

2020-2021 AP STATISTICS SUMMER ASSIGNMENT

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Introduction: Welcome to AP Statistics! Below are the directions for the summer assignment. The purpose of this assignment is to get us off to a strong start by covering the foundational content of AP Statistics. This will ensure that we have sufficient time to cover all of the material in the course and ample time to review for the AP exam. The first Unit of AP Statistics is mostly a review of concepts you have likely learned about in previous math courses, but you will need to focus on the new AP Statistic vocabulary. During the school year, we would normally take about 2 - 3 class periods to get this work done. Please read these directions carefully and contact me by email at kyle.markwalter@kippsanjose.org if you have any questions about the assignment or require clarification about my expectations of the work that you do. I will check my email periodically throughout the summer, but I might not reply immediately

In this class you will learn to describe and analyze sets of data and use that analysis to draw conclusions in context about the situation that gave the data. This course is not like any other math class you have ever taken! I would say that it is a combination of Math, English, and Science. Communication skills are essential, and there is MUCH more reading and writing than what you are used to in a math class. It is a very rewarding course and a very important one, in my opinion, but can be quite difficult at times. Since it is an AP course, it is considered to be college-level. The mathematics required for this course may not be as difficult as in other advanced math courses, but some of the concepts can be very confusing. In addition, there is a great deal of material that we are expected to cover by April's end, so you need to be committed to giving it your absolute best effort day in and day out.

The summer assignment is designed for you to review some algebra skills, refresh your knowledge or learn about basic descriptive statistics, graphs, and general information. Please write neatly. **The assignment is due the first day of class.**

Resources/supplies: Everything you need to help support you through the summer assignment can be found at markwaltermath.weebly.com. Click on the Summer Homework tab and look for the AP Statistics Section. You will find videos and links posted throughout summer to help you complete this packet. You will also find my answers posted around August 9th, 2020.

I encourage you to invest in a **graphing calculator** (recommended for homework and for the AP Statistics exam). A TI-83 or higher is best. I do have a class set of TI-84 Plus CE but you will not be able to take it home. For the summer homework, I will provide links to calculators on my website if you need them.

Caution about Academic Integrity: DO NOT copy the answers to any assignment from sources you find on the internet or the textbook solutions. Doing so will be considered plagiarism and consequences of such actions will result in zero's.

Caution! Answers you find on the internet are sometimes incorrect and will often be stated using terminology and techniques that are not specific to the current AP Statistics curriculum. In addition, this will make it easy for me to identify work that is not your own.

*****Due Date:** Summer assignments must be completed by the first class! I will not accept any late summer assignments so do not wait until the last minute to work on these. Each student will read and learn at a different pace. All work should be completed on a separate piece of paper. **USE A RULER TO CREATE STRAIGHT GRAPH AND PLOT AXES LIKE THE ONES PROVIDED. LABEL AND NUMBER EVERYTHING IN YOUR WORK.**

The summer assignment is composed of two parts.

1. **Reading and Vocabulary:** You will use a free online Statistical tutoring site that will give you information on variables and data displays. While reviewing information on the site you will be completing a vocabulary list (on proceeding pages). Follow the steps below:
 - Go to www.stattek.com
 - Click on “Tutorial” at the top of the page (also on left).
 - Click on the AP Statistics tutorial in the dropdown.
 - A list of BIG TOPICS and general topics will appear on the left hand side of the screen. You will work from the EXPLORING DATA big topic. You have three general topics you will work from in EXPLORING DATA. When you click on the general topic a list of subtopics will appear. You will read or watch the video on the following subtopics to complete the vocabulary list.

| General Topic: The Basics | |
|---|-------------------------|
| Subtopics: | Variables |
| | Populations vs. Samples |
| | Mean and Median |
| General Topic: Charts and Graphs | |
| Subtopics: | Patterns in data |
| | Dotplots |
| | Histograms |
| | Stemplots |
| | Boxplots |
| | Cumulative plots |
| | Comparing data sets |
| General Topic: Categorical Data | |
| Subtopics: | One-way tables |
| | Two-way tables |

2. **Practice Problems.** Use your learning from stattrek.com and the links I will post on markwaltermath.weebly.com to learn the material necessary to complete the questions in the remaining pages of this packet (Part 2).

