AP STATISTICS

SUMMER FUN

2014-2015 SCHOOL YEAR

BRIEF DESCRIPTION OF SUMMER ASSIGNMENT: This packet that contains information and examples of basic statistics problems, and also exercises for the student to complete.

RESOURCES NECESSARY TO COMPLETE ASSIGNMENT: Graphing calculator

OBJECTIVE OF SUMMER ASSIGNMENT: For students to gain understanding in basic statistical topics that should be known before starting AP Statistics. Also, students should learn important vocabulary that will be used throughout the year.

APPROXIMATE TIME COMMITMENT DURING THE SUMMER: 3 - 4 hours

DUE DATE: First day of scheduled class

VALUE OF ASSIGNMENT: Quiz Grade – out of 50 points.

FOR QUESTIONS OVER THE SUMMER, PLEASE CONTACT:

Mrs. Cecere by Email: kmcecere@fcps.edu

AP STATISTICS SUMMER ASSIGNMENT

Welcome to AP Statistics! This course is built around four main topics: exploring data, planning a study, probability as it related to distributions of data, and inferential reasoning. Among leaders of industry, business, government, and education, almost everyone agrees that some knowledge of statistic is necessary to be an informed citizen or a productive worker.

This assignment is due the FIRST day of class and will count as your first quiz grade (50 pts).

Summer Packet Guidelines

1. Start summer assignment early to allow for time to receive clarification (if necessary) and to complete it by the **FIRST day of class**. If you have any questions, you may contact me. Please do not wait until the last minute to contact me and I will be busy preparing for the upcoming school year and may not be able to response as quickly to your last minute questions!!
   E-mail for Questions: ***Ms. Cecere - kmcecere@fcps.edu***

2. I have provided a small resource of information on statistical basics at the end of this packet. However, if you are still stuck and cannot complete the problems on your own it is okay to use math reference books and websites to help. Google is a wonderful thing! You can Google any term or concepts if you want to find more information. I also recommend the following websites:
   http://stattrek.com/
   http://calculator.maconstate.edu/calc_topics.html (*Calculator help)*

3. **DO NOT DISCARD THIS SUMMER ASSIGNMENT!** Write, highlight, take notes throughout this packet! Email with any questions you have! There 4 parts to this packet with 26 practice problems. **Record your answers to the provided answer sheet at the very end. Be sure to review the checklist on page 16 to make sure you've done EVERYTHING and purchased any necessary materials for AP Statistics.**

4. **YOU MUST HAVE YOUR OWN GRAPHING CALCULATOR AND BRING IT TO CLASS EVERYDAY!!**
   A TI-83 is the minimum calculator needed for this course. TI-84 or TI-84 + is better. The TI-84 will be the calculator demonstrated in class. Do not discard the owner's manual that is included when you purchase a calculator. If you choose not to use the TI-84+ (or TI-83) it will be your responsibility to learn where to located the functions we use in class. Our current textbook does give instructions on using the TI-89.

Remember, this is an AP Course! **Do not expect this to be an "easy course".** Although it may not seem as difficult computationally as calculus, it required a great deal of outside reading and homework, and it required a thorough understanding of many abstract concepts. **This is as much a writing course as it is a math course! Explaining in complete sentences is required on this assignment and throughout the course.** You cannot just write down numbers and be done, you must use numbers in context – what they mean to that particular problem using appropriate units like feet or $, for example.

Enjoy your summer!

Ms. Cecere

PART 1: GET THE NECESSARY MATERIALS.

Review the checklist on page 16 for more details.

PART 2: WRITING ASSIGNMENT / SUCCESS IN YOUR AP CLASSES

Take a moment and watch the video link: http://tedxtalks.ted.com/video/Social-Media-Changing-Learning. When finished, think about what Eduardo says about fixed mindset versus growth mindset. Think about what kind of mindset you may have when it comes to school and how this applies to your ability with classes – especially AP courses.

After viewing and reflecting on the video, ***write*** a letter to your future self about what you are going to do to ensure success this next year in ***ALL of your AP classes***. Use the video as inspiration to guide you through the letter. Attach the letter to the Summer Break Packet Answer Sheet. ***Requirements of the paper:*** The paper should be at least one typed page, with 1" margins, double-spaced, in Times New Roman 12pt black font.

PART 3 & 4: VOCABULARY & PRACTICE!

Complete Topics 1 through 5. Record your answers on the given answer sheet located at the very end of the packet. Bring the answer sheet and writing assignment to the first day of class.

Topic 1: Basic Vocabulary & Symbols

As you work through the summer assignment, record any definitions with a "★" next to it on a separate sheet of paper. Place the list of "★" words, the vocabulary below, and symbols into your 1/2" binder.

★Individual- the objects described by a set of data. Individuals may be people but they may also be animals or things.

★Variable - any characteristic of an individual. A variable can take different values for different individuals.

