

Name: _____

2018-2019 AP STATISTICS SUMMER ASSIGNMENT

Introduction:

Welcome to AP Statistics! I want to start by saying I am very excited you are taking this course, and I am looking forward to getting to know each and every one of you. A little background on myself, this will be my third year at Warren Hills, and my second year teaching statistics at Warren Hills. Before coming to Warren Hills, I taught AP and Honors Statistics at Easton High School. Over the last several years I have found AP Statistics to be an extremely rewarding class, and while challenging, I hope that you will find it rewarding as well. Statistics is a versatile field that can be applied to different branches of Science, Engineering, Business, and Mathematics, and one of the things I love about it is that you can find a way to combine statistics with whatever you are passionate about.

Below you will find the directions for the AP Statistics Summer Assignment. The purpose of this assignment is to get us off to a strong start and will focus on some foundational and pre-requisite skills required to be successful in this course. Taking the time to complete the assignment 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. Chapter 1 is mostly a review of concepts you have learned in previous math courses but you will need to focus on the new **AP Statistic vocabulary**. Please read these directions carefully, and contact me by email at cuomom@warrenhills.org if you have any questions about the assignment, or require clarification about my expectations of the work that you do. Please be patient, if I don't respond within 24 hours I am most likely on vacation and will email you when I return. After August 10, football season begins, and my availability to answer questions related to the summer assignment will become limited, so please plan accordingly.

I don't want to take up too much of your summer with school work, but just a word of advice, do not wait until the last week before school to cram this information. The assignment is designed to take between eight to ten hours. Think of this packet as an opportunity to lay a solid foundation that will help you throughout the remainder of the year. This information will be used throughout the year, and I **will not** be reviewing it. This packet will be your first **test** grade in the 1st MP and is graded on both its completion as well as correctness. If you need more room for work, attach lined paper, and be sure to write the *page* and *question number*.

Resources/supplies:

Our textbook is *The Practice of Statistics* (Starnes, Yates, Moore, 5th ed.) Pick one up from me in Room 206 or from the Main Office during the summer, along with a graphing calculator if you need it.

This textbook is well aligned to the AP Statistics curriculum and the sample problems and activities will prepare you for the AP Statistics exam. Part of your summer assignment is to read through Chapter 1 and complete some of the exercises. It is important that you understand that reading and taking your own notes will enhance our class discussions and help with class activities. Failing to complete readings and assignments and simply expecting to "get by" with my class notes will not put you in the best position to be successful.

You will need a TI-84+ graphing calculator (you may borrow one from the school, but it is highly recommended that you purchase your own, I'll say it again, I highly recommend you purchase your own, Amazon currently has them for around \$100). I know some of you plan to major in Engineering and may have purchased a TI-89 (which is a great calculator as well), however the TI-84+ will be what we use in class. The textbook has "Technology Corners" which usually show a worked example using the calculator different statistical tools. It is so important you understand how to use your graphing calculator as well as to interpret its results, it can be the difference between a 4 or 5 on the AP Exam.

Finally, I will be adding each of you to our Google Classroom, you will receive an invite once I have the roster for next year. It is imperative that you join as soon as possible. I will post anything and everything I feel you need in order to be successful. Youtube tutorials, helpful websites, answer keys, and something new this year narrated worked examples. I would highly suggest downloading the Google Classroom app on your phone and turning on the push notifications, especially during the summer. Join our class Remind. Text @mrmcuom to Class Number: 81010.

Assignment:

1. **Reading and Vocabulary:** You will be responsible to read Chapter 1 which consists of three sections as well as use a free online Statistical tutoring site that will give you information on variables and data displays. The textbook and online site will be used to complete the vocabulary list (see page 2 and 3). *Follow the steps below to access the online site:*
 - a. Go to www.stattek.com
 - b. Click on "AP Statistics" then "AP Tutorial"
 - c. On the left side of the screen is a list of general topics. Under each general topic are lists of subtopics. You will read the following subtopics under the heading, **Exploring Data**, to complete the vocabulary list.

General Topic: The Basics

- Variables
- Population vs. Sample
- Central Tendency
- Variability
- Position

General Topic: Charts and Graphs

- Patterns in data
- Dotplots
- Histograms
- Stemplots
- Boxplots
- Scatterplots
- Comparing data sets

These vocabulary terms as well as the vocabulary from Chapter 1 will be revisited often throughout the year, and will be seen on vocabulary quizzes.

