AP Statistics Summer Homework 2017

The six worksheets at the end of this google doc are **REQUIRED**. All other components are **OPTIONAL**.

Your summer homework is due the first day of class this fall. Work may be completed on these worksheets electronically or attached on separate paper (or a combination). Click here to access the solutions to the worksheets (ignore that it says 2016 at the top).

If you have any questions, feel free to email me at cvesperman@prairieschool.com. Please allow 72 hours for a response.

Supplementary Course Resources

The textbook we will be using is *The Practice of Statistics*, 5th Edition by Starnes, Tabor, Yates, and Moore. The following resources will enrich your AP Statistics experience. Click here to see the Table of Contents.

Textbook companion website:

It doesn't look pretty but it sure is useful. Here you will find videos explaining examples from the book, detailed video solutions from homework problems, and technology how-to videos.

MyOpenMath web course:

There is an AP Statistics course created in MyOpenMath, but it does not align to the textbook. Feel free to use it as you see fit, both over the summer and throughout the coming school year.
Go to myopenmath.com. Register as a new student ***OR*** sign in with your existing account. Add a new course using course ID: **22903** and enrollment key: **TPS**.

Getting to Know Your TI-84 Calculator

There are two quick guides here and here to help you get started with the cool things your calculator can do!

YouTube video series for AP Statistics concepts:

https://www.youtube.com/playlist?list=PLC8478000586FA6F9

Information from College Board about the course:

https://apstudent.collegeboard.org/apcourse/ap-statistics/exam-practice

Additional resources to utilize this summer:

Stat Trek: http://www.stattrek.com/tutorials/ap-statistics-tutorial.aspx
Stats Monkey: http://apstatsmonkey.com/StatsMonkey/Statsmonkey.html
How to Lie with Statistics by Darrell Huff (If you're looking for summer reading):
http://www.amazon.com/How-Lie-Statistics-Darrell-Huff/dp/0393310728
Plus, lots more! There is a lot online about statistics because it's such a great course!

Supplemental Videos

These answer the “When are we ever going to use this?” questions
Your homework involves watching the six videos listed below and completing the worksheet associated with each video. Note: the videos provide contextual background for the concepts but do not “teach” the content in a direct manner. Watching more videos is recommended but not required.

Video 1: What Is Statistics?
length - 06:23
link - https://www.learner.org/courses/againstallodds/unitpages/unit01.html

Video 2: Stemplots
length - 11:49
link - https://www.learner.org/courses/againstallodds/unitpages/unit02.html

Video 3: Histograms
length - 09:41
link - https://www.learner.org/courses/againstallodds/unitpages/unit03.html

Video 4: Measures of Center
length - 08:50
link - https://www.learner.org/courses/againstallodds/unitpages/unit04.html

Video 5: Boxplots
length - 09:06
link - https://www.learner.org/courses/againstallodds/unitpages/unit05.html

Video 6: Standard Deviation
length - 09:07
link - https://www.learner.org/courses/againstallodds/unitpages/unit06.html

Summer Worksheet 1 - What is Statistics?

In AP Statistics we will explore data. Specifically, we will look at characteristics about some group of individuals. Individuals may be people, animals, or things We call these characteristics we measure **variables**. There are two types of variables, **categorical** and **quantitative**. See this website (http://support.minitab.com/en-us/minitab/17/topic-library/basic-statistics-and-graphs/introductory-concepts/data-concepts/cat-quan-variable/) for definitions and examples of each and then answer the questions below.

1) Classify the following variables as either categorical or quantitative.

    a) air pollution index

    b) breed of a dog

    c) letter grade you received on a test

    d) height of a building

    e) number of M&Ms in a one-pound bag

    f) gender

2) Give an example of a variable where you are not sure if it is categorical or quantitative and explain why you are not sure.

3) Give an example of a quantitative variable you might be interested in studying during AP Statistics.

4) Give an example of a categorical variable you might be interested in studying during AP Statistics.

Summer Worksheet 2 - Stemplots

The stemplot (also spelled stem plot, depending on the source) is also known as the stem-and-leaf plot. Stemplots are a way of organizing data to see the distribution of the data and still be able to see all the data points.

1) What are three advantages to using a stemplot to display data? Name at least one disadvantage.

2) The following data represents test scores on a test: 101, 85, 24, 0, 32, 83, 41, 50, 89, 58, 62, 86, 64, 91, 64, 67, 68, 71, 100, 101, 72, 75, 79, 79, 80, 81, 82, 82, 32, 88, 85, 87, 59, 87, 84, 90, 91, 91, 91, 55, 79, 91, 92, 94, 96, 97, 100, 75

   Create a stemplot organizing the data. Don't forget the key! See this website if you need help: http://statistics.about.com/od/HelpandTutorials/a/How-To-Use-Stem-And-Leaf-Plots.htm.

Summer Worksheet 3 - Histograms

A histogram is a helpful way to display the distribution of data without seeing each individual data point.

1) How are histograms different than bar graphs?

2) Below are data collected from patients who suffer from migraine headaches. The patients were instructed to take their assigned drugs as soon as their headaches began and to record how much time passed before the drugs gave relief. Drug A is a traditional drug, and Drug B is an experimental drug. Each value is the number of minutes (rounded to the nearest two minutes) that elapsed before a patient got relief.

