

AP Statistics Fall Final Exam Information & Study Plan

How many questions are there? 30 multiple choice and 2 free response questions

What else do I get to use? A calculator of course, and a formula sheet. You may also use a single 3x5 index card **IF AND ONLY IF** you bring me one of the following items: a box of Kleenex, a bag of M&M's, a package of Expo markers, or a large roll of paper towels

What does it cover? What should I study? In a word... everything. Your old tests are a great resource so redo/review those problems for practice. Review problems from your textbook are included on this sheet as well.

Finals Week Schedule

Monday 12/12: Guinea Pig Project Due

Tuesday 12/13: **A2, A4**

Wednesday 12/14: **B2, B4**

Thursday 12/15: **1st, A3**

Friday 12/16: **B3, 5th**

Units and concepts we have covered so far include:

- A. Categorical and Quantitative data
 - a. What types of graphs are used for each and how to create them
 - b. How to calculate outliers (as in boxplots)
 - c. Finding the 5-number summary of a data set (Min, Q1, Med, Q3, Max)
 - d. Calculating percents from two-way tables
 - e. Describing distributions of quantitative variables (CUSSing)
- B. Normal Curve
 - a. The Empirical Rule (68-95-99.7)
 - b. Calculating percents and percentiles (normalcdf)
 - c. Calculating z-scores from stats/data or a percentile rank (invnorm)
 - d. Finding the mean and/or standard deviation given percentile ranks, z-scores, or raw scores (solving with a system of equations)
- C. Regression and Correlation
 - a. What does r measure, what is it called, and how is it interpreted?
 - b. What does r^2 measure, what is it called, and how is it interpreted?
 - c. Calculating and interpreting the slope in context
 - d. Calculating and interpreting the y-intercept in context
 - e. Finding the LSRL (from given data or from computer output) and writing the equation in context
 - f. Using the LSRL to find predicted values
 - g. What is a residual and how is it calculated?
 - h. Reading residual plots... why do we have them?
- D. Sample Surveys
 - a. Be able to identify different sampling methods (SRS, Stratified sample, Cluster sample, Systematic, Multi-stage) and why one would be better suited for different situations
 - b. Be able to identify the different types of bias (Selection Bias [convenience sample], Response Bias, Non-response Bias, Voluntary Response Bias)
 - c. VOCAB VOCAB VOCAB!
- E. Experiments and Observational Studies
 - a. Know/identify the difference between experiments and observational studies
 - b. Be able to identify and describe the different types of randomized designs (Completely Randomized, Blocked, Matched Pairs) as well as **WHY** blocking or matched pairs is necessary
 - c. Key parts of an experiment
 - i. Explanatory and Response variables
 - ii. Treatments (actual treatment, placebo/control)
 - iii. Experimental Units
 - iv. Confounding variables

Study Plan for Fall Final

If you follow this plan you will be well prepared and it will be much less work/stress than cramming the night before. Each arrowed bullet represents a set of problems that can be completed in one day or you can do all the problems listed at your leisure during the week. All solutions will be posted online and on Canvas for your studying pleasure.

<p><i>Week of Nov 29 – Dec 2</i> Practice Exam on Page 336-342: →Do the first 10 MC problems →Do the first 2 free response problems →Do AP Practice Problem #1 (on back)</p>	<p><i>Week of December 5 – 9</i> Finish Practice Exam from pages 336-342: →Do MC problems 11-20 →Do free response problems 3,4 →Do AP Practice Problem #2</p>	<p>Finals week December 12 – 16 →Do AP Practice Problem #3 →Go over old tests →Don't forget to make notes on your 3x5 index card!</p>
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1. There have been many studies recently concerning coffee drinking and cholesterol level. While it is known that several coffee-bean components can elevate blood cholesterol level, it is thought that a new type of paper coffee filter may reduce the presence of some of these components in coffee.

The effect of the new filter on cholesterol level will be studied over a 10-week period using 300 nonsmokers who each drink 4 cups of caffeinated coffee per day. Each of these 300 participants will be assigned to one of two groups: the experimental group, who will only drink coffee that has been made with the new filter, or the control group, who will only drink coffee that has been made with the standard filter. Each participant's cholesterol level will be measured at the beginning and at the end of the study.

- Describe an appropriate method for assigning the subjects to the two groups so that each group will have an equal number of subjects.
- In this study, the researchers chose to include a group who only drank coffee that was made with the standard filter. Why is it important to include a control group in this study even though cholesterol levels will be measured at the beginning and at the end of the study?
- Which test would you conduct to determine whether the change in cholesterol level would be greater if people used the new filter rather than using the standard filter?
- Why would the researchers choose to use only nonsmokers in the study?

2. A researcher thinks that modern Thai dogs may be descendants of golden jackals. A random sample of 16 animals was collected from each of the two populations. The length (in millimeters) of the mandible (jawbone) was measured for each animal. The lower quartile, median, and upper quartile for each sample are shown in the table below, along with all values below the lower quartile and all values above the upper quartile.

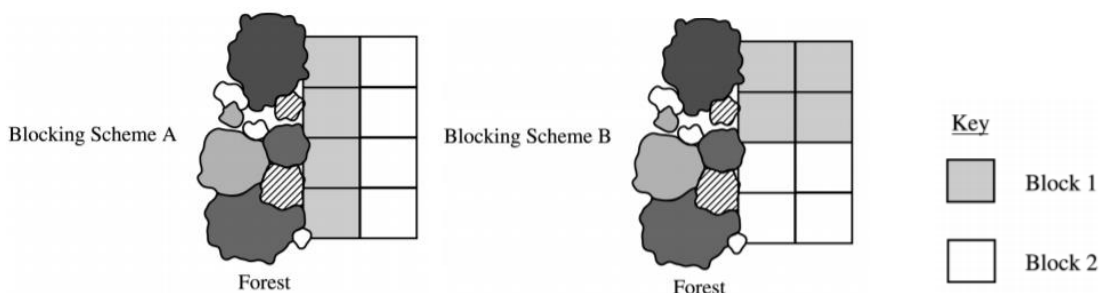
Sample	Values Below Q_1	Q_1	Median	Q_3	Values Above Q_3
Modern Thai dog	114, 116, 116, 120	121	125	128	129, 130, 130, 132
Golden jackal	104, 104, 105, 106	107	108	112	114, 122, 124, 125

- Display parallel boxplots of mandible lengths (showing outliers, if any) for the modern Thai dogs and the golden jackals on the grid below.

Based on the boxplots, write a few sentences comparing the distributions of mandible lengths for the two types of dogs.

3. Students are designing an experiment to compare the productivity of two varieties of dwarf fruit trees. The site for the experiment is a field that is bordered by a densely forested area on the west (left) side. The field has been divided into eight plots of approximately the same area. The students have decided that the test plots should be blocked. Four trees, two of each of the two varieties, will be assigned at random to the four plots within each block, with one tree planted in each plot.

The two blocking schemes shown below are under consideration. For each scheme, one block is indicated by the white region and the other block is indicated by the gray region in the figures.



- Which of the blocking schemes, A or B, is better for this experiment? Explain your answer.
- Even though the students have decided to block, they must randomly assign the varieties of trees to the plots within each block. What is the purpose of this randomization in the context of this experiment?