2. **Practice Problems:** In addition to reading and vocabulary you will be required to complete selected problems from the textbook. Solutions to worked examples will be posted and problems will closely align to the worked examples from the textbook. It is very important that you work these problems out on your own or in small groups using all available resources. I expect you to be active learners and take risks, not passive learners.

Caution about Academic Integrity: DO NOT copy the answers to any assignment from sources you find on the Internet, or from peers*. Doing so will be considered plagiarism and consequences of such behavior will result in zeroes. You need to show all work done to derive the answer.

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. Example: we will learn the difference between Normal and Symmetric Distributions this year, while they seem very similar and often times are incorrectly used interchangeably, misuse of the term can result in no credit on a Free Response Problem.

*Do not be afraid to work in a small group, I've always found it easier to work on higher level math in a small group. If you and your friends get together to work on the assignment, that's great, but remember what the purpose of this is, it's more than a grade. I want you to be successful for the year, build a strong foundation, and get an idea of some of the challenges you may face this year, don't lose sight of that.

Due Date and Grading of Summer Assignment:

Summer assignments must be completed by the *beginning* of **first class**! I **will not** accept any late summer assignments so do not wait for the last minute to work on these.

- Tests/Projects count towards 70 % of your grade. ***Your Chapter 1 Test (separate from your Summer Assignment) will be the second class of the first week. I do NOT offer make-ups for graded assessments/assignments.***

Enjoy your summer, and don't hesitate to contact me if you need help!

Part 1: Vocabulary

Directions: Use both Chapter 1 from the textbook and the “stattrek” website to define the following terms. These terms will be revisited throughout the year, be sure to provide an example or sketch when necessary. Try to use a unique example, don’t just copy the examples from the text or site. This is a basic intro to statistical vocabulary, not exclusive to Chapter 1, Chapter 1 Vocabulary can be found in your reading.

1. Categorical Variables/Qualitative Variables

Example:

2. Quantitative Variables

Example:

3. Discrete Variables

4. Continuous Variables

5. Univariate Data

6. Bivariate Data

7. Population

Example:

8. Sample

Example:

9. Median

10. Mean

Formula:

11. Outlier

Formula for Calculating an Outlier:

12. Parameter

13. Statistic

14. Range

15. Standard Score (z-score)

Formula:

16. Center

17. Spread

18. Variance

Formula:

19. Standard Deviation

Formula:

20. Symmetric Distribution

Sketch:

21. Unimodal Distribution

Sketch:

22. Bimodal Distribution

Sketch:

23. Skewedness/Skewed Distribution

Sketch Skewed Left:

Sketch Skewed Right:

24: Uniform Distribution

Sketch:

25. Gaps in a Distribution

Sketch:

26. Dotplot

Sketch:

27. Bar Chart/Graph

Sketch:

29. Histogram

Sketch:

30. Stemplot

Sketch:

31. Boxplot

Sketch:

32. Quartiles

33. Interquartile Range

36. Four ways to describe Data Sets

37. Types of graphs that can be used for comparing data

Part 2: Practice Problems.

Directions: After completing the reading in Chapter 1 complete the following example problems from the text book on a separate sheet of paper, show all work. It is highly suggested that you take your own notes, and then use them to compare to my notes. My notes/PowerPoints are only meant to give a general overview of the chapter. It is expected that you will take your own notes, keep up with nightly reading assignments, and complete all assigned exercises (graded or not).

Chapter 1 – Exploring Data

Introduction – Data Analysis: Making Sense of Data pages 2 – 7

Assignment: Complete Problem #'s 1, 3, 5, 7, 8 starting on page 6

1.1 – Analyzing Categorical Data pages 7 – 24

Assignment: Complete Problem #'s 11, 13, 15, 17, 19, 21, 23, 25, 27 – 32 starting on page 20

1.2 – Displaying Quantitative Data with Graphs pages 25 – 48

Assignment: Complete Problem #'s 37, 39, 41, 43, 45, 47, 47, 53, 55, 59, 60, 65, 69 – 74 starting on page 41

1.3 – Describing Quantitative Data with Numbers pages 48 – 73

Assignment: Complete Problem #'s 79, 81, 83, 87, 89, 91, 93, 95, 97, 99, 103, 105, 107 – 110 starting on page 69

Not Required: Chapter 1 Review/Practice Test – however it will help to prepare you for the Chapter 1 Test, remember we will not be reviewing and the Chapter 1 Test will be the second class of the first week.

