

大葉大學九十學年度研究所碩士班招生考試試題紙

系 所 組 別	考 試 科 目 (中 文 名 稱)	考 試 日 期	備 註
資管所甲、乙組	統計學	4 月 22 日 第 3 節	不准攜帶計算機

Multiple choice questions (36%)

(page 2-1)

- Which of the following statements about a discrete random variable and its probability distribution are true? (1) Values of the random variable can never be negative (2) Some negative values of $f(x)$ are allowed as long as $\sum f(x)=1$ (3) Values of $f(x)$ must be greater than or equal to zero (4) The values of $f(x)$ increase to a maximum point and then decrease (5) None of the above answers is correct.
- The probability of rejecting a false null hypothesis is equal to (1) α (2) β (3) $1-\alpha$ (4) $1-\beta$ (5) 0.05
- In a regression analysis if $SSR=2925$ and $SSE=1575$, then the coefficient of determination is (1) 0.65 (2) 0.35 (3) 1.86 (4) 0.54 (5) 0.59
- If a hypothesis is not rejected at the 5% level of significance, it (1) will always be rejected at the 1% level (2) will also not be rejected at the 1% level (3) will never be tested at the 1% level (4) may be rejected or not rejected at the 1% level (5) None of the above answers is correct.
- In order not to violate the requirements necessary to use the chi-square distribution, each expected frequency in a goodness of fit test must be (1) at least 30 (2) at least 20 (3) at least 10 (4) at least 5 (5) at least 1.
- The level of significance can (1) be any positive value (2) be any value (3) be any value larger than 0.1 (4) be any value between -1.96 to 1.96 (5) none of the above answers is correct.
- In order to determine whether or not there is a significant difference among the hourly wages of three companies, the test statistic used is (1) χ^2 (2) F (3) Z (4) r (5) t.
- If we are interested in testing the mean of population 1 is smaller than the mean of population 2, the null hypothesis is stated as:
(1) $\mu_1 - \mu_2 = 0$ (2) $\mu_1 - \mu_2 < 0$ (3) $\mu_1 - \mu_2 > 0$ (4) $\mu_1 - \mu_2 \geq 0$ (5) $\mu_1 - \mu_2 \leq 0$
- The sampling distribution for a goodness of fit test is (1) the Poisson distribution (2) the t distribution (3) the chi-square distribution (4) the normal distribution (5) none of the above answers is correct.
- If the confidence coefficient is reduced from 0.95 to 0.80, the standard error of the mean (1) remains unchanged (2) will decrease (3) will increase (4) becomes negative (5) none of the above answers is correct.
- Changing from using the normal distribution to using the t distribution in a hypothesis test, (1) will result in the rejection region being smaller (2) will result in the rejection region being larger (3) would have no effect on the rejection region (4) not enough information is given to answer this question (5) none of the above answers is correct.
- A standard normal distribution is a normal distribution (1) with a mean of 1 and a standard deviation of 0 (2) with any mean and any standard deviation (3) with a mean of 0 and a standard deviation of 1 (4) with a mean of 0 and any standard deviation (5) none of the above answers is correct.

Fill in the blanks (18%)

(page 2-2)

1. If A and B are mutually exclusive events with $P(A) = 0.4$ and $P(B) = 0.3$, then $P(A \cup B) = \underline{\hspace{2cm}}$
2. If A and B are independent events with $P(A) = 0.05$ and $P(B) = 0.65$, then $P(A | B) = \underline{\hspace{2cm}}$
3. If $P(A) = 0.62$ and $P(B) = 0.47$, and $P(A \cup B) = 0.88$, then $P(A \cap B) = \underline{\hspace{2cm}}$.
4. In a standard normal distribution, the range of z value is $\underline{\hspace{2cm}}$ to $\underline{\hspace{2cm}}$.
5. The degrees of freedom for a contingency table with 12 rows and 12 columns is $\underline{\hspace{2cm}}$.

Computational Questions (46%)

1. The student body of a large university consists of 60% female students. A random sample of 8 students is selected. What is the probability that among the students in the sample exactly two are female? (5%)
2. Shoppers enter a department store at an average of 120 per hour. What is the probability that at least 1 shoppers will enter the store within every one minute? (5%)
3. The starting salaries of individuals with a master degree are normally distributed with a mean of 40,000 dollars and a standard deviation of 5,000 dollars. What is the probability that a randomly selected individual with a master degree will get a starting salary of 35000 dollars to 50000 dollars? (5%)
4. Regression analysis was applied between sales data (in \$1,000s) and advertising data (in \$100s) and the following information was obtained. Sales data is denoted by Y. Advertising data is denoted by X.

$$\textcircled{1} Y=12+1.8X \quad \textcircled{2} n=17 \quad \textcircled{3} SSR=225 \quad \textcircled{4} SSE=75 \quad \textcircled{5} S_{b1}=0.30$$

Based on the above estimated regression equation,

- (1) If advertising is \$3,000, then the point estimate for sales (in dollars) is $\underline{\hspace{2cm}}$. (6%)
- (2) The F statistic computed from the above data is $\underline{\hspace{2cm}}$. (5%)
- (3) The t statistic for testing the significance of the slope is $\underline{\hspace{2cm}}$. (5%)
5. Consider the following results for two independent random samples taken from two populations.

	Sample I	Sample II
Sample Size	35	34
Sample Mean	43	37
Sample Variance	140	170

Answer the following questions:

- (1) What is the standard error of the difference between the two means? (5%)
- (2) Develop a 95% confidence interval for the difference between the means of the two populations. (5%)
- (3) At 95% confidence, test to determine whether or not there is a significant difference between the means of the two samples. (5%)