

Name: \_\_\_\_\_

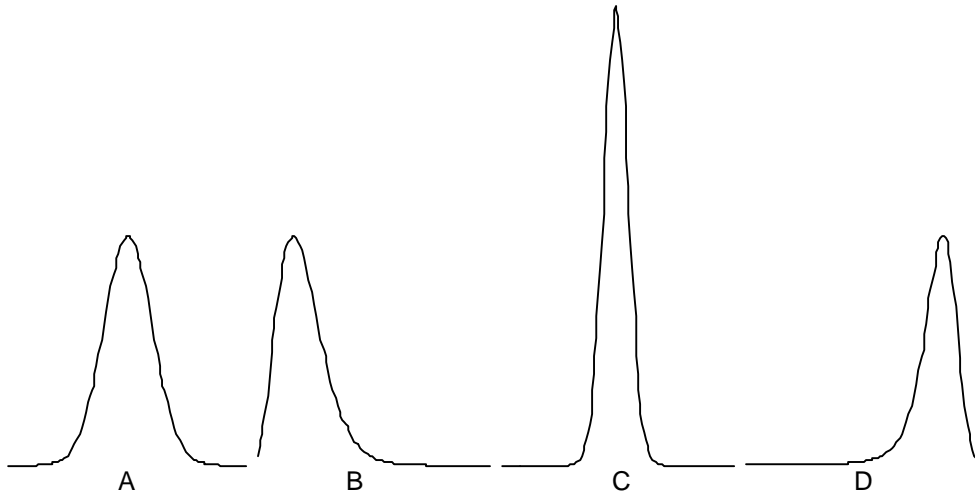
*PSY 216: Elementary Statistics*  
*Exam 1*

This exam consists of 25 multiple-choice questions and 5 essay / problem questions. For each multiple-choice question, circle the one letter that corresponds to the correct answer. Each multiple-choice question is worth 2 points. If you do not show your work in the essay / problem questions, you cannot receive partial credit. Each of the essay / problem questions is worth 10 points. You have until 10:50 AM to finish the exam. Budget your time wisely.

1. A researcher randomly assigned 50 students to take a test in a hot room and 50 students to take the same test in a cold room. The researcher recorded the percent correct on the test. The researcher gave each group 50 minutes to take the test. Which of the following is a correct statement?
  - A. The independent variable is the temperature of the room -- hot vs. cold.
  - B. The independent variable is the percent correct on the test.
  - C. The independent variable is that each group had 50 minutes to take the test.
  - D. There are no independent variables in this study. There are only subject variables.
  
2. A researcher randomly assigned 50 students to take a test in a hot room and 50 students to take the same test in a cold room. The researcher recorded the percent correct on the test. The researcher gave each group 50 minutes to take the test. Which of the following is a correct statement?
  - A. The dependent variable is the temperature of the room -- hot vs. cold.
  - B. The dependent variable is the percent correct on the test.
  - C. The dependent variable is that each group had 50 minutes to take the test.
  - D. There are no dependent variables in this study. There are only subject variables.
  
3. If we want to generalize what we know about a sample to a population, we must ensure that
  - A. the sample is sufficiently large.
  - B. the sample is selected in a random manner from the population.
  - C. the sample consists of the entire population.
  - D. Answers A and B.
  
4. In a choice reaction time experiment, one of four lights comes on. If the first light comes on, the participant is to press the first of four keys. If the second light comes on, the participant is to press the second of four keys, and so on. The time between when the light comes on and when the key is pressed is recorded. What is the level of measurement for this study?
  - A. Nominal
  - B. Ordinal
  - C. Interval
  - D. Ratio

5. In a personality inventory, people are asked to rate how much they agree with a given statement. If they strongly agree with the statement, they circle the number 1. If they agree with the statement, they circle the number 2. If they disagree with the statement, they circle the number 3. If they strongly disagree with the statement, they circle the number 4. What is the level of measurement for this inventory?
- A. Nominal
  - B. Ordinal
  - C. Interval
  - D. Ratio
6. You are stranded on a desert island and have no standardized way of measuring length. So you decide to adopt the length of a particular stick as your unit of measure. You record your height as 3 sticks tall. After you are rescued you find out that the stick is exactly 2 feet in length, how tall are you?
- A. You are exactly 3 sticks  $\times$  2 feet / stick = 6 feet tall.
  - B. The true limits of the stick are 1.5 to 2.5 feet. Since you are 3 sticks tall, you could be anywhere between  $1.5 \times 3 = 4.5$  feet and  $2.5 \times 3 = 7.5$  feet tall.
  - C. The true limits of your height are 2.5 to 3.5 sticks. Since each stick is 2 feet in length, you could be anywhere between  $2.5 \times 2 = 5$  feet and  $3.5 \times 2 = 7$  feet tall.
  - D. There is no way to determine how tall you might be.
7. What is the value of  $\Sigma X$  for the following numbers: 5 10 15 20
- A. 4
  - B. 5
  - C. 12.5
  - D. 50
8. The *percentile rank* is defined as
- A. the percentage of observations that are below a given score.
  - B. the percentage of observations that are at or below a given score.
  - C. the percentage of observations that are above a given score.
  - D. the percentage of observations that are at or above a given score.