★Data- the actual observations or measurements of a variable

★Discrete data- quantitative data consists of data that are a listable set of values

★Continuous data- quantitative data consist of data that can take on any values in the domain of the variable

★Percentile- data value below which the specified percent of data values occurs

★2 number summary of data - mean and standard deviation (for data that symmetric and without outliers)

★Bivariate Data (two variable) – data that describes a two characteristics of a population

★Important Symbols you will see throughout this school year

μ	Population mean
$\bar{x}$	Sample mean
p	Population proportion
$\hat{p}$	Sample proportion
σ	Standard deviation of the population
s	Standard deviation of the sample
n	Number of observations

r	Correlation coefficient
$\hat{y}$	Estimated value of y
b	Slope of regression
a	y-intercept of regression
P(A)	Probability of event A
P(A ∩ B)	Probability of events A and B
P (A | B)	Probability of A given that B has already occurred

Topic 2: Important Comparisons

Categorical versus Quantitative Data

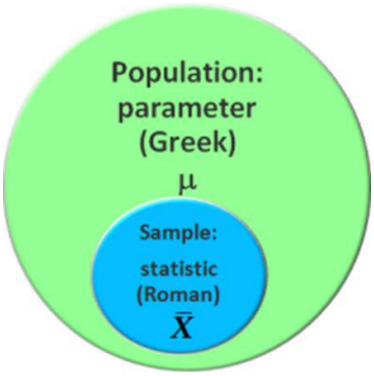
★Quantitative Variables: takes on numerical values, measurable quantities (Ex. Weight)

★Categorical Variables: takes on values that are names and descriptions (Ex. Color)

Population versus Sample

★Population: The entire group of individuals intended to be studied (Ex. Every individual living in Fairfax County)

★Sample: Part of a population that is examined in order to gather information
(Ex. 200 individuals living in Fairfax County)



Statistics versus Paramter

★Parameter: number that describes a population

★ Statistic: a number that describes a sample

PRACTICE

Identify as Quantitative (Q), Categorical (C), Population (Pop), Sample (S), Statistic (ST), or Parameter (P):
(Need help? See quick reference pg. 10)

1. _____ Types of Dog Breeds
2. _____ Names of Students in a Class
3. _____ True mean height of everyone living in California
4. _____ Students in a School
5. _____ Heights of Students in a Class
6. _____ Daily Temperature in a Given Month
7. _____ 50 Dogs in a City
8. _____ Proportion of Test Grades for 30 Students in a Class
9. _____ Favorite Breakfast Cereal
10. _____ Mean amount of Liquid in 100 selected Bottles of a certain Juice
11. _____ 80 Families in a County
12. _____ True Mean Number of Family Members in Wisconsin
13. _____ Colors of Shirts
14. _____ True Proportion of Students Wearing Glasses in a School

Topic 3: Univariate Distributions

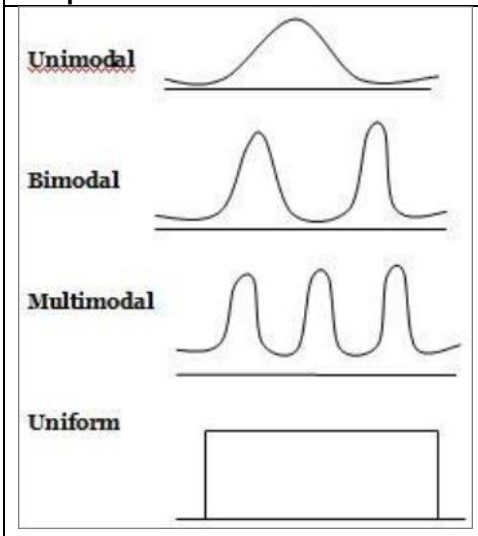
★**Distribution**- of a variable tells us what values the variable takes and how often it takes these values

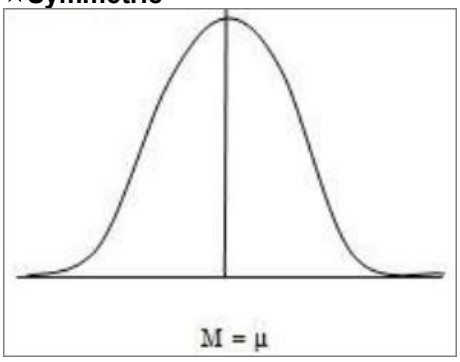
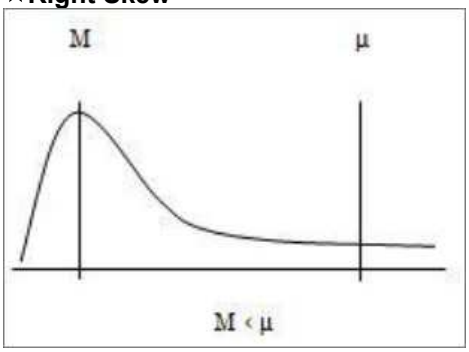
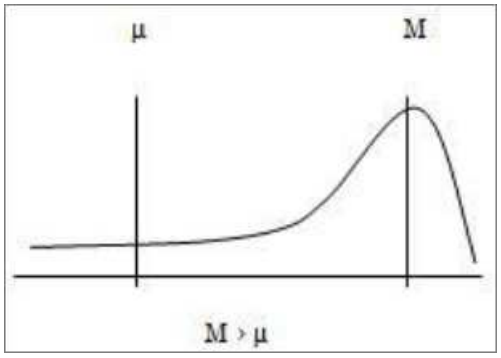
★**Univariate data (one- variable)** – data that describes a single characteristic of a population

★**Resistant measure-** a measure that is not sensitive to extreme values

How do we describe univariate distributions? There are 4 characteristics to look for:

1. **Shape** – what form does the distribution take?
2. **Outliers (and other unusual features)** – identify any extreme values and gaps or cluster (clumps) in the distribution
3. **Center** – Where is it centered? Which measure of center should you use?
4. **Spread** – How dispersed is the data? Which measure of spread should you use?

