



- Name: _____
 - Date: _____
 - Section: ☐ Mon/Wed ☐ Tue/Thu
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BUSN 320: Business Statistics

Quiz #1: Suggested Solutions

Fall 2026

INSTRUCTIONS:

- Write your name, date, and section clearly at the top of the first page.
- This is a closed-book quiz. Do not use your textbook, class notes, or electronic devices other than a calculator.
- The quiz consists of three parts: Definitions, True / False, and Short Answers.
- You have 75 minutes to complete the quiz. Manage your time carefully.

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Problem 1. Definitions**(5 Points Each)**

Select FOUR items from the list below, and provide a definition for each item you choose.

- Population
- Sample
- Statistic
- Parameter
- z-score
- Variance

- Population:
The set of all elements of interest in a particular study.

- Sample:
The subset of the population that we actually observe.

- Statistic:
A numerical characteristic of the sample.

- Parameter:
A numerical characteristic of the population.

- z-score:
A measure of the relative location of an observation within a dataset. It reports how many standard deviations the observation is from the mean.

- Variance:
A measure of variability based on the squared deviations of the data values from the mean.

Problem 2. True / False**(5 Points Each)**

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. Recording a single company's monthly revenue over five years produces cross-sectional data.

- FALSE

Because the company's revenue is recorded repeatedly over a period of five years, these are time-series data. Cross-sectional data would instead contain observations collected from multiple entities at approximately the same point in time.

2.B. A distribution with a long tail extending to the right is described as left-skewed.

- FALSE

A distribution with a long tail extending to the right is right-skewed. The direction of the skew is determined by the direction in which the longer tail extends.

2.C. The mean must always be one of the observed values in a data set.

- FALSE

The mean does not have to be one of the observed values in a data set. Because the mean is calculated by dividing the sum of all observations by the number of observations, the resulting value may fall between observed values.

2.D. An observation with a z-score of -2 is two standard deviations below the mean.

- TRUE

Problem 2. True / False (continued)**(5 Points Each)**

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.E. Descriptive statistics are used to summarize and organize data, while inferential statistics use sample information to make statements about a population.

- TRUE

2.F. A scatter diagram is primarily used to display the relationship between two categorical variables.

- FALSE

A scatter diagram is used to display the relationship between two quantitative variables. Each point represents a paired observation containing a value for each of the two variables.

2.G. A data set can have more than one mode.

- TRUE

2.H. The correlation coefficient can take any value between -100 and 100 .

- FALSE

The correlation coefficient can only take values between -1 and 1 . Values closer to -1 or 1 indicate a stronger linear relationship, while values closer to 0 indicate a weaker linear relationship.

Problem 3. Short Answers**(15 Points)**

3.A An airline records the arrival delays of 200 randomly selected flights that arrived late at Chicago O'Hare International Airport (ORD). The flights are grouped according to the number of minutes they arrived after their scheduled arrival times.

- Complete the frequency distribution below.

Arrival Delay (minutes)	Frequency	Relative Frequency	Percent Frequency	Cumulative Percent Frequency
0–9	40	$\frac{40}{200} = 0.2$	20%	20%
10–19	60	$\frac{60}{200} = 0.3$	30%	50%
20–29	50	$\frac{50}{200} = 0.25$	25%	75%
30–39	30	$\frac{30}{200} = 0.15$	15%	90%
40–49	20	$\frac{20}{200} = 0.1$	10%	100%
Total	200	1	100%	—

- Based on the completed frequency distribution, what percentage of flights arrived less than 30 minutes late?
 - 75% of the flights arrived less than 30 minutes late.
 - The cumulative percent frequency for the 20–29 minute group gives the percentage of flights that arrived less than 30 minutes late.
- Suppose the airline considers any flight arriving 30 or more minutes late to be significantly delayed. How many of the 200 flights would be classified as significantly delayed?
 - 50 flights would be classified as significantly delayed.
 -
 - Flights arriving 30 or more minutes late are included in the 30–39 and 40–49 minute groups.

Problem 3. Short Answers (continued)**(15 Points)**

- 3.B An airline records the flight times, in minutes, for a sample of six nonstop flights from Fargo Hector International Airport (FAR) to Chicago O'Hare International Airport (ORD). The recorded flight times are shown below.

