

Unit 2, AS2: Variability
(Please write your answers in red)

1. Define the preferred descriptive measure of variability: _____

2. All distributions can be fully described by which 3 “measures”?

1. _____ 2. _____ 3. _____

3. If a professor returned an exam to you and your exam only had a deviation score of 25, what would you know about the location of your X-score (your exam score) on the distribution of the entire set of scores?

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: _____

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 _____

Low variability _____

Zero variability _____

6. Imagine a data set for maze running times for $n=50$ rats. The mean is 25seconds and the standard deviation is 5 seconds. What, specifically, does the measure of standard deviation tell you about the maze running of the $n=50$ rats?

7. What is the statistical notation for the following?

Population standard deviation: _____ Sample standard deviation: _____

Sum of the squared deviations: _____

8. Calculate SS (by hand) for the following set of population data:

Data set: 4, 6, 2, 1, 3, 2, 4, 0, 5

Answer: _____

9. Calculate the population variance (by hand) for the data set in question 8.

Answer: _____

10. Calculate the population standard deviation for the data set in question 8.

Answer: _____

11. A population has a mean of 80 and a variance of 9 . What is its standard deviation?

Answer: _____

12. A sample data set has a standard deviation of 3.8 . What is its variance?

Answer: _____

13. Calculate SS (by hand) for the following set of sample data: 1, 6, 10, 9, 4, 6

Answer: _____

14. Calculate the sample standard deviation for the data set in question 13.

Answer: _____

15. What is the variance for the sample data in question 13?

Answer: _____

16. If a sample has a standard deviation of 2.44, what is its variance?

Answer: _____

17. If a sample has a variance of 6, what is its standard deviation?

Answer: _____

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

5-6 hours of sleep: 10, 12, 6, 4

7-8 hours of sleep: 5, 6, 10, 3

Calculate the following by hand:

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

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

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

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

What can you say about the differences/similarities in the descriptive statistics between the groups?

19. These data are teacher first year salaries across a number of states. Enter these data, using SPSS (you should enter the data WITHOUT the \$ signs) and calculate the mean and the standard deviation for these data as well as an appropriate graph.

\$57,000	\$32,200
\$45,000	\$35,100
\$32,100	\$23,250
\$36,000	\$35,100
\$21,900	\$23,250

\$27,900 \$29,250
\$24,000 \$30,750
\$30,300 \$22,350
\$28,350 \$30,000
\$27,750 \$30,750
\$35,100 \$34,800
\$27,300 \$60,000
\$40,800
\$45,000
\$103,750
\$42,300
\$26,250
\$38,850
\$21,750
\$24,000
\$16,950
\$21,150
\$31,050
\$60,376
\$32,550
\$31,200
\$36,150
\$42,000
\$92,000
\$81,250
\$31,350

Based on your SPSS results, what is the mean? _____

Based on your SPSS results, what is the standard deviation? _____

20. Using SPSS and the same data set given in question 19, but this time omitting the following values: \$103,750, \$81,250, and \$92,000, calculate the mean, the standard deviation, and generate an appropriate graph.

Based on your SPSS results, what is the mean? _____

Based on your SPSS results, what is the standard deviation? _____

21. Review both SPSS results. Compare the SPSS results (the data set with all of the salaries to the data set omitting some of the salaries. Based on both analyses of these data, what measure of central tendency do you think is appropriate for each of the analyses and why? Note your answers below:

For the data set including all of the salaries:

For the data set omitting some of the salaries:

To what do you attribute the differences in the standard deviations between the two data sets?

22.	<u>Females</u>	<u>Males</u>
	9	8
	9	10
	10	11
	13	9
	8	6

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

What is the mean for women? _____

What is the mean for men? _____

What is the standard deviation for women? _____

What is the standard deviation for men? _____

23. Based on the means and standard deviations for #22, describe the differences/similarities in intelligence scores for women and men.

24. The following POPULATION data represent memory scores obtained for two groups of women, one older and one younger.

<u>Younger</u>	<u>Older</u>
8	7
7	5
6	8
6	5
6	7
3	10

Calculate the sample mean for younger women _____

Calculate the sample mean for older women _____

Calculate the standard deviation for younger women _____

Calculate the standard deviation for older women _____

Based on the means and standard deviations, describe the differences in scores between younger and older women

TRUE / FALSE

- _____ 25. The range, the standard deviation, and variance are all measures of distance.
- _____ 26. If the highest score in a distribution is $X = 15$ and the lowest is $X = 3$, then the range is 12 or 13 points.
- _____ 27. The range is not usually considered to be a relatively crude measure of variability.
- _____ 28. For a population of scores, the sum of the deviation scores is equal to N .
- _____ 29. For a population data set and for a sample data set, a deviation score is computed as $X - \mu$
- _____ 30. A positive deviation always indicates a score that is more than the mean.
- _____ 31. For a population of $N = 3$ scores with $\Sigma X = 1$ and $\Sigma X^2 = 30$, $SS = 4$.
- _____ 32. To calculate the variance for a population, SS is divided by $N-1$.
- _____ 33. A population with $SS = 90$ and a variance of 9 has $N = 10$ - scores.
- _____ 34. If the population variance is 5, then the population standard deviation is its square root.
- _____ 35. If the population variance is 4, then the standard deviation will be $\sigma = 16$.
- _____ 36. 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.
- _____ 37. 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 $\sigma^2 = 5$.
- _____ 38. A sample with a variance of 25 has a standard deviation equal to 5 points.
- _____ 39. To calculate the variance for a sample, SS is divided by n