Review for Test 1

Chapters 1, 2, 3, and 10

YOU NEED TO KNOW
1. **The different sampling techniques: SRS, cluster sample, stratified sample, systematic sample, multistage sample, convenience sample, volunteer sample (you need to know which ones are based on chance, thus good sampling techniques)**
2. **The issues we need to deal with when sampling: undercoverage, nonresponse, response bias, and bias in general**
3. **The difference between observational studies and experiments (and why we prefer experiments)**
4. **Surveys—wording effect**
5. **Experiments: treatment, treatment group, placebo, control group**
6. **The best possible experiment to avoid bias: randomized controlled experiment (double-blind, if possible)**
7. **Blind, double-blind experiments, blocking, matched-pair design**
8. **Issues with experimentation: lack of realism, unethical (illegal) issues**
9. **How to outline the design of the experiment**
10. **Where and why we use random assignment**
11. **How to identify categorical and quantitative variables**
12. **How to construct a frequency, and relative frequency tables and histograms**
13. **What type of graphical representations we use to display categorical variables—pie chart, bar graph. You need to know how to construct and interpret them.**
14. **What type of graphical representations we use to display quantitative variables—dotplot, histogram (frequency, and relative frequency), stem-and-leaf (also split) How to describe distributions—look for the overall pattern, center, spread and outliers**
15. **Asses from a graphical display whether the shape of a distribution is roughly symmetric, skewed, or neither, also asses whether the distribution has one or more peaks.**
16. **Describe the distribution by giving numerical measures of center (<u>mean</u>, <u>median,</u> and <u>mode</u>) and spread (<u>range</u>, <u>IQR,</u> and <u>variance/standard deviation</u>)**
17. **The basic properties of the standard deviation**
18. **How to find the five-number summary and construct a boxplot.**
19. **How to indentify outliers using the 1.5IQR rule, and construct a modified boxplot**
20. **How to "read" boxplots (like the True or False questions in Quiz 2)**
21. **Which numerical summary is more appropriate for the distribution (mean and standard deviation, or median and IQR)**
22. **How the skewness and outliers of a distribution affect the mean and the median**
23. **How to find z-scores, and decide if the value is usual or unusual.**
24. **How to use the Empirical rule.**
25. **How make scatterplots to display the relationship between two quantitative variables, and describe the scatterplots**

26. **Whether or not it is appropriate to use correlation to describe the relationship between two quantitative variables**
27. **How to find the correlation coefficient**
28. **The basic properties of the correlation coefficients**
29. **Be able to match scatterplots with their correlation coefficients.**
30. **How to find the equation of the least squares regression line either by using your calculator or the two formulas.**
31. **The basic properties of the least squares regression line**
32. **Sketch the regression line on your plot**
33. **How to use a regression line to predict values of the response variable**
34. **What extrapolation means.**
35. **Understand that correlation (association) does not imply causation. Be able to think of lurking variables in a situation.**

You should review the slides, the class worksheets (you can try to do those we didn't do in class; that would be a good practice for you), the summary pages from the website, and the book.
You are responsible to know everything (and only that) I talked about in class.

Email me if you have any questions: andrea.nemeth.898@csun.edu

Have a good weekend, and study hard!