Exam 1 Preparation

- Logistical details
  - Thur Oct 8
  - 50 minutes
  - Open-book, open-notes
  - Calculator needed
- Coverage
  - Handouts 1–7
  - Sections 1.1 – 1.3, 2.1 – 2.3, 3.1 – 3.3
- Resources available online
  - This preparation sheet
  - Handouts
  - Quizzes 1–7 and solutions
  - Investigation assignments and solutions
  - Optional exercises
- Types of questions to expect
  - Short answer (e.g., identify observational units and variables)
  - Calculations (e.g., determine five-number summary, regression equation)
  - Interpretations and explanations
  - Similar to handout examples, quizzes, investigations, optional exercises
- Advice for preparing
  - Prepare and organize your notes carefully
  - Don’t study less because it’s open-notes/book
  - Plan not to rely on your notes/book too much
  - Re-read, work through handouts
  - Re-read sections from text
  - Focus on understanding, not memorization
  - Review and make sure that you can answer quiz, investigation, optional exercise questions
  - Ask questions during class, office hours
- Advice during the exam
  - Show up on time!
  - Be cognizant of time constraint
  - Read carefully
  - Relate conclusions to context
  - Write and explain clearly
  - Show details of calculations
  - Do not elaborate excessively
Outline (of most important topics)

- Fundamental terms
  - Observational unit, variable
    - Categorical vs. quantitative
    - Explanatory vs. response
  - Population, sample
- Drawing conclusions
  - To what population can results be generalized?
    - Random sampling
    - Biased sampling
  - Can a cause/effect conclusion be drawn?
    - Observational study
    - Confounding variable
    - Experiment
    - Random assignment
- Two-way tables
  - Segmented bar graph
  - 2×2 tables
    - Marginal distributions
    - Conditional proportions
    - Relative risk
- Graphical displays
  - Dotplot, histogram, stemplot, boxplot
  - Features: shape, center, variability, outliers
    - Symmetry, skewness
- Numerical summaries
  - Mean, median (center)
  - Standard deviation, IQR (variability)
  - Properties, including resistance
  - Standardizing (z-scores)
  - Five-number summary
  - Outlier check
- Bivariate data
  - Association
    - Scatterplot
    - Form, direction, strength
    - Correlation coefficient
      - Properties
  - Least squares (regression) lines
    - Least squares criterion
      - Calculating coefficients from summary statistics
    - Residuals
    - Prediction
      - Extrapolation
    - Interpretation of slope coefficient
    - Coefficient of determination ($r^2$)