The following three questions refer to these distributions. Assume that the scale of the X axis is identical for each distribution:



9. Which of the distributions is positively skewed?
  - A. Distribution A
  - B. Distribution B
  - C. Distribution C
  - D. Distribution D
  
10. If distribution A is mesokurtic, which of the distributions is platykurtic?
  - A. Distribution B
  - B. Distribution C
  - C. Distribution D
  - D. None of the distributions are platykurtic.
  
11. Which distribution has a mean that is larger than the median?
  - A. Distribution A
  - B. Distribution B
  - C. Distribution C
  - D. Distribution D
  
12. What is / are the modes for the following data: 8 8 9 7 6 9 8 9 7 7
  - A. 6
  - B. 7.8
  - C. 8
  - D. 7, 8, and 9

13. What is the median for the following data: 3 4 6 7 8 8
- A. 8
  - B. 6.5
  - C. 6
  - D. 6 and 7
14. The median is another name for
- A. the difference of the first and third quartiles.
  - B. the 50<sup>th</sup> percentile.
  - C. the mean.
  - D. the square root of variance.
15. You should use the range as a measure of dispersion when
- A. the variable has a nominal scale.
  - B. the variable has a ratio scale.
  - C. you are presenting the results to people with little to no knowledge of statistics.
  - D. the distribution is skewed.
16. You should use the semi-interquartile range as a measure of dispersion when
- A. the variable has a nominal scale.
  - B. you are presenting the results to people with little to no knowledge of statistics.
  - C. the distribution is skewed.
  - D. the distribution is not mesokurtic.
17. Which of the following statements is true about the relation between standard deviation and variance?
- A. standard deviation = variance<sup>2</sup>
  - B. standard deviation<sup>2</sup> = variance
  - C. standard deviation = variance
  - D. There is no systematic relation between standard deviation and variance.
18. What is the difference between  $s^2$  and  $\sigma^2$ ?
- A.  $s^2$  is a measure of skewness while  $\sigma^2$  is a measure of dispersion.
  - B.  $s^2$  is the standard deviation while  $\sigma^2$  is the variance.
  - C.  $s^2$  is the variance of a sample while  $\sigma^2$  is the variance of a population.
  - D.  $s^2$  is the variance of a population while  $\sigma^2$  is the variance of a sample.
19. If  $s^3$  is less than 0 then the distribution
- A. has a negative skew.
  - B. has a positive skew.
  - C. is leptokurtic.
  - D. is platykurtic.

20. If  $s^4$  is greater than 3 then the distribution
- has a negative skew.
  - has a positive skew.
  - is leptokurtic.
  - is platykurtic.



21. Consider the Tukey box plot given above. It is based on the question “How many younger brothers and sisters do you have?” What do the top and bottom of the box represent?
- The top represents the third quartile and the bottom represents the first quartile; together they represent the interquartile range.
  - The top represents one standard deviation above the mean and the bottom represents one standard deviation below the mean.
  - The top and bottom represent the range of all of the scores that are not “extreme” or “outliers.”
  - The top represents the mean and the bottom represents the mode.
22. If you want to see if two variables are related to each other you should use a
- bar chart.
  - histogram.
  - Tukey’s box plot.
  - scatter plot.
23. What is the difference between a statistic and a parameter?
- Statistics are used to describe data while parameters are used to decide if two (or more) groups are likely to be different from each other.
  - Statistics are used with experiments and parameters are used with quasi-experiments.
  - Statistics are based on samples while parameters are based on populations.
  - Statistics are based on populations while parameters are based on samples.

24. Validity

- A. is the extent to which a measurement is repeatable.
- B. is the extent to which a measurement measures what it claims to.
- C. can only be high if reliability is also high.
- D. Both answers B and C.

25. What does SS stand for?

- A. Sum of Squares
- B. The sum of the squared deviations.
- C.  $\Sigma(X-\mu)^2$
- D. All of the above

26. *Briefly* describe the four levels of measurement. Why is it necessary to determine the level of measurement before calculating statistics?

27. Create a stem and leaf plot for the following set of test scores. By just looking at the stem and leaf plot, what can you say about the mode and skew of the distribution?

82	91	76	84	56	93	84	78	89	77	61	63
88	74	94	82	47	96	85	79	88	68	92	88



28. List the three commonly used measures of central tendency. Discuss when each should be used. (Give the answer that a statistician would give, and not what social scientists often do. That is, give the answer given in the lecture notes.)

29. Give a formula for the variance of a population. Explain why it measures dispersion.

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**Remove this page from your test and turn in the rest of the test before answering this question. You may not have the rest of your test back once it has been turned in. You may use whatever resources *you* have (including the web) to answer this, and only this, question. Failure to turn in the rest of the test prior to working on this question will automatically result in a score of 0 on the test.**

30. Start SPSS and load the standard class data set (you can get the standard class data set from the web if necessary.) Calculate the mean, median, mode, range, interquartile range, variance, skewness and kurtosis of the “younger” variable (“How many younger brothers and sisters do you have?”). Enter the values into the following table:

Mean:	
Median:	
Mode:	
Range:	
Interquartile Range:	
Variance:	
Skewness:	
Kurtosis:	

Select an appropriate type of graph (bar chart, histogram, Tukey box plot, line graph, scatter plot) for this variable and have SPSS produce the graph. Print the graph and put your name on it. Submit the graph with this page.

Why did you select this particular type of graph?