Stat 50 - Elementary Statistics — Winter 2020

Exam 1

Ch 1, 2, 3 — **Dr. Jorge Basilio**

Jan_16 — Pasadena City College — **gbasilio@pasadena.edu**

Honesty Pledge

On my honor, by printing and signing my name below, I vow to neither receive nor given any unauthorized assistance on this examination:

NAME (PRINT): _____ SIGNATURE: _____

Directions

- YOU ARE ALLOWED TO USE A CALCULATOR ON THIS EXAM. (Ti83/Ti83+/Ti84/Ti84+/Ti84+CE-T, or scientific calculator)
- You have 80 minutes to complete this exam.
- The exam totals **100 points**
- There are 12 problems, many of them with multiple parts.
- Place all of your belongings in the front of the classroom and I will assign you a seat. Bring with you your writing utensils.
- Cell phones must be turned off and put away in with your items in the front of the classroom.
- Handwriting should be neat and legible. If I cannot read your writing, zero points will be given.
- Make sure to ALWAYS SHOW YOUR WORK; you will not receive any partial credits unless work is clearly shown. *If in doubt, ask for clarification.*
- Leave answers in exact form (as simplified as possible), unless told otherwise.
- Put a box around your final answer where applicable.
- **PLEASE CHECK YOUR WORK!!!**
- If you need extra space, there is extra space on the back of the cover page and clearly indicate that you are continuing your work there in the original location.
- If you finish early, make sure to double- and triple-check your work. If you're done with that, then you may leave.
- I will take attendance at the end of class

Score	Grade

This page is intentionally blank. It may be used for scratch paper. If you wish for me to grade your work on this page, please (i) label the problem you are working on, (ii) box your answer, (iii) indicate in the original problem's location that you will continue your work on this page.

Problem 1: 12 pts

Refer to the data set of body temperatures in degrees Fahrenheit given in the accompanying table to answer the following questions.

97.5	96.6	97	98.6	97.2	98.8	99	98
97.6	98.7	98.8	97	97.6	97.8	96.8	98.7
98.2	97.2	96.8	96.8	97.1	98.5	98.4	97.4
99.5	97.5	96.6	99.5	98.7	98.3	99.5	97.9
97.7	99.3	99.5	98.7	99.3	99.4	96.8	99.2

(1 pt) (a) Find the **sample mean**: _____

(1 pt) (b) Find the **median:** _____

(1 pt) (c) Find the **mode:** _____

(1 pt) (d) Find the **sample standard deviation:** _____

(1 pt) (e) Find the **sample variance:** _____

(1 pt) (f) Find the **minimum:** _____

(1 pt) (g) Find the **maximum:** _____

(1 pt) (h) Find the **range:** _____

(4 pt) (i) Create a **box plot**. Be sure to scale your axis appropriately and give the 5 number summary.

Problem 2: 4 pts

Identify whether the given data set is **discrete** or **continuous** data:

(a) _____ Weights of vintage GI Joes

(b) _____ Number of people that can speak 5 or more languages

(c) _____ Number of contestants on 'Naked and Afraid'

(d) _____ Amount of water you can drink in an hour

Problem 3: 20 pts

The following **frequency distribution** shows the number of fountain pens that mathematicians own.

(8 pt) (a) Fill out the rest of the table:

Class	Frequency	Relative Frequency	Cumulative Relative Frequency	Midpoint	Class Boundary
1-5	3				
6-10	15				
11-15	20				
16-20	12				
21-25	6				
26-30	1				

NOTE: Give only the class boundaries on the right (first one is not needed).

NOTE: Give the relative frequency as decimals rounded to the nearest thousands (3 decimal places).

(3 pt) (b) Construct a **histogram** of the frequency distribution.

(2 pt) (c) How many mathematicians were surveyed?

(1 pt) (d) Determine the **shape** of the histogram from part (a) by stating the skewness.

(2 pt) (e) What is the **relative frequency** of mathematicians that have <u>at most</u> 15 fountain pens?

(2 pt) (f) How many mathematicians own <u>at least</u> 21 fountain pens?

(2 pt) (d) Calculate the **mean** number of fountain pens owned by mathematicians:

Problem 4: 8 pts

(4 pt) (a) The scores for a statistics test are as follows:

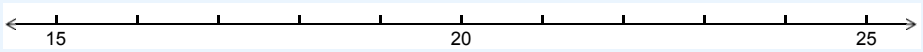
87	76	91	77	93	96	88	85	66	17
89	79	97	50	98	83	88	82	54	69

Create a **stem-leaf plot** display for the data.

(4 pt) (b) The following data represent the number of cars passing through a toll booth during a certain time period over a number of days.

18 19 17 17 24 18 21 18 19 15 22 19 23 17 21

Create a **dot plot** display for the data.



