CONCORDIA COLLEGE
MOORHEAD, MINNESOTA

- Name: _____
- Date: _____
- Section: ○ Mon/Wed ○ Tue/Thu

BUSN 320: Business Statistics

Problem Set #1

Fall 2026

INSTRUCTIONS:

- These practice problems are intended to help you prepare for Quiz #1.
- You may use your textbook, class notes, calculator, and other course resources while completing these problems.
- The problem set consists of three parts: Definitions, True / False, and Short Answers.
- The practice problems are broader than the quiz and do not necessarily represent the exact questions that will appear on Quiz #1.

Problem 1. Definitions

The following terms are fair game for definition questions on Quiz #1. You should be able to define each term and distinguish it from closely related concepts.

Chapter 1

- Population
- Parameter
- Descriptive Statistics
- Cross-Sectional Data
- Categorical Variable
- Sample
- Statistic
- Inferential Statistics
- Time-Series Data
- Quantitative Variable

Chapter 2

- Frequency
- Percent Frequency
- Frequency Distribution
- Bar Chart
- Relative Frequency
- Cumulative Frequency
- Histogram
- Scatter Diagram

Chapter 3

- Mean
- Mode
- Variance
- Percentile
- Interquartile Range (IQR)
- z-score
- Correlation Coefficient
- Median
- Range
- Standard Deviation
- Quartile
- Five-Number Summary
- Covariance
- Outlier

Problem 2. True / False

For each statement, indicate whether it is `TRUE` or `FALSE`. A correct `TRUE` response will receive full credit. For a `FALSE` statement, you must briefly explain why the statement is false to receive full credit.

2.A. A numerical measure calculated from a sample is called a parameter.

2.B. A quantitative variable must always take whole-number values.

2.C. Data collected from several businesses at the same point in time are an example of time-series data.

2.D. The relative frequencies in a frequency distribution should sum to 1.

2.E. A bar chart and a histogram are interchangeable because both use bars to display frequencies.

2.F. A histogram with a long tail extending toward larger values is right-skewed.

2.G. An extreme observation will generally have a greater effect on the mean than on the median.

Problem 2. True / False (continued)

For each statement, indicate whether it is `TRUE` or `FALSE`. A correct `TRUE` response will receive full credit. For a `FALSE` statement, you must briefly explain why the statement is false to receive full credit.

2.H. If every observation in a data set is identical, the standard deviation is zero.

2.I. A larger standard deviation indicates that observations tend to be more dispersed around the mean.

2.J. Variance and standard deviation are expressed in the same units as the original data.

2.K. The interquartile range measures the distance between the first and third quartiles.

2.L. An observation with a z-score of zero must also have a value of zero.

2.M. A positive covariance indicates that two variables tend to move in opposite directions.

2.N. A correlation coefficient of $r = 0$ proves that there is no relationship of any kind between two variables.

Problem 3. Short Answers

3.A. A grocery chain wants to estimate the average amount customers spend per visit. During one week, the company randomly selects 250 transactions from its stores. The average amount spent among these transactions is $40.10.

- Identify the population of interest.

- Identify the sample.

- Identify the parameter of interest.

- Identify the statistic reported in the problem.

Problem 3. Short Answers (continued)

3.B. The following data represent the number of items purchased by 20 customers during a visit to a store.

3	5	2	4	3	6	2	3	4	5
3	2	7	4	3	5	2	4	6	3

- Construct a frequency distribution containing the frequency, relative frequency, percent frequency, and cumulative percent frequency for the number of items purchased.

- What percentage of customers purchased four or fewer items?

- How many customers purchased at least five items?

Problem 3. Short Answers (continued)

3.C. The following data represent weekly sales, in thousands of dollars, for a small business.

12 13 13 14 15 17 42

- Calculate the mean, median, mode, and range.

- Explain why the mean and median differ substantially.

- Which measure of center better describes a typical week in this case? Briefly explain.

Problem 3. Short Answers (continued)

3.D. A retailer records the number of customers entering one of its stores during a sample of five one-hour periods. The observed numbers of customers are shown below.

18 20 20 22 20

Using the sample above, calculate each of the following numerical measures. Show your work where appropriate.

- Sample Variance: _____

- Sample Standard Deviation: _____

Problem 3. Short Answers (continued)

3.E. The following data represent the number of customer complaints received by a business over 11 weeks.

2 3 4 4 5 6 7 8 8 9 18

- Find the five-number summary.

- Calculate the interquartile range (IQR).

- Use the $1.5 \times IQR$ rule to determine whether the data set contains any potential outliers.

Problem 3. Short Answers (continued)

3.F. Two pairs of variables have the following correlation coefficients:

$$r_{X,Y} = 0.82 \qquad r_{W,Z} = -0.35$$

- Describe the direction and strength of the linear relationship for each pair.

- Which pair exhibits the stronger linear relationship? Briefly explain.

- Without calculating the covariance, what sign would you expect the covariance to have for each pair? Briefly explain.

Problem 3. Short Answers (continued)

3.G. A company reports that the average amount customers spend per visit is $60, with a standard deviation of $12. One customer spends $84.

- Calculate the z-score for this customer's spending.

- Interpret the z-score in the context of the problem.