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淡江大學98學年度碩士班招生考試試題

系別：保險系、國貿系
產經系、經濟系

科目：統　計　學

准帶項目請打「V」	
	簡單型計算機

本試題共 1 頁，4 大題

1. A fair coin is tossed four times,
   (1) List the space of all possible outcomes, S; (5 points)
   (2) List and calculate the probability of the event, A, that a head occurs on each of the first two tosses; (10 points)
   (3) List and calculate the probability of the event, B, that a tail occurs on the third toss; (10 points)
   (4) Ar e events A and B independent or dependent? Show your work..(5 points)

2. The Cheb yshev's Inequality states that: If μ and σ are the mean and standard deviation of a random variable X, then for any positive constant k, the probability is at least $1-\frac{1}{k^2}$ that X will take on a value within k standard deviations of the mean.
   (1) W rite the inequality symbolically. (10 points)
   (2) The r andom variable $\overline{X}$ has mean μ and standard deviation $\sigma/\sqrt{n}$. Suppose it has been claimed that the average height of students in a college is 171 cm with known variance 9. Suppose a sample of 100 students are drawn randomly, their heights been measured and the mean is calculated to be 175 cm with standard deviation 1.5 cm.
      (i) Apply the Chebyshev's inequality to approximate a 90% confidence interval within which the true average height of the students in this college lies. (5 points)
      (ii) Do you accept the claim that the average height is 171cm, or not? Show your work (5 points).
      (iii) Write your conclusion formally in words. (5 point)

3. Suppose you are interested in finding whether the male workers and female workers in a city are earning equally.
   (1) State the process that you would follow to find the answer. (5 points)
   (2) After collecting sample data, how would you proceed to calculate the test statistics? Write the formulas for all possible situations. (10 points)
   (3) Specify the null hypothesis of the test. (5 points)
   (4) How would you make decisions? (5 points)

4. Describe the following two methods of point estimation:
   (1) Th e method of moment. (10 points)
   (2) The method of m aximum likelihood. (10 points)