

1. Be able to identify/distinguish samples vs. populations, statistics vs. parameters, explanatory vs. response variables, and categorical vs. quantitative variables.
2. Given a histogram, be able to find the mean, median, range, percent and total number of the data.
3. Decide which measures of center and spread are more appropriate to use with symmetric and skewed distributions.
4. Know how to calculate a z-score, what it means, and how to find the percentage above, below, or between given data values.
5. Given a probability, be able to find the z-score and compute cut-off scores.
6. Be able to use boxplots to compare the median and variability of sets of data and to identify the presence of outliers.
7. Given a scatterplot and a JMP correlation printout, be able to describe the strength, form, and direction of the relationship; to identify the explanatory and response variables; to identify and interpret the correlation coefficient r ; to give the regression equation and interpret the meaning of its slope; and to use the equation to make predictions and to calculate residuals.
8. Know the meaning of extrapolation and that its use with linear regression equations is inappropriate.
9. Know the difference between correlation and causation.
10. Be able to distinguish among surveys, observational studies, and experiments, and to identify lurking variables.
11. Be able to identify biases that might occur in statistical studies.
12. Given a discrete probability distribution, be able to find a missing probability and to calculate specific probabilities for intervals of random variables (e.g., $x > 3$, or $2 < x < 12$).
13. Use a contingency table to determine simple, marginal and conditional probabilities.
14. Given a problem involving confidence intervals or hypothesis tests for means, be able to determine if the following assumptions are met: (a) Randomness, (b) Nearly Normal population (c) Large enough sample.
15. Given sample statistics, be able to find a confidence interval (CI) for μ , to interpret its meaning in the context of the problem, to calculate its margin of error, and to describe the

impact on its size due to changing its confidence level, sample size, and/or its margin of error.

16. Given the desired margin of error of a CI, be able to determine the necessary sample size, n .
17. Be able to identify the appropriate null and alternative hypotheses for a given hypothesis test and to determine which hypothesis test should be used: z-test for individual means (μ), or t-test for individual means (μ), matched pairs and 2-sample problems.
18. For a hypothesis test of individual means, be able to find the calculated test statistic (z-calc or t-calc) and the P-value for z-calc.
19. Be able to determine whether to reject or fail to reject the null hypothesis, to explain your conclusion in the context of the problem, and to know what is meant by Type I and Type II errors.