大葉大學九十學年度轉學招生考試試題紙

系別	日(第二部)	年級	考試科目	考試日期	節次	備註
企業管理學系 工業關係學系 休閒事業管理學系		三	統計學	七月二十四日		可使用不可程式計算機 第1頁（試題共3頁）

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律准攜帶）

1. Let $\bar{x}$ denote the mean of a random sample of size 25 from the distribution whose probability density function is $f(x)=\frac{x^3}{4}, 0<x<2$ **(20%)**

(a). show that $\mu=\frac{8}{5}$ and $\sigma^2=\frac{8}{75}$

(b). find $P(1.5\le\bar{x}\le 1.65)$

2.A marketing report states that the annual per capita expenditures on cereal following a normal distribution with $\mu=\$60$ and standard deviation $\sigma=\$15$. Suppose we want to test the $H_0:\mu=60$ against $H_A:\mu\neq 60$, using a 5% level of significance and a random sample of $n=100$ customers. Find the power of the test if the true value of the mean is $\mu=58$. **(20%)**

3.An experiment was conducted in a completely randomized design from. A sample of 16 observations was obtained from each of 5 populations. Some of the relevant data are show in the following table.

Source	df	ss	ms	F
Factor	------	------	97.3	------
Error	------	149.1	------	
Total	------	------		

Perform the F test using $\alpha=0.05$ **(20%)**

4.An educational economist wants to establish the relationship between an individual's income and education. She takes a random sample of 10 individuals and asks for their income(in $1000) and education (in years). The results are shown below **(20%)**

$\sum x_i=118$ $\sum x_i^2=1{,}450$ $\sum y_i=302$ $\sum y_i^2=10{,}072$ $\sum x_i y_i=3{,}779$

(a).Find the least squares regression line

(b).Find coefficient of determination

5.Suppose we have the following normal equations: **(20%)**

$10b_0+800b_1+29b_2=67$

$800b_0+67{,}450b_1+2{,}345b_2=5{,}594$

$29b_0+2{,}345b_1+91b_2=202.2$

Further we define $S_{pp}=\begin{bmatrix}\sum x_{1i}^2 & \sum x_{1i}x_{2i}\\ \sum x_{2i}x_{1i} & \sum x_{2i}^2\end{bmatrix}$, $b=\begin{bmatrix}b_1\\ b_2\end{bmatrix}$ and $S_{pc}=\begin{bmatrix}\sum x_{1i}y_i\\ \sum x_{2i}y_i\end{bmatrix}$

Use the relationship $b=S_{pp}^{-1}S_{pc}$ find the estimated regression equation: $\hat{y}_i=b_0+b_1x_{1i}+b_2x_{2i}$