財務金融系碩士班
財政稅務系碩士班　　　　筆試科目：統計學　　　　共　6　頁，第 1 頁
國際商務系碩士班
企業管理系碩士班

注意事項	1. 本科目合計 100 分，答錯不倒扣。 2. 請於答案卷上依序作答，並標註清楚題號（含小題）。 3. 考完請將答案卷及試題一併繳回。

A. 選擇題 (每題 2 分，合計 40 分)

1. A bank asks customers to evaluate the drive-thru service as good, average, or poor. Which level of measurement is this classification?

   A. Nominal

   B. Ordinal

   C. Interval

   D. Ratio

2. The main purpose of descriptive statistics is to:

   A. Summarize data in a useful and informative manner.

   B. Make inferences about a population.

   C. Determine if the data adequately represents the population.

   D. Gather or collect data.

3. When TV advertisements report "2 out of 3 dentists surveyed indicated they would recommend Brand X toothpaste to their patients," an informed consumer may question the conclusion because the:

   A. Sample was only 5 dentists.

   B. Sample of dentists is clearly explained.

   C. Advertisement does not include the total number of dentists surveyed.

   D. Conclusion is not illustrated with a graph.

4. When data is collected using a qualitative, nominal variable (in other words, male or female), what is true about a frequency distribution that summarizes the data?

   A. The upper and lower class limits must be calculated.

   B. Class midpoints can be computed.

   C. The number of classes corresponds to the number of a variable's values.

   D. The "2 to the k rule" can be applied.
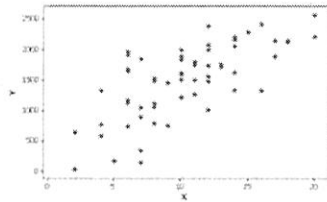
5. If two events A and B are mutually exclusive, what does the special rule of addition state?

   A. P(A or B) = P(A) + P(B)

   B. P(A and B) = P(A) + P(B)

   C. P(A and/or B) = P(A) + P(B)

   D. P(A or B) = P(A) - P(B)

6. The following graph illustrates _____.

   A. A positive or direct relationship

   B. A negative or inverse relationship

   C. No relationship

   D. A distribution for a single variable

7. A purchasing agent for a trucking company is shopping for replacement tires for their trucks from two suppliers. The suppliers' prices are the same. However, Supplier A's tires have an average life of 60,000 miles with a standard deviation of 10,000 miles. Supplier B's tires have an average life of 60,000 miles with a standard deviation of 2,000 miles.

   Which of the following statements is true?

   A. The two distributions of tire life are the same.

   B. On average, Supplier A's tires have a longer life than Supplier B's tires.

   C. The life of Supplier B's tire is more predictable than the life of Supplier A's tires.

   D. The dispersion of Supplier A's tire life is less than the dispersion of Supplier B's tire life.

8. In which of the following discrete distribution does the probability of a success vary from one trial to the next?

    A. Binomial

    B. Poisson

    C. Hypergeometric

    D. All of these.

9. Probabilities are important information when _____.

    A. Summarizing a data set with a frequency chart

    B. Applying descriptive statistics

    C. Computing cumulative frequencies

    D. Using inferential statistics

10. In a finance class, the final grade is based on three tests. Historically, the instructor tells the class that the joint probability of scoring "A"'s on the first two tests is 0.5. A student assigns a probability of 0.9 that she will get an "A" on the first test. What is the probability that the student will score an "A" on the second test given that she scored an "A" on the first test?

    A. 0.50

    B. 0.95

    C. 0.55

    D. 0.90

11. An experiment consists of making 80 telephone calls in order to sell a particular insurance policy. The random variable in this experiment is a _____.

    A. discrete random variable

    B. continuous random variable

    C. complex random variable

    D. simplex random variable

12. The center of a normal probability distribution is _____.

    A. the same as the standard deviation or the distribution

    B. never negative

    C. the mean of the distribution

    D. always equal to zero

13. For the normal distribution, the mean plus and minus two standard deviations will include about what percent of the observations?

