



THE KNOX SCHOOL

Always Toward the Light

Summer Assignment

AP Statistics

Welcome to AP Statistics! This course will be unlike any other mathematics class you have ever taken before (except, of course statistics). Before taking this course, you will need to be competent in basic algebra, be familiar with basic statistical plots (box-and-whisker, scatter, bar graphs, histograms, pie charts, frequency diagrams, dotplots, and stem-and-leaf plots). If you are not familiar with ANY of these plots, it is up to you to fully understand them before the class begins.

Statistics is all about the analysis of data. Being such, you must be willing to explain your answers, not just simply get the correct answer. In this class, you will learn to describe and analyze sets of data and use that analysis to draw a conclusion about the situations that arise. At the conclusion of this course, you will be able to draw seemingly random conclusions drawn from disparate data and form hypotheses that neither make common sense nor seems reasonable to the average person.

Most of the material for this course is online and readily available, you just have to do some digging. I'm preparing you for college-level work and this is what it takes. A full requirement for this course is a graphing calculator (I don't really care what brand, but it **MUST** have statistical functions built-in. The Ti-** series are good options) but I will be using a TI series in class. Whatever calculator you buy, make sure it is capable of performing the following: Statistical plots - box and whisker, modified box and whisker, histogram, scatter plot Regression equations and correlation statistics Distribution & probability density functions - normal, binomial, and geometric, Statistical tests - t, z, Chi-sq, and confidence intervals.

Every student will be required to submit a completed summer assignment on the first day of school - **no exceptions**. This assignment will be graded and counted as an exam grade.

Every student in this class will be required to complete a summer assignment, which will be due the first day of school. The purpose of this assignment is to ensure that you enter this course with the required background knowledge in order to be successful. All answers must be on your own paper and legible. Be careful with spelling, sentence structure, and grammar. A large part of this class is clear communication of your answers. This is five - part assignment. Please make sure to bind your work in a pocket folder or report cover, with your name clearly marked on every page. This is worth a test grade and any missing part will result in a major deduction of your grade. If you have any questions, please feel free to email me at penzinger@knoxschool.org.

Good Luck and have a great summer! See you in September!

Part I: Why Statistics?

Write a page explaining why high school students should take a statistics class. First, use evidence from the following sources to make your case:

http://www.ted.com/talks/lang/eng/arthur_benjamin_s_formula_for_changing_math_education.html

(<http://tinyurl.com/nw8uyo>)

http://www.wired.com/magazine/2010/04/st_thompson_statistics/

Then, write a paragraph explaining what you hope to gain from taking a class in Statistics. What are your reasons for signing up for this class?

Part II: Vocabulary

This course is heavy with new vocabulary. Attached to this document is a list of new vocabulary words that we will use in the course. Study these well.

Part III: Problems

1. Categorical or Quantitative Data
 - a. Number of students in a classroom
 - b. Sex of students in a classroom
 - c. Height of students in a classroom
 - d. Temperature in the classroom
 - e. Age
 - f. Smoking or not smoking
 - g. Republican, Democrat, or Neither
 - h. Colors of the Rainbow
 - i. Grade you are in
 - j. Your class standing (9, 10, 11, 12)
2. Data analysis

In a rural town in Oklahoma during the 1970's, the following data was collected concerning the age at which the eldest child in a family was given the opportunity to drive a car. The sample consists of 31 people, 16 males and 15 females.

M	16	16	17	16	18	17	17	16	16	27	16	17	16	17	16	16
F	17	18	19	20	18	19	20	18	18	17	16	18	19	17	18	

- A. Calculate the following statistics for the male and female data respectively (measures of central tendency)
 - a. Mean
 - b. Median
 - c. Mode
 - d. Range
- B. Plot each set of data. Either use a stem-and-leaf plot or a dot plot
- C. Looking at your plot, which data point(s) would be considered an outlier? Why?
- D. Re-calculate part (a) above for males excluding the outlier if there is one.
- E. Summarize the effects of the outlier on the mean, median, mode and range

- F. In statistics, often you will be required to interpret your data. In a paragraph, compare the two sets of data.
3. Suppose a set of data consists of 33 whole number observations. Its five number summary is (min, Q1, median, Q3, max) = (16, 20, 22, 30, 46). This problem refers to the box and whisker plot
- What is the range of the data?
 - How many observations are strictly less than 22?
 - Is it possible that there is no observation equal to 22? Explain.
 - How many observations are strictly less than 20?
 - Is it possible that there is no observation equal to 20? Explain.
 - Construct a modified box plot.
4. The following data describes the number of persons per household in the United States in the census years between 1850 and 2000.

YEAR	# OF PERSONS IN HOUSEHOLD
1850	5.55
1860	5.28
1870	5.09
1880	5.04
1890	4.93
1900	4.76
1910	4.54
1920	4.34
1930	4.11
1940	3.67
1950	3.37
1960	3.35
1970	3.14
1980	2.76
1990	2.63
2000	2.59

- A. Construct a scatter plot of this data on graph paper. Put year on the x-axis (independent variable) and household size on the y-axis (dependent or response variable). Clearly label the axes and give the graph a title.
- B. Using a straight edge or ruler, carefully draw what you believe to be the line of best fit through the data.
- Estimate the slope of your best fit line. Include proper units for your slope.
 - Use your graph and best fit line to estimate the number of persons in 1918.

Part IV: Using your TI Graphing Calculator

Entering data into a list

STAT -> 1: EDIT -> enter data into appropriate list

To clear a list:

Scroll up to the list name and hit clear followed by the down arrow or select CLEAR LIST IN EDIT

To find the Mean of a list:

2nd STAT -> Math -> 3:mean (L1)

To find the median of a list:

2nd STAT -> Math -> 4: median (L1)

Calculator problem: Use the data below to do the following exercises

12	19
18	58
33	30
15	14
66	46
4	21
26	34
42	54
22	23
4	44
17	55
54	60
44	39
52	62
38	33
27	28
25	53
44	35
18	55
25	44
42	21
63	55
38	50
36	33
44	9

1. Enter the data into a list
2. Sort the list in ascending order and find the mode
3. Find the median of the data
4. Find the mean of the data
5. Find the sum of the data
6. Find the Standard Deviation of each set of data

Part V: MKTB (Must Know the Basics)

1. Write 7% as a decimal
2. Write $\frac{3}{10}$ as a percent
3. What is 25% of 500?
4. What is 12% of 82?
5. What is the probability of rolling a number greater than a 2 when rolling a fair 6-sided die?
6. What does $3 < x < 20$ mean if you were to put it into words?

7. $g(x) = 3x - 5$, find $g(8)$
 8. Solve the following for z : $b = r(z) + g$
 9. Solve the following for z : $b = r(z) + z$
 10. Graph $y = 4x + 3$
 11. Graph $y = 3 - 5x$
 12. Graph $y = 22.4 + 6.8x$
 13. If the height of a human in inches is linearly related to their age in years, what would be the interpretation of a slope of 5.67?
 14. Suppose the scenario in #13 was represented by the equation $a(h) = 18.4 + 5.67h$. What does the value 18.4 represent in the real world?
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It is very important to complete this assignment in a timely manner. Do not procrastinate. It is okay to ask others for help or to share ideas, but it is in no way acceptable to copy each other's work. Remember cheating in any way (copying, plagiarism, &c.) will result in an automatic zero and a referral to the disciplinary committee on campus. That would be an awful way to start out the school year! Amidst your summer assignments, most importantly, don't forget to enjoy the summer!