I am asking that you complete your work on separate sheets of paper. Many of the links to learn the material will be posted on the Summer Homework tab by June 20, but others will follow later in the summer.

Part I: Vocabulary List

Please define each of the following terms from the information on the stattrek website. When asked to provide an example of the word, provide a unique example of the word NOT given on the website.

1. Categorical Variables

Example:

2. Quantitative Variables

Example:

3. Univariate Data

4. Bivariate Data

5. Median

6. Mean

7. Population

Example:

8. Sample

Example:

9. Center

10. Spread

11. Symmetry

12. Unimodal and Bimodal

13. Skewness

Sketch Skewed left:

Sketch Skewed right:

14. Uniform

15. Gaps

16. Outliers

17. Dot plots

18. Difference between a bar chart and histogram

19. Stem plots

20. Boxplots

21. Quartiles

22. Range

23. Interquartile Range

24. Parallel boxplots

25. Difference between a frequency table and relative frequency table

26. Parameter

27. Statistic

28. Marginal Distribution

29. Conditional Distribution

30. Segmented Bar Chart

31. What are the W's of data (might need to do your own digging for this!)

Part 2: Practice Problems

CATEGORICAL OR QUANTITATIVE

Determine if the variables listed below are *quantitative* or *categorical*.

1. Time it takes to get to school
2. Number of people under 18 living in a household
3. Hair color
4. Temperature of a cup of coffee
5. Teacher salaries
6. Gender
7. Smoking
8. Height
9. Amount of oil spilled
10. Age of Oscar winners
11. Type of Depression medication
12. Jellybean flavors
13. Country of origin
14. type of meat
15. number of shoes owned

STATISTIC – WHAT IS THAT?

A statistic is a number calculated from data. Quantitative data has many different statistics that can be calculated. Determine the given statistics from the data below on the number of homeruns Mark McGuire has hit in each season from 1982 – 2001.

| | | | | | | | |
|----|----|----|----|---|----|----|----|
| 70 | 52 | 22 | 49 | 3 | 32 | 58 | 39 |
| 39 | 65 | 42 | 29 | 9 | 32 | 9 | 33 |

| | |
|---------|--|
| Mean | |
| Minimum | |
| Maximum | |
| Median | |
| Q1 | |
| Q3 | |
| Range | |
| IQR | |

16. State the difference between a bar chart and histogram, draw a sketch of each
Provide a sketch of the following

- ❖ Unimodal
 - Bimodal
 - Skewed Left
 - Skewed Right
- ❖ Define and provide the formula for
 - Standard Deviation
 - Variance
 - Standard Score (z-score)

17. Draw a dot plot of the data. Then calculate the sample mean, median, and standard deviation.
3, 3, 4, 7, 7, 1, 5, 9, 8, 7, 9, 4, 1, 2, 6, 1, 9, 6, 6, 4

18. Calculate the sample mean, standard deviation, the five-number summary and IQR. Then draw a box plot of the data.

19, 22, 23, 23, 23, 26, 26, 27, 28, 29, 29, 31, 32

19. Make a pie chart for the following:

Diego loves to play video games. His parents added a feature to his gaming system that tracks the total time on each game and send them an email every week. In the past week he played a total of 470 minutes. The email reported that Fortnite was played 180 minutes, PUBG was played 40 minutes, 38 minutes were used in The Show, Madden 2017 was played 94 minutes, God of War was played 91 minutes, and Call of Duty was played 27 minutes.

20. Make a pie chart for the following:

| Items Sold | Quantity |
|-----------------|----------|
| Cheeseburger | 16 |
| Milkshake | 4 |
| Chicken Fingers | 5 |
| Box of Fries | 13 |
| Egg Salad | 2 |

SHOPPING SPREE!

A marketing consultant observed 50 consecutive shoppers at a supermarket. One variable of interest was how much each shopper spent in the store. Here are the data (round to the nearest dollar), arranged in increasing order:

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 3 | 9 | 9 | 11 | 13 | 14 | 15 | 16 | 17 | 17 |
| 18 | 18 | 19 | 20 | 20 | 20 | 21 | 22 | 23 | 24 |
| 25 | 25 | 26 | 26 | 28 | 28 | 28 | 28 | 32 | 35 |
| 36 | 39 | 39 | 41 | 43 | 44 | 45 | 45 | 47 | 49 |
| 50 | 53 | 55 | 59 | 61 | 70 | 83 | 86 | 86 | 93 |

- a. Make a stemplot using tens of dollars as the stem and dollars as the leaves. Make sure you include appropriate labels, title and key.



