Math 13 - Homework 2

Name: _____ **Class Number:** _____

1) About the Mode: indicate whether the following statements are True or False

a. The mode is the most frequent value in a distribution.
b. There cannot be more than one mode per distribution.
c. The mode is influenced by extreme values.
d. The mode's value can change by organizing the data into different categories.
e. The mode is only applicable to qualitative variables.

2) About the Median: indicate whether the following statements are True or False

a. The median is the central value with 50% of the values larger than it and 50% smaller.
b. There can be more than one median per distribution.
c. The median is affected by extreme values.
d. The median's value is rather stable even when data are organized into different categories.
e. The median is applicable to both qualitative and quantitative variables.

3) About the Average: indicate whether the following statements are True or False

a. The average is the sum of all entries divided by half the number of entries.
b. There is only one average per distribution.
c. The average is not influenced by extreme values.
d. The average is applicable to quantitative variables only.
e. The average is always greater than the median.

4) Find the mean, median, and mode of the data set: 8, 2, 7, 2, 6, 5

5) Consider the numbers: 2, 3, 4, 5, 5.

a. Compute the mode, median, and mean.
b. If the numbers represent codes for the colors of T-shirts, which average(s) would make sense?
c. If the numbers represent one-way mileages for trails to different lakes, which average(s) would make sense?
d. Suppose the numbers represent survey responses from 1 to 5, with 1 = disagree strongly, 2 = disagree, 3 = agree, 4 = agree strongly, and 5 = agree very strongly. Which averages make sense?

6) Find the mean, median, and mode of the data set: 8, 2, 7, 2, 6, 5

7) A job-performance evaluation form has these categories: 1 = excellent; 2 = good; 3 = satisfactory; 4 = poor; 5 = unacceptable. Based on 15 client reviews, one employee had a median rating of 4, and a mode rating of 1. The employee was pleased that most clients had rated her as excellent. The supervisor said improvement was needed because at least half the clients had rated her at the poor or unacceptable level. Comment on the different perspectives.

8) In this problem, we explore the effect on the mean, median, and mode of adding the same number to each data value. Consider the data set 2, 2, 3, 6, 10.

a. Compute the mode, median, and mean.
b. Add 5 to each of the data values. Compute the mode, median, and mean.
c. Compare the results of parts (a) and (b). In general, how do you think the mode, median, and mean are affected when the same constant is added to each data value in a set?

9) In this problem we explore the effect on the mean, median, and mode of multiplying each data value by the same number. Consider the data set 2, 2, 3, 6, 10.

a. Compute the mode, median, and mean.
b. Multiply each data value by 5. Compute the mode, median, and mean.
c. Compare the results of parts (a) and (b). In general, how do you think the mode, median, and mean are affected when each data value in a set is multiplied by the same constant?

10) Consider a data set of 15 distinct measurements with mean A and median B.

a. If the highest number were increased, what would be the effect on the median and mean? Explain.
b. If the highest number were decreased to a value still larger than B, what would be the effect on the median and mean?
c. If the highest number were decreased to a value smaller than B, what would be the effect on the median and mean?

11) The following data are taken from a study conducted by the National Park System, of which Death Valley is a unit. The ground temperatures (in Fahrenheit degrees) were taken from May to November in the vicinity of Furnace Creek.

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[1] 146 152 168 174 180 178 179 180 178 178 168 165 152 144
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12) Consider two data sets A and B. The set A has 5 values and a mean of 10. The set B has 50 values and a mean of 10.

a. Suppose the number 20 is included as an additional data value in set A. Compute the mean for the new data set.
b. Suppose the number 20 is included as an additional data value in set B. Compute the mean for the new data set.
c. Why does the addition of the number 20 to each data set change the mean for set A more than it does for set B?

13) The highway mileages of 13 compact cars are:

	model	mileage
1	Aston Martin Vanquish	19.00
2	Audi TT Coupe	29.00
3	BMW 325CI	27.00
4	BMW 330CI	28.00
5	BMW M3	23.00
6	Jaguar XK8	26.00
7	Jaguar XKR	23.00
8	Lexus SC 430	23.00
9	Mini Cooper	32.00
10	Mitsubishi Eclipse	31.00
11	Mitsubishi Spyder	29.00
12	Porsche Cabriolet	26.00
13	Porsche Turbo 911	22.00

a. Calculate the median:
b. Calculate the mode:
c. Calculate the mean:
d. Calculate the range:
e. Calculate the Interquartile Range (IQR):

14) A small accounting firm pays each of its five clerks $35,000, two junior accountants $80,000 each, and the firm's owner $320,000.

a. What is the mean salary paid at this firm?
b. How many of the employees earn less than the mean?
c. What is the median salary?

15) The firm in the previous question gives no raises to the clerks and junior accountants, while the owner's take increases to $455,000.

a. How does this change affect the mean?
b. How does it affect the median?

16) A person's metabolic rate is the rate at which the body consumes energy. Here are the metabolic rates of 77 men who took part in a study of dieting: 1792, 1666, 1362, 1614, 1460, 1867, 1439 (The units are calories per 24 hours.)

Calculate the mean and standard deviation of the metabolic rates, showing each step in detail. First find the mean $\bar{x}$. Then find each of the deviations from the mean $x_i - \bar{x}$, and their squares $(x_i - \bar{x})^2$. Finally, add all the squared deviations and divide them by $n - 1$. Write down all the computing steps.