Answer keys can be found in the back of the book and will be posted in google classroom. Worked solutions can be found throughout the chapter and some worked solutions will also be posted to Google Classroom for your benefit.

Part 3: Pre-Requisite Practice (Optional)

Directions: While this section is not required, you are required to have a basic understanding of Algebra 2, Probability, and how to read graphs. These problems will not be graded, and we will not go over them, however it is expected you know how to do them. Please utilize online resources if you need assistance.

Here is a formula that is used often in AP Statistics: $z = \frac{x - \bar{x}}{s}$, where z is what is known as the z-score, but more about that later.

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

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

It is expected that you have a thorough understanding of linear functions and scatterplots.

The USDA reported that in 1990 each person in the US consumed an average of 133 pounds of natural sweeteners. They also claim that this amount has decreased by about 0.6 pounds each year.

- a. If 1990 could be considered “year 0”, which of the above numbers represents the slope and which represents the y-intercept?

 - b. What is the equation of the line of best fit (linear equation) using the slope and y-intercept above?

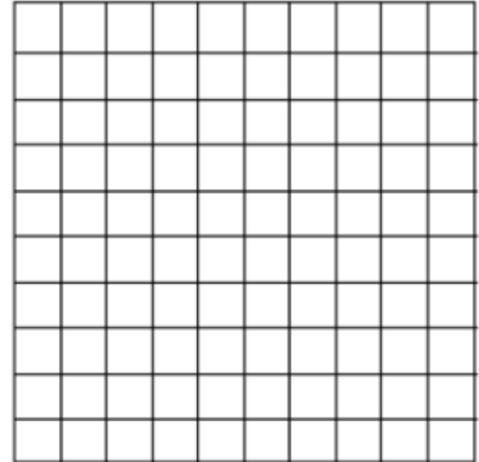
 - c. Predict the average consumption of sweeteners per person for the year 2005. Show all work.
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3. The following equation can be used to predict the average height of boys anywhere between birth and 15 years old: $y = 2.79x + 25.64$, where x is the age (in years) and y is the height (in inches).
 - a. What does the slope represent in this problem? Interpret it IN CONTEXT of this problem/situation.

 - b. What does the y-intercept represent in this problem? Interpret it IN CONTEXT.

4. Amy wonders if people of similar heights tend to date each other. She measures herself, her dormitory roommate, and the women in the adjoining rooms; then she measures the next man each woman dates. Here are the data (heights in inches):

Women:	66	64	66	65	70	65
Men:	72	68	70	68	74	69

- Construct a scatterplot of the data. Be sure to label.
- Describe the association between the heights of the women and the men they date.



You are expected to have a basic understanding of simple probability. If you get stumped, use online resources to help.

- A special lottery is to be held to select the student who will live in the only deluxe room in a dormitory. There are 100 seniors, 150 juniors, and 200 sophomores who applied. Each senior's name is placed in the lottery 3 times; each junior's name twice; and each sophomore's once. What is the probability that a senior's name will be chosen?
 - $\frac{1}{8}$
 - $\frac{2}{9}$
 - $\frac{2}{7}$
 - $\frac{3}{8}$
 - $\frac{1}{2}$
- Which of the following has a probability closest to 0.5?
 - The sun will rise tomorrow (no apocalypse situations!)
 - It will rain tomorrow.
 - You will see a dog with only three legs when you leave your house.
 - A fair die will come up with a score of 6 four times in a row.
 - There will be a plane crash somewhere in the world within the next five minutes.
- If a coin is tossed twice, what is the probability that on the first toss, the coin lands on heads and on the second toss the coin lands on tails? (*Hint: what are the possible outcomes when you toss a coin twice?*)
 - $\frac{1}{6}$
 - $\frac{1}{3}$
 - $\frac{1}{4}$
 - $\frac{1}{2}$
 - 1
- If a coin is tossed twice, what is the probability that it will land either heads both times or tail both times?
 - $\frac{1}{8}$
 - $\frac{1}{6}$
 - $\frac{1}{4}$
 - $\frac{1}{2}$
 - 1