淡江大學八十九學年度日間部轉學生招生考試試題

33

系別：數學系數理統計組三年級　　科目：機率與統計學

本試題共 1 頁

一、(10%) Let the experiment consist of two independent throws of a die, where we let X and Y be the result on the first and second throws respectively. We want to find the distribution of $Z = \max(X, Y)$. Find the distribution of Z ?

二、(20%) A meteorologist (氣象家) at a TV station kept the record of all maximal daily temperatures during a year. Suppose that the data, say $t_1, t_2, \cdots, t_{365}$, are such that $\sum t_i = 20075$, and $\sum t_i^2 = 1113250$. What is the minimal possible number of days in the year when the temperature was strictly between 46 and 64 degrees Fahrenheit (華氏) ?

三、(20%) Assume that the population has the N elements, of which a are of one kind, say successes, and $b = N - a$ are of another kind, say failures. We sample n elements, without replacement and let X denote the number of successes in the sample. Find (i) the p.d.f. of X (5%), (ii) EX (5%), (iii) Var X (10%).

四、(25%) Let $X_1, X_2, \cdots, X_n$ be a random sample distributed as geometric distribution with parameter θ, i.e. $f(x;\theta) = \theta(1-\theta)^{x-1}$, $x = 1, 2, \cdots$. Find a uniformly minimum variance unbiased estimator of $EX = \frac{1}{\theta}$.

五、(25%) Suppose that $X_1, X_2, \cdots, X_n$ be a random sample distributed as $N(\theta, 1)$. We want to test $H_0 : \theta = \theta_0$ against $H_1 : \theta \neq \theta_0$ at level α. Find this test statistic and its critical region.