

AP Statistics – Summer Packet - 2020

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Congratulations on your decision to join the thousands of other students across the country that will be enrolled in AP Statistics in the upcoming school year. You have joined the growing ranks of students who recognize the need to take an introductory statistics course. A course such as this is typically required of many college majors including the social sciences, health sciences, and business.

What you need to know about this class: This is probably unlike any course that you have taken. I would say that it is a combination of Math, English, and Science. Communication skills are essential, and there is much more reading and writing than what you are used to in a math class. AP Statistics is not an easy class. No Advance Placement class is easy. However, it is a very rewarding course and, in my opinion, a very important one. Since it is an AP course, it is considered to be college-level. The mathematics required for this course may not be as difficult as in other advanced math courses, but some of the concepts can be very confusing. You can expect to spend time studying outside of class, as well as in class. However, AP Statistics is special. It is a course that combines both mathematical and verbal skills. On the AP exam, you will be asked to write descriptive paragraphs and concluding sentences. You will have to explain the reasoning behind the method you use and your conclusions. In addition, there is a great deal of material that we are expected to cover by April's end, so you need to be committed to giving it your absolute best effort day in and day out. Lastly, a **TI-84 Graphing Calculator** is an essential tool for this course, as those calculators have many statistical features we take advantage of. I recommend getting one as soon as possible.

The assignments in this packet will be due on or before September 8 and will count as a project grade of 25 points.

This should be submitted via email to rbasaman@manasquan.k12.nj.us on or before the due date.

**You may choose to respond to the questions by typing them in, or you can write them by hand. If you find something confusing, please email me and I will help you find the right direction. We will go over the critical components of this packet in class and you will be tested on this material. As with any assignment, copying answers from another individual or another source is considered academically dishonest and will result in a grade of a zero.

Suggested Resources:

www.khanacademy.com

<http://stattrek.com/>

Part 1 - Displaying and Describing Categorical Data

1. Determine if the variables listed below are *quantitative (Q)* or *categorical (C)*.

a. Time it takes to get to school _____

b. Number of people under 18 living in a household _____

c. Hair color _____

d. Temperature of a cup of coffee _____

e. Teacher salaries _____

f. Gender _____

g. Smoking _____

h. Height _____

i. Amount of oil spilled _____

j. Age of Oscar winners _____

k. Type of Depression medication _____

l. Jellybean flavors _____

m. Country of origin _____

n. Type of meat _____

2. ACCIDENTAL DEATHS

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. Find the percent of accidental deaths from each of these causes, rounded to the nearest percent.

b. What percent of accidental deaths were from "other" causes? Show how you determined your answer.

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

d. NEATLY create a well-labeled **pie chart** of the distribution of causes of accidental deaths. Be sure to include an "other causes" bar. Be sure the pie "wedges" are proportionally sized to each category.

Part 2 – Measures of Center and Spread for Quantitative Data

3. Consider the following data set: $\{-2, 0, 4, 2, 2\}$

a. Find the **mean**.

b. Find the **median**.

c. Identify the **mode**:

d. If the number 20 was added to the data set, what would the new mean be? (show work)

e. If the number 20 was added to the data set, what would the new median be? (show work)

f. Which one changed more?

g. If you had 50 numbers arranged in numerical order, the median would be the average of the ____ and ____ numbers.

h. If you had 49 numbers arranged in numerical order, the median would be located at the ____ number.

4. You have kept a record of the number of hours of sleep you got each night during a two-week period.

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Week 1	8	9	8.5	7.5	6	8	9
Week 2	7	7.5	8	7.5	8	6	8.5

a) Use your data to create a dotplot.

b) Determine the measures of center for the two week period. (mean, median & mode)

c) Find the "5-number Summary":

d) Make a Boxplot. Are there any outliers? How do you know?

e) Calculate the measures of variability (range, standard deviation*, interquartile range)

**may be new to you*

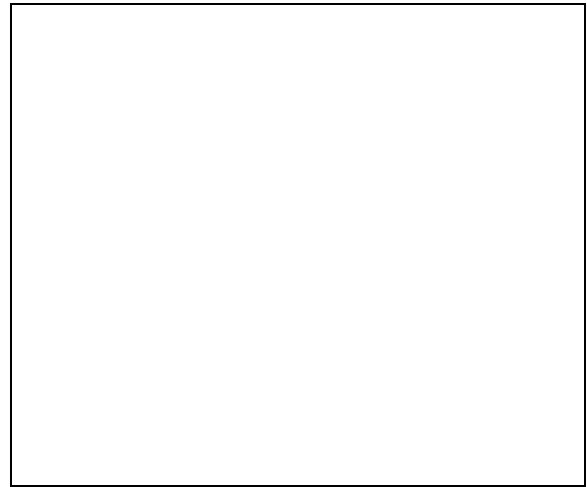
f) What do these values tell you about how your sleep times vary on average?

Part 3 – Combinatorics and Probability

Show how you arrived at each answer. If you are having difficulty with these, check out the tutorials on this site: <http://www.intmath.com/counting-probability/counting-probability-intro.php> (there are many other good tutorial sites as well)

1. If there are 3 appetizers, 3 entrees, and 2 desserts available, how many different three course meals are possible?
2. Suppose three coins are tossed, and each time, they turn up heads. What is the probability that the next toss will be heads?
3. How many ways are there to arrange the first five letters of the alphabet (no repetition of characters)?
4. How many 4 digit PINs (personal identification numbers) are possible if repetition of digits is allowed?
5. There are three slots available per day for oral presentations in a hypothetical class. If there are 25 students in the class, how many ways can the presentations be arranged on the first day?
6. For two standard 6 sided dice,
 - a. What is the probability of rolling two sixes?
 - b. Of not rolling two sixes?
 - c. Of rolling a sum of three?
7. Two cards are drawn from a standard 52 card deck. What is the probability that they're both aces?

8. Police report that 78% of drivers stopped on suspicion of drunk driving are given a breath test, 36% a blood test, and 22% both tests.
- a. Draw a **Venn diagram** of this information in the box at the right. Label each area clearly with the variable and the probability.



- b. What is the probability that a randomly selected DUI suspect is given a test?
- c. A blood test or a breath test, but not both?
- d. Neither test?
- e. A blood test?
- f. A blood test, if a breath test was already given at the scene?
- g. Based on your answers to **e** and **f**, do you think that receiving a breath test and a blood test are **independent**? That is, does having a breath test appear to be related to the likelihood that you receive a blood test? Explain your reasoning.
- *you may not know this, so use your best judgement

9. An insurance company is conducting a study in Connecticut of “at risk” drivers—those drivers most likely to be in an accident. The insurance company decides to define each of the following groups as “at risk” drivers:
1. Drivers under 21 years of age
 2. Drivers over 75 years of age
 3. Drivers of any age with a traffic ticket in the last year.

The insurance company took a random sample of 1,000 Connecticut drivers to determine their age and whether they had received a ticket in the last year. These data are shown below:

	Under 21	Over 75	Other Ages (21-75)	Total
Traffic Ticket	24	11	218	253
No Traffic Tickets	29	84	634	747
Total	53	95	852	1000

- a. What is the probability that a randomly selected driver was over 75?

- b. What is the probability that a randomly selected driver received a traffic ticket in the past year?

- c. What is the probability that a driver received a traffic ticket in the past year, **given the driver is under 21**?

- d. Based on your answers to the last two questions, do you think that receiving a traffic ticket and age are independent? That is, does age appear to be related to the likeliness that you receive a ticket? **Explain your reasoning.**

*you may not know this, so use your best judgement