

東吳大學 105 學年度碩士班研究生招生考試試題

第 1 頁，共 3 頁

系級	國際經營與貿易學系碩士班	考試時間	100 分鐘
科目	統計學	本科總分	100 分

1. 假設母體是一個 $N=5$ 的公司超級營業員，其營業額分別為 1、2、3、4 與 5 億元。如果要從這個母體中隨機抽出兩個營業員計算其營業額的樣本平均數，而且是抽出放回的話，請計算出樣本平均數的抽樣分配，以及這個抽樣分配的平均數與變異數。(10%)
2. 解釋下面名詞且/或圖示：(20%)
 - (1) 型 I 錯誤(type I error)
 - (2) 信賴區間(confidence interval)
 - (3) 統計量(statistic)
 - (4) 次序量尺(ordinal scale)
 - (5) 迴歸分析(regression analysis)
3. 假設 X 與 Y 都是連續變項，以 Y 為依變項的散佈圖中，說明迴歸係數與相關係數的異同有哪些?(10%)
4. 根據附錄 B.1 表格，請計算 (10%)
 - (1) $X \sim N(100 = \mu, 16 = \sigma^2)$, $P(96 < X < 108) = ?$
 - (2) $X \sim N(100, 16)$, $P(y < X < 104) = 0.50$ ，求 y ?

5. Given the below data. (30%)

X=gender, 0=girl and 1=boy	Y=statistics score
0	80
1	50
0	70
1	60
0	90
0	80
1	40
1	50
0	70
1	50

Estimate the regression equation: $\hat{Y} = a + bX$.

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第 2 頁，共 3 頁

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- (1) Complete the ANONA Summary Table.
- (2) Calculate the adjusted coefficient of determination.
- (3) Complete a scatter plot and label a and b on it.
- (4) Please tell us the meanings of a and b.

Do a two-independent t test and answer the relationships with (1) and (4).

6. Suppose Best Buy would like to know if the age of a customer affects the brand of digital camera he or she purchases. This information would be used to help design a new promotional campaign. The data show the frequency with which 150 people, categorized by their age groups, purchased various camera brands. (10%)

Age groups	Camera brand			Total
	Canon	Nikon	Sony	
18 to 34	30	16	8	54
35 to 51	22	25	19	66
52 and older	8	9	13	30
Total	60	50	40	150

Please calculate the chi-square test whether the age of a customer affects the brand of digital camera he or she purchases (Don't test, but write down the null and alternative hypotheses).

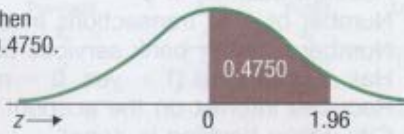
7. Please state the assumptions for regression analysis and explain the multicollinearity problem. (10%)

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B.1 Areas under the Normal Curve

Example:
If $z = 1.96$, then
 $P(0 \text{ to } z) = 0.4750$.



z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990