

國立嘉義大學99學年度

生物事業管理學系碩士班招生考試試題

科目：統計學

※ 僅可使用試務單位提供之計算機

1. Please answer the following questions in details. Any answer with no explanation or calculation procedure will yield 0 point. (5% for each question)

(1) Please estimate $\sum_{i=1}^n (x_i - \mu) = ?$

(2) What are different between coefficient of variation and variance?

(3) If $f(x)$ is a probability density function (p.d.f) and $f(0)=0.9$, $f(1)=0.08$, $f(2)=0.02$. Please compute population variance and median.

(4) What's the meaning of central limit theorem?

(5) What is the unbiased estimator?

2. Given a sample linear regression model to be $Y_i = \beta + X_i + \varepsilon_i$, where $i=1,2,\dots,n$,

(1) Please estimate the parameter β through least square method. (15%)

(2) Estimate the above simple regression using the data. (10%)

x	4	-2	3	0	1
y	5	0	3	0	2

3. A random sample of 250 households in a large city revealed that the mean number of televisions per household was 2.76. From previous analyses we know that the population standard deviation is 1.8.

(1) State the appropriate hypotheses if we wish to determine that the true mean number of televisions per household is at least 2.5. Calculate the p-value. Based on the p-value, can we conclude the true mean number of televisions per household is at least 2.5 at the 5% significance level? (5%)

(2) Will you change your answer in (1) if you discover that the numbers of televisions per household in the large city are not normally distributed? Explain your answer. (5%)

(3) Compute the probability of a Type II error if the true mean number of televisions per household is 3, and the power of the test. (10%)

(4) Interpret the meaning of the power for this example. (5%)

4. 嘉大花卉公司有兩位業務員，工作內容為爭取各大公司的植栽維護。花卉公司的老闆在分析幾個月的成交案件資料後，獲得業務員王先生和李先生每月成交資料的聯合機率分配如下，其中隨機變數X與Y分別代表王先生和李先生的每月成交件數。

Y \ X	0	1	2
0	0.08	0.14	0.12
1	0.09	0.17	0.13
2	0.05	0.18	0.04

(1) 王先生和李先生每月各至少成交一件(含一件)案件的機率為何? (5%)

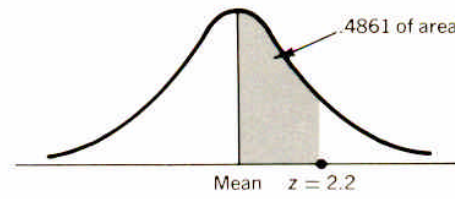
(2) 求王先生每月成交案件的期望值? (5%)

(3) 王先生和李先生每月成交件數相互獨立嗎? 請解釋理由。(5%)

(4) 花卉公司只有王先生和李先生兩位業務員，因此這兩位的成交件數總和即是花卉公司的成交件數。求花卉公司每月成交件數的機率分配。(10%)

STANDARD NORMAL PROBABILITY DISTRIBUTION

Areas under the Standard Normal Probability Distribution
between the Mean and Successive Value of z.*



EXAMPLE: To find the area under the curve between the mean and a point 2.2 standard deviations to the right of the mean, look up the value opposite 2.2 in the table; .4861 of the area under the curve lies between the mean and a z value of 2.2.

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990

*From Robert D. Mason, *Essentials of Statistics*, Prentice-Hall, Inc., 1976.