

# AP Statistics Summer 2017 Assignment

Welcome to Advanced Placement Statistics! This course is like no other mathematics course in that the emphasis is placed on your ability to think, reason, explain, and support as opposed to plugging in formulas or performing memorized computations. You will be asked to read about real-life situations, pick out the useful data, and use that data to find a conclusion.

Before being ready for AP Statistics, you should be competent in algebraic concepts taught in Algebra 1, Algebra 2, and PreCalculus. Also, you will need to familiarize yourself with the following topics:

1. Descriptive Statistics – mean, median, mode, variance, standard deviation, range, minimum, maximum, quartiles, outliers
2. Modes of Displaying Statistics – box-and-whisker plot, scatter plot, bar graph, histogram, pie graph, stem-and-leaf plot
3. Probability and Logic – ratios, conditional events, samples, populations

**Note that you may or may not have seen some of these topics before**

You will need to have your own calculator and bring it to class every day. AP Statistics relies on the use of a calculator, and you may not use your iPad as you are preparing for the AP exam. I highly recommend you have a TI-83, TI-84 (Plus Silver Edition), or TI-89. I will be using a TI-89 in class but will give instruction with all the types of calculators. If you choose to use a different edition or type, I will likely not be able to help you with all topics.

Before starting this course, I ask that you commit to being an active participant in the course. This means you must be willing to work with your fellow classmates and me. We will have a lot of fun; however, the ultimate goal of this course is to get you college credit in Statistics by getting a good score on the AP exam. If you are a student who likes to sit and do nothing during class time, not complete homework, or does not enjoy working through good mathematics questions, this course is probably not for you.

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Now that you have a little information about the course, you are ready to start your summer assignment. Make sure you read all directions thoroughly and complete each part of the assignment. Remember that this assignment will be your first big grade in the course as well as set the tone for the type of student you will be in the class. I look forward to working with and teaching all of you over the course of the next year!

The assignment is due Friday, September 15th, 2017. (the first Friday of the first full week)

**Enjoy your summer and see you at the start of school!**

**On this assignment, you may use your calculator, internet resources, and notes/books from previous mathematics courses. You may not work together or get help from another person. I will be available at school to answer questions before the assignment is due.**

### **Part 1: Vocabulary**

The following is a list of basic concepts you will see often in AP Statistics. Define each word using a dictionary or online resource in a one or two sentence definition. You may also use your own definition if you know the meaning of the word. Definitions can be written or typed on this page or on a separate sheet and attached.

1. study
2. average
3. population
4. sample
5. randomly selected
6. correlation
7. descriptive statistics
8. mean
9. variance
10. standard deviation
11. median
12. range
13. minimum
14. maximum
15. permutation
16. combination
17. categorical variables (with an example)
18. quantitative variables (with an example)
19. outliers
20. difference between probability and statistics

## **Part 2: Data and Graphs**

For each of the following sections, provide a complete solution to each problem described. Complete solutions include explanations and work, not just answers. Do not worry if you cannot completely solve a problem; you must attempt each by looking up what to do and trying. If you are still lost as to how to solve, provide your thoughts on what you think you should do. All work should be done on separate paper (or graph paper) and attached.