SSHA SCORES

Here are the scores on the Survey of Study Habits and Attitudes (SSHA) for 18 first-year college women:

154 109 137 115 152 140 154 178 101 103 126 126 137 165 165 129 200 148

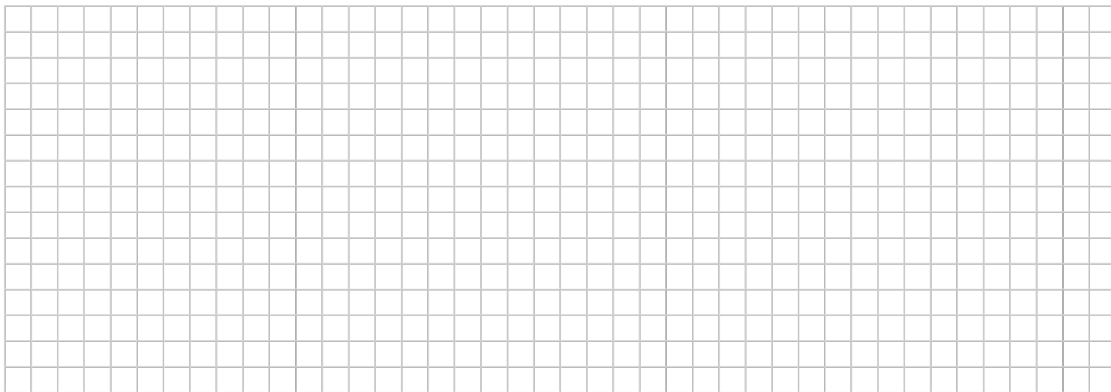
and for 20 first-year college men:

108 140 114 91 180 115 126 92 169 146 109 132 75 88 113 151 70 115 187 104

- a. Put the data values in order for each gender. Compute numeral summaries for each gender.

| Women | | Men | |
|---------|--|---------|--|
| Mean | | Mean | |
| Minimum | | Minimum | |
| Q1 | | Q1 | |
| Median | | Median | |
| Q3 | | Q3 | |
| Maximum | | Maximum | |
| Range | | Range | |
| IQR | | IQR | |

- b. Using the minimum, Q1, Median, Q3, and Maximum from each gender, make parallel boxplots to compare the distributions.



New Grading Policy

A new grading policy has been proposed by the dean of the College of Education for all education majors. All faculty and students in the college were asked to give their opinions about the new policy. The results are given below.

| | Favor | Neutral | Opposed | Row Total |
|--------------|-------|---------|---------|-----------|
| Students | 353 | 75 | 191 | 619 |
| Faculty | 11 | 5 | 18 | 34 |
| Column Total | 364 | 80 | 209 | 653 |

- State the variables and if they are categorical or quantitative.
- What percent of responses were from students favoring the policy change? _
 What percent of students favored the policy change? _____
 What percent favoring the policy change were students? _____
- What is the marginal distribution of the grading policy change?
- What is the distribution of the grading policy among just students?
- What is the distribution of the grading policy among just faculty?
- Create a segmented bar graph of students and faculty and their view on the proposed grading policy change.



Algebra Section:

The prerequisite for AP Statistics is Algebra II. You will find very much equation solving in this course, but some quick review of Algebra I and Algebra II content will be helpful.

Here is a formula that is used often in AP Statistics:

$$z = \frac{x - \bar{x}}{s}$$

1. If $z = 2.5$, $x = 102$, and $\bar{x} = 100$. What is s ? Show your work.

2. If $z = -3.35$, $x = 60$, and $s = 4$, what is \bar{x} ? Show your work.

3. Solve $0.05 = 1.96 \sqrt{\frac{0.5^2}{n}}$ for n .

4. If $-1.64 = \frac{60 - \mu}{\sigma}$ and $1.96 = \frac{95 - \mu}{\sigma}$, solve for μ and σ .