

# AP Statistics Overview

## Instructor Information

- **Teacher:** Ms. Meaghan Simms
  - 2023 – 2024 will be my 14<sup>th</sup> year teaching, all of which have been at Lakeland High School.
  - This will be my 7<sup>th</sup> year teaching AP Statistics and Honors Probability and Statistics.
- **Email:** [meaghan.simms@polk-fl.net](mailto:meaghan.simms@polk-fl.net)
  - Please contact me if you have any questions; I check my email all summer.

## Course Information

Welcome to AP Statistics! You are choosing to take one of the most important mathematical sciences in today's world. Data science has experienced a huge job growth in the last several years and is expected to increase even more so over the next decade. The concepts you learn in AP Statistics (equivalent to introductory or elementary statistics in college) are the basis for statistics in other fields – business, biology, psychology, etc. These concepts are not relegated to jobs only. Studies, experiments, probabilities, and more are featured in news stories, weather updates, sports, and other areas of everyday life. Statistics is the foundation of understanding relationships between variables and making predictions about the world around you.

**To succeed in this course, you must first become comfortable with the idea that statistics is not like any other mathematics course you have taken.** This course puts a stronger emphasis on analyzing, explaining, and supporting conclusions over basic computation. Meaning, it is not so much about getting a “correct” numerical answer, but rather your process for arriving at that answer. The course has much less traditional math “work” and more writing/analyzing.

The first half of the course focuses on Descriptive Statistics – how we gather, display, and summarize data. Many of these concepts are basic algebra, and you are likely familiar with several of them. You need to have a working knowledge of the following terms: mean, median, mode, variance, standard deviation, range, outlier, minimum, maximum, lower quartile, and upper quartile. Also, become familiar with the following displays: boxplot, stemplot, histogram, scatterplot, segmented and side-by-side bar graphs, and pie chart.

A huge portion of this course is done via calculator. Most statistics courses and jobs rely on technology (simply because “big data” is cumbersome to work with by hand). **It is required that you have a TI-83 or TI-84 calculator.** Any version will work. It is imperative that you always have access to one. They are expensive brand new, so I would suggest checking eBay or Amazon for used ones. Stores like Target and Walmart often put them on sale in late July. If access to this calculator will be difficult, please email me, and we will work on a solution.

Lastly, **statistics is a much easier course if you are actively engaged!** You will be surprised at how applicable the course material is! It requires a certain level of engagement with your peers and obviously with the material. It is an easier journey if you are willing to work with those around you. It's truly a fun course! We work with M&Ms, playing cards, actual data from classmates, and even look at current studies and experiments.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Summer Homework Assignment

Complete the problems in this packet. *SHOW ALL WORK.* **The packet is due on first day of class in August.**

**1) Well connected.** Who has more phone contacts – males or females? A statistics student at a high school wanted to know the answer to this question, so she randomly selected male and female students from her high school and asked each student the number of phone contacts they have. The male sample size is 20 students, and the female sample had 14 students. The table below shows the results of her survey.

Males	124	41	29	27	44	87	85	260	290	31
	168	169	167	214	135	114	105	103	96	144
Females	30	83	116	22	173	155	134	180	124	33
	213	218	183	110						

(a) What is the mean of *each* set of data?

(b) What is the 5-number summary (minimum, lower/first quartile, median, upper/third quartile, and maximum) for *each* set of data?

(c) Create a boxplot for the *female* data using the values found in part (b). Make sure to include a horizontal axis.

(d) A statistician needs to interpret data in order convey thoughts. Write a short paragraph comparing and contrasting the male and female data sets. Make sure to use the statistics found in previous parts of the question and to use context.

**2) Crime on campus.** Is there an association between two college variables: crime rate and student enrollment? The table to the right shows the number of enrolled students (in thousands) and the number of burglaries for eight public universities in one U.S. state.

Enrollment (in 1000s)	Burglaries in one year
5	3
36	23
22	9
29	34
18	20
11	2
8	9
31	42

**(a)** Which variable is the explanatory, and which is the response? Why?

**(b)** Create a scatterplot of the data. Make sure to label the axes.

**(c)** Using the scatterplot created in part (b), determine if the relationship between enrollment and burglaries is... (circle one for each)

Linear or non-linear?    Positive or negative?    Weak, moderate, or strong?    Has outliers: yes or no?

**(d)** Describe the overall trend between college enrollment and burglaries on campus based on your answers to parts (c) and (d).

**(e)** You and a friend are working on the summer homework together in a parallel universe. Your friend claims that the relationship between college enrollment and burglaries on campus is causal – meaning, one variable *causes* the response of the other one. Is your friend correct? Why or why not?

3) Correct notation is *very critical* in AP Statistics. Match each notation to the correct parameter/statistic. Each answer is used exactly once.

- |   |                       |
|---|-----------------------|
| _____ <b>A)</b> Population Mean               | <b>i)</b> $s$         |
| _____ <b>B)</b> Sample Mean                   | <b>ii)</b> $\cup$     |
| _____ <b>C)</b> Population Standard Deviation | <b>iii)</b> $n$       |
| _____ <b>D)</b> Sample Standard Deviation     | <b>iv)</b> $\mu$      |
| _____ <b>E)</b> Sample Size                   | <b>v)</b> $P( )$      |
| _____ <b>F)</b> Sample Proportion             | <b>vi)</b> $\hat{y}$  |
| _____ <b>G)</b> Predicted $y$ -value          | <b>vii)</b> $P(   )$  |
| _____ <b>H)</b> Probability of an event       | <b>ix)</b> $\bar{x}$  |
| _____ <b>I)</b> Union/Or                      | <b>x)</b> $\sigma$    |
| _____ <b>J)</b> Intersection/And              | <b>xi)</b> $\cap$     |
| _____ <b>K)</b> Conditional Probability       | <b>xii)</b> $\hat{p}$ |

4) The Queen of England records some cars that pass by Buckingham Palace and creates the two-way table shown to the right.

(a) Complete the table.

(b) Find the probability of randomly selecting the following. Show work.

	Mercedes	BMW	Volkswagen	TOTAL
Grey		9	14	31
Red	4	11		23
Blue				
TOTAL	12		25	60

(i) a red car

(ii) not a Volkswagen

(iii) Mercedes or a red car

(iv) a blue BMW

(v) not a grey Volkswagen

(vi) of the Mercedes, a blue one

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**5)** Answer the following questions.

**(a)** Are you planning to attend college after high school? \_\_\_\_\_ (If “no”, skip to part (d)).

**(b)** If you said “yes” to question (a), where do you hope to go? \_\_\_\_\_.

**(c)** Google search if that school accepts the AP Stats exam for credit. If it does, what score is needed? \_\_\_\_\_.

**(d)** If you said “no” to question (a), what are your post-high school plans? \_\_\_\_\_

\_\_\_\_\_.

**(e)** Answer with absolute honesty: why are you taking AP Statistics? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_.