Exam Two: Inference

Key ideas:

1. Distributions
   (a) What is a distribution?
   (b) What is the difference between a population distribution and a sample distribution?
   (c) What is the difference between the true sample distribution and a bootstrap distribution?
   (d) Why do we use bootstrap distributions?
   (e) What is a randomization distribution, and how is connected to sample and bootstrap distributions?

2. Confidence intervals
   (a) What is a confidence interval? Know how to interpret one, and use language appropriately.
   (b) Know how to form a confidence interval from a histogram of a bootstrap distribution
   (c) Know how to form a confidence interval from a bootstrap distribution using percentiles
   (d) Know how to form a confidence interval from formulas for proportions, mean, differences of proportions, and differences of means.

3. Hypothesis Tests
   (a) Understand the form of the null hypothesis, and the three possible forms of the alternative
   (b) Understand how to calculate $P$-values using point estimates and randomization distributions
   (c) Understand how to calculate $P$-values using point estimates and formulas
   (d) Understand how to interpret $P$-values as a probability of a result “as or more extreme”
   (e) Understand the idea of “level of significance”
   (f)

4. R
   (a) Know basic statistical commands like `mean`, `sd`, `summary`, `hist`, `pnorm`, `qnorm`, `pt`, `qt`, etc.
   (b) Know basic functional commands like `rep`, `seq`, etc. and how to use these in a `for` loop
   (c) Be able to use R to solve your homework problems.