AS1 (Assignment 1, Unit 2): Central Tendency and Shapes of Distributions

1. What is the goal of central tendency, and why are there 3 measures of central tendency rather than, for example, just one measure?

   The goal of the measure of central tendency is to find the middle of a distribution, the mean, median or the mode. Each of these measures are considered an average but no one central tendency is best for a set of data. That is why it's important to choose the one that best the arithmetic the mean, the median for the exact location where the number of scores above and below equal in half and last the mode for the highest frequency.

2. Find the mean, median, and mode for the following sample of scores: 6, 4, 3, 6, 5, 4, 3, 0

   Mean_____3.9_____ Median_____4_____   Mode_____3,4,6_____

3. Find the mean, median, and mode for the following sample of scores: 5,6,4,5,3,2,7,5,4,0,1

   Mean_____3.8_____   Median_____4_____   Mode_____5_____

4. Find the answers to the mean, median, mode, and the other expressions based on the following frequency table:

X	f
5	2
4	2
3	3
2	2
1	5

   Mean_____2.5_____ Median____2.5_____ Mode____1_____

   $N=$ _14____ $EX=$_36___ $(EX)^{2=}$__1296_____

5. Find the mean, median, and mode, and the other expressions based on the following frequency table.

X	f
7	1
6	2
5	5
4	2
3	2

   Mean_____4.8_____ Median____5_____ Mode_____5_____

   $N =$ __12_____ $EX=$__58_____ EX^2 3364

6. Explain why the median is often preferred to the mean as a measure of central tendency for a skewed distribution?

   The reason the median is often preferred to the mean is due to the mean being pulled toward the outlier and given a distorted measurement. The median is usually affected by the outlier and stays in the middle.

7. A researcher conducts a study comparing two different treatments with a sample of participants divided into 2 treatments. The study produced the following data:

Treatment 1: 6, 7, 4, 19, 17, 2, 5, 9, 13, 6, 23, 11, 4, 6

Treatment 2:   9, 6, 6, 1, 11, 8, 6, 3, 2, 11, 1, 12, 7, 10

Calculate mean for treatment 1 and put your answer here_____9.4_____

Calculate mean for treatment 2 and put your answer here_____6.7_____

Calculate the median for treatment 1 and put your answer here_____6.5_____

Calculate the median for treatment 2 and put your answer here_____6.5_____

Calculate the mode for treatment 1 and put your answer here_____6_____

Calculate the mode for treatment 2 and put your answer here_____6_____

8. Schmidt (1994) conducted a series of experiments examining the effects of humor on memory. In one study, participants were shown a list of sentences of which half were humorous and half were non-humorous. Schmidt then measured the number of each type of sentence recalled by each participant. The following scores are similar to the results obtained in the study:

Humorous	Non-humorous
4 5 2 4	5 2 4 2
6 6 6 6	2 3 1 6
2 5 4 3	3 2 3 3
1 3 5 5	1 3 1 3
6 5 4 3	4 1 5 3

Mean for humorous group: ___4.25_____   Mean for non-humorous group:___3.8_____

Do the data suggest that humor helps memory? Answer "yes" or "no" and why:

Yes, because the means average was higher in the humorous group

9.   A researcher measured the time that a selected sample of students, aged 14 to 17, from a local New Jersey high school took to perform a sorting task. Here are the data in hours:

4, 6, 5, 4, 5, 7, 8, 6, 5, 7, 8, 9, 9,1, 2, 2, 3, 5, 6, 4, 3, 7, 8, 4, 5, 6, 7, 8, 17, 6

ANSWER the following questions based on the information given in question #9

Name the population: New Jersery High School

Name the sample: Students

How many participants are in the sample? 30

Is the variable continuous or discrete? Continuous

What is the scale of measurement used to measure the variable? Mean

9a. Use SPSS to compute the following (using the data from question 9):

VAR00001

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	3.3	3.3	3.3
	2.00	2	6.7	6.7	10.0
	3.00	2	6.7	6.7	16.7
	4.00	4	13.3	13.3	30.0
	5.00	5	16.7	16.7	46.7
	6.00	5	16.7	16.7	63.3
	7.00	4	13.3	13.3	76.7
	8.00	4	13.3	13.3	90.0
	9.00	2	6.7	6.7	96.7
	17.00	1	3.3	3.3	100.0
	Total	30	100.0	100.0	

