Statistics 10 Review

Midterm 1

*Note: This is a list of **important** topics, but is not exhaustive. Use this list to prioritize your studying, but not to completely exclude topics that aren't on this list!*

Chapter 1

- Data, observations, and variables
- Categorical vs numerical variables
- Coding data and coded variables
- Collecting data

  - Observational studies vs controlled experiments
  - Treatments, outcomes, responses
  - Controls and placebos
  - Confounding variables / factors

- Aspects of "good" experiments

  - Large sample size
  - Random assignment
  - Blinding
  - Placebos and the placebo effects

- Understanding when and how to generalize conclusions based on data

Chapter 2

- Distribution of data and frequencies
- Basic graphs

  - Histograms
  - **Boxplots**

- Interpreting scales and units
- Properties of distributions

  - Shape: Symmetric, skewed, modality (unimodal vs multimodal)
  - Center
  - Spread and variation
  - Outliers

- Identifying misleading graphics

Chapter 3

- Mean, median, mode
- Standard deviation, IQR

- Max, min, Q1, Q2, Q3

  - "Five-number" summaries

- Empirical rule
- z-scores $(z = (x - \overline{x})/s)$
- The effect of outliers on numerical summaries
- Potential outliers
- Boxplots

  - Comparing boxplots and histograms
  - Identifying Q1, Q3, IQR, median, outliers from boxplots

Chapter 4

- Scatterplots

  - Trend and association
  - Strength of association
  - Shape
  - Unusual features

- Correlation coefficient r

  - Interpreting sign and magnitude of r
  - Effect of outliers
  - Causality and/or nonlinear associations vs r