

國立中央大學 105 學年度碩士班考試入學試題

所別： 產業經濟研究所 碩士班 產經組(一般生)

共 4 頁 第 1 頁

科目： 統計學

本科考試禁用計算器

\*請在答案卷(卡)內作答

Please list your answers according to the order of the questions. Otherwise, 10 points will be deducted from your total score. Also, calculator is not allowed to use.

A. Multiple Choice (40%, 5% each)

1. If events A and B are mutually exclusive and collectively exhaustive, what is the probability that event A occurs?

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

2. According to a survey of American households, the probability that the residents own 2 cars if annual household income is over \$50,000 is 80%. Of the households surveyed, 60% had incomes over \$50,000 and 70% had 2 cars. The probability that the residents of a household do not own 2 cars and have an income over \$50,000 a year is

- A) 0.12.
- B) 0.18.
- C) 0.22.
- D) 0.48.

3. A multiple-choice test has 30 questions. There are 4 choices for each question. A student who has not studied for the test decides to answer all questions randomly. What type of probability distribution can be used to figure out his chance of getting at least 20 questions right?

- A) Binomial distribution
- B) Poisson distribution
- C) Hypergeometric distribution
- D) None of the above.

注意：背面有試題

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4. A lab orders 100 rats a week for each of the 52 weeks in the year for experiments that the lab conducts. Prices for 100 rats follow the following distribution:

Price: \$10.00 \$12.50 \$15.00

Probability: 0.35 0.40 0.25

How much should the lab budget for next year's rat orders be, assuming this

distribution does not change?

- A) \$520  
B) \$637  
C) \$650  
D) \$780
5. If we know that the length of time it takes a college student to find a parking spot in the library parking lot follows a normal distribution with a mean of 3.5 minutes and a standard deviation of 1 minute, 75.8% of the college students will take more than how many minutes when trying to find a parking spot in the library parking lot?
- A) 2.8 minutes  
B) 3.2 minutes  
C) 3.4 minutes  
D) 4.2 minutes
6. If the expected value of a sample statistic is equal to the parameter it is estimating, then we call that sample statistic
- A) unbiased.  
B) minimum variance.  
C) biased.  
D) random.

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7. It is desired to estimate the mean total compensation of CEOs in the Service industry. Data were randomly collected from 18 CEOs and the 95% confidence interval was calculated to be (\$2,181,260, \$5,836,180). Based on the interval above, do you believe the mean total compensation of CEOs in the Service industry is more than \$3,000,000?
- A) Yes, and I am 95% confident of it.  
B) Yes, and I am 78% confident of it.  
C) I am 95% confident that the mean compensation is \$3,000,000.  
D) I cannot conclude that the mean exceeds \$3,000,000 at the 95% confidence level.
8. A manager of the credit department for an oil company would like to determine whether the mean monthly balance of credit card holders is equal to \$75. An auditor selects a random sample of 100 accounts and finds that the mean owed is \$83.40 with a sample standard deviation of \$23.65. If you wanted to test whether the mean balance is different from \$75 and decided to reject the null hypothesis, what conclusion could you reach?
- A) There is not evidence that the mean balance is \$75.  
B) There is not evidence that the mean balance is not \$75.  
C) There is evidence that the mean balance is \$75.  
D) There is evidence that the mean balance is not \$75.

B. Problem (60%, 10% each)

1. A sample of 300 adults is selected. The contingency table below shows their registration status and their preferred source of information on current events.

		Preferred source of information			
		Television	Newspapers	Radio	Internet
Voting registration status	Registered	45	30	45	36
	Not registered	35	44	45	20

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- a) Referring to Table \_\_\_\_\_, if an adult is selected at random, what is the probability that he/she is a registered voter who does not prefer to get his/her current information from the Internet?
- b) Referring to Table \_\_\_\_\_, if an adult is selected at random, what is the probability that he/she is a not a registered voter or does not prefer to get his/her current information from the Internet?
- c) Referring to Table \_\_\_\_\_, is the preferred source of current information independent of the voting registration status?
2. As part of an evaluation program, a sporting goods retailer wanted to compare the downhill coasting speeds of 4 brands of bicycles. She took 3 of each brand and determined their maximum downhill speeds. The results are presented in miles per hour in the table below.

<u>Trial</u>	<u>Barth</u>	<u>Tornado</u>	<u>Reiser</u>	<u>Shaw</u>
1	43	37	41	43
2	46	38	45	45
3	43	39	42	46

- a) Referring to Table \_\_\_\_\_, in testing the null hypothesis that the mean downhill coasting speeds of the 4 brands of bicycles are equal, the value of the test statistic is \_\_\_\_\_.
- b) Referring to Table \_\_\_\_\_, the sporting goods retailer decided to perform an ANOVA  $F$  test. The amount of total variation or  $SST$  is \_\_\_\_\_.
- c) Referring to Table \_\_\_\_\_, using an overall level of significance of 0.05, the critical range for the Tukey-Kramer procedure is \_\_\_\_\_.

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