Problem Set for Unit 2:Measures of Center

1. (a) Arturo had six quiz grades of 88, 92, 75, 90, 84, and 80. What grade would he need to earn on the next quiz to have a mean quiz grade of 85?

   (b) After three quizzes in science class, Josie has an average of 90. What does she need to average on the next four quizzes to have an overall average of 95?

   (c) The class average on a reading test was 27.5 out of 40 possible points. The 19 girls in the class scored 532 points. How many total points did the 11 boys score? (See 8th edition → # 22 pg. 503; 7th edition → # 18 page 471)

   (d) When 100 students took a test, the average was 77.1. Two more students took the test. The sum of their scores was 125. What is the new average? (See 8th edition → # 23 pg. 503; 7th edition → # 19 page 471)

   (e) The average height of a class of students is 134.7 cm. The sum of all the heights is 3771.6 cm. There are 17 boys in the class. How many girls are in the class? (See 8th edition → # 22 pg. 506; 7th edition → # 18 pg. 474)

   (f) The average score on a reading test for 58 students was 87.3. Twelve more students took the test. The average of the 12 students was 90.7. What was the average for all the students? (See 8th edition → # 23 pg. 506; 7th edition → # 19 pg. 474)

2. Lucy took three tests. If her median score was 82, her mean score was 87, and the range was 17, what were her three test scores? Show or explain what you did.

3. (a) On a certain exam, Tony corrected 10 papers and found the mean for his group to be 70. Alice corrected the remaining 20 papers and found that the mean for her group was 80. What is the mean of the combined group of students?

(b) Suppose that an instructor is teaching two sections of a course and that she calculates the mean score to be 60 for section 1 and 90 for section 2. Do you have enough information to determine the mean exam score for the two sections combined? If so, find it. If not, explain what information you would need to find it.

(c) Compute Ed's GPA, to two decimal places, for the semester (A = 4, B = 3, C = 2).

Course	Grade	Credits
Mathematics	B	3
Elementary Methods	A	6
Computers in School	C	1
Biology	B	4

4. The following sodium-content data were collected on a single-serving "light" frozen meals from a particular product line.

   730, 660, 750, 600, 440, 680, 880, 850, 650, 810, 680, 780

   (a) Without a calculator, show how to find the median for this set of data. What is the median? Explain in practical terms what this means for this data.

   (b) The *midrange* is defined to be the average of the minimum and maximum values of a data set. Find the midrange of the data set above. Is the midrange a resistant statistic? Briefly explain.

5. Identify each of the following descriptions as ***mean***, ***median*** or ***mode.***

   (a) The measure of center that is most sensitive to extreme values.

   (b) A resistant measure of center.

   (c) The measure of center used for categorical data.

   (d) The measure of center that balances the deviations on either side of it.

   (e) The measure of center that balances the number of data on either side of it.

   (f) Often more representative of the center if the distribution of data is skewed.

   (g) The *average* lady's shoe size is 7 ½ .

   (h) The *average* size of a household in the United States is 2.64 people

   (i) The *average* annual family income in the United States is $40,611.

   (j) A real estate agent notes that the *average* housing prices for an area is $250,000 and concludes that half of the houses in the area cost more than that.

   (k) A businesswoman calculates that the *average* cost of the five business trips that she took in a month is $600 and concludes that the total cost was $3000.

6. The age distribution of 20 subjects in a medical study is given in the stem-and-leaf plot below. Find the following.

3	2
	7 9
4	0 1 1 1 2 2 3 4
	5 5 5 6 7 7 9
5	0 1

Note: 3|2 represents 32

Mode = …….

Median = ……..

Range = ……

Midrange = ……

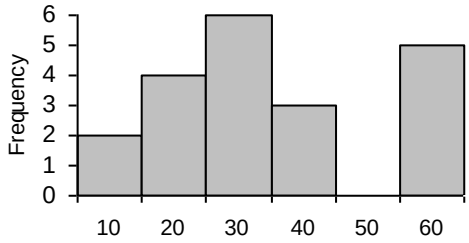
Which of the statistics above is NOT resistant? ……

7. Find the mean, median and mode for the distribution represented by the histogram.

(a) Mean = …….

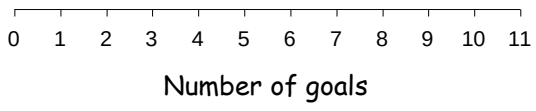
(b) Median = ……..

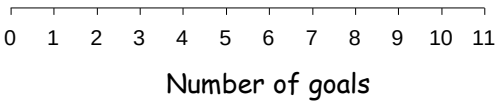
(c) Mode = ……..



8. Suppose in eight games in the 2007 World Cup the USA Women's National Soccer Team has a mean average of 3 goals. Create a line plot for each of the following conditions.

