

※ 注意：請於試卷上「非選擇題作答區」標明題號並依序作答。

是非題，每題四分

- \_\_\_\_\_ 1. When the  $F$  test is used for ANOVA, the rejection region is always in the right tail.
- \_\_\_\_\_ 2. If you are comparing the mean sales among 3 different brands you are dealing with a three-way ANOVA design.
- \_\_\_\_\_ 3. The test for equality of two population variances assumes the means are equal.
- \_\_\_\_\_ 4. In multiple regression, a 95% prediction interval for the dependent variable  $y$  is narrower than a 95% confidence interval for  $E(y)$ .
- \_\_\_\_\_ 5. If  $X_1, \dots, X_n$  are  $n$  independent variables, then  $\text{Var}(X_1+X_2+X_3+\dots+X_n)=\text{Var}(X_1)+\text{Var}(X_2)+\dots+\text{Var}(X_n)$

單選題，每題四分

- \_\_\_\_\_ 6. If we wish to determine whether there is evidence that the proportion of items of interest is the same in group 1 as in group 2, the appropriate test to use is  
A) the  $Z$  test.  
B) the  $\chi^2$  (chi-square) test.  
C) Both A and B.  
D) Neither A nor B.
- \_\_\_\_\_ 7. If  $P(A)=0.60$ ,  $P(B)=0.40$ , and  $P(B|A)=0.6$ , it follows that  $P(A|B)$  is  
A) 0.9  
B) 0.6  
C) 0.36  
D) 0.10
- \_\_\_\_\_ 8. The least squares method minimizes which of the following?  
A)  $SSR$   
B)  $SSE$   
C)  $SST$   
D) All of the above
- \_\_\_\_\_ 9. In a multiple regression problem involving two independent variables, if  $b_1$  is computed to be +2.0, it means that  
A) the relationship between  $X_1$  and  $Y$  is significant.  
B) the estimated mean of  $Y$  increases by 2 units for each increase of 1 unit of  $X_1$ , holding  $X_2$  constant.  
C) the estimated mean of  $Y$  increases by 2 units for each increase of 1 unit of  $X_1$ , without regard to  $X_2$ .  
D) the estimated mean of  $Y$  is 2 when  $X_1$  equals zero.

見背面

\_\_\_\_\_ 10. Why is the Central Limit Theorem so important to the study of sampling distributions?

- A) It allows us to disregard the size of the sample selected when the population is not normal.
- B) It allows us to disregard the shape of the sampling distribution when the size of the population is large.
- C) It allows us to disregard the size of the population we are sampling from.
- D) It allows us to disregard the shape of the population when  $n$  is large.

\_\_\_\_\_ 11. Suppose the ages of students in Statistics 101 follow a right skewed distribution with a mean of 23 years and a standard deviation of 3 years. If we randomly sampled 100 students, which of the following statements about the sampling distribution of the sample mean age is **incorrect**?

- A) The mean of the sampling distribution is equal to 23 years.
- B) The standard deviation of the sampling distribution is equal to 3 years.
- C) The shape of the sampling distribution is approximately normal.
- D) The standard error of the sampling distribution is equal to 0.3 years.

\_\_\_\_\_ 12. The standard error of the mean

- A) is never larger than the standard deviation of the population.
- B) decreases as the sample size increases.
- C) measures the variability of the mean from sample to sample.
- D) All of the above.

\_\_\_\_\_ 13. When using the general multiplication rule,  $P(A \text{ and } B)$  is equal to

- A)  $P(A|B)P(B)$ .
- B)  $P(A)P(B)$ .
- C)  $P(B)/P(A)$ .
- D)  $P(A)/P(B)$ .

\_\_\_\_\_ 14. If two events are mutually exclusive, what is the probability that one or the other occurs?

- A) 0
- B) 0.50
- C) 1.00
- D) Cannot be determined from the information given

\_\_\_\_\_ 15. The parameters(s) for the t-distribution is (are)

- A)  $\mu$  and  $\sigma$
- B) variance
- C) degree of freedom
- D)  $\chi^2$

\_\_\_\_\_ 16. Sampling distributions describe the distribution of

- A) parameters.
- B) statistics.
- C) both parameters and statistics.
- D) neither parameters nor statistics.

\_\_\_\_\_ 17. The head librarian at the Library of Congress has asked her assistant for an interval estimate of the mean number of books checked out each day. The assistant provides the following interval estimate: from 740 to 920 books per day. If the head librarian knows that the population standard deviation is 150 books checked out per day, approximately how large a sample did her assistant use to determine the interval estimate?

- A) 2
- B) 3
- C) 12
- D) It cannot be determined from the information given.

\_\_\_\_\_ 18. Whenever  $\pi = 0.1$  and  $n$  is small, the binomial distribution will be

- A) symmetric.
- B) right-skewed.
- C) left-skewed.
- D) None of the above.

\_\_\_\_\_ 19. For a given sample size  $n$ , if the level of significance ( $\alpha$ ) is decreased, the power of the test

- A) will increase.
- B) will decrease.
- C) will remain the same.
- D) cannot be determined.

\_\_\_\_\_ 20. The power of a statistical test is

- A) the probability of not rejecting  $H_0$  when it is false.
- B) the probability of rejecting  $H_0$  when it is true.
- C) the probability of not rejecting  $H_0$  when it is true.
- D) the probability of rejecting  $H_0$  when it is false.

\_\_\_\_\_ 21. You have created a 95% confidence interval for  $\mu$  with the result  $10 \leq \mu \leq 15$ . What decision will you make if we test  $H_0: \mu = 16$  versus  $H_1: \mu \neq 16$  at  $\alpha = 0.01$ ?

- A) Reject  $H_0$  in favor of  $H_1$ .
- B) Do not reject  $H_0$  in favor of  $H_1$ .
- C) Fail to reject  $H_0$  in favor of  $H_1$ .
- D) You cannot tell what our decision will be from the information given.

\_\_\_\_\_ 22. In a one-way ANOVA

- A) an interaction term is present.
- B) an interaction effect can be tested.
- C) there is no interaction term.
- D) the interaction term has  $(c - 1)(n - 1)$  degrees of freedom.

\_\_\_\_\_ 23. In a multiple regression model, which of the following is correct regarding the value of the adjusted  $r^2$ ?

- A) It can be negative.
- B) It has to be positive.
- C) It has to be larger than the coefficient of multiple determination.
- D) It can be larger than 1.

24. The covariance

- A) must be between -1 and +1.
- B) must be positive.
- C) can be positive or negative.
- D) must be less than +1.

25. which of the following is NOT one of the assumptions for regression analysis:

- A) the relationship between X and Y is linear
- B)  $E(e_i)=0$
- C) zero conditional mean:  $E(e_i|x_i)=0$
- D) homoscedasticity:  $\text{var}(e_i)=\sigma^2$
- E)  $E(e_i x_i) > 0$