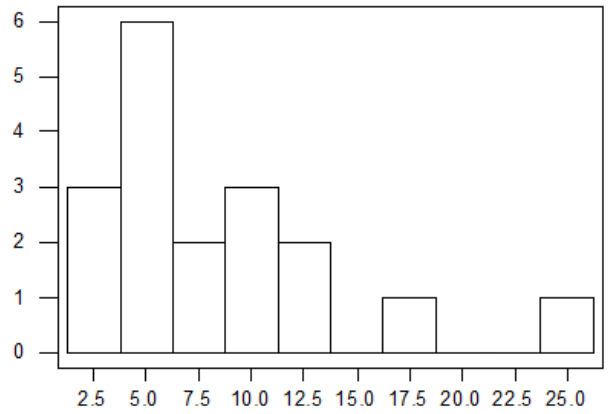
Shape	Measures of Center	Measures of Spread
	★Median (M) – Resistant to outliers – Use if distribution is skewed – calculate by placing observations in numerical order and find middle observation ★Mean (μ) – NOT resistant to outliers – Use if distribution is symmetric – calculate by taking the average $(\Sigma x_i)/n$ x-bar ($\bar{x}$) is the SAMPLE mean (use with sample standard deviation, s) μ is the PARAMETER (population) mean (use with population standard deviation, σ)	★Interquartile Range (IQR) = Q3 – Q1 Q1 is the first 25% of the data Q3 is the last 25% of the data IQR always goes with the median ★Standard deviation (s) – measures the spread or dispersion about the mean and should only be used when the mean is the chosen measure of center

	Skewness (part of SHAPE)	
★**Symmetric**	★**Right Skew**	★**Left Skew**
		
Median = mean	**Median < mean** **"Skewed right, the mean is MIGHT"**	**Median > mean** **"Skewed left, the mean is LESS"**

PRACTICE - Describe each distribution by its center, shape, spread and outliers (if they exist). (Need help? See quick reference pg. 14)

Examples of Shape: symmetric, skewed right, skewed left
Center: approximate where the center of the data is (mean or median)
Spread: Calculate the range of the data
Outliers: approximate the location of extreme values, if they exist

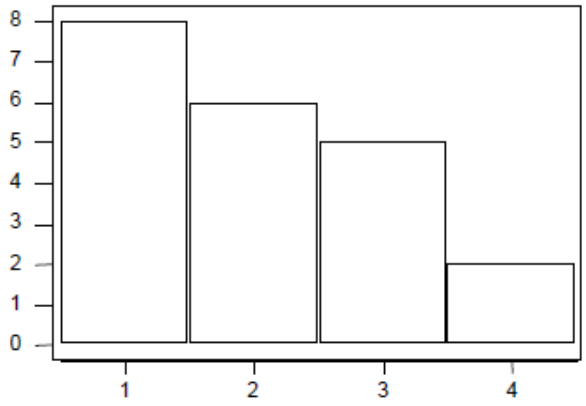
15.



Shape _____ Center _____

Outliers _____ Spread _____

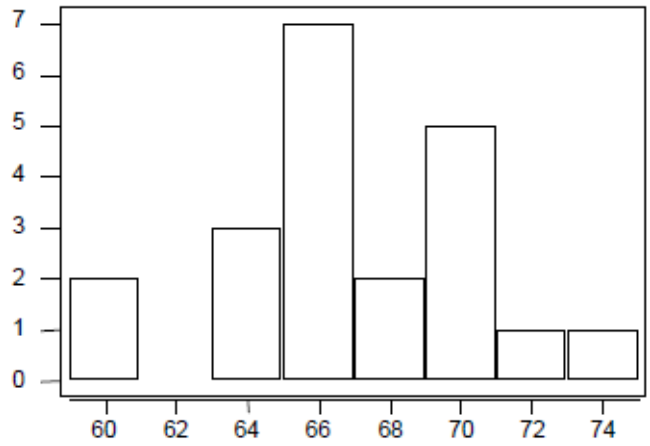
16.



Shape _____ Center _____

Outliers _____ Spread _____

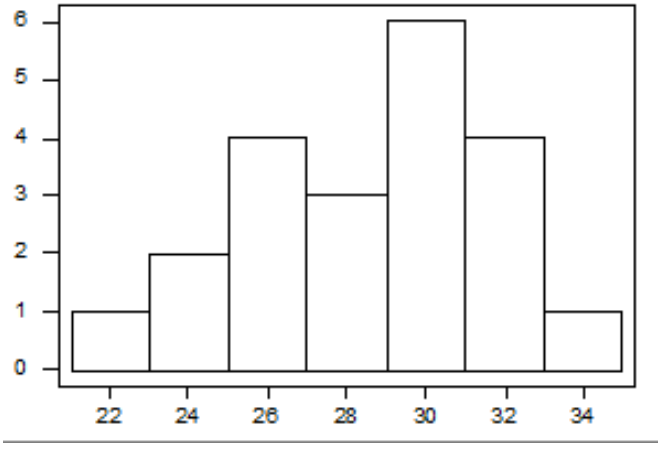
17.



Shape _____ Center _____

Outliers _____ Spread _____

18.



