Test 3 Information

**Time, Location, Coverage**

Test 3 will be given in class on Tuesday, December 5. The test is cumulative, but will emphasize the material in chapters 4, 5, 6, 18, 19, 20, 21, and 22. You are responsible for material covered in the text, in the problem sets, and in class.

**Format**

Test questions will be designed to try to see how well you understand the material, not how well you can perform various procedures mindlessly. A variety of question formats may be used. Some items may be tested using "short answers" (a couple sentences to a paragraph), multiple choice, or true/false.

**Instructions**

Read through these prior to coming to the test and follow them when you take your test.

1. Always **show your work** and **explain your reasoning**. Answers without work or reasoning will not receive full credit.
   - Use mathematical **notation** (especially the equals sign) correctly.
   - Don’t be afraid to **use words** in your explanations.
   - **If you get an unreasonable answer, be sure to say so.** Give a brief explanation about how you know your answer is wrong (for example, the mean I calculated is less than 10, but I can see from the data that it should be at least 20). Then go on to other problems and come back and try to fix the error if you have time at the end of the test period.
   - Even if you cannot do a problem completely, **show me what you do know**.

2. You may use your own (even fancier) calculator on this exam. Remember that for each number you write on the exam, it must be clear where it came from. For example, if you got .25 by multiplying .5 by .5, I want to see \( .5 \cdot .5 = .25 \) on your paper (or words indicating the same). When you get a value from a table, say so.

3. Short answer questions will be graded based on **truth**, **accuracy**, **clarity**, **significance**, and **brevity**. In short, I’m looking for high quality answers. (Example: If you are asked to give an example of something, pick the best example you can think of, one that makes the issue especially clear.)

4. Test restrictions.
   - The test is **closed book**. You may, however, bring one 8.5 by 11 inch “cheat sheet”. These must be handwritten and one-sided. They will be collected with your exam.
   - I will provide you with copies of Tables C and E for use during the exam. (You will not need to use table D.)
   - Do not write in purple on the exam. (The exam will be graded in purple.)
Content

Here is a list of things you should be sure you know how to do. It is not intended to be an exhaustive list, but it is an important list.

You should be able to:

- Understand, use and explain the statistical vocabulary/terminology including the ideas in chapters 4–6 (two-way tables, marginal and conditional distributions, positive/negative association, influential observation, extrapolation, residual, etc.)

- Understand the issues involved in collecting good data and the design of studies, including
  - the distinctions between sample surveys, observational studies, and randomized experiments, and
  - matching study designs with appropriate analysis methods.

- Work with normal, $t$, $\chi^2$, and $F$-distributions. This includes being able to use the 68-95-99.7 Rule and/or Tables to find percentages, critical values, etc. (You will not need to use Table D, however.)

- Understand the basic framework for hypothesis testing and how to interpret $P$-values. You should be able to accurately explain what a $p$-value measures.

- Understand the basic framework for confidence intervals and how to interpret the confidence level. This includes understanding the differences between the various kinds of intervals we have seen in connection with regression and Tukey’s pairwise comparison method for ANOVA. You should be able to accurately explain what the confidence level of a confidence interval means.

- Perform and interpret all of the confidence intervals and hypothesis tests covered so far. This includes being able to locate the necessary information on computer output as you have had to do in several homework problems.

- Understand the layout and information displayed in an ANOVA table, including and ANOVA table for regression and the interpretation of $R^2$ that comes from ANOVA.

- Be aware of the assumptions that must be true to make use of various statistical procedures and the degree to which the procedures are robust. (How well do they work if the assumptions are not met?)

- Understand how to make and interpret graphical representations of data (stemplot, histogram, boxplot, scatter plot, normal quantile plot) and when each might be appropriate or inappropriate to use.

Note that the test will be a sample from the possible topics, it will not be exhaustive.

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