

Econ 311: Sample Midterm I

Monday, October 1
Time: 8:00-9:50 pm

Please do not turn this page over until instructed to do so.

Instructions (**Please Read Carefully Before Starting**)

- This test has a total of **100 points**. Unless otherwise instructed, you have 1h 50m to solve it, that is, 110 minutes. There are 15 multiple choice questions (each is worth 3 points) and 4 written questions 15, 10, 15, and 15 points respectively).
- Show your work, unless you are explicitly told not to ! No credit will be given for correct answers if you do not justify your argument.
- Please be sure that your handwriting is **legible!**
- We will grade only what is written on your exam sheet. There should be plenty of space for all your answers. **Do not turn in anything aside from your exam sheet.**
- If time is running short, you should try to set up the problem without doing the final calculations.

Name : _____

Signature: _____

Part I. Multiple Choice (15 questions worth 3 points each).

1. A summary measure that is computed from a sample to describe a characteristic of the population is called
- A) a parameter.
 - B) a statistic.
 - C) a population.
 - D) inferential statistics.

Answer: (Just answer writing the letter corresponding to the statement you believe to be correct.)

2. Which of the following statements involve inferential statistics as opposed to descriptive statistics?
- A) The FAA reported there were 200 near misses among airplanes last year.
 - B) A class of fifty statistics students earned an average grade of 75.5.
 - C) The city business office reported 40 building permits for new single-family housing units.
 - D) Based on a sample of 500 subscribers, a local cable system a sample of 500 subscribers estimates that forty percent of its subscribers watch a premium channel at least once per day.

Answer:

3. Which of the following statements is false?
- A) Pareto diagram is a bar graph with the bars arranged from the most numerous categories to the least numerous categories.
 - B) Pareto diagram includes a line graph displaying the cumulative percentages and counts for the bars.
 - C) A Pareto diagram of types of defects will show the ones that have the greatest effect on the defective rate in order of effect. It is then easy to see which defects should be targeted in order to most effectively lower the defective rate.
 - D) None of the above.

Answer:

4. Which of the following is the graphical analog of a frequency table?
- A) The histogram
 - B) The scatterplot
 - C) The time series plot
 - D) The contingency table

Answer:

5. Which of the following statements is true about correlation coefficient and covariance?
- A) The covariance is the preferred measure of the relationship between two variables since it is generally larger than the correlation coefficient.
 - B) The correlation coefficient is a preferred measure of the relationship between two variables since its calculation is easier than the covariance.
 - C) The covariance is a standardized measure of the relationship between variables.
 - D) The correlation coefficient is the preferred measure of the relation between variables since it is a standardized measure.

Answer:

6. If you are interested in comparing variation in sales for small and large stores selling similar goods, which of the following is the most appropriate measure of dispersion?
- A) The range
 - B) The interquartile range
 - C) The standard deviation
 - D) The coefficient of variation

Answer:

7. Which of the following descriptive statistics is least affected by outliers?
- A) Mean
 - B) Median
 - C) Range
 - D) Standard deviation

Answer:

8. Suppose you are told that the mean sample of numbers is below the median. This information suggests which of the following?
- A) The distribution is symmetric.
 - B) The distribution is skewed to the right or positively skewed.
 - C) The distribution is skewed to the left or negatively skewed.
 - D) There is insufficient information to determine the shape of the distribution.

Answer:

Question 9. Suppose you are told that the average return on investment for a particular class of investments was 7.8% with a standard deviation of 2.3. Furthermore, the histogram of the distribution of returns is approximately mound-shaped. We would expect that 95 percent of all of these investments had a return between what two values?

- A) 5.5% and 10.1%
- B) 0% and 15%
- C) 3.2% and 12.4%
- D) 0.9% and 14.7%

Answer:

Question 10. Which of the following statements is true for the following data values: 17, 15, 16, 14, 17, 18, and 22?

- A) The mean, median and mode are all equal
- B) Only the mean and median are equal
- C) Only the mean and mode are equal
- D) Only the median and mode are equal

Answer:

Question 11. Which of the following statements is always true for any two events A and B defined on a sample space S ?

- A) If the complement of event A is the empty set, then event A is the sample space S .
- B) If the union of events A and B is not the empty set \emptyset , then $A \cup B = \emptyset$.
- C) If events A and B are mutually exclusive, then $A \cup B = S$.
- D) If events A and B are collectively exhaustive, then $A \cup B = \emptyset$.

Answer:

Question 12. Which of the following statements is not true?

- A) Insurance companies employ the subjective approach to probability in many ways.
- B) In general, $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.
- C) If \bar{A} is the complement of event A , then $P(A) + P(\bar{A}) = 1.0$.
- D) None of the above.

Answer:

Question 13. If A and B are independent events with $P(A) = 0.60$ and $P(B) = 0.70$, then the probability that A occurs or B occurs or both occur is:

- A) 1.30.
- B) 0.88.
- C) 0.42.
- D) 0.10.

Answer:

- Question 14.** If $P(A) = 0.84$, $P(B) = 0.76$ and $P(A \cup B) = 0.90$, then $P(A \cap B)$ is:
- A) 0.06.
 - B) 0.14.
 - C) 0.70.
 - D) 0.83.

Answer:

- Question 15.** It was found that 84% of all stockbrokers drink more than three 8 oz. cups of coffee each day. Furthermore, 64% eat at least one candy bar each day. Finally, half of those stockbrokers who do not drink coffee, eat a candy bar. What is the probability that a stockbroker who eats candy also drinks coffee?
- A) 0.360
 - B) 0.560
 - C) 0.875
 - D) 0.280

Answer:

Part II. Written Questions.

Question 1. (10 pts) In a survey of top executives, it was found that 46% had either traveled internationally on business or could fluently speak a foreign language. The probability that an executive who had not traveled internationally could speak a foreign language was 10%. It was found that only 4% of the executives had traveled internationally and could speak a foreign language. a. What is the probability that an executive who speaks a foreign language has not traveled internationally?

b. What is the probability that an executive who has traveled internationally speaks a foreign language fluently?

c. What is the probability that an executive has not traveled internationally?

d. What is the probability that an executive who speaks a foreign language fluently has traveled internationally?

e. What is the probability that an executive does not speak a foreign language fluently?

Question 2. (10pts) Firms are increasingly asking applicants to submit to drug tests. Suppose that drug tests can identify a drug user 98% of the time. However, 1% of the time the test indicates a positive result although the applicant is not a drug user. If 10% of all applicants are drug users, what is the probability that a person who has tested positive for drug use is not really a drug user?

Question 3. (10 pts) The annual percentage returns on two stocks over a 3year period were as follows:

Stock A: 4.01% 14.31% -14.69%

Stock B: 6.51% 4.41% 8.01%

- a. Compare the means of these two population distribution.
- b. Compare the standard deviations of these two population distributions.
- c. Compute an appropriate measure of dispersion for both stocks to measure the risk of these investment opportunities. Which stock is more volatile?

Question 4. (10pts) Rising Hills Manufacturing Inc. wishes to study the relationship between the number of workers, X and the number of tables, Y , produced in its Redwood Falls plant. It has obtained a random sample of 3 hours of production. The following (x, y) combinations of points were obtained:

(12, 20) (18,30), (26,54)

- a. Compute the covariance and correlation coefficient.
- b. Compute the regression coefficient b_0 , and b_1 .
- c. If management decided to employ 25 workers, estimate the expected number of tables that are likely to be produced.