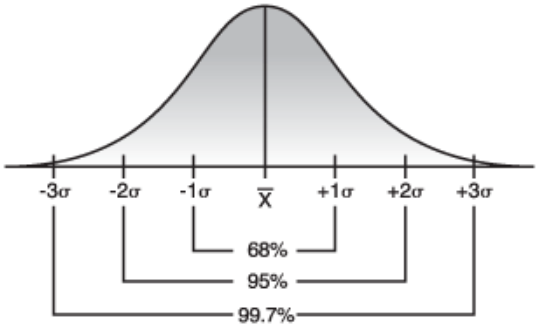
Shape _____ Center _____

Outliers _____ Spread _____

Topic 4: Normal Distributions (review from Algebra 2)

★Properties of a normal distribution curve

a. Mean and median are the same
b. Bell Shape (perfectly symmetrical) and follows the *empirical rule*
   68% of everything in the population is within 1 Standard deviation
   95% of everything in the population is within 2 Standard deviations
   99.7% of everything in the population is within 3 Standard deviations
c. The total area under the curve is 1 or 100%

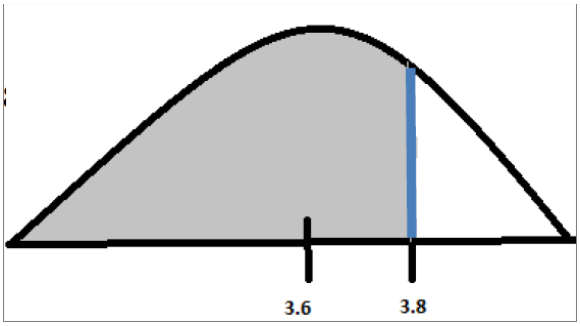


Notation:

For normal distributions, a short notation is helpful. We abbreviate the normal distribution with mean and standard deviation as ~N(μ,б). For example, the distribution of young women's heights is ~N(64.5,2.5). This means that the average heights of young women are 64 inches with a standard deviation of 2.5 inches.

To show the probability of a certain data falling below, above, or at a specific value can be depicted through your choice of notation. For example, P(X μ), means, "the probability that the sample value, X, is less than or equal to the population mean, μ. It is extremely important to use correct *probability notation*.

Example: The duration of a flight between 2 cities is normally distributed with a mean of 3.6 hours and a standard deviation of .15 hour. What is the probability that the flight will be less than 3.8 hours long?



NOTATION: ~N(3.6, .15)

Shaded Area = P(X < 3.8) = ?

Use the calculator to determine the area:
normalcdf(-1E99, 3.8, 3.6, .15) = .9087

Write a contextual statement:
The probability that the flight will take less than 3.8 hours, when the mean flight length is 3.6 hours, is 90.9%.

(Need help? See the Quick Reference on Page 15 for the calculator steps.)

PRACTICE! Use the example above to properly construct your answer, record your answers on the Summer Assignment answer sheet located at the very end of this packet.

19. X is a normally distributed variable with mean μ = 30 and standard deviation σ = 4. Draw a labeled sketch and determine the probabilities () listed a) P(x < 40) b) P(x > 21) c) P(30 < x < 35)

20. A radar unit is used to measure speeds of cars on a motorway. The speeds are normally distributed with a mean of 90 km/hr and a standard deviation of 10 km/hr. What is the probability that a car picked at random is travelling at more than 100 km/hr?

21. For a certain type of computers, the length of time between charges of the battery is normally distributed with a mean of 50 hours and a standard deviation of 15 hours. John owns one of these computers and wants to know the probability that the length of time will be between 50 and 70 hours.

22. The annual salaries of employees in a large company are approximately normally distributed with a mean of $50,000 and a standard deviation of $20,000.
a) What percent of people earn less than $40,000? b) What percent of people earn more than $70,000?

Topic 5: Graphing Distributions

★A **dotplot** is a type of graphic display used to compare frequency counts within categories or groups. As you might guess, a dotplot is made up of dots plotted on a graph. Here is how to interpret a dotplot. Each dot can represent a single observation from a set of data, or a specified number of observations from a set of data.

★A **stemplot** is used to display quantitative data, generally from small data sets (50 or fewer observations).

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23. WEATHER! The data below gives the number of hurricanes that happened each year from 1944 through 2000 as reported by *Science* magazine.

3	2	1	4	3	7	2	3	3	2	5	2	2	4	2	2	6	0	2	5	1	3	1	0
3	2	1	0	1	2	3	2	1	2	2	2	3	1	1	1	3	0	1	3	2	1	2	1
1	0	5	6	1	3	5	3																

On your answer key, make a dotplot to display these data. Include appropriate labels, title, and scale.
(Need help? See quick reference pg. 12)

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24. 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

On your answer key, make a stemplot using tens of dollars as the stem and dollars as the leaves. Include appropriate labels, title and key. (Need help? See quick reference page 12)

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25. WHERE DO OLDER FOLKS LIVE? This table gives the percentage of residents aged 65 of older in each of the 50 states.

State	Percent	State	Percent	State	Percent
Alabama	13.1	Louisiana	11.5	Ohio	13.4
Alaska	5.5	Maine	14.1	Oklahoma	13.4
Arizona	13.2	Maryland	11.5	Oregon	13.2
Arkansas	14.3	Massachusetts	14.0	Pennsylvania	15.9
California	11.1	Michigan	12.5	Rhode Island	15.6
Colorado	10.1	Minnesota	12.3	South Carolina	12.2
Connecticut	14.3	Mississippi	12.2	South Dakota	14.3
Delaware	13.0	Missouri	13.7	Tennessee	12.5
Florida	18.3	Montana	13.3	Texas	10.1
Georgia	9.9	Nebraska	13.8	Utah	8.8
Hawaii	13.3	Nevada	11.5	Vermont	12.3
Idaho	11.3	New Hampshire	12.0	Virginia	11.3
Illinois	12.4	New Jersey	13.6	Washington	11.5
Indiana	12.5	New Mexico	11.4	West Virginia	15.2
Iowa	15.1	New York	13.3	Wisconsin	13.2
Kansas	13.5	North Carolina	12.5	Wyoming	11.5
Kentucky	12.5	North Dakota	14.4		

★Histograms are a way to display groups of quantitative data into bins (the bars). These bins have the same width and scale and are touching because the number line is continuous. To make a histogram you must first decide on an appropriate bin width and count how many observations are in each bin.

