

## AS1 (Assignment 1): Unit 1

### Introduction to Terminology, Scales of Measurement, Notation and Basic Computation

1. A researcher is investigating the effectiveness of a treatment for adolescent boys taking medication for depression. A group of 30 boys is selected and half receive the new treatment in addition to their medication and the other half continue to take their medication without treatment. For this study
  - a. Identify the population:        **group of 30 boys**
  - b. Identify the sample:        **2 groups of 15 boys**
  
2. Define the terms:
  - a. Population        **A population may consist of an entire set of people, animals, corporations, or other sets that is studied by researchers.**
  - b. Sample        **a sample is a selected subset of individuals taken from a population that is an interest of study by researchers.**
  - c. Parameter        **Summarized data from a population - information that describes a set of data from population.**
  - d. Statistic        **Summarized data from a sample of a population – information that describes data from a sample.**
  
3. Name 3 descriptive statistics methods
  - 1)        **Histograms**
  - 2)        **Polygons**
  - 3)        **Bar Graphs**

Please place a T if the statement is true and an F if the statement is false in the space provided.

- F**   4. A researcher calculates a mean from a sample. Her mean is an example of a parameter.
- F**   5. A researcher calculates a mean from a population set of data. His mean is a statistic.
- T**   6. The entire group of voters in Florida is an example of a population.
- T**   7. A researcher who selects a sample from a population should expect some difference between the sample mean and the true population parameter.
- F**   8. The participants in a research study are classified as high, medium, or low in self-esteem. This classification involves measurement on a nominal scale.
- F**   9. A discrete variable must be measured on a nominal or an ordinal scale.

- T 10. Students in an introductory art class are classified as art majors and non-art majors. This is an example of measurement on a nominal scale.
- F 11. Men's shirt sizes are classified as small, medium, large, and extra-large. This is an example of measurement on a nominal scale.
- T 12. A researcher records the number of mathematics problems answered correctly during a 15 minute period. This is an example of measurement on a ratio scale.
- T 13. To determine how much difference there is between two individuals, you must use either an interval or a ratio scale of measurement.
- F 14. If a researcher measures two individuals on a nominal scale, it is impossible to determine which individual has the larger score.
- T 15. Recording the number of students who are absent each day at a high school would be an example of measuring a discrete variable.
- T 16. A high school gym teacher records how much time each student requires to complete a one-mile run. This is an example of measuring a continuous variable.
- T 17. A researcher records the gender of each child born in the county hospital during the month of June. This researcher is measuring discrete a variable.
- T 18. A data set is described as consisting of  $n = 15$  scores. Based on the notation being used, the data set is a sample.
- T 19. To compute  $(\Sigma X)^2$ , you first add the scores, then square the total.
- T 20. For the following scores, 1, 2, 5,  $\Sigma X^2 = 30$ .
- F 21. For the following scores, 1, 4, 2, 0,  $(\Sigma X)^2 = 21$ .
22. Statistical techniques are classified into two major categories: Descriptive and Inferential. Describe the general purpose of each category.

***Descriptive statistics seeks to “define” or “describe” a set of data to organize, simplify and summarized its characteristics, while inferential statistics draws from the sample data of the population and gives explanation to understand why the data is the way it is. This affords researchers to form cause and effect connections between variables and make conclusions on their findings of the population. Descriptive statistics describe the data and inferential statistics explains the data.***

23. Define the concept of “sampling error.” Note: Your definition should include the concepts of sample, population, statistic, and parameter.

***When researchers investigate a population most likely a sample is taken as a representation of that population, however, that sample may not be an exact reflection of said population, thereby presenting some differentiation between sample and population, and producing a variation between the population parameter data and the sample statistic data; so in this case, this is called***

a “sampling error”, where the results of the sample would not truly represent the results of the population if taken.

24. Calculate each value requested for the following set of scores. Scores: 1, 7, 6, 4, 3, 0

$$N = \underline{6} \quad \Sigma X = \underline{21} \quad \Sigma X^2 = \underline{111} \quad (\Sigma X)^2 = \underline{441}$$

25. For the following set of scores, find the value of each expression: 12, 14, 10, 9

$$\Sigma X = \underline{45}$$

$$\Sigma X^2 = \underline{521}$$

$$(\Sigma X)^2 = \underline{2,025}$$

26. For the following set of scores, find the value of each expression

$\frac{X}{5}$   
1  
3

a.  $\Sigma X = \underline{9}$

b.  $\Sigma X^2 = \underline{35}$

c.  $(\Sigma X)^2 = \underline{81}$

27. For the following set of scores, find the value of each expression:

$\frac{X}{6}$   
-2  
0  
-3  
-1

$$n = \underline{5}$$

$$\Sigma X = \underline{0}$$

$$\Sigma X^2 = \underline{50}$$

$$(\Sigma X)^2 = \underline{0}$$

28. Two scores, X and Y, are recorded for each of  $n = 4$  subjects. For these scores, find the value of each expression.

Subject	X	Y
A	3	4
B	0	7
C	-1	5
D	2	2

$$\Sigma X = \underline{4}$$

$$\Sigma Y = \underline{18}$$

29. For each set of scores at the right, find the value of each expression.

$\frac{x}{\quad}$   
1  
6  
2  
3

$$n = \underline{4}$$

$$\Sigma X = \underline{12}$$

$$\Sigma X^2 = \underline{50}$$

$$(\Sigma X)^2 = \underline{144}$$