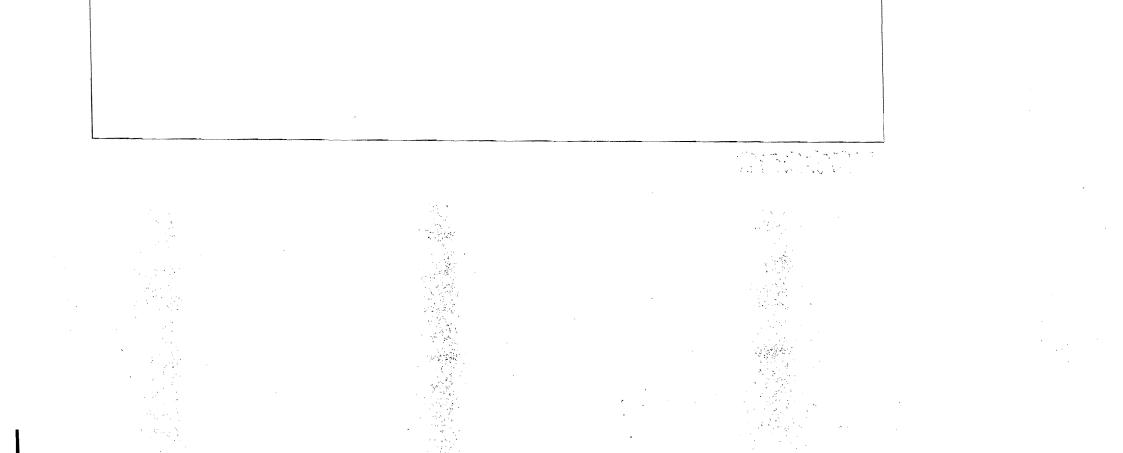
淡江大學107學年度日間部寒假轉學生招生考試試題 數學系資統組三年級 科目:機率與統計學 枀 别: 考試日期:1月13日(星期日) 第1節 本試題共 6 大題, 2 頁 1. Let A, B, C be three events, P(A) = 0.5, P(B|A) = 0.2, $P(A^c|B^c) = 0.2$. (1) find $P(A \cap B) = ?$ (5%) (2) find P(B) =? (5%) 2. Let f(x, y) = c(x + 2y), (x, y) = (1,1), (1,2), (2,1), (2,2) be the joint pmf of two random variables X and Y of the discrete type. Find (1) c = ? (5%)(2) covariance of X and Y. (5%)(3) E(Y|X = 2) (5%) 3. Let $f(x; \theta) = (1/\theta)x^{(1-\theta)/\theta}$, 0 < x < 1, $0 < \theta < \infty$. Let X_1, X_2, \dots, X_n denote a random sample of size n from this distribution. (1) Find the maximum likelihood estimator of θ . (5%) (2) Let $Y = -\ln X_1$, find the pdf of Y. (5%) (3) Find the variance of the maximum likelihood estimator of θ . (10%) 3.Let $X_1, X_2, ..., X_n$ be random sample from uniform distribution on the interval $(\theta - 1, \theta + 1)$. (1) Find $E(X_1)$ and $E(X_1^2)$ (5%) (2) Find the method of moments estimator for θ (5%) 4. Let X equal the tarsus length for a male grackle. Assume that the distribution of X is $N(\mu, 2.2^2)$. Find the sample size n that is needed so that we are 95% confident that the maximum error of the estimate of μ is 0.4. (10%) 5. Assume that SAT mathematics scores of students who attend small liberal arts colleges are $N(\mu, 90^2)$. We shall test $H_0: \mu = 530$ against the alternative hypothesis $H_1: \mu < 530$. Given a random sample of size n=36 SAT mathematics scores, let the critical region be defined by $C = \{\bar{x} | \bar{x} \le 510.77\}$, where \bar{x} is the observed mean of the sample. (a) How is the power function, $K(\mu)$, defined for this test? (5%) (b)What is the significance level of this test? (5%) (c)Sketch the graph of the power function. (5%) (d)What is the p_value corresponding to $\bar{x} = 83.41(5\%)$

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淡江大學 107 學年度日間部寒假轉學生招生考試試題 數學系資統組三年級 科目:機率與統計學 / 〇 - 之 系 别: 本試題共 6 大題, 2 頁 考試日期:1月13日(星期日) 第1節 6. Let X,Y denote the tarsus lengths of male and female grackles, respectively. Assume that X is $N(\mu_x, \sigma_x^2)$ and Y is $N(\mu_y, \sigma_y^2)$. Given that n=25, $\bar{x} = 33.8$, $s_x^2 = 4.88$, m=29, $\bar{y} = 31.66$, and $s_{\gamma}^2 = 5.81$, test (a) $H_0: \frac{\sigma_x^2}{\sigma_x^2} = 1$ against a two side alternative with $\alpha = 0.02$. (7%) (b) $H_0: \mu_x = \mu_y$ against $H_1: \mu_x > \mu_y$ with $\alpha = 0.01$. (8%) Note: Suppose $Z \sim N(0,1)$ and $F_{r_1,r_2} \sim F$ distribution with r_1 and r_2 degrees of freedom. then P($|Z| \le 1.96$)=0.95, P($|Z| \le 1.645$)=0.90, P($Z \le 2.326$)=0.99 $P(F_{28,24} \le 0.4)=0.01$, and $P(F_{28,24} \ge 2.6)=0.01$

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