The bins for percentage of residents aged 65 or older have been started for you on your answer key.

On your answer key, create a histogram using those bins on the grid. Include appropriate labels, title and scale.
(Need help? See quick reference page 13)

★**Boxplot,** sometimes called a box and whisker plot, is a type of graph used to display patterns of quantitative data. A boxplot splits the data set into quartiles. The body of the boxplot consists of a "box" (hence, the name), which goes from the first quartile (Q1) to the third quartile (Q3).

★**5 number summary of data** - minimum, maximum, Q1, Q3, and median (use when skewed and outlier resistant)

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26. 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. Using the chart on your answer sheet, compute numeral summaries for each gender. (Need help? See quick reference pages 11 & 12)

b. Using the minimum, Q1, Median, Q3, and Maximum from each gender, make parallel boxplots to compare the distributions. Graph is located on your answer sheet.

c. On your answer sheet, give a summary comparison of each gender.

"Quick Reference" of Statistical Basics

I. Types of Data

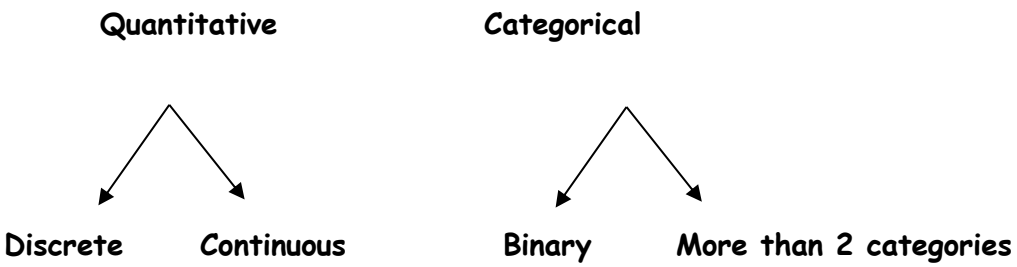
Quantitative (or measurement) Data

These are data that take on numerical values that actually represent a measurement such as size, weight, how many, how long, score on a test, etc. For these data, it makes sense to find things like "average" or "range" (largest value – smallest value). For instance, it doesn't make sense to find the mean shirt color because shirt color is not an example of a quantitative variable. Some quantitative variables take on **discrete** values, such as shoe size (6, 6 $\frac{1}{2}$, 7, …) or the number of soup cans collected by a school. Other quantitative variables take on **continuous** values, such as your height (60 inches, 72.99999923 inches, 64.039 inches, etc,) or how much water it takes to fill up your bathtub (73.296 gallons or 185. 4 gallons or 99 gallons, etc.). The "easiest" way to differentiate between discrete and continuous is to think of continuous as measurable items (height, weight, volume, time, etc.). Discrete values fit into a "bins" (either your shoe size is a size 6, size 7, etc…).

Categorical (or qualitative) Data

These are data that take on values that describe some characteristic of something, such as the color of shirts. These values are "categories" of a population, such as M or F for gender of people, Don't Drive or Drive for the method of transportation used by students to get to school. These are examples of **binary** variables. These variables only have two possible values. Some categorical variables are not binary and have more than two values, such as hair color, brand of jeans, and so on.

Two types of variables:



II. Numerical Descriptions of Quantitative Data

Measures of Center

Mean: The sum of all the data values divided by the number (n) of data values.

Example

Data: 4, 36, 10, 22, 9 Mean = $\bar{x} = \sum \frac{x_i}{n} = \frac{4+36+10+22+9}{5} = \frac{81}{5} = 16.2$

Median: The middle element of an ordered set of data.

Examples

Data: 4, 36, 10, 22, 9 = 4 9 **10** 22 36 ⟶ Median = 10

Data: 4, 36, 10, 22, 9, 43 = 4 9 10 | 22 36 43 ⟶ Median = $\frac{10+22}{2} = 16$

Measures of Spread:

Range: Maximum value – Minimum value

Example

Data: 4, 36, 10, 22, 9 = 4 9 10 22 36

Range = Max. – Min. = 36 – 4 = **32**

Interquartile Range (IQR): The difference between the 75th percentile (Q_3) and the 25th percentile(Q_1). This is $\mathbf{Q_3 - Q_1}$. Q_1 is the median of the lower half of the data and Q_3 is the median of the upper half. In neither case is the median of the data included in these calculations.

The IQR contains 50% of the data. Each quartile contains 25% of the data.

Examples

1. Data: 4, 36, 10, 22, 9 = 4 9 **10** 22 36

$Q_1 = 6.5$ $Q_3 = 29$

So, the IQR = 29 – 6.5 = 22.5

2. Data: 4 **9** 10 | 22 **36** 43

Q_1 Q_3

So, the IQR = 36 – 9 = 27

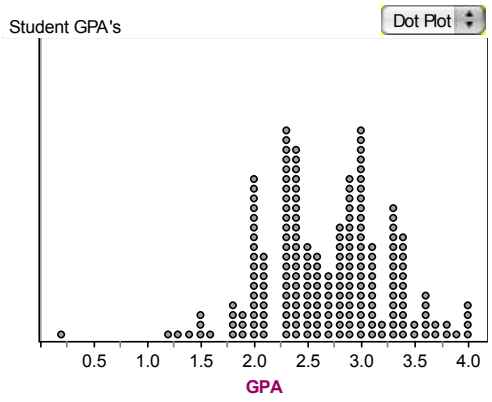
Five-number summary: consists of Minimum , Q_1, Median, Q_3, and Maximum. To find these statistics, enter the data you have into your calculator using the list function :

STAT → ENTER → type the data into L_1. If you make a mistake, you can go to the error and **DELETE**. If you forget an item, you can go to the line below where it is supposed to be and press **2nd DEL** to insert it. To find the each value of the five-number summary, go to 2nd STAT → MATH → 5 and then type in L_1 by typing 2nd → 1

NOTE: If the lists you are using already have numbers in them before you start, you can clear them this way: Arrow up (↑) to the line where L_1 is shown. Press CLEAR, then the down arrow (↓).