(a) Only one game had 3 goals and two games had 6 goals
(b) The median is 3 and the mode is 4.





9. (a) Find a list of 6 data values such that the mean is greater than 5 of the data values. Verify your results.

(b) Find a list of 6 data values such that the median is greater than the mean. Verify your results.

(c) Find a list of 6 data values such that the mode is 5, the mean is 4 and the median is 4.

10. The family sizes for Paola's 4^{th} grade class are given in the table below.

Family Size	2	3	4	5	6	7	8	9
Number of Families of That Size	3	3	9	10	1	2	0	1

(a) How many students are in Paola's 4^{th} grade class? ……

(b) What percent of the students had families with more than 3 people? ……

(c) What is the modal family size? ……..

(d) What is the median family size? ……..

(e) What is the mean family size? ……..

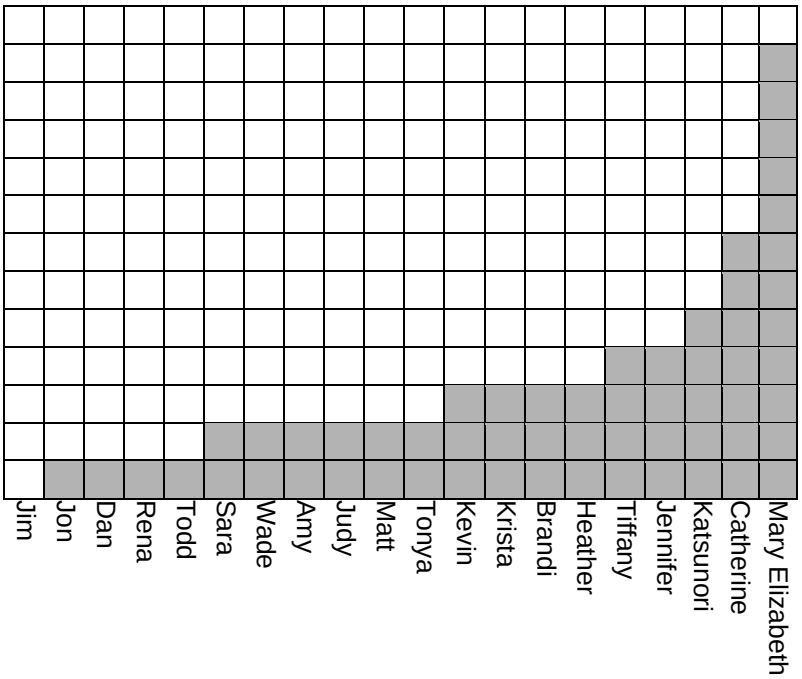
(f) Make a bar graph for this data.

11. Sammy in 1st grade made a bar graph representing the number of pets each student owns in her class. Her graph is shown below. Her big brother, Matthew who is in 6th grade says I can find the "average" number of pets in your class by looking at your graph by balancing.

    (a) Show how to find the mean average by sharing all the pets equally among the students.

    (b) Show how to find the median average by balancing number of data.

    (c) Now represent this data in a line plot and show how to find the mean by balancing deviations. Also show how to find median using a line plot.



12. Consider the data set: 28, 52, 14, 94, 45, 18, 29

(a) Add four values to the data set without changing the value of the median.

(b) Add five values to the data set without changing the value of the median.

(c) Add one value to the data set so that the value of the median increases by 5.

(d) Add four values to the data set so that the median is unchanged, but the mean increases by 5.

13. Which of the following situations are possible regarding the mean, median, and mode for a set of data? Give examples. (See 8th edition → # 6 pg. 502 & # 6 pg 504; 7th edition → #5 pg. 470 & # 5 pg. 472)

(a) mean = median = mode

(b) mean < median = mode

(c) mean < median <mode

(d) mean = median < mode

14. (a) Spike looks at the data 5, 6, 7, 8, 8, 9, 4, 9 and tells you that the median is 8. Do you agree? If not, how can you explain his misconception? (See 8th edition → # 29 pg. 504; 7th edition → # 1 pg. 475)

(b) Over the summer the third-grade classroom was painted lavender. Amber took a poll of her third grade classmates in September to see how they liked the new color. They were asked to respond on a five-point scale with 1 meaning they really did not like the new color, 3 being neutral, and 5 meaning they really liked it. Amber announced the results as follows: The median was 5, but the mean was 3.9, so it seemed people were pretty neutral about it. How would you respond?

(c) Consider the following data set: 26, 32, 22, 35, 25. Find the mean.

Mark found the mean using the following strategy. Explain why Mark's strategy works.

> I guessed the mean was 30. Then I found the difference between each data point and 30 and got −4, 2, −8, 5, −5. The average of these numbers is −2. So 30 + −2 is 28 which is the average of the original data set.