

國立臺北商業大學 104 學年度研究所碩士班考試入學試題

准考證號碼：□□□□□□ (請考生自行填寫)

國際商務系碩士班、財務金融系碩士班、商學研究所 筆試科目：統計學 共 4 頁，第 1 頁

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。
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A. 選擇題 Multiple Choice (60%，每題 4 分)

- 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.
- 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
- What type of variable is "projected return on an investment"?
A) Qualitative B) Continuous C) Attribute D) Discrete
- When data is collected using a quantitative, ratio variable, what is true about a frequency distribution that summarizes the data?
A) Upper and lower class limits must be calculated.
B) A pie chart can be used to summarize the data.
C) Number of classes is equal to the number of variable's values.
D) The "5 to the k rule" can be applied.
- The monthly salaries of a sample of 100 employees were rounded to the nearest ten dollars. They ranged from a low of \$1,040 to a high of \$1,720. If we want to condense the data into seven classes, what is the most convenient class interval?
A) \$ 50 B) \$100 C) \$150 D) \$200
- What is the relationship among the mean, median and mode in a symmetric distribution?
A) They are all equal
B) The mean is always the smallest value
C) The mean is always the largest value
D) The mode is the largest value

背面尚有試題

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7. Fifteen accounting majors had an average grade of 90 on a finance exam. Seven marketing majors averaged 85, while ten finance majors averaged 93 on the same exam. What is the weighted mean for the 32 students taking the exam?
- A) 89.84 B) 89.33 C) 89.48
D) Impossible to determine without more information
8. Mr. and Mrs. Jones live in a neighborhood where the mean family income is \$45,000 with a standard deviation of \$9,000. Mr. and Mrs. Smith live in a neighborhood where the mean is \$100,000 and the standard deviation is \$30,000. What is the relative dispersion of the family incomes in the two neighborhoods?
- A) Jones 40%, Smith 20% B) Jones 20%, Smith 30% C) Jones 30%, Smith 20%
D) Jones 50%, Smith 33%
9. Routine physical examinations are conducted annually as part of a health service program for the employees. It was discovered that 8% of the employees needed corrective shoes, 15% needed major dental work and 3% needed both corrective shoes and major dental work. What is the probability that an employee selected at random will need either corrective shoes or major dental work?
- A) 0.20 B) 0.25 C) 0.50 D) 1.00
10. A board of directors consists of eight men and four women. A four-member search committee is to be chosen at random to recommend a new company president. What is the probability that all four members of the search committee will be women?
- A) $1/120$ or 0.00083 B) $1/16$ or 0.0625 C) $1/8$ or 0.125 D) $1/495$ or 0.002
11. A tennis match requires that a player win three of five sets to win the match. If a player wins the first two sets, what is the probability that the player wins the match, assuming that each player is equally likely to win each match?
- A) 0.5 B) $1/8$ or 0.125 C) $7/8$ or 0.875 D) Cannot be computed.
12. For the normal distribution, the mean plus and minus 1.96 standard deviations will include about what percent of the observations?
- A) 50% B) 99.7% C) 95% D) 68%

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二、為探討廣告促銷效果,若隨機觀察 100 家廠商,如下面的資料:

銷售額 廣告費用	0-2 萬元	2-4 萬元	4-6 萬元	6-8 萬元	8-10 萬元	總共
低	12 家	15	9	4	0	40 家
高	3	5	21	16	15	60 家

請據上述資料在顯著水準 5% 之下,以變異數分析方法探討「廠商平均銷售額是否因為廣告費用類別的不同而彼此不相等」?10%。又採用此種分析方法有無任何限制?說明之。5%

[註:按原始資料分別計算高廣告費用(60 家)及低廣告費用(40 家)廠商銷售額之變異數都是 5]。

附表值: $F(0.95, 1, 98) = 3.95$, $F(0.95, 4, 95) = 2.46$ 。

三、設有二個獨立隨機變數 X 、 Y , 令 $W = X + Y$, 試依以下的條件, 求算 W 的期望值 $E(W)$, 變異數 $V(W)$ 及變量 $W = 1$ 時的機率 $P(W = 1)$ 。15% (每小題 5 分)

- (1) X 及 Y 分配皆為二項分配 [Binomial Distribution, $BD(n, p)$] 且 $X \sim BD(6, 0.2)$, $Y \sim BD(4, 0.2)$ 。
- (2) X 及 Y 分配皆為常態分配 [Normal Distribution, $ND(\mu, \sigma^2)$] 且 $X \sim ND(27, 16)$, $Y \sim ND(23, 9)$ 。
- (3) X 及 Y 分配皆為波氏分配 [[Poisson Distribution, $PD(\mu)$] 且 $X \sim PD(1.8)$, $Y \sim PD(1.2)$ 。

—本科試題結束—

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13. All possible samples of size n are selected from a population and the mean of each sample is determined. What is the mean of the sample means?
- A) Exactly the same as the population mean
 - B) Larger than the population mean
 - C) Smaller than the population mean
 - D) Cannot be estimated in advance
14. For a given confidence interval, what is the interpretation of a 96% confidence level?
- A) 96% chance that the given interval includes the true value of the population parameter
 - B) Approximately 96 out of 100 such intervals would include the true value of the population parameter
 - C) 4% chance that the given interval does not include the true value of the population parameter
 - D) Both "a" and "c" are true
15. If we reject the null hypothesis what can we conclude subject to the α risk?
- A) Null hypothesis is false
 - B) Alternative hypothesis is false
 - C) Null hypothesis is true
 - D) Both the null hypothesis and the alternative hypothesis are true

B. 計算題 (40%)

- 一、為提高工人生產力，A 公司擬對工人的作業流程作新的調整，為了解新作業流程是否有效的提高工人生產力，A 公司將 100 位工人平均分成二組，甲組採新作業流程，乙組用原作業流程進行試驗，結果發現，甲組工人的平均單位產出為 35，標準差為 5.3；乙組工人的平均單位產出為 32，標準差為 4.7，試列出虛無假設及對立假設，並檢定 $\alpha = 0.05$ 下，A 公司應否全面實施新作業流程 (工人產出為常態分配)。
附表值： $Z(0.975) = 1.96$ ， $Z(0.95) = 1.645$ ， $Z(0.9) = 1.28$ 。10%

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