

國立成功大學

111學年度碩士班招生考試試題

編 號：230、233

系 所：會計學系
財務金融研究所

科 目：統計學

日 期：0220

節 次：第 3 節

備 註：可使用計算機

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第 1 頁，共 3 頁

※ 考生請注意：本試題可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

一、選擇題 50 分(每題五分)

1. The choice between conducting a one-tailed test or a two-tailed test in a particular analysis is determined by
 - (a) whichever procedure is more convenient.
 - (b) a logical analysis of the problem being considered
 - (c) an assessment of which technique will be significant at the higher level
 - (d) whether or not the population is finite

2. The mean life of a particular brand of light bulb is 1000 hours and the standard deviation is 50 hours. It can be concluded that at least 75% of the bulbs will last between
 - (a) 900 and 1100 hours
 - (b) 950 and 1050 hours
 - (c) 850 and 1150 hours
 - (d) 800 and 1200 hours

3. Which of the following is not a property of a discrete probability distribution ?
 - (a) The probability for every value of a random variable is positive
 - (b) The sum of the probabilities for the value of a random variable is 1.
 - (c) The probabilities for any two different values of a random variable are different.
 - (d) One of the values of a random variable may have a probability equal to zero.

4. Which of the following random variables are LEAST apt to be Poisson distributed?
 - (a) The number of nuts in a \$1.50 candy bar.
 - (b) The weight of a \$1.50 candy bar.
 - (c) The number of stalled cars per day in the company parking lot.
 - (d) The number of people arriving per 10-minute interval at a fast food outlet.

5. A t distribution random variable has eight degrees of freedom. The mean and variance of this distribution are respectively:
 - (a) 0; 1.00
 - (b) 0; 1.33
 - (c) 8; 16.00
 - (d) 8; 1.33

6. If $p(A) = 0.8$, $p(B) = 0.65$, and $p(A \cup B) = 0.9056$, then $p(A|B) =$

- (a) 0.6700
- (b) 0.8375
- (c) 0.9750
- (d) None of above answers is correct.

7. In linear regression analysis, $\hat{\sigma}^2$ should be interpreted as

- (a) a measure of the scatter of the y values around their means,
- (b) a measure of the variation of the x values,
- (c) a measure of the variation in y explained by the variation in x,
- (d) a measure of the variation in y not explained by the variation in x,

8. The key assumption which allows one to construct confidence intervals for β_i (the coefficient of x_i in a multiple

regression, for example, $y = \sum \beta_i x_i + \varepsilon_i$) is that

- (a) y is independent of x_i .
- (b) the x_i are normally distributed.
- (c) the relationship of y and x_i is linear.
- (d) the ε_i are normally distributed.

9. Multicollinearity refers to a condition where:

- (a) Several independent variables can be used to predict a response, y.
- (b) More than one indicator variable is required to represent a qualitative variable having several classes.
- (c) More than one response variable needs to be predicted from the same set of independent variables.
- (d) The observations of the independent variables are highly correlated.

10. When decomposing a time series into its components, it is good to remember that

- (a) trend, cyclical, seasonal, and random movements do not occur simultaneously.
- (b) all time series contain trend, cyclical, seasonal, and random movements.
- (c) trend values are always positive.
- (d) not all time series contain all of the four possible components of a time series.

二、非選擇題 50 分

1. (10%) If $E(x) = 50$ and $\sigma_x = 5$, how large a sample must you take in order that $P(|\bar{x} - 50| \leq 1) \geq 0.99$.

(hint: Use Chebyshev Inequality to find the value)

2. (10%) Prove the identity: $\sum_{i=1}^n (x_i - \bar{x})^2 = \sum_{i=1}^n (x_i - G)^2 - n(\bar{x} - G)^2$, $\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$.

3. (20%) Let (X, Y) have joint density function

$$f(X, Y) = 2; \quad 0 < X < 1, \quad 0 < Y < X$$

$$f(X, Y) = 0, \quad \text{elsewhere}$$

(a) (4%) Find the conditional density function of Y given X .

(b) (4%) Find $E(Y|X)$ for $0 < X < 1$.

(c) (4%) Find $E(E(Y|X))$.

(d) (4%) Are X and Y independent? Prove your answer.

(e) (4%) Find $E(XY)$.

4. (10%) Compute the probability of being dealt at random and without replacement a 13-card bridge hand consisting of 5 spades, 4 hearts, 3 diamonds, and 1 club.