   Drug A (106 patients)
   16, 18, 18, 20, 22, 22, 24, 24, 26, 26, 28, 28, 30, 30, 32, 32, 34, 36, 36, 36, 38, 38, 40, 42, 44, 44, 46, 46, 48, 50, 54, 56, 56, 58, 58, 58, 62, 62, 64, 64, 66, 68, 68, 70, 70, 70, 72, 72, 74, 76, 76, 76, 78, 78, 80, 80, 80, 82, 82, 84, 84, 84, 86, 86, 88, 88, 88, 88, 90, 90, 90, 90, 90, 92, 92, 92, 92, 94, 94, 94, 96, 96, 98, 98, 98, 98, 100, 100, 100, 100, 102, 102, 102, 104, 104, 106, 106, 108, 108, 108, 110, 110, 112, 114, 118, 120

   Drug B (47 patients)
   18, 20, 20, 22, 24, 24, 24, 26, 26, 30, 30, 30, 34, 34, 34, 36, 36, 36, 38, 38, 40, 40, 44, 44, 46, 50, 52, 52, 56, 56, 58, 62, 62, 66, 74, 74, 78, 88, 94, 98, 98, 100, 104, 106, 110, 116, 120

   Construct a histogram for each dataset above. You may do this by hand or by using technology. See http://studenthelp.cpm.org/m/TI-84/l/94655-ti-84-histograms for how to do this on your calculator.

3) From examining the histograms, which drug do you think was more effective in giving fast relief from headache pain? Explain.

Summer Worksheet 4 - Measures of Center

The measures of center are **mode**, **median**, and **mean**. It is important to recognize the **measures of center** (also called measures of central tendency) and which one is the most representative of a set of data. Sometimes one of the measures is clearly the most useful. Sometimes two or three measures may be equally valuable. If all three numbers are identical or very close, you know the data is likely to be statistically valid. Another important statistical measure is range. Range is a measure of spread.

Using your calculator is a quick way to help find the above number. This website will help get you started: http://tibasicdev.wikidot.com/1-var-stats.

Find the mean, median and mode of each set. Also, determine the range. Indicate which measure you think is or measures you think are most representative of the data. Give answers to three decimal places.

1) Number of dots on selected ladybugs: (15, 0, 7, 9, 13, 2, 13, 15, 16, 13, 9, 13, 0)

   Mode:
   Median:
   Mean:
   Range:
   Most Representative measure of center (mode, median, or mean):
   Reason:

2) Number of chocolates in each package: (22, 24, 25, 22, 21, 26, 23, 22, 23, 23, 25, 24)

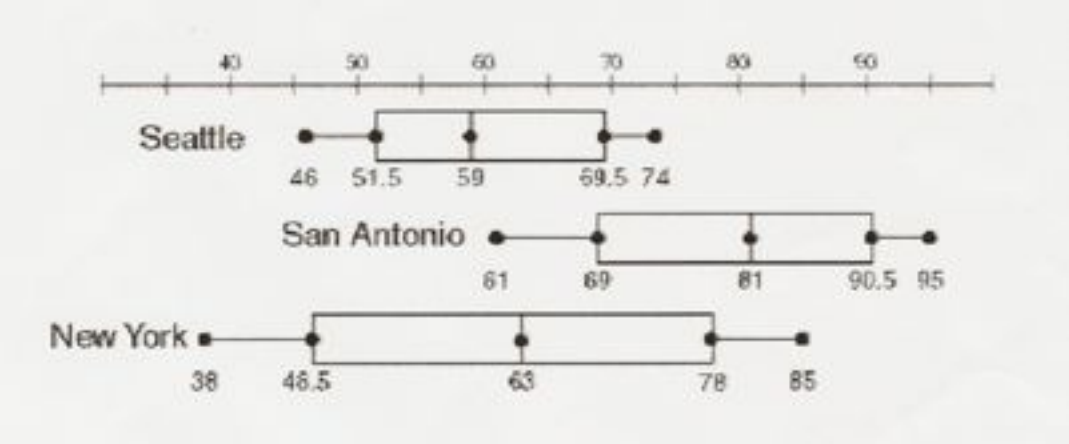
   Mode:
   Median:
   Mean:
   Range:
   Most Representative measure of center (mode, median, or mean):
   Reason:

3) Length of red worms (in centimeters): (10, 8, 6, 5, 12, 8, 7, 9, 11, 8, 6, 9, 10, 8, 8)

   Mode:
   Median:
   Mean:
   Range:
   Most Representative measure of center (mode, median, or mean):
   Reason:

Summer Worksheet 5 - Boxplots

Boxplots, also called box-and-whisker plots, also show distribution of data. One important concept that goes with boxplots is the five number summary. For help interpreting boxplots see this resource:
http://flowingdata.com/2008/02/15/how-to-read-and-use-a-box-and-whisker-plot/.



1) Which team is the best? How do you know? Can you tell for sure?

2) If the data is showing points per week, which team is most consistent? Explain your answer.

3) Which team would have the largest standard deviation? How do you know? (If you are not sure how to answer this question - come back to this after Summer Worksheet 6).

Summer Worksheet 6 - Standard Deviation

Standard deviation is a measure of variability. It shows how far away from the data is from the mean. A large standard deviation means the data is really spread out. A small standard deviation means the data is really close together.

1) Given the following amounts of money that students spend in the bookstore:

Money Spent	Deviation	Squared values
$15.49		
$48.01		
$13.03		
$5.98		
$37.04		

$15.49, $48.01, $13.03, $5.98, $37.04, find the standard deviation using the steps at https://www.khanacademy.org/math/probability/descriptive-statistics/variance-std-deviation/a/calculating-standard-deviation-step-by-step.
Mean of money spent:
Variance:
Standard Deviation:

2) Given the following grades on a math test:
71, 52, 88, 96, 99, 88, 91, 93, 71, 93, 93, 76, find the standard deviation using the method above.
Mean of money spent:
Variance:
Standard Deviation: