the Discordance Test
Box 4-18	Box 4-18	An Example of the Discordance Test
Box 4-19	Box 4-19	Directions for Rosner's Test for Outliers
Box 4-20	Box 4-20	An Example of Rosner's Test for Outliers
Box 4-21	Box 4-21	Directions for Walsh's Test for Large Sample Sizes
Box 4-22	Box 4-22	Dir. for Construct. Confidence Intervals and Confidence Lim...
Box 4-23	Box 4-23	Directions for an F-Test to Compare Two Population Variances...
Box 4-24	Box 4-24	Directions for Bartlett's Test
Box 4-25	Box 4-25	An Example of Bartlett's Test
Box 4-26	Box 4-26	Directions for Levene's Test
Box 4-27	Box 4-27	An Example of Levene's Test
Box 4-28	Box 4-28	Directions for Transforming Data and an Example
Box 4-36	Box 4-29	Directions for Aitchison's Method to Adjust Means and Variances
Box 4-37	Box 4-30	An Example of Aitchison's Method
Box 4-29	Box 4-31	Directions for Cohen's Method
Box 4-30	Box 4-32	An Example of Cohen's Method
Box 4-31	Box 4-33	Example of Double Linear Interpolation
Box 4-38	Box 4-34	Directions for Selecting Between Cohen's Method or Aitchison's Method
Box 4-39	Box 4-35	Example of Determining Between Cohen's Method and Aitchison's...
Box 4-40	Box 4-36	Directions for the Rank von Neumann Test
Box 4-41	Box 4-37	An Example of the Rank von Neumann Test
Box 4-32	—	Direction for Developing a Trimmed Mean
Box 4-33	—	Example of the Trimed mean
Box 4-34	—	Direction for Developing a Winsorized Mean and Standard Deviation
Box 4-35	—	Example of Developing a Winsorized Mean and Standard Deviation
Box 5-1	Box 5-1	Checking Adequacy of Sample Size for a One-Sample t-test...
Box 5-2	Box 5-2	Example of Power Calculations for the One-Sample Test...
Box 5-3	—	Example of a Comparison of Two Variances which is Statistically...
Box 5-4	—	Example of a Comparison of Two Biases