Ph.D. in Leadership and Policy
Niagara University
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ADS 805 – RESEARCH AND STATISTICS

Problem Set #1 (Basic Concepts and Descriptive Statistics)

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1. Label the following as nominal, ordinal, interval, or ratio.

    a. Grading system using A, B, C, F   __Ordinal_____

    b. Number correct on a quiz   _____Ratio_____

    c. Fur color of dogs   _____Nominal_____

    d. Type of housing in an urban center   ____Nominal _____

    e. Age   __Interval_____

    f. The ten healthiest American cities to
       live in based on weather, pollution, crime
       rate, etc.   __Ordinal_____

2. Suppose the following personal information is collected from a participant of a research study.
    a. Annual personal income: $37,646
    b. Number of Children: 3
    c. American citizen: Yes
    d. Marital status: Married

    Classify each of the responses by type of data and level of measurement.

    a. Annual personal income of $37,646 is what type of variable?
    A. Numerical, discrete, interval
    B. Categorical, nominal
    C. Numerical, continuous, ratio
    D. Numerical, continuous, interval
    E. Categorical, ordinal
    F. Numerical, discrete, ratio

    b. The number of children is what type of variable?
    A. Numerical, continuous, interval
    B. Numerical, discrete, interval
    C. Categorical, ordinal
    D. Categorical, nominal
    E. Numerical, discrete, ratio
    F. Numerical, continuous, ratio

c. American citizen is what type of variable?
A. Numerical, discrete, ratio
B. Numerical, discrete, interval
C. Numerical, continuous, interval
D. Categorical, ordinal
E. Categorical, nominal
F. Numerical, continuous, ratio

d. The marital status is what type of variable?
A. Numerical, continuous, ratio
B. Categorical, nominal
C. Categorical, ordinal
D. Numerical, continuous, interval
E. Numerical, discrete, interval
F. Numerical, discrete, ratio

3. Calculate the mean, mode, and median for the following set of data. What direction is the skew?

X	f
10	3
9	1
8	2
7	2
6	5
5	6

A. Mean =6.789474
B. Medium = 6
C. Mode = 5
D. Right or positively skew to the right

4. Use the computational formulas to calculate the variance and standard deviation for the following data.

X	f
10	3
9	1
8	2
7	2
6	5
5	6

   A. Standard Deviation = 1.843274
   B. Variance = 3.397661

5. A bank manager records the following waiting times, in minutes, of a sample of clients.

     4.23   5.57   3.00   2.36   0.40   5.14
a. Compute the mean and median
    Mean = 3.45 Median = 3.615
b. Compute the variance, standard deviation, range, coefficient of variation, and Z scores. Are there any outliers?
Variance = 3.7304 , Standard Deviation = 1.931424, Range = 5.17, CV= 0.559833

   c. Are the data skewed? If so, how?
   d. The bank manager claims that each client can expect to wait "almost certainly less than five minutes." Based on the given data, is this accurate?

a. The mean wait time is _____3.45_____ minutes (Round to two decimal places as needed).

   The median wait time is ____3.62_____ minutes (Round to two decimal places as needed).

b. The variance is _3.730_____ minutes (Round to three decimal places as needed).

   The standard deviation is _____1.931_____ minutes (Round to three decimal places as needed).

   The range is ___5.17___ _____ minutes (Type an integer or a decimal).

   The coefficient of variation is __55.98_____% (Round to two decimal places as needed).

   Compute the Z scores.

Data	Z Score (Round to two decimals as needed)
4.23	0.40
5.57	1.10
3.00	-.23
2.36	-.56
0.40	-1.58
5.14	.88

Are there any outliers?

A. Yes, since 0.40 is far away from the median.
B. Yes, since 0.40 is far away from the mean.
C. No, since this set of data does not have a mode.
D. **No, since there are no A scores that are less than -3 or greater than 3.**

c. Are the data skewed?
A. Yes, they are right-skewed.
B. **Yes, they are left-skewed.**
C. No, they are not skewed.

d. Is the bank manager's claim accurate?
A. **No, since the two times that are greater than five minutes have Z scores less than 3.**
B. It cannot be determined since "almost certainly" is too vague to be analyzed.
C. Yes, since the given times that are greater than five minutes are outliers.
D. Yes, since the two times that are greater than five minutes have Z scores less than 3.