Problem 5: 6 pts

Write down the notation we use for:

(a) **sample mean**: _____

(b) **sample standard deviation**: _____

(c) **sample size**: _____

(d) **population mean**: _____

(e) **population standard deviation**: _____

(f) **population size**: _____

Problem 6: 6 pts

A test is used to assess readiness for college. In a recent year, the **mean** test score was 21.5 and the **standard deviation** was 5.3.

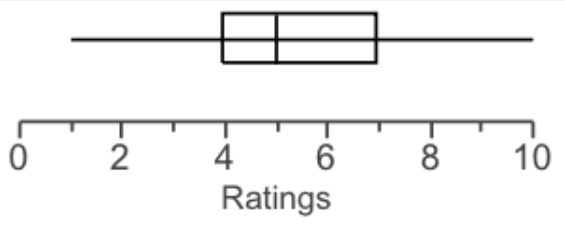
(a) Celeste got a test score that was 2.5 standard deviations above the mean. What was her test score?

(b) What test scores are significantly low?

(c) What test scores are significantly high?

Problem 7: 8 pts

The following box-plot represents the ratings of twenty males by females in an experiment involving speed dating. Please give your answers in complete sentence(s) $(M \rightarrow E)$.



(a) What is the **median** rating of the males?

(b) **How many** males were rated a 4 or higher?

(c) Jesse was rated the lowest, what was he rated?

(d) Taylor is rated higher than 75% of the other males and lower than 25% of the others. What is Taylor's rating?

Problem 8: 14 pts

We want to know the average (mean) amount of money spent on school supplies each year by families with children at Hogwarts School of Witchcraft and Wizardry. We randomly survey 30 families with children in the school. To ensure fairness, we sampled proportional amounts from low, middle, and high income families. From the survey, we found that families spent an average of $376.55 on school supplies. Identify the following:

(a) population

(b) sample

(c) parameter

(d) statistic

(e) variable

(f) data

(g) What type of sampling was used (simple random, cluster, stratified, systematic, or convenience)?

Problem 9: 9 pts

Malik took the SAT test and scored in the 97th percentile. Please give your answers in complete sentence(s) $(M \to E)$.

(a) Did he do well relative to all people who took the SAT test? Interpret this result.

(b) If 500 students took the same test at Malik's school, how many people had a score higher than his?

Problem 10: 5 pts

Abraham scored 92 on his stat's test where his class had a mean of 71 and a standard deviation of 15. Whereas Amadi scored 688 on his stat's test with a mean of 493 and a standard deviation of 150. Who did did better on their test?
Justify your answer with statistical reasoning. Please give your answers in complete sentence(s) $(M \to E)$.

Problem 11: 4 pts

Identify whether the given data set is **qualitative** or **quantitative** data:

(a) _____ Collection of grams of fat in the cheese pizza served at PCC cafeteria

(b) _____ Collection of nations of origin of PCC students

(c) _____ Collection of jersey numbers of the PCC football team

(d) _____ Collection of number of days you studied for this test

Problem 12: 4 pts

Identify appropriate **level of measurement** (nominal, ordinal, interval, ratio):

(a) _____ Assessed value of a house

(b) _____ Zip codes

(c) _____ T-shirt Sizes (S, M, L, XL)

(d) _____ Temperature of Pasadena

Formula Sheet

- $\boxed{\bar{x} = \dfrac{\sum x}{n}}$
- $\boxed{\bar{x} = \dfrac{\sum (f \cdot x)}{\sum f}}$
- $\boxed{s = \sqrt{\dfrac{\sum (x - \bar{x})^2}{n}}}$
- $\boxed{z = \dfrac{x - \bar{x}}{s}}$ or $\boxed{x = \bar{x} + s \cdot z}$

- k^{th} **Percentile:**

$$\boxed{P_k = \frac{\text{\# scores < given score}}{\text{total \# scores}}}$$

- **Finding the score L given a percentile k:**

$$\boxed{L = \frac{k}{100} \cdot n}$$

  - if L is a decimal, round up
  - if L is whole, then average the k^{th} score and the next higher score

Post Exam Survey

Now that you have finished the exam, please take a few minutes to reflect on how you prepared for the exam and how you think you did. Then answer these questions.

1. When taking the exam I felt
   (a) Rushed. I wanted more time.
   (b) Relaxed. I had enough time.
   (c) Amazed. I had tons of extra time.
2. The week before the test I did all my homework on time: YES NO
3. The week before the test, in addition to the homework I followed a study plan. YES NO
   (a) I think this helped: YES NO
4. The day before the test I spend _____ hours studying and reviewing.
   (a) I think that was enough time: YES NO
5. The night before the test:
   (a) I stayed up very late cramming for the test
   (b) I stayed up very late, but I wasn't doing math
   (c) I didn't need to cram because I was prepared
   (d) I got a good night's sleep so my brain would function well.
6. I think I got the following grade on this test: _____
7. Strategies that worked well for me were (please elaborate):

8. Next time I will do an even better job preparing for the test by: