

# AP Statistics Summer 2021 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 for the AP exam. I highly recommend you have a TI-84 CE, TI-84 (Plus Silver Edition), or TI-89. 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 on the first day of class.

**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. Also, you can email me over the summer at [daniel.borkowski@saintjosephprep.org](mailto:daniel.borkowski@saintjosephprep.org). I will do my best to get back to you quickly.**

### **Part I: 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 II: 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    |

### **PART III Reading and Questions**

Answer all questions on a separate piece of lined paper. Answers should be in complete sentences and in your own words.

**Caution about Academic Integrity:** DO NOT copy the answers to any assignment from sources you find on the internet or other students. Doing so will be considered plagiarism. While having the answers available can be used as a guide, if you do not practice these skills, it will be evident when you take your tests this year. The textbook gives answers for the odd problems, but you need to show all work done to derive the answer; and answers must be in your own words!

**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?

**D)**

1. Read Chapters 1 and 2 of the text Stats Modeling The World
2. P 13 Complete the Just Checking #1 and # 2
3. P 17-18 Complete # 5,7,8,9,12,16. Answers must be in complete sentences.