Exam 1 Preparation

Logistics:
- Wed Jan 28
  - 50 minutes
- Open-notes, open-handouts
  - You may bring anything that I have provided or that you produce yourself
- Bring calculator, normal probability table
  - No computer use
- Handouts 1-8, Quizzes 1-8, HW1-4, Chapters 1-3

Overview:
We have analyzed studies that involve one binary categorical (i.e., yes/no) variable, where the data are a sample (ideally, a random sample) from a population or process

We have studied two primary types of statistical inference:
- Statistical significance, where the goal is to assess the degree to which the sample data provide evidence supporting a research conjecture;
- Statistical confidence, where the goal is to estimate a population parameter with an interval of plausible values.

We have studied two ways to conduct statistical inference in this situation:
- Simulation
  - Tactile (e.g., with coins)
  - Technology (e.g., with applet)
- Normal distribution
  - When conditions are satisfied
  - With table or technology (applet)

Outline:
- Handout 1: Data, Variables, Studies
  - Observational unit, variable, categorical, quantitative, population, sample
- Handout 2: Statistical Significance
  - Null model/hypothesis, simulation, p-value, strength of evidence
- Handout 3: Testing Hypotheses
  - Parameter, statistic, test of significance, null hypothesis, alternative hypothesis, p-value, significance level, test decision, two-sided test
- Handout 4: Normal Distributions
  - Normal curve, mean, standard deviation, empirical rule, z-score, normal probability table/calculations, inverse (percentile) calculations
- Handout 5: Sampling Distribution (of Sample Proportion)
  - Sampling variability, sampling distribution, key result (Central Limit Theorem for Proportion)
• Handout 6: One-Proportion z-Test
  o Test statistic, technical conditions
• Handout 7: Sampling
  o Representative sample, generalizability, biased sampling, simple random sampling, sampling variability, precision
• Handout 8: Confidence Intervals
  o Plausible values, standard error, confidence interval, confidence level, margin-of-error, sample size determination, effect of sample size and confidence level, interpretation of confidence level, “plus four” method, statistical significance vs. practical importance, importance of random sampling

Resources available online:
  • This preparation sheet
  • Handouts
  • Chapters (PolyLearn)
  • Quizzes and solutions
  • HW assignments and solutions
  • Practice exam and solutions

Types of questions to expect:
  • Short answer (e.g., identify observational units and variables)
  • Calculations (e.g., z-statistic, normal probability)
  • Interpretations and explanations
  • Similar to examples, quizzes, HWs

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
  • Focus on understanding, not memorization
  • Review and make sure that you can answer example, quiz, HW, practice exam 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