

招生學年度	105	招生類別	碩士班
系所班別	企業管理學系碩士班(經營分析組)、運籌管理研究所碩士班(供應鏈管理組)、財務金融學系碩士班		
科目名稱	統計學		
注意事項	本考科可使用掌上型計算機		

### I. Multiple Choice (40 points; 2 points for Each one)

1. How many scales of measurement exist?
  - a. 1
  - b. 2
  - c. 3
  - d. 4
2. On a street, the houses are numbered from 300 to 450. The house numbers are examples of
  - a. categorical data
  - b. quantitative data
  - c. both quantitative and categorical data
  - d. neither quantitative nor categorical data
3. A tabular summary of a set of data showing the fraction of the total number of items in several classes is a
  - a. frequency distribution
  - b. relative frequency distribution
  - c. frequency
  - d. cumulative frequency distribution
4. A researcher is gathering data from four geographical areas designated: South = 1; North = 2; East = 3; West = 4. The designated geographical regions represent
  - a. categorical data
  - b. quantitative data
  - c. label data
  - d. either quantitative or categorical data
5. When the smallest and largest percentage of items are removed from a data set and the mean is computed, the mean of the remaining data is
  - a. the median
  - b. the mode
  - c. the trimmed mean
  - d. any of the above
6. The variance of a sample of 169 observations equals 576. The standard deviation of the sample equals
  - a. 13
  - b. 24
  - c. 576
  - d. 28,461
7. A numerical description of the outcome of an experiment is called a
  - a. descriptive statistic
  - b. probability function
  - c. variance
  - d. random variable
8. A measure of the average value of a random variable is called a(n)
  - a. variance
  - b. standard deviation
  - c. expected value
  - d. coefficient of variation
9. Four percent of the customers of a mortgage company default on their payments. A sample of five customers is selected. What is the probability that exactly two customers in the sample will default on their payments?
  - a. 0.2592
  - b. 0.0142
  - c. 0.9588
  - d. 0.7408
10. Twenty percent of the students in a class of 100 are planning to go to graduate school. The standard deviation of this binomial distribution is
  - a. 20
  - b. 16
  - c. 4
  - d. 2

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11. The Poisson probability distribution is a
  - a. continuous probability distribution
  - b. discrete probability distribution
  - c. uniform probability distribution
  - d. normal probability distribution
12. Which of the following is **not** a characteristic of an experiment where the binomial probability distribution is applicable?
  - a. the experiment has a sequence of n identical trials
  - b. exactly two outcomes are possible on each trial
  - c. the trials are dependent
  - d. the probabilities of the outcomes do not change from one trial to another
13. The standard deviation of a binomial distribution is
  - a.  $p(1-p)$
  - b.  $np$
  - c.  $np(1-p)$
  - d. None of these alternatives is correct
14. A normal probability distribution
  - a. can have any value of the mean
  - b. must have a mean of 0
  - c. must have a standard deviation of 0
  - d. must have a standard deviation of 1 and a mean of 0
15. The standard deviation of a normal distribution
  - a. is always greater than zero
  - b. is always 1
  - c. can be any value
  - d. cannot be negative
16. The probability that a continuous random variable takes any specific value
  - a. is equal to zero
  - b. is at least 0.5
  - c. depends on the probability density function
  - d. is very close to 1.0
17. Parameters are
  - a. numerical characteristics of a sample
  - b. numerical characteristics of a population
  - c. the averages taken from a sample
  - d. numerical characteristics of either a sample or a population
18. A simple random sample of 100 observations was taken from a large population. The sample mean and the standard deviation were determined to be 80 and 12 respectively. The standard error of the mean is
  - a. 1.20
  - b. 0.12
  - c. 8.00
  - d. 0.80
19. Convenience sampling is an example of
  - a. probabilistic sampling
  - b. stratified sampling
  - c. nonprobabilistic sampling
  - d. cluster sampling
20. Whenever the population standard deviation is **unknown** and the population has a normal or near-normal distribution, which distribution is used in developing an interval estimation?
  - a. standard distribution
  - b. z distribution
  - c. alpha distribution
  - d. t distribution

## II. Short Questions (20 points; 5 points for Each one)

1. How does one calculate the sample size with a specified maximum error, E, if the population proportion is unknown? Why?
2. What are the assumptions of comparing the means of paired sample ( $\mu_d$ )?
3. What are the assumptions of ANOVA?
4. How does one check the assumptions of a regression model?

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### III. Calculation (40 points; 20 points for Each one)

1. Phone calls arrive at the rate of 48 per hour at the reservation desk for Regional Airways.

(a) Find the probability of receiving three calls in a 5-minute interval of time. (10 points)

(b) If no calls are currently being processed, what is the probability that the agent can take 3 minutes for personal time without being interrupted by a call? (10 points)

2. The lifetime (hours) of an electronic device is a random variable with the following exponential probability density function.

$$f(x) = \frac{1}{50} e^{-\frac{x}{50}} \quad \text{for } x \geq 0$$

(a) What is the mean lifetime of the device? (6 points)

(b) What is the probability that the device will fail in the first 25 hours of operation? (6 points)

(c) What is the probability that the device will operate 100 or more hours before failure? (8 points)