

銘傳大學 100 學年度研究所碩士班招生考試

企業管理學系碩士班(乙組)

第三節

統計學(乙)試題

(第 1 頁共 3 頁) (限用答案本作答)

可使用計算機 不可使用計算機

計算時，保留四個小數位；最後答案至少應有兩個小數位。

1. 假設某一十字路口每天發生交通事故件數(X)的機率分配如下所示： 20%

X=x	0	1	2	3	4
P(X=x)	0.3	0.2	0.1	0.1	k

- a) 上述機率分配的 k 值為何？
b) 計算 $P(X > 1)$ 。
c) 計算 $P(X \leq \pi)$ 。
d) 計算每天發生交通事故件數的期望次數。
2. 一項投資理財研究指出，某一大都會地區之居民 85% 投資股票，80% 購買基金，而兩種皆有的居民占 60%。 15%
- a) 在投資股票居民中，購買基金的比率有多少？
b) 該地區居民只有投資股票的比率有多少？
c) 皆無上述理財居民比率有多少？
3. 當使用樣本數 100 來估計平均數時，若欲降低標準誤為 1/3 時，樣本數應為多少？ 5%
4. 以 $n=50$ 和 $\sigma=200$ ，使用 $\alpha=0.05$ 檢定 $H_0: \mu \leq 2400$ 和 $H_a: \mu > 2400$ 時， 15%
- a) 若一組樣本平均數等於 2460 時，有無證據顯示母體平均數超過 2400？
b) 若 $H_a: \mu = 2475$ 時，計算檢定力。

5. A total of 200 travel professionals participated in a salary and attitude survey. The table below gives the results of one of the question. The responses were classified by gender and salary. 15%

	Males	Females
Salary to low	42	18
Equitable/fair	55	45
Paid well	19	21

本試題兩面印刷

- a) Use the χ^2 -test with $\alpha=0.05$ to test whether salary and gender are independent.
b) Find the p-value in a).
6. A specific type of ancient china sold at auction showed that the price (US\$) received for the china depends on both the age (Age) of the china and the number of bidders (Bidders) at the auction. A sample of 15 auction cases was examined and a linear regression analysis including an interaction term of the age and the number of bidders (Age-Bid) was investigated. The computer outputs of the full model with the interaction term and a reduced model were displayed below.

Full Model

Source	DF	SS	MS	F	P Value
Regression	3	1440646	480215.3	72.53547	1.56391E-07
Residual	11	72824.62	6620.42		

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(第 2 頁共 3 頁)(限用答案本作答)

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Variable	Coefficient	Std Error	t-Ratio	P Value	Lower 95% CI	Upper 95% CI
Constant	223.4986	355.7231	0.628294	0.542636	-559.4425965	1006.439886
Age	1.7544	2.701811	0.649333	0.529448	-4.192271325	7.701018511
Bidders	-87.6904	43.71781	-2.00583	0.0701	-183.912672	8.53181748
Age-Bids	1.2259	0.350355	3.498909	0.00498	0.454734686	1.996989076

Reduced Model

Source	DF	SS	MS	F	P Value
Regression	1	940624.2	940624.2	21.34624	0.000479764
Residual	13	572846.2	44065.09		

Variable	Coefficient	Std Error	t-Ratio	P Value	Lower 95% CI	Upper 95% CI
Constant	11.40164	261.5958	0.043585	0.965898	-553.7417936	576.5450802
Age	8.2995	1.796345	4.620199	0.00048	4.418705507	12.18024194

Answer the following questions based on the results from the outputs. (Keep 2 decimal-digits in your final answer.) 30%

- Write down the estimated full regression model.
- What is the R^2 of the full model?
- What is the estimated mean square error (MSE)?
- Write down the 95% confidence interval for the effect of the number of bidders.
- Use the full and reduced models to test the hypothesis that at least one of the numbers bidders or the interaction of the age and the number of bidders has effects on the mean price of the china. Use $\alpha=0.05$.

$$\chi^2_{.05}(1)=3.8415; \chi^2_{.05}(2)=5.9915; \chi^2_{.025}(1)=5.0239; \chi^2_{.025}(2)=7.3778;$$

$$\chi^2_{.01}(1)=6.6349; \chi^2_{.01}(2)=9.2103; \chi^2_{.005}(1)=7.8794; \chi^2_{.005}(2)=10.5966.$$

$$F_{.025}(2,11)=5.2559; F_{.025}(2,13)=4.9653; F_{.05}(2,11)=3.9823; F_{.05}(2,13)=3.8056;$$

本試題兩面印刷

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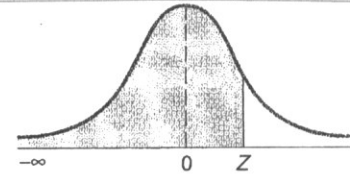
統計學(乙)試題

(第 3 頁共 3 頁) (限用答案本作答)

可使用計算機 不可使用計算機

The Cumulative Standardized Normal Distribution (Continued)

Entry represents area under the cumulative standardized normal distribution from $-\infty$ to Z



Cumulative Probabilities										
Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7518	0.7549
0.7	0.7580	0.7612	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.99865	0.99869	0.99874	0.99878	0.99882	0.99886	0.99889	0.99893	0.99897	0.99900
3.1	0.99903	0.99906	0.99910	0.99913	0.99916	0.99918	0.99921	0.99924	0.99926	0.99929
3.2	0.99931	0.99934	0.99936	0.99938	0.99940	0.99942	0.99944	0.99946	0.99948	0.99950
3.3	0.99952	0.99953	0.99955	0.99957	0.99958	0.99960	0.99961	0.99962	0.99964	0.99965
3.4	0.99966	0.99968	0.99969	0.99970	0.99971	0.99972	0.99973	0.99974	0.99975	0.99976
3.5	0.99977	0.99978	0.99978	0.99979	0.99980	0.99981	0.99981	0.99982	0.99983	0.99983
3.6	0.99984	0.99985	0.99985	0.99986	0.99986	0.99987	0.99987	0.99988	0.99988	0.99989
3.7	0.99989	0.99990	0.99990	0.99990	0.99991	0.99991	0.99992	0.99992	0.99992	0.99992
3.8	0.99993	0.99993	0.99993	0.99994	0.99994	0.99994	0.99994	0.99995	0.99995	0.99995
3.9	0.99995	0.99995	0.99996	0.99996	0.99996	0.99996	0.99996	0.99996	0.99997	0.99997

試題完