Exam 1 Study Guide

Materials

- Calculator (no graphing calculator)
- Pencil and eraser
- UCLA Student ID
- 1 Cheat Sheet is allowed. 8.5x11 paper, both sides. Handwritten OR typed font Arial size 12.

- The exam will be all multiple choice. It will be on Thursday May 2 during lecture.
- The exam covers Chapters 1 through 5.

Chapter 1

- What are data?
    - How are data collected?
    - What is a variable?
    - What is an observation?
- Populations vs Samples
- Types of Variables: Numerical vs Categorical
- Two-way tables - displaying two categorical variables
    - Make sure you know how to interpret two-way tables!
- Observational Study vs Controlled Experiment
    - treatment group vs control group
- Association is NOT Causation
- Experimental Design (large sample size, bias, random assignment, blind)

Chapter 2

- Graphs - How do we visualize data?
- Plots for categorical data:
    - Bar Chart
    - Pareto Chart
    - Pie Chart
- Descriptions of categorical data
    - Mode: the category that occurs the most
    - Variability: the more categories, the more variability
- Plots for numerical data:
    - Stem-and-leaf plot
    - Dot plot
    - Histogram and Relative Frequency Histogram
- Make sure you know the differences between histograms and bar charts!
- Descriptions of numerical data
    - Shape: peaks (unimodal, bimodal), symmetric/skewed, outliers
    - Center: typical value
    - Variability/Spread: how spread out the data is from the center

Chapter 3

- Numerical Summaries
    - Center: Mean, Median, Mode
    - Spread: Standard deviation, IQR, Range
- How do you interpret center and variability by looking at plot?
- Make sure you know how to calculate median, Q1, Q3 and IQR.
- Know when to use mean, median, standard deviation and IQR.
- Empirical Rule
- Z-scores
- Five-number summary
- Boxplots - Know how to draw and interpret!

Chapter 4

- Scatterplots
    - Trend: increasing, decreasing
    - Shape: linear, non-linear
    - Strength: strong relationship, weak relationship
- x-axis variable: predictor, independent, explanatory variable
- y-axis variable: predicted, outcome, dependent, response variable
- Correlation coefficient (r): measures strength of the linear relationship. Always between -1 and 1. Make sure you can calculate and interpret graphically.
- Regression line (slope, intercept). Make sure you can write the equation and interpret each component.
- Coefficient of determination (r-squared): percentage of the variable of y is explained by x.
- Prediction using the equation of the regression line. Don't extrapolate!

Chapter 5

- What is randomness?
  - Simulating randomness. Ex: coin toss, random number table
  - Estimating probabilities via simulation
- Probabilities
  - Trial, outcome, sample space
  - Law of Large Numbers
  - Calculating probabilities
  - Disjoint (or mutually exclusive) vs Independent - How does this affect the addition and multiplication rules?
  - Complement Rule
  - Addition Rule
  - Multiplication Rule
  - Conditional Probabilities
  - Sequences and Tree Diagrams - Make sure to know how to draw tree diagrams and how to solve for all probabilities!