    A. 50%

    B. 99.7%

    C. 95%

    D. 68%

14. The true sampling error is usually not known because _____.

    A. μ is unknown

    B. μ is a random variable

    C. σ² is unknown

    D. the sample mean cannot be computed

15. When testing the safety of cars using crash tests, a sample of one or two cars is used because _____.

    A. sampling is more accurate

    B. cars are destroyed

    C. it is quicker

    D. the population is very large

16. A confidence interval for a population mean _____.

　　A. estimates the population range

　　B. estimates a likely interval for a population mean

　　C. estimates likelihood or probability

　　D. estimates the population standard deviation

17. Which of the following is NOT necessary to determine how large a sample to select from a population?

　　A. The level of confidence in estimating the population parameter

　　B. The size of the population

　　C. The maximum allowable error in estimating the population parameter

　　D. An estimate of the population variation

18. A hypothesis regarding the weight of newborn infants at a community hospital is that the mean is 6.6 pounds. A sample of seven infants is randomly selected and their weights at birth are recorded as 9.0, 7.3, 6.0, 8.8, 6.8, 8.4, and 6.6 pounds. The null hypothesis is _____.

　　A. $H_0: \mu = 6.6$

　　B. $H_0: \mu \geq 6.6$

　　C. $H_0: \mu > 7.6$

　　D. $H_0: \mu \leq 7.6$

19. As the sample size for a t distribution increases, the differences between the t distribution and the standard normal distribution:

　　A. are unchanged and remain the same.

　　B. become smaller, as the t distribution approaches the standard normal distribution.

　　C. become greater.

　　D. are evident because the tails of the t distribution become thicker.

20. A null hypothesis makes a claim about a _____.

　　A. Population parameter

　　B. Sample statistic

　　C. Sample mean

　　D. Type II error

B. 計算題 (60%)

請使用計算機，以小數填答，將答案四捨五入至小數點以下第 4 位。(每格 2 分，合計 60 分)

1. 若 $f(x,y)=$ $\begin{cases} d*(x+y), & 1\leq x\leq 3;\ 2\leq y\leq 4。 \\ 0, & x\ 和\ y\ 為其他值。 \end{cases}$

   則 d=(1)。

   邊際機率密度函數 f(x)=(2)；f(y)=(3)。

   期望值 E(x)=(4)；E(y)=(5)；E(xy)=(6)。

   變異數 V(x)=(7)；V(y)=(8)；Cov(x, y)=(9)；V(2x−3y)=(10)；相關係數 corr(x, y)=(11)。

2. (變異數分析；ANOVA)

以變異數分析法檢定右 3 組的平均數是否相等，顯著水準 =1%

虛無假設：(12)；對立假設：(13)

變異來源	平方和	自由度	平均平方和	F 值	P 值
因子(組間)	(14)	(17)	(20)	(22)	0.4050
誤差(組內)	(15)	(18)	(21)		
總和	(16)	(19)			

第 1 組	第 2 組	第 3 組
3	2	5
5	3	1
7	5	7
9		

是否拒絕虛無假設 (23) (請填 "拒絕" 或 "不拒絕")

3. (迴歸分析；regression analysis)

以計算題第 2 題中的第 2 組為解釋變數 x ，第 3 組為被解釋變數 y，請以最小平方法估計簡單迴歸模型： y=截距+斜率*x+殘差

斜率估計值＝(24)、截距估計值＝(25)；

已知迴歸式的變異數估計值 $(\sigma\_hat)^2=14$，斜率估計值標準誤= (26)

截距估計值標準誤=(27)，被解釋變數 y 的總變異當中可以被本迴歸模型解釋的變異為 (28)，判定係數為 (29) ，調整後的判定係數為 (30)。