Statistics

VAR00001

N	Valid	30
	Missing	0
Mean		5.9000
Median		6.0000
Mode		5.00[a]
Std. Deviation		2.96357

a. Multiple modes exist. The smallest value is shown

-generate a frequency table
-the appropriate graph
-mean
-median
-mode

Histogram

Mean = 5.90
Std. Dev. = 2.964
N = 30
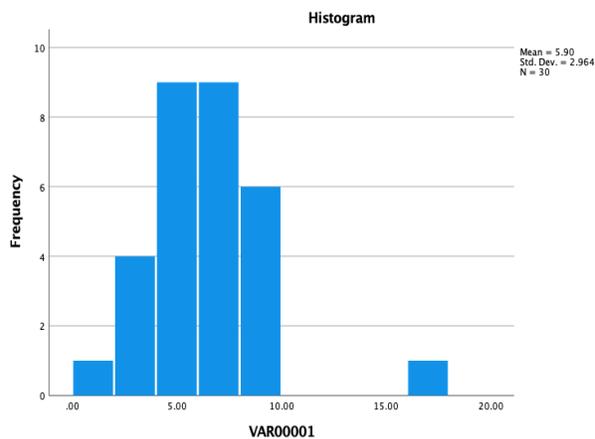
PASTE your SPSS results here:

Based on your SPSS results, please answer the following questions:

What is the mean?_5.9_____   What is the mode? _5____   What is the median?__6_____

What is the shape of this distribution? Positively Skewed

Which is the "best" measure of central tendency for these data?__Median

Why?
Due to the outlier # 17 distorted the average the median would be the best measure of central tendency

Going on to a different set of questions, which have nothing to do with any of the above questions:

10. You have collected the data representing the eye color of n=50 students. What measure of central tendency might best represent these data? And why?

Mode because eye color could only be measured on a nominal scale

11. You have measured how long it has taken each of n=25 first graders to complete a puzzle. What measure of central tendency might best represent these data? And Why?

Mean because it is most common for representing averages of a groups in general.

12. If a distribution were perfectly symmetrical and Jane got an exam score that was equal to the mean, and Juan got an exam score that was equal to the mode, what would you know about their scores?

Answer: They would all be the same scores

13. A professor gave a very, very difficult exam. Brandon scored at the mode, Vincent scored at the median, and Linda scored at the mean. Place the names in order from who got the highest exam score to who got the lowest exam score.

Answer: Linda   Vincent   Brandon

14. A professor gave a very, very easy exam. Dan scored at the mean, Stephen scored at the mode, and Luci scored at the median. Place the names in order from who got the lowest exam score to who got the highest exam score:

Answer: Stephen   Luci   Dan

True / False Questions
Please type "T" is the statement is true, and type "F" if the statement is false in the provided spaces

__T_   16. A student takes a 10-point quiz each week in statistics class. If the student's quiz scores for the first three weeks are 2, 6, 18, and 10, then the mean score is M = 9.

__F___ 17. A sample of *n* = 5 scores has ΣX = 45. This sample has a mean of M = 8.

_T___18. For the scores in the following frequency distribution table, the mean is M = 3.

X	f
4	1
4	3
2	2

___T__ 19. The mean will **always** be located at the point where the total distance between the mean and all of the scores below it equals the total distance between the mean and all of the scores above it.

___T__ 20. In a sample of *n* = 3 scores, if two scores are each below the mean by 2 points, then the third score must be above the mean by 4 points.

___T_ 21. A sample has *n* = 4 scores: 2, 4, 5, and 11. The median for the sample is 4.5.

__T_ 22. There are situations for which it is either impossible to compute a mean or the mean does not provide a central, representative value.

__F___ 23. A distribution of scores has a mean of 28, a median of 33, and a mode of 35. Based on this information, it appears that the distribution is positively skewed.

___F__ 24. If a positively skewed distribution has a mean of 30, then the median and the mode are probably both greater than 30.

___F__ 25. For a negatively skewed distribution, the mean usually has a larger value than either the median or the mode.