PSYC 203 Exam 1
Spring 2019

Name_____

SECTION I

Define and briefly discuss the use of the following terms (1 or 2 sentences). You may use diagrams and/or formulae *in addition,* but the concepts must be explained ***in words***. If you use any symbols, be sure to define them. (*4 points each*)

1.   Standard Deviation

2.   Histogram

3.   Bar Chart

4.   Median

5.   Grouped frequency distribution

SECTION II

Answers to the following questions should be in essay form and as long (or short) as it takes you to answer the question.

6.   Briefly define the two kinds of variables (discrete, continuous) and give an example of a representative variable for each. *(4 points)*

7.   In the space below, draw (a) a negatively skewed distribution, (b) a playykurtic distribution, (c) a unimodal distribution, and (d) a non-skewed distribution. *(8 points)*

8.   A researcher uses an anonymous survey to investigate the study habits of American college students. Based on the set of 56 surveys that were completed and returned, the researcher finds that these students spend an average of 4.1 hours each week working on course material outside of class. Identify the statistic, parameter, population and sample. *(8 points)*

9.   I administer a math test to a class and observe the variance is $\sigma^2 = 32.50$. I administer a geography test to the same class and observe the variance is $\sigma^2 = 20.50$. Can I conclude that the magnitude of individual differences is different on these two tests? Explain your reasoning. *(5 points)*

10. What is the value of $\sum(X - \overline{X})^2$ for the following scores (1, 2, 3, 4, 5)? *(5 points)*

SECTION III

Circle the alternative that best addresses each of the following questions. Items in this section are each worth *3 points*.

11. (True or False). The mode will always be greater than the mean in a positively skewed distribution.

12. (True or False). Shirt sizes are classified as small, medium, large and extra large. This is an example of measurement on a nominal scale.

13. (True or False). 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.

14. The lowest bar in a grouped frequency distribution (histogram) corresponds to the class interval that contains the:
     a. lowest score in the distribution.
     b. highest score in the distribution.
     c. fewest scores in the distribution.
     d. most scores in the distribution.

15.   For the following distribution, how many people had scores greater than X = 14?

X	f
20-25	2
15-19	5
10-14	4
5-9	1

a. 5
b. 7
c. 11
d. cannot be determined

16.   What is the mode of the following set of scores (1, 1, 6, 7, 8, 10, 11)?

a. 6
b. 7
c. 8
d. 1

17.   (True or False). Multiplying every score in a sample by 3 will not change the value of the standard deviation.

SECTION IV

The following section contains two scenarios. Be sure to answer the questions related to each using the information provided.

Scenario A: For items #19-21, the City of Chicago maintains a database on the number of potholes they fill per block per day. The number of potholes filled for each block on December 31, 2018 is summarized in the ungrouped frequency table at the top of the next page.

```
Frequencies
potholes$Number of Potholes
Type: Numeric
```

	Freq	% Valid	% Valid Cum.	% Total	% Total Cum.
0	4	8.51	8.51	8.51	8.51
1	8	17.02	25.53	17.02	25.53
2	6	12.77	38.30	12.77	38.30
3	2	4.26	42.55	4.26	42.55
4	5	10.64	53.19	10.64	53.19
5	1	2.13	55.32	2.13	55.32
6	3	6.38	61.70	6.38	61.70
7	2	4.26	65.96	4.26	65.96
8	3	6.38	72.34	6.38	72.34
9	1	2.13	74.47	2.13	74.47
10	1	2.13	76.60	2.13	76.60
11	1	2.13	78.72	2.13	78.72
12	1	2.13	80.85	2.13	80.85
13	2	4.26	85.11	4.26	85.11
14	1	2.13	87.23	2.13	87.23
16	2	4.26	91.49	4.26	91.49
17	1	2.13	93.62	2.13	93.62
23	1	2.13	95.74	2.13	95.74
37	1	2.13	97.87	2.13	97.87
48	1	2.13	100.00	2.13	100.00
<NA>	0			0.00	100.00
Total	47	100.00	100.00	100.00	100.00

18.   What is the mode in these data? *(3 points)*

19.   What is the range in these data? *(3 points)*

The associated grouped histogram for these data is below:

Histogram of potholes
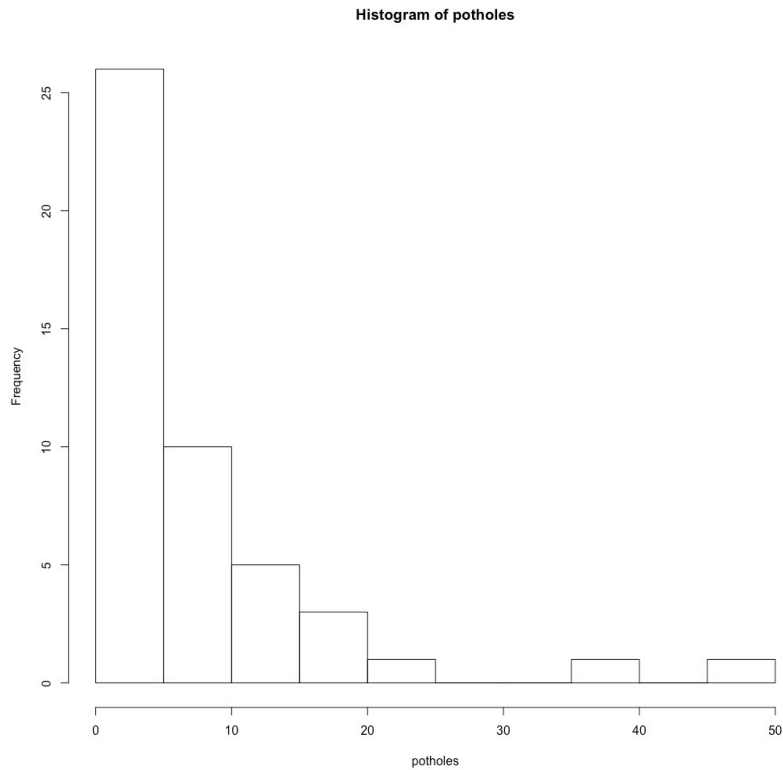
20.   Describe the overall shape of this distribution. How would you characterize the shape of this distribution? *(3 points)*

21.   Does it appear that there are any outliers (extreme values) in these data? *(2 points)*

Scenario B: For items #21-24, use the following data:

$$2, 6, 6, 7, 15$$

22.   How would you compute the mean of these data? *(3 points)*

23.   If you correctly computed the mean, what will be the sum of the deviations of each score from the mean? *(2 points)*

24.   If these data represent a sample from a larger population of cases, which of the following formulas would you use to compute the standard deviation? Why? *(4 points)*

$$\sigma = \sqrt{\frac{\sum(X-\mu)^2}{N}} \quad \text{or} \quad s = \sqrt{\frac{\sum(X-\overline{X})^2}{n-1}}$$

25.   If you added another case to these data with a score of 7, would the mean increase, decrease, or stay the same? Would the variance increase, decrease, or stay the same? *(4 points)*

26.   What is the difference between a sample and population? Include in your answer the difference between a statistic and parameter. (*5 points*).