Decatur City Schools

Decatur, Alabama

Mathematics Department

Summer Course Work

In preparation for

AP Statistics

Completion of this summer work is required on the first class day of the 2019-2020 school year.

**A TI-84 (Plus, SE, or CE) is needed for this class – Email Mrs. Oyervidez @ haley.oyervidez@dcs.k12.al.us (DHS) or Mrs. Duffey @ wendy.duffey@dcs.k12.al.us (AHS) if you have any questions

Student Name:_____

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Mathematics Department
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Dear Parents and Guardians:

Attached are the summer curriculum review materials for *Advanced Placement Statistics.* This booklet was prepared by the Decatur City Schools Math Department and contains topics that reflect content learned in prerequisite courses. These materials must be completed and brought to class on the first class day of school.

Your child is required to complete this booklet over the summer. A test based on the material in the packet will be given to your child during the second week of school. It will count as the first test of the year and the grade will be determined as follows:

Completion of the packet on time will count 20% of the grade
Performance on the test will count 80% of the grade.

Thank you for your cooperation.

Sincerely,

Decatur City School Mathematics Department

PART 1 - Definitions

Write a 1 or 2 sentence definition for each of the following vocabulary words. You can use online resources if needed. www.stattrek.com is a good resource!

1. **Mean-**
2. **Median-**
3. **Mode-**
4. **Range-**
5. **Categorical Variables-**
6. **Quantitative Variables-**
7. **Univariate Data-**
8. **Bivariate Data-**
9. **Population-**
10. **Sample-**
11. **Unimodal-**
12. **Simple Random Sample-**
13. **Outlier-**
14. **Center-**
15. **Spread-**
16. **Symmetry-**
17. **Bar Chart vs. Histogram-**
18. **Dot Plot-**
19. **Stem Plot-**
20. **Box Plot-**
21. **Quartiles-**
22. **Interquartile Range (IQR)-**
23. **Left Skewed-**
24. **Right Skewed-**

****Look up videos on Youtube, Khan Academy, etc. for help****

PART 2 - Data Analysis

In a rural town in Oklahoma during the 1970's, the following data was collected concerning the age at which the eldest child in a family went to get his/her license.

M	16	16	17	16	18	17	17	16	16	27	16	17	16	17	16	16
F	17	18	19	20	18	19	20	18	18	17	16	18	19	17	18	

A. A. Calculate the following statistics for the male and female data separately.

	Females	Males	Males without outliers
Mean			
Median			
Mode			
Range			

B. Use a dot-plot to graph the data for the males. Draw it in the space provided below.

C. Looking at your plot, which data point(s) would be considered an outlier?

D. Summarize the effects of the outlier on the mean, median, mode, and the range.

E. In statistics, often you will be required to interpret your data. In a paragraph use the summary statistics to compare males and females.

PART 3 – Categorical or Quantitative?

Determine if the variables listed below are quantitative or categorical. Place an "X" in the appropriate column.

Variable	Categorical	Quantitative
Time it takes to get to school		
Number of minors living in a household		
Hair color		
Temperature of a cup of coffee		
Salary		
Gender		
Smoking status		
Height		
Amount of milk spilled		
Age of Oscar winners		
Type of shoes worn		
Jelly bean flavor		
Type of cheese		
Number of shoes owned		

PART 4 – Bar Charts and Pie Chart

In 1997 there were 92,353 deaths from accidents in the United States. Among these were 42,340 deaths from motor vehicle accidents, 11,858 from falls, 10,163 from poisoning, 4051 from drowning, and 3601 from fires. The rest were listed as "other" causes.