80 80 86 87 88 89

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

- Mean:

$$\bar{x} = \frac{80 + 80 + 86 + 87 + 88 + 89}{6} = \frac{510}{6} = \boxed{85}$$

- Median:

$$\cancel{80}, \cancel{80}, 86, 87, \cancel{88}, \cancel{89} \Rightarrow \frac{86 + 87}{2} = \boxed{86.5}$$

- Mode:

$$\boxed{80}$$

- Sample Variance:

$$s^2 = \frac{\sum_{i=1}^6 (x_i - \bar{x})^2}{6 - 1} = \frac{(-5)^2 + (-5)^2 + 1^2 + 2^2 + 3^2 + 4^2}{5} = \boxed{16}$$

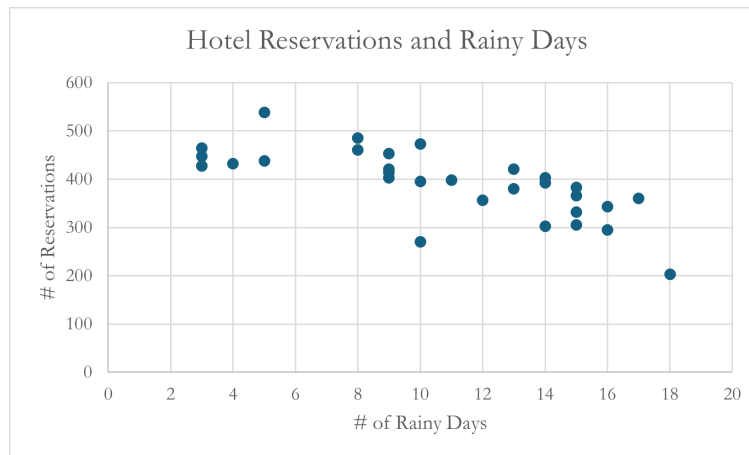
- Sample Standard Deviation:

$$s = \sqrt{s^2} = \sqrt{16} = \boxed{4}$$

Problem 3. Short Answers (continued)

(10 Points)

- 3.C A hotel in a popular tourist destination compares the number of rainy days each month with the number of hotel reservations received during that month. The scatter diagram below summarizes the data for the past several years.



- Suppose the correlation coefficient between the two variables is $r = -0.72$. What does this value tell us about the relationship between rainy days and hotel reservations?
 - The correlation coefficient of $r = -0.72$ indicates a relatively strong negative linear relationship between rainy days and hotel reservations. Months with more rainy days tend to have fewer hotel reservations, and vice versa.
- The hotel manager concludes that rainy weather causes the hotel to receive fewer reservations. Is this conclusion justified by the data? Briefly explain.
 - No. Correlation indicates an association between rainy days and hotel reservations, but does not establish a causal relationship. Other variables may help explain the observed relationship.

Problem 4. Extra Credit**(5 Points)**

Two airlines operate different routes from Fargo Hector International Airport (FAR) to Chicago O'Hare International Airport (ORD). Today, Airline A's flight experienced a 42-minute delay, while Airline B's flight experienced a 36-minute delay. Historical delay statistics for the two routes are shown below.

Airline	Historical Mean Delay	Historical Standard Deviation
Airline A	18 minutes	12 minutes
Airline B	12 minutes	8 minutes

- Calculate the z-score for each flight's arrival delay.

- Airline A:

$$z_A = \frac{x_A - \bar{x}_A}{s_A} = \frac{42 - 18}{12} = \frac{24}{12} = \boxed{2}$$

- Airline B:

$$z_B = \frac{x_B - \bar{x}_B}{s_B} = \frac{36 - 12}{8} = \frac{24}{8} = \boxed{3}$$

- A passenger argues that Airline A experienced the worse delay because 42 minutes is greater than 36 minutes. Using the z-scores, evaluate this argument and explain which flight experienced the more unusual delay relative to its route's historical delay pattern.
 - Although Airline A experienced the larger delay in minutes, Airline B experienced the more unusual delay relative to its historical delay pattern. Airline A's delay was 2 standard deviations above its historical mean, while Airline B's delay was 3 standard deviations above its historical mean. Therefore, Airline B's delay was more unusual.

- Original Score: _____

- Recovered Score: _____

- Original Date: _____

- Recovered Date: _____