

國立勤益技術學院九十五學年度研究所一般招生筆試試題卷

所別：流通科技管理研究所

組別：

科目：統計學

准考證號碼：□□□□□□□□ (考生自填)

考生注意事項：

一、考試時間 100 分鐘。

二、

三、

試題一：〈10 分〉

某個針對低脂乳酪所做的營養成分研究指出，平均一片一盎司的乳酪包含 3.50 公克的脂肪，標準差為 0.04 公克。

- (1) 根據柴必雪夫(Chebyshev) 定理，至少有多少比例以上的產品，其一盎司的脂肪含量介於 3.38 公克與 3.62 公克之間？(5%)
- (2) 根據柴必雪夫(Chebyshev) 定理，93.75%以上的這種乳酪，其一盎司的脂肪含量的範圍應該是多少？(5%)

試題二：〈10 分〉

設隨機變數 X 的機率分配如下表：

x	0	1	2	3	4	5
$f(x)$	a	$2a$	$4a$	a^2	$2a^2$	$6a^2+a$

試求(1) $P(X>2)$

(2) 求滿足 $P(X\leq k)>2/3$ 時之最小 k 值

試題三：〈10 分〉

某籃球選手平常投籃時平均每投十次可投進八次，試求該選手在某趣味投籃中至少投中一次的機率大於 0.999 時，他至少須投籃幾次？

試題四：〈20 分〉

A sample of 250 students majoring in business and a sample of 500 executive were asked to respond to the question. Should corporations become more directly involved with social issues such as homelessness, education, and drug?

	More Involved	Not More Involved	Not Sure
Executives	345	135	20
Business students	222	20	8

- (1) Conduct a χ^2 test of your null hypothesis. Use $\alpha = 0.05$. And comment on the form of any departure from the null hypothesis. (10%)
- (2) Let p_1 be the proportion of executives who would answer "More involved," and let p_2 be the same probability for students. Test $H_0 : p_1 = p_2$ versus $H_1 : p_1 < p_2$. Use $\alpha = 0.05$. And obtain a 95% confidence interval for the difference in proportion. (10%)

$$Z_{0.01} = 2.33 \quad Z_{0.005} = 2.58 \quad Z_{0.05} = 1.645 \quad Z_{0.025} = 1.96$$

$$\chi_{1,0.05}^2 = 3.84, \quad \chi_{2,0.05}^2 = 5.99, \quad \chi_{3,0.05}^2 = 7.81$$

試題五：〈30分〉

An experiment is conducted to determine how the strength y of plastic fiber depends on the size x of the droplets of a mixing polymer in suspension. Data of (x, y) values, obtained from 15 runs of the experiment, have yielded the following summary statistics.

$$\bar{x} = 8.3, \quad \bar{y} = 54.8, \quad S_{xx} = 5.6, \quad S_{xy} = -12.4, \quad S_{yy} = 38.7.$$

- (1) Obtain the equation of the least squares regression line. (10%)
- (2) Test the significance of β (slope) : the null hypothesis $H_0 : \beta \geq -2$ versus

$$H_1 : \beta < -2, \text{ with } \alpha = 0.05 \text{ (10\%)}$$

- (3) Estimate the expected fiber strength for droplet size $x = 10$ and set a 95% confidence interval. (10%)

$$t_{12,0.05} = 1.782, \quad t_{13,0.05} = 1.771, \quad t_{14,0.05} = 1.761, \quad t_{15,0.05} = 1.753,$$

$$t_{12,0.025} = 2.179, \quad t_{13,0.025} = 2.160, \quad t_{14,0.025} = 2.145, \quad t_{15,0.025} = 2.131,$$

$$\chi_{1,0.05}^2 = 3.84, \quad \chi_{2,0.05}^2 = 5.99, \quad \chi_{3,0.05}^2 = 7.81$$

$$F_{3,28,0.05} = 2.95, \quad F_{4,28,0.05} = 2.71, \quad F_{3,31,0.05} = 2.91, \quad F_{4,31,0.05} = 2.68$$

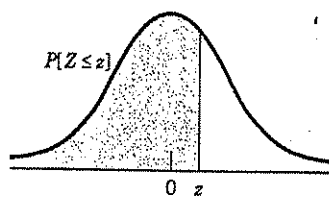
試題六：〈20 分〉

臺灣在 2002 年加入 WTO 之後，可預期對農業與現有的農民生活，產生重大衝擊。農試所為協助農民而研究開發三種水果品種進行試驗，每種水果品種有四塊試驗田，共 12 塊，此 12 塊農田安排在四個區集內，測得各塊試驗田的水果產量分別如下表所示，試問在水果品種間，水果產量有無顯著之差異？($\alpha=0.05$)

水果品種	區 集			
	A	B	C	D
甲	12 (公噸)	10	9	14
乙	15	12	9	15
丙	11	8	10	12

參考資料

$\log 2=0.3010$	$T_{0.025}(9)=2.262$	$\chi^2_{0.05}(2)=5.99$	$\chi^2_{0.95}(2)=0.103$	$F_{0.05}(9, 2)=19.38$
$\log 3=0.473$	$T_{0.025}(10)=2.228$	$\chi^2_{0.05}(3)=7.815$	$F_{0.05}(2, 9)=4.26$	$F_{0.025}(9, 2)=39.39$
$T_{0.05}(10)=1.812$	$T_{0.05}(9)=1.833$	$\chi^2_{0.95}(3)=0.352$	$F_{0.025}(2, 9)=5.71$	$F_{0.05}(9, 3)=14.47$



z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
.7	.7580	.7611	.7642	.7673	.7703	.7734	.7764	.7794	.7823	.7852
.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998
3.5	.9998	.9998	.9998	.9998	.9998	.9998	.9998	.9998	.9998	.9998