

Stat 218 – Exam 2 Preparation

Basic information:

The exam will be given on Thursday, February 16 at the usual time in our usual classroom (02-206). The exam covers days 15-24 of class, investigations 7-10, portions of chapters 6 (section 6.6) through 10 (through section 10.3, also sections 10.7 and 10.9) of your text.

Some general advice:

- Prepare well-organized notes
- Arrive on time
- Don't rely on text, notes too much
- Be cognizant of time constraint
- Read questions carefully
- Make use of partial information, calculations
- Relate conclusions to context
- Explain reasoning when asked

Outline (of most important topics since the first exam):

- Comparing independent samples

$$(\bar{y}_1 - \bar{y}_2) \pm t^* \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

- Confidence interval for $(\mu_1 - \mu_2)$:
 - Degrees of freedom
 - Importance of checking zero
 - Technical conditions
- Hypothesis test
 - Null and alternative hypotheses
 - Non-directional vs. directional

$$t_s = \frac{\bar{y}_1 - \bar{y}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

- Test statistic:
- P -value
 - Calculation from table
 - Interpretation
 - Two-sided vs. one-sided
- Significance level
 - Test decision
- Technical conditions
 - Transformations
- More inference considerations
 - Duality of tests and intervals
 - Significance vs. importance
 - Tests concern significance
 - Intervals address importance

- Non-sacredness of conventional α levels
- Types of errors
 - Consequences, trade-offs
- Designing statistical studies
 - Observational studies vs. controlled experiments
 - How to distinguish
 - Explanatory, response variables
 - Scope of conclusions
 - Lurking variables
 - Confounding
 - Causation
 - Designing experiments
 - Comparison
 - Control group
 - Placebo effect
 - Blindness
 - Randomization
- Paired data
 - Advantages of paired design
 - Paired t -procedures
 - Hypothesis test
 - Confidence interval
- Categorical data
 - Goodness-of-fit test
 - Expected counts
 - Test statistic
 - Chi-square distribution
 - P -value
 - Binary data
 - Goodness of fit test
 - Directional alternative
 - Confidence interval for population proportion p
 - Conventional procedure: $\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$
 - Technical conditions
 - Sample size determination
 - Alternative procedure: $\tilde{p} \pm z^* \sqrt{\frac{\tilde{p}(1-\tilde{p})}{n+4}}$
- Chi-square tests for 2×2 tables
 - Testing equality of population proportions
 - Directional, nondirectional alternatives
 - Expected counts, test statistic, P -value
- Analyzing 2×2 tables
 - Chi-square test

- Testing equality of population proportions
- Directional, nondirectional alternatives
- Expected counts, test statistic, P -value
- Difference in proportions
 - Confidence interval
- Relative risk
- Odds ratio
 - Confidence interval
 - Importance of containing 1