Math 153 - Test 1a

September 10, 2015

Name _____

Score _____

Show all work. Supply explanations when necessary.

1. (12 points) Jake at State Farm believes that people drive more carefully after reading about horrific traffic accidents. He asks drivers to read about about several bad accidents, and then he tracks their driving habits for one week.

   (a) Is his study an experiment or an observational study? Briefly explain.

   (b) Are car speeds discrete or continuous?

   (c) Identify the level of measurement (nominal, ordinal, interval, ratio) for car speeds.

   (d) Jake obtains his sample of 40 drivers by randomly selecting 20 males and 20 females from his list of clients. Is his sample a simple random sample? Briefly explain.

   (e) Jake finds that young drivers tend to have poor driving habits. Does this mean that being young causes one to be a poor driver? Explain.

   (f) What is the population that Jake is studying?

2. (6 points) Stan received grades of B, A, A, D, C in classes with 3, 5, 4, 3, 1 credit hours, respectively. Compute Stan's GPA using a 4-point scale.

3. (10 points) In the following display, 4 | 5 means 45.

1	7					
2	0					
3	3	4				
4	1	2	5			
5	0	0	2	6	7	8
6	3	8	8			
7	0					

(a) What is the name of this type of display?

(b) Are the data values shown above approximately normally distributed? Briefly explain. If not normal, describe the distribution.

(c) Without computing the mean and median, which do you think is greater and why?

(d) Compute the mean, median, and mode(s).

4. (10 points) Bags of a certain brand of corn chip are supposed to contain 10.25 oz of chips. The following frequency distribution, showing the weights of corn chips per bag, was obtained from a sample of 50 bags.

Weights (oz)	Frequency
10.10–10.15	4
10.16–10.21	9
10.22–10.27	21
10.28–10.33	11
10.34–10.39	5

(a) What is the class width?

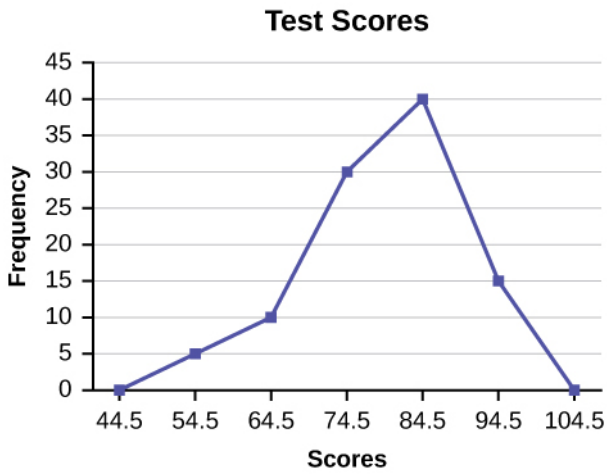
(b) What are the class boundaries associated with the last class?

(c) What are the class midpoints?

(d) If the frequency distribution was changed to a cumulative frequency distribution, what count would be associated with "Less than 10.335 oz"?

(e) Do the weights appear to be normally distributed? Explain.

5. (12 points) The following graph shows the distribution of test scores on a widely administered test.



(a) What is the name of this type of graph?

(b) How many test scores are in the sample?

(c) If a **relative frequency** histogram was to be constructed based on the data, what would be the height of the bar centered on 74.5?

(d) Assuming that the numbers along the horizontal axis are class midpoints, use these numbers to estimate the mean test score.

(e) Assuming that the numbers along the horizontal axis are class midpoints, use these numbers to estimate the median test score.

6. (7 points) A sample of students is obtained as described. Identify the type of sampling (random, systematic, convenience, stratified, cluster). You may receive partial credit if you explain your reasoning.

   (a) Students are separated into groups according to age, then 15 students are selected from each age group.

   (b) Student ID numbers are selected at random by using a computer.

   (c) Students are selected as they walk in the main door.

   (d) A complete list of students is compiled and every 200th name is selected.

   (e) Students are separated into groups according to last initial. Ten letters are chosen at random and all students with that initial are selected.

   (f) A group of students from a single table in the cafeteria are selected.

   (g) Students are grouped according to which high school they attended. Two students are selected from each high school.

7. (6 points) Determine whether the data are discrete or continuous.

   (a) The body temperatures of humans

   (b) The numbers of wheels on vehicles on interstate I-80

   (c) The numbers of pages of newspapers

   (d) The weights of newspapers

8. (12 points) For each of the following situations, tell which type of graph would best display the data. Choose from *frequency polygon*, *dot plot*, *bar graph*, *time-series graph*, *scatterplot*, *pie chart*, *ogive*, *histogram*, *stem-and-leaf plot*, or *Pareto chart* You may receive partial credit if you explain your reasoning.

   (a) A teacher has just returned the graded tests to a class of twenty-seven students. The test scores are whole numbers that range from 48 to 96. The teacher would like to show the entire list of scores.

   (b) A botany class spent the day at Morton Arboretum collecting leaves from mature elm trees. The leaves were measured, placed into groups according to lengths, and counted. The class would like to draw a graph to illustrate the numbers of leaves in the different groups.

   (c) A company's annual budget is $457,000. This money is budgeted into eight different categories. The company's president would like to make a chart showing the employees how the budget is divided into the eight categories.

   (d) Going back to 1990, the student government has obtained the total number of enrolled students for each academic year. The Student Government Association wants to make a chart showing how the enrollment has changed over the years.

   (e) Sarah randomly selected 55 middle school boys. For each boy, she recorded age and height in inches. She then formed ordered pairs and plotted the data.

   (f) The author of a geography textbook wants to show a graph displaying the areas of the seven continents.

9. (3 points) After stopping him for speeding, the state trooper told John that his speed was 93.18935 mph. Is this number an example of too much accuracy or too much precision? Explain.

10. (6 points) Determine the level of measurement. Choose from nominal, ordinal, interval, or ratio.

    (a) Years in which winter olympics were held

    (b) Colors of Starburst fruit chews

    (c) Weights of Starburst fruit chews

    (d) Movie ratings on a scale of 5 stars

11. (4 points) Organize the following data into a stem-and-leaf plot. Are the data approximately normally distributed? Explain.

47	32	48	51	10	27	50	21	24	12
21	32	48	12	28	32	36	37	38	49

Math 153 - Test 1b

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Show all work. Supply explanations when necessary. This problem is worth 12 points. **You must individually on this problem.**

While trying to estimate the life expectancy of an average human, a group of students collected the following data.

36.6	47.5	50.4	52.8	53.0	54.2	55.7	57.9	58.4	59.1
60.3	60.8	61.1	63.8	63.8	65.3	65.6	66.2	66.5	66.6
66.7	67.4	67.7	68.4	68.6	68.8	68.9	69.3	69.4	69.9
70.3	70.5	71.4	72.0	72.4	72.9	73.1	76.9	77.2	77.5
78.1	78.2	78.4	79.2	79.8	80.4	80.9	80.9	82.4	85.0

The numbers in the data set represent ages (in years) at death.

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1. Construct the corresponding frequency distribution. Use at least 6 classes.

2. Using class boundaries for tick marks along your horizontal axis, construct the histogram corresponding to your frequency distribution. Use a separate sheet of graph paper.

3. Based on your histogram, do ages at death appear to be normally distributed? Explain? If you don't think the ages are normally distributed, describe the distribution.