A. Use the following table to answer the questions.



Marvel Comics Superheros	Gender	Eyes	Hair	Height	Weight	First Appeared
Black Cat	Female	Green	Blonde	5'10"	120	1979
Captain America	Male	Blue	Blonde	6'2"	240	1941
Daredevil	Male	Blue	Red	6'0"	200	1964
Dark Angel	Female	Green	Red	5'7"	120	1992
Deadpool	Male	Brown	None	6'2"	210	1990
Elektra	Female	Blue	Black	5'9"	130	1981
Human Torch	Male	Blue	Blonde	5'10"	170	1961
Iceman	Male	Brown	Brown	5'8"	145	1963
Invisible Woman	Female	Blue	Blonde	5'6"	120	1961
Iron Man	Male	Blue	Black	6'1"	225	1963
Mr. Fantastic	Male	Brown	Brown	6'1"	180	1961
Ms. Marvel	Female	Blue	Blonde	5'11"	124	1967
Phoenix	Female	Green	Red	5'6"	115	1963
Silver Surfer	Male	Silver	None	6'4"	225	1969
Spider-man	Male	Hazel	Brown	5'10"	167	1962
Spider-woman	Female	Green	Black	5'10"	130	1977
Storm	Female	Blue	White	5'11"	127	1976
The Black Widow	Female	Blue	Red	5'7"	135	1962
Thing	Male	Blue	None	6'0"	500	1961
Thor	Male	Blue	Blonde	6'5"	640	1951
Venus	Female	Blue	Blonde	5'6"	280	1948
Wolverine	Male	Blue	Black	5'3"	195	1974

1. For each category, label it as categorical or quantitative.
2. Create a bar graph of hair color with color on the x-axis and number of heroes on the y-axis.
3. Create a stem-and-leaf plot for weight.
4. For height,
  - a. convert all heights to inches (1 foot = 12 inches)
  - b. find the maximum and minimum heights
  - c. find the range in height
  - d. find the median height
  - e. find the mode height
  - f. find the mean height

B. The following tables contain a list of data of height (inches) and weight (pounds) for 15 randomly selected individuals. We are studying if there is any correlation between the height and weight. Construct a scatter plot of the data with height on the x-axis and weight on the y-axis (clearly label the axes and provide a scale). Then, with a ruler, sketch a line of best fit.

Height	Weight
62	165
58	157
71	192
81	265
74	223
69	211
68	188
51	153

Height	Weight
71	244
62	215
67	199
85	321
61	170
57	164
56	148

C. According to a press release and data on car thefts in 2002, the 1989 Toyota Camry was the most stolen car in 2002. Further, according to the data, the 1990 Camry, 1991 Camry, and 1988 Camry were also all among the top ten most stolen cars in that year. The press release claims that the most compelling reason for these cars being stolen is for parts but does not discuss any confounding variables.

1. The press release claims that these cars are stolen mostly for their parts. Can you think of any OTHER reasons that an older family car would be a prime target for thieves? (Think about statistics – provide at least two statistical/mathematical reasons)
2. Based on the article, a researcher claims that because there is a high correlation between the age of the car and its theft (i.e. as the car gets older, it becomes more likely that it will be a target for theft), it is obvious that car thieves prefer older cars. Does the high correlation mean that the age of the car causes the car to become a target? Do car thieves really prefer older cars or is there something else occurring?

### **Part 3: Statistics in Your Life**

For this part of the assignment, you will be applying statistical analysis to your everyday life. To start, you need to think about two quantitative variables in your life that you think might have some association with each other. For example, how much I exercise in a day might effect how long it takes me to fall asleep that night. I would graph amount of exercise, in minutes, on the x-axis and time it took me to fall asleep, in minutes, on the y-axis for each day.

You are going to collect data for two consecutive weeks, graph the data points on a scatterplot, and explain what association, if any, that you notice. The more thoughtful you are about selecting the variables, the better your results will be. If you have questions about how to collect the data or if your variables make sense, **please email me *before*** completing this part of the assignment. Be careful not to pick a variable that would be the exact same amount every day because your graph will not make sense. For example, if I exercise exactly 33 minutes every day, my graph would be one vertical line hence no association.

You will be graded as follows:

1. Two variables could have an association and are stated
2. At least 14 data points graphed on graph paper
3. Scatterplot has 1 variable labeled on x-axis and other variable labeled on y-axis with a title
4. You have made a statement about the association between the two variables with specific detail from your scatterplot
5. A picture of you collecting your data is included

If you are done with the summer assignment, you should have:

Part 1: 20 terms defined

Part 2: a list of categorical/quantitative data topics, 3 graphs, 6 computations, and 2 short answer responses

Part 3: a statement about your variables, a scatterplot with labels and title, a summary statement of your analysis, a picture of you collecting your data