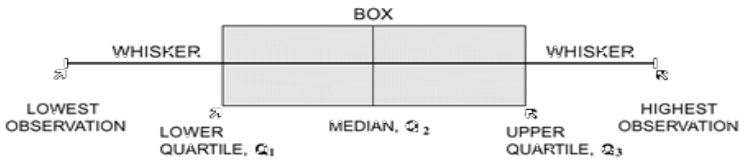
A. NEATLY create a well-labeled bar graph of the distribution of causes of accidental deaths. Be sure to include "other causes"…

B. NEATLY create a well-labeled pie graph of the distribution of causes of accidental deaths. Be sure to include "other causes"…

PART 5 – Box and Whiskers Plots

BOX AND WHISKER PLOTS – a box and whisker plot breaks the data into quartiles (25% of the data in each part). It shows the minimum (also called the lower extreme), the maximum (upper extreme), the median, the **lower quartile** (also called Q1) and the **upper quartile** (also called Q3). The lower quartile is the median of the lower half of a data set. The upper quartile is the median of the upper half of a data set. A box and whisker plot looks like:

Figure 1. Box and whisker plot



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. Compute numerical summaries for each gender.

	Women	**Men**
Mean		
Minimum		
Lower Quartile (Q_1)		
Median		
Upper Quartile (Q_3)		
Maximum		
Range		
IQR		

B. Use the minimum, Q1, Median, Q3, and Maximum to make a box plot for each gender. Compare the two distributions.

PART 6 – Regression

The USDA reported that in 1990 each person in the United States consumed an average of 133 pounds of natural sweeteners. They also claim 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 using the slope and y-intercept above?

C. Predict the average consumption of sweeteners per person for the year 2016.

PART 7 – Correlation

Sue 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

A. Construct a scatter plot of the data. Include labels!!

B. Describe the association between the heights of the women and the men they date.

PART 8 – Probability

1. A lottery is to be held to select the student who will live in the 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, 2 times; and each sophomore's name, 1 time. What is the probability that a senior's name will be chosen?

A. 1/8 B. 2/7 C. 1/2 D. 2/9 E. 3/8

2. Which of the following has a probability closest to 0.5?

A. The sun will rise tomorrow.

B. It will rain tomorrow.

C. You will see a dog with only three legs when you leave the room.

D. A fair die will come up with a score of 6 four times in a row.

E. There will be a plane crash somewhere in the world within the next five minutes.

3. If a coin is tossed twice, what is the probability that on the first toss the coin lands heads and on the second toss the coin lands tails?

A. 1/6 B. 1/4 C. 1 D. 1/3 E. 1/2

4. If a coin is tossed twice what is the probability that it will land either heads both times or tails both times?

A. 1/8 B. 1/4 C. 1 D. 1/6 E. 1/2

5. Calculate the following probabilities and arrange them in order from least to greatest.

I. The probability that a fair die will produce an even number. _____

II. A random digit from 1 to 9 (inclusive) is chosen, with all digits being equally likely. The probability that when it's squared the answer will contain the digit 1. _____

III. The probability that a letter chosen from the alphabet will be a vowel. _____

IV. A random number between 1 and 20 (inclusive) is chosen. The probability that its square root will not be an integer. _____

ORDER: _____, _____, _____, _____

PART 9 – Algebra and Logic

1. The mean age of 12 of the members attending a mathematics department faculty meeting is 37. Mr. Smith, who is 50, arrives late. What is the average of all 13 members? Show your work!!!

2. The class average in a class of 15 is 86%. If one additional student earns a 100% in the class, what is the new class average?

3. What is the missing letter in this series: a c e ? i

4. What is the missing letter in this series: a z b ? c x

5. How many times a day do the minute hand and the hour hand on a clock form a straight line?

6. There are three boxes. One is labeled "APPLES" another is labeled "ORANGES". The last one is labeled "APPLES AND ORANGES". You know that each is labeled incorrectly. You may ask me to pick one fruit from one box which you choose. How can you label the boxes correctly?

7. You are in the dark, and on the floor there are six shoes of three colors, and a heap of twenty-four socks, black and brown. How many socks and shoes must you take into the light to be certain that you have a matching pair of socks and a matching pair of shoes?

8. There are three playing cards lying face up, side by side. A five is just to the right of a two. A five is just to the left of a two. A spade is just to the left of a club, and a spade is just to the right of a spade. What are the three cards?

9. The following verse spells out a word, letter by letter. "My first" refers to the word's first letter, and so on. What's the word that this verse describes?

   My first is in fish but not in snail
   My second in rabbit but not in tail
   My third in up but not down
   My fourth in tiara not in crown
   My fifth in tree you plainly see
   My whole a food for you and me