III. Graphical Displays of Univariate (one variable) Data

•Dotplot •Boxplot (Box and Whiskers) •Stemplot (Stem and Leaf) •Histogram



To make a Dotplot:

1. Draw and label a number line so that all the values in your dataset will fit.
2. Graph each of the data values with a dot. Be sure to line the dots up vertically as well as horizontally so that you can really see the shape of the graph.

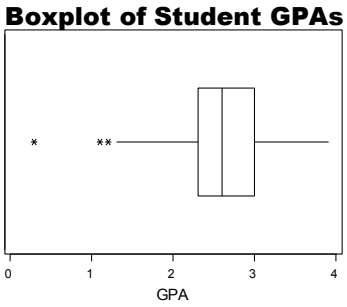
Stemplot of Student GPAs

1	23
1	444
1	67
1	88888999
2	00000000000000000111111111
2	3333333333333333333
2	444444444444444445555555555
2	66666666666677777
2	888888888899999999999999
3	00000000000000000111111111
3	2233333333333333
3	44444444455
3	6666677
3	889

Key: 3|4 = 3.4

TO MAKE A STEMPLOT:

1. Put the data in ascending order. Make a key!
2. Use only the last digit of the number as a leaf (see the numbers to the right of the line –each digit is the last digit of a larger number).
3. Use one, two, or more digits as the stem. (Sometimes, you can truncate data when there are too many digits in each data value – i.e. the number 20, 578 would become 20 | 5, where the "20" is in thousands. Note that this is **different** from rounding.)
4. Place the "stem" digit(s) to the left of the line and the leaf digit to the right of the line. Do this for each data value. You should then arrange the "leaves" in ascending order.
5. Sometimes, there are many numbers with the same "stem." In this situation it might be useful to break the numbers with the same stem into either two distinct groups (each on a separate line; say, "leaves" from 0 – 4 on the first line and 5 – 9 on the second.) or into five distinct groups as is shown in the graph to the right. Here, the first line for each stem contains all the 0 – 1 leaves, the next line contains the 2 – 3 leaves and so on. This technique is called "splitting the stems." It is useful in some cases in order to show the shape of the data more clearly.

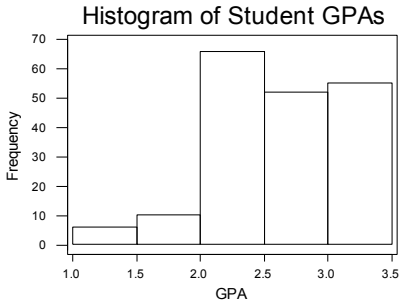


To make a Boxplot:

1. **Draw and label a number line** that includes the minimum and the maximum values for the set of data.
2. Calculate the five-number summary and make a dot for each of these summary numbers above the number line.
3. Draw a line between the 1st and 2nd dot, showing the "lower quartile"; and then draw a line from the 4th to the 5th dot to show the "upper quartile." These are commonly called the "whiskers."
4. Draw a rectangular box from the 2nd to the 4th dot and draw a line through the box on the middle dot – the median.

NOTE: In AP Statistics, a "modified boxplot" is used. This shows any "outliers." An outlier is a data point that does not fit the pattern of the rest of the data. When your calculator or computer software graphs a modified boxplot, an algorithm is used to determine what it takes to "not fit the pattern of the rest of the data." This algorithm is:

1.5*(IQR) away from the "box" part of the graph. (above and below the box). These outliers are shown with dots or stars, or any other small symbol.



To make a histogram:

1. Put the data into ascending order.
2. Decide upon evenly spaced intervals into which to divide the set of data (such as 0, 10, 20, 30, etc.) and then count the number of values that fall within each interval. This number is called the "frequency." If you divide each of these frequencies by the size of the data set, *n*, making percents, then you have what are called "relative frequencies."
3. Draw and **label** a 1st quadrant graph using scales appropriate for the data. Be sure to include a title for the x- and for the y-axes.
4. Graph the frequencies that you calculated in step 2.

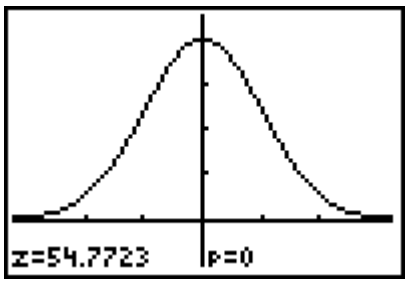
Categorical Data:

- Bar Graph
- Circle Graph (Pie Chart)

I'm assuming that you already know how to make these two types of graphs.

IV. Assessing the *Shape* of a Graph

There are two basic shapes that we will examine: ***Symmetric*** and ***Skewed***.

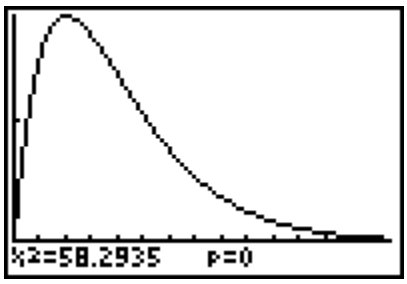


Symmetric

Symmetric: One can tell if a graph is symmetric if a vertical line in the "center" divides the graph into two fairly congruent shapes. (A graph does ***not*** have to be "bell-shaped" to be considered symmetric.)

