Unit 2, Assignment 2: Variability
Please fill in the answers using RED text ☺

1. Which is the preferred descriptive measure of variability? Standard Deviation.

2. All distributions can be defined by which 3 things?

A measure of: 1. Central Tendency, 2. Shape. 3. Variability

  3.If a professor returned an exam to you and your exam only had a deviation score of -15, what would you know about your X-score (your exam score)?

My exam score is within a range of high variability. The Range of distance which is 15 digits below (-) (or away) from the Mean.

4. If a professor returned an exam to you and your exam had a deviation score of 8, and the professor told you that the class mean was 70, you would know that your exam score was:

Answer: My exam score had a range of variability (a distance) of (-) 62.

5. Make up 3 sets of data, each of which has 6 scores so that one set has very high variability, one has very low, and one has zero variability:

High variability: 4, 25, 40, 60, 85, 100.

Low variability: 3, 3, 3, 3, 3, 4.

Zero variability: 4, 4, 4, 4, 4, 4.

6. What does the measure of standard deviation tell you about a set of data?

It defines the data set as "average distances" (distances from score to score), from the mean. Also, he more spread out the data is, the higher the standard deviation or higher variability will be.

7. What is the statistical notation for the following?

Population variance: σ^2.

Population standard deviation: σ.

Sample standard deviation: s

Sum of the squared deviations: ss.

8. Calculate SS (by hand) for the following set of population data (you do not have to show your work):

        Data set: 10, 4, 8, 5, 8   Answer: 24.

9. Calculate the population variance (by hand) for the data set in question 8 (you do not have to show your work):

Answer: 4.8

10. Calculate the population standard deviation for the data set in question 8 (you do not have to show your work):

Answer: 2.19

11. A population has a mean of 100 and a variance of 4. What is its standard deviation (no math is necessary to answer this question)?

     Answer: 2

12. A sample has a standard deviation of 7. What is its variance (no math is necessary to answer this question)?

     Answer: 49

13. Calculate SS (by hand) for the following set of sample data: 1, 6, 10, 9, 4 (no need to show work)

     Answer: 54

14. Calculate the sample standard deviation for the data set in question 13 (no need to show work)

Answer: 3.67

15. What is the variance for the sample data in question 13? (no need to show work)

     Answer: 13.50

16. If a sample has a standard deviation of 3.2 what is its variance? (no need to show work)

     Answer: 10.24

17. If a sample has a variance of 2.2, what is its standard deviation?

     Answer: 1.48

18. A study examines the relationship between hours of sleep and the level of relaxation one feels in the afternoon in a SAMPLE of women. One group was allowed to sleep between 5 and 6 hours and the other group was allowed to sleep between 7 and 8 hours.

Here are the data for both groups:

5-6 hours of sleep	7-8 hours of sleep
4, 1, 5, 10, 5, 10	3, 2, 9, 15, 1, 12

Calculate the following by hand (no need to show work):

Calculate the mean for the 5-6 hour group. Answer: 5.83

Calculate the mean for the 7-8 hour group. Answer: 7

Calculate the standard deviation for the 5-6 hour group. Answer: 3.54

Calculate the standard deviation for the 7-8 hour group. Answer: 5.83

19. These data are teacher first year salaries across a number of states. Enter these data on SPSS (you should enter the data WITHOUT the $ signs and remember to enter the data into ONE column on SPSS, despite the fact that I have given you the data in two columns). Calculate a mean, a standard deviation, and generate a histogram for these data:

|	
$57,000	$28,350
$31,350	$30,000
$40,200	$27,750
$36,000	$30,750
$21,450	$35,100
$19,200	$34,800
$21,900	$27,300
$23,550	$60,000
$45,000	$40,800
$35,100	$45,000
$32,100	$103,750
$23,250	$42,300
$36,000	$26,250
$35,100	$38,850
$21,900	$21,750
$23,250	$24,000
$27,900	$16,950
$29,250	$21,150
$24,000	$92,000
$30,750	$81,250
$30,300	

Based on your SPSS results, what is the mean? 35918.29
Based on your SPSS results, what is the standard deviation? 18748.23

What is the best measure of central tendency to describe these data? The Median._

Why did you choose that answer? The data set has an "outlier" (103,750), which affects (distorts) the Mean and disqualifies it as a best measure of central tendency.

Cut and paste the histogram from SPSS here:
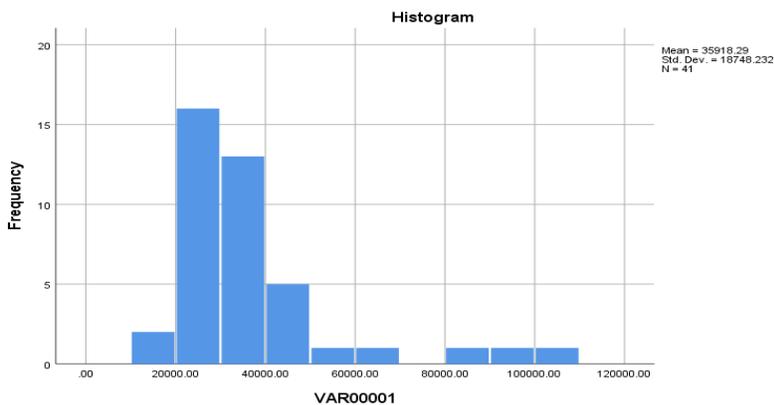
20.

Females	Males
9	8
9	10
10	11
13	12
8	11
16	9

Above are SAMPLE data for standardized intelligence scores for men and women.

What is the mean for women? 10.83

What is the mean for men? 10.16

What is the standard deviation for women? 3.05

What is the standard deviation for men? 1.46

Based on the means and standard deviations, how would you describe the differences in intelligence scores between men and women?

TRUE / FALSE

__T___ 21. The range and the standard deviation are both measures of distance.

__T___ 22. If the highest score in a distribution is X = 16 and the lowest is X = 4, then the range is 12 or 13 points.

__T___ 23. The range is usually considered to be a relatively crude measure of variability.

__F___ 24. For a population of scores, the sum of the deviation scores is equal to N.

__F___ 25. For a population, a deviation score is computed as $X - \mu$

__F___ 26. A positive deviation always indicates a score that is less than the mean.

__F___ 27. For a population of N = 4 scores with $\Sigma X = 1$ and $\Sigma X^2 = 30$, SS = 5.

__T___ 28. To calculate the variance for a population, SS is divided by N.

__T___ 29. A population with SS = 90 and a variance of 9 has N = 10- scores.

__F___ 30. If the population variance is 5, then the population standard deviation is $\sigma = 25$.

__F___ 31. If the population variance is 4, then the standard deviation will be $\sigma = 16$.

__T___ 32. If the scores in a population range from a low of X = 5 to a high of X -= 14, then the population standard deviation must be less than 10 points.

__T___ 33. A sample of $n = 6$ scores has SS = 30 and $s^2 = 6$. If the 6 scores were a population, the value of SS would still be 30, but the variance would be $\sigma^2 = 5$.

__T___ 34. A sample with a variance of 25 has a standard deviation equal to 5 points.

__T___ 35. To calculate the variance for a sample, SS is divided by $n - 1$.