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# AP STATISTICS

## Summer Assignment 2011

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Welcome to AP Statistics! I hope you are looking forward to taking this course as much as I look forward to teaching it again! In order to accomplish our goals this year, we will need to do some work over the summer. Don't worry – I don't expect you to spend your entire summer thinking about statistics. There will be enough time for that next year! But, I do want you to at least start thinking about statistics and get an introduction into the subject. Good luck, enjoy your summer, and I'll see you in September!!!

### Summer Assignment:

This assignment will be due the first day of school for a quiz grade. There will not be any summer sessions for this course, so feel free to email me if you have any questions ([aspiegel@rbrhs.org](mailto:aspiegel@rbrhs.org)).

I. Part I – Exploring and Understanding Data (See Attached)

Feel free to make use of statistical software to make your graphs (Fathom, Excel, etc.). Or of course, graphs can be made *neatly* by hand. You may also need to do some research (online or via textbooks) to answer some of the questions. Please think!! Don't just guess.

II. Part II – Summary Questions (See Attached)

Your answers to these questions should be *typed* and submitted on separate paper.

## AP Statistics Project Part I – Exploring and Understanding Data

This project explores the numerical and visual display and analysis of data and determines students' ability, using a graphing calculator to:

- ❑ Enter and manipulate data;
- ❑ Complete basic numerical computations (5-number summaries, mean and standard deviation);
- ❑ Create properly formatted visual displays of data (tables, bar graphs, histograms, box plots, stem-and-leaf plots and normal distribution plots);
- ❑ Analyze and interpret numerical summaries and visual displays of data;

### Scenario and Data

Scores (in percentages) for the first test of the year for two AP Statistics classes are provided below. The class “**First**” meets first period of the day, every day of the school year. The second class “**Last**” meets last period of the day, every day of the school year. There are 21 students in the First class and 30 students in the Last class:

**First Scores:** 98, 52, 92, 92, 60, 66, 90, 86, 86, 70, 72, 84, 82, 82, 82, 82, 74, 74, 76, 80, and 80  
(checksum: 1,660).

**Last Scores:** 96, 95, 92, 54, 57, 58, 86, 85, 82, 82, 82, 60, 66, 66, 66, 68, 80, 80, 77, 76, 76, 75, 74, 74, 74, 73, 72, 72, 71, and 70 (checksum: 2,239).

The AP Statistics teacher would like to conduct an analysis that compares the grades of the classes to determine if there is a difference in skill level between the students in the two classes.

### Section 1: Graphing Calculator (round all decimals to the tenth place)

- a) Enter the data sets into two columns in the list processor of your graphing calculator. Order the data from highest to lowest.
- b) Use the checksum numbers above to ensure that you entered your data correctly. The sum of each data set should equal its checksum.
- c) Use your calculator to find the mean and standard deviation of each class. Insert your answers here:

First Mean: \_\_\_\_\_

Last Mean: \_\_\_\_\_

First Standard Deviation: \_\_\_\_\_

Last Standard Deviation: \_\_\_\_\_

Which standard deviation did you record above,  $s$  or  $\sigma$ ? Explain why: \_\_\_\_\_

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d) Create a 5-number summary for each class, round to 1 decimal place & record your results here:

	<b>First</b>	<b>Last</b>
<b>Max</b>		
<b>Q3</b>		
<b>Median</b>		
<b>Q1</b>		
<b>Min</b>		

e) Identify any outlier(s) in these data sets. Explain why they're outliers.

f) Create modified box plots of the data for each class. Sketch the box plots, side-by-side, here:

How is a “modified” box plot different than a regular box plot?

Explain in a sentence or two the usefulness of a box plot when analyzing data.

g) Create (by hand) back-to-back stem-and-leaf plots for the data sets; split your stems if necessary.

Explain in a sentence or two the particular usefulness of a stem-and-leaf plot in analyzing data.

h) Make a frequency table of As (90-100), Bs (80-89), Cs (70-79), Ds (60-69) and Fs (<60) for each class, then create a histogram for each class.

Explain in a sentence or two the particular usefulness of frequency tables and histograms when analyzing data.

i) Create a table that displays marginal grade summaries and marginal distributions.

Grades	FIRST Frequency	LAST Frequency	Totals	Marginal Distribution (%)
A (90 +)				
B (80-89)				
C (70-79)				
D (60-69)				
F (< 60)				
<b>Totals</b>				

In a sentence or two, comment on the marginal distribution percentages that you calculated.

j) Compare the conditional probabilities of the grades for FIRST and LAST (e.g. what is the conditional probability that a student will get a grade of B or better given that s/he is in the FIRST PERIOD class). Complete the table and write a few sentences explaining your findings.

**Conditional Distribution Table**

Grades	First Period Conditional	Last Period Conditional
A (90 +)		
B (80-89)		
C (70-79)		
D (60-69)		
F (< 60)		
A or B		
A, B or C		
C, D or F		
D or F		

**Section2 - Summary Questions:** Using the data, tables, summaries and visual displays you created, answer the following questions. Your answers should be typed on separate paper.

- (1) Describe the shape of the data for each data set (shape, center, and spread).
- (2) Discuss your numerical findings in general, comparing the data of these two classes. What conclusions can you make?
- (3) Should the AP Statistics teacher conclude that there is a difference in the level of abilities between the students in the two classes? Support your answers in 3-5 sentences using your data.
- (4) Are there factors besides student ability that might be affecting this data? Using your experiences as a student, identify some possible factors and support your arguments in 3-5 sentences.
- (5) What recommendations would you make to the AP Statistics teacher regarding these two classes? Be specific in your recommendations and support your answers.