Mean ~ Median in a symmetric distribution

Skewed: One can tell that a graph is skewed if the graph has a big clump of data on either the left (skewed right) or on the right (skewed left) with a tendency to get flatter and flatter as the values of the data increase (skewed right) or decrease (skewed left). A common misconception is that the "skewness" occurs at the big clump.
The direction of the skew = direction of the "tail".



Skewed Right

Relationship between Mean and Median in a skewed distribution:

Skewed *Left*, the mean is *Less*.
Skewed *Right*, the mean is *Might*.

Gathering Information from a Graphical Display

The first thing that should be done after gathering data is to examine it graphically and numerically to find out as much information about the various features of the data as possible. These will be important when choosing what kind of procedures will be appropriate to use to find out an answer to a question that is being investigated.

The features that are the most important are Shape, Outliers, Center, Spread: **SOCS**. Most of these can only be seen in a graph. However, sometimes the shape is indistinct – difficult to discern. So, in this instance (usually because of a very small set of data), it's appropriate to label the shape "indistinct."

V. Calculating normal probabilities using a TI-83 and TI-84 graphing calculator

Skill: 

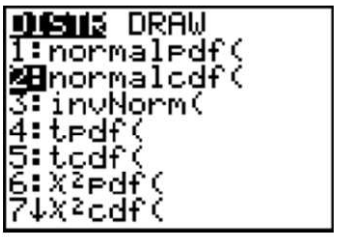
2:normalcdf(

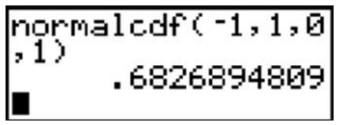
Calculate area under any normal curve

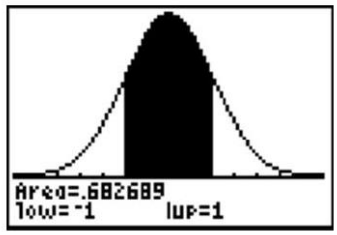
DISTR 2:normalcdf(

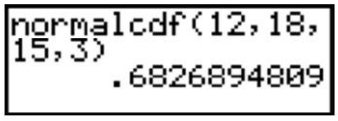
- The input for the command is the minimum value for area, the maximum value, the mean, μ, the standard deviation, σ.
- The keystrokes below calculate the area between -1 and 1 for a normal distribution with μ=0 and σ=1.
  - (the STANDARD normal distribution)

- Press ENTER.
- The shaded image will not appear, on the screen, but is the sketch that should accompany the solution.
- The area between 12 and 18 for a normal distribution: $N(\mu=15,\sigma=3)$ is shown.









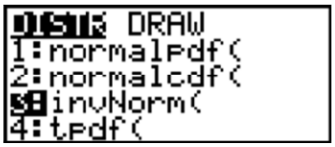
Skill: 

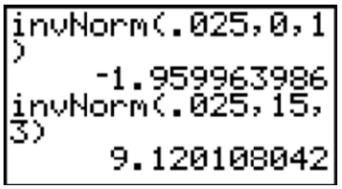
3:invNorm(

Find a value that corresponds to an area.

DISTR 3:invNorm(

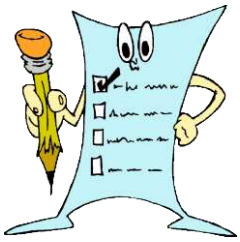
- The input for the command is the area as a decimal, the mean, μ, the standard deviation, σ.
- The syntax shown calculates the observation with an area 0.025 or 2.5% below its value.
  - First a z-score for $N(\mu=0,\sigma=1)$ the STANDARD normal distribution.
  - Next an observation for the normal distribution, $N(\mu=15,\sigma=3)$.





- Note that both are $\approx \mu - 2\sigma$

SUMMER ASSIGNMENT CHECK-LIST



Have you completed the following….

Part 1: Get the necessary materials!

- Purchase a ½" binder ***EXCLUSIVELY for Statistics***. It will be kept in our classroom. We will use it for practice problems and important review materials throughout the year.
- Do you have a TI-83, TI-83+, TI-84, TI-84+? If not, get one. TI-89s are allowed but have different menus. If you have a TI-89, download a quick guide here (http://www.sonoma.edu/users/n/nickleac/ti89.pdf) or bring the original TI-89 manual.
- Want a study guide for the class? It's not required, but I typically recommend one of the two below.
  - ***5 steps to a 5 AP Statistics.*** Cost $9.99; Available as printed book and an iTunes app
    Printed Book available through Amazon (ISBN-10: 0071802479)
    App available on iTunes
    (https://itunes.apple.com/us/app/ap-statistics-5-steps-to-a-5/id739773112?mt=8)
  - ***AP Statistics by Study By App.*** Cost: $3.99,
    Available on iTunes (https://itunes.apple.com/us/app/ap-statistics/id417628160?mt=8)

Part 2: Writing Assignment

- After viewing the video link listed on page 3, ***write*** a letter to your future self about what you are going to do to ensure success this next year in ***ALL of your AP classes***. Use the video as inspiration to guide you through the letter. Attach the letter to the Summer Break Packet Answer Sheet. ***Requirements of the paper:*** The paper should be at least one typed page, with 1" margins, double-spaced, in Times New Roman 12pt black font. **Attach it to the Summer Break Packet Answer Sheet.**

Part 3: Vocabulary & Symbols

- Record the vocabulary and symbols onto a separate piece of paper. Put that vocabulary paper in your ½" binder. It will be checked at a later date.

Part 4: Complete the practice problems

- Complete the practice problems in the packet.
  Record your answers on the Summer Break Packet Answer Sheet.

AP Statistics **Name** _____

Summer Assignment Answer Sheet **Period** _____

Detach and bring to the first day of class. Don't forget your binder and letter!

TOPIC 2: IMPORTANT CHARACTERISTICS (Page 4)

Identify as Quantitative (Q), Categorical (C), Population (Pop), Sample (S), Statistic (ST), or Parameter (P):

1. _____ 2. _____ 3. _____ 4. _____ 5. _____

6. _____ 7. _____ 8. _____ 9. _____ 10. _____

11. _____ 12. _____ 13. _____ 14. _____

TOPIC 3: UNIVARIATE DISTRIBUTIONS (Page 6)

Describe each distribution by its center, shape, spread and outliers (if they exist, identify where they are).

15. Shape _____ Outliers _____ Center _____ Spread _____

16. Shape _____ Outliers _____ Center _____ Spread _____

17. Shape _____ Outliers _____ Center _____ Spread _____

18. Shape _____ Outliers _____ Center _____ Spread _____

TOPIC 4: NORMAL DISTRIBUTIONS (Page 7)

Answer question #19 through 22. Use the example on page 3 to properly construct your answers. SHOW WORK!

19.

20.

21.

22.

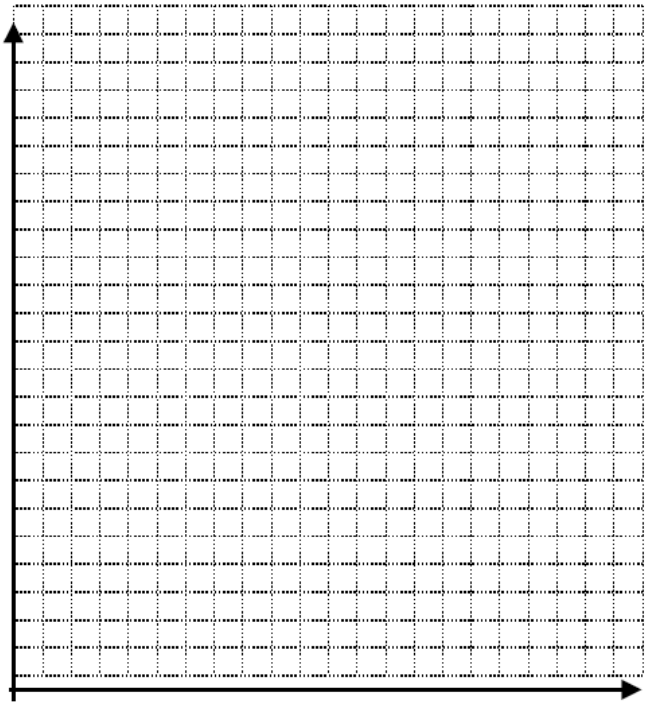
TOPIC 5: GRAPHING DISTRIBUTIONS (Pages 8 & 9)

23. Construct a dotplot to display these data. Include appropriate labels, title, and scale.

24. Construct a stemplot using tens of dollars as the stem and dollars as the leaves.
Include appropriate labels, title and key.

25. Create a histogram using those bins on the grid below. Include appropriate labels, title and scale.

Bin Widths	Frequency
4 to < 6	1
6 to < 8	
8 to < 10	

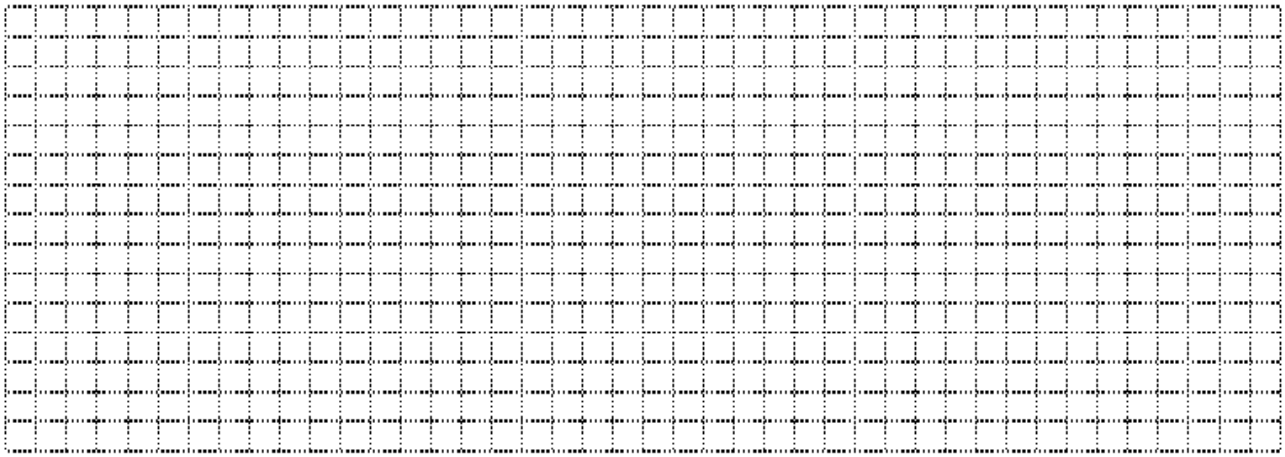


26.

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.



c. Give a summary comparison of each gender.

27. Estimate how long did it take you to complete this summer assignment? _____