

# 國立臺北大學 104 學年度碩士班一般入學考試試題

系(所)組別：國際企業研究所

科目：統計學

第 1 頁 共 5 頁

可 不可 使用計算機

## 一·填充題

1. A portfolio consists assets A and B. The standard deviation of asset return for A and B is 100 and 150, respectively. Assume that the standard deviation of portfolio return is 220. The correlation of asset return A and B is \_\_\_\_\_. (10%)
2. Suppose the default probability of company ABC for year 1, 2, and 3 is 3%, 4%, and 5%, respectively. The cumulative default probability of company ABC after 3 years is \_\_\_\_\_. (10%)
3. Suppose that each of two investments for a portfolio has a 4% chance of a loss of \$10 million, a 2% chance of a loss of \$1 million, and 94% chance of a gain of \$1 million. They are independent of each other. The one percentile investment return of this portfolio is \_\_\_\_\_. (10%)
4. A state highway patrol periodically samples vehicle speeds at various locations on a particular highway system into order to test vehicle speeds  $H_0: \mu \leq 65$  vs  $H_a: \mu > 65$ . A sample of 36 vehicles will be selected and the population standard deviation is assumed to be 12 miles per hour. With 0.05 level of significance ( $Z_{0.05} = 1.645$ ), the probability of making a Type II error when the actual mean speed is 66 miles per hour is \_\_\_\_\_. (10%)
5. Suppose that  $x_1, x_2, x_3, \dots, x_n$  are independently identically distributed as normal distribution with mean 0 and variance  $\theta$ , a sufficient statistic for  $\theta$  is \_\_\_\_\_. (10%)

## 二·填充題共 10 格，不須計算過程，答案完全正確始予計分，並請務必依格子順序作答於答案卷，

例如 (1) \_\_\_\_\_  
(2) \_\_\_\_\_  
:  
(10) \_\_\_\_\_

1. Two cards are drawn at random without replacement from an ordinary deck (撲克牌). Let X be the number of hearts and Y the number of black cards obtained.
  - (a) Write an expression for the joint pdf,  $f(x, y)$ . \_\_\_\_\_ (1) (5%)
  - (b) Find the marginal pdf's,  $f_1(x)$ . \_\_\_\_\_ (2) (5%)
  - (c) Find  $P(Y = y|X = 1)$ . \_\_\_\_\_ (3) (5%)
  - (d) Assuming that the cards are drawn with replacement, find the joint pdf,  $f(x, y)$ . \_\_\_\_\_ (4) (5%)
2. The  $m+n$  r.v.'s  $X_1, X_2, \dots, X_m$  and  $Y_1, Y_2, \dots, Y_n$  are independent and  $X_i \sim N(\mu_1, \sigma_1^2), i=1, \dots, m, Y_j \sim N(\mu_2, \sigma_2^2), j=1, \dots, n$ . Set  $\bar{X} = \frac{1}{m} \sum_{i=1}^m X_i, \bar{Y} = \frac{1}{n} \sum_{j=1}^n Y_j$ , and
  - (a) Specify the distribution of  $\bar{X} - \bar{Y}$ . \_\_\_\_\_ (5) (5%)
  - (b) Calculate the probability  $P(\bar{X} > \bar{Y})$  in terms of  $m, n, \mu_1, \mu_2, \sigma_1$ , and  $\sigma_2$ . \_\_\_\_\_ (6) (5%)
  - (c) Give the numerical value of the probability in part (b) when  $\mu_1 = \mu_2$  unspecified. \_\_\_\_\_ (7) (5%)
3. In a study of revenue generated by national lotteries, the following regression equation was fitted to data from 29 countries with lotteries:

$$y = -31.323 + 0.04045x_1 + 0.8772x_2 - 365.01x_3 - 9.9298x_4$$

(0.00755)    (0.3107)    (263.88)    (3.4520)

$$R^2 = 0.51$$

Where

Y= Dollars of net revenue per capita per year generated by the lottery

$x_1$ = Mean per capita personal income of the country

$x_2$ = Number of hotel, motel, inn, and resort rooms per thousand of population

$x_3$ = Spendable revenue per capita per year generated by parimutual betting, racing, and other legalized gambling

$x_4$ = Percentage of the nation's border contiguous with a state or states with a lottery

The numbers in parentheses below the coefficient estimates are the corresponding estimated standard errors.

- (a) Find a 95% confidence interval for the coefficient on  $x_1$ , in the population regression. \_\_\_\_\_ (8) (5%)
- (b) Give  $H_0$  and  $H_a$  for a test of overall model adequacy. \_\_\_\_\_ (9) (5%)
- (c) Compute the value of the test statistic. Make the appropriate conclusion at  $\alpha = 0.05$ . \_\_\_\_\_ (10) (5%)

試題隨卷繳交

接背面

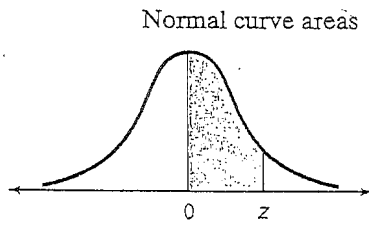
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系（所）組別：國際企業研究所

科 目：統計學

第 2 頁 共 5 頁

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z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
.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

試題隨卷繳交

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# 國立臺北大學 104 學年度碩士班一般入學考試試題

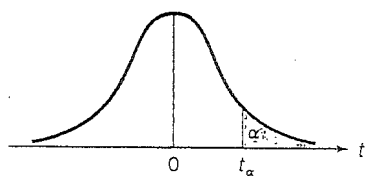
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科目：統計學

第 3 頁 共 5 頁

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Critical values for Student's  $t$



$\nu$	$t_{.100}$	$t_{.050}$	$t_{.025}$	$t_{.010}$	$t_{.005}$	$t_{.001}$	$t_{.0005}$
1	3.078	6.314	12.706	31.821	63.657	318.31	636.62
2	1.886	2.920	4.303	6.965	9.925	22.326	31.598
3	1.638	2.353	3.182	4.541	5.841	10.213	12.924
4	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	1.319	1.714	2.069	2.500	2.807	3.485	3.767
24	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	1.303	1.684	2.021	2.423	2.704	3.307	3.551
60	1.296	1.671	2.000	2.390	2.660	3.232	3.460
120	1.289	1.658	1.980	2.358	2.617	3.160	3.373
$\infty$	1.282	1.645	1.960	2.326	2.576	3.090	3.291

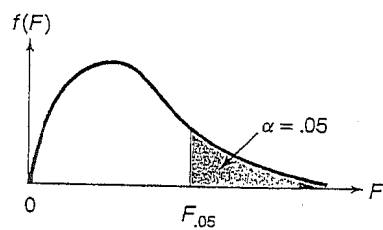
試題隨卷繳交

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# 國立臺北大學 104 學年度碩士班一般入學考試試題

系(所)組別：國際企業研究所  
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$\nu_2$	$\nu_1$	Numerator Degrees of Freedom								
		1	2	3	4	5	6	7	8	9
DENOMINATOR DEGREES OF FREEDOM	1	161.4	199.5	215.7	224.6	230.2	234.0	236.8	238.9	240.5
	2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38
	3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81
	4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00
	5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77
	6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10
	7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68
	8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39
	9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18
	10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02
	11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90
	12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80
	13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71
	14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65
	15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59
	16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54
	17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49
	18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46
	19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42
	20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39
	21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37
	22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34
	23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32
	24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30
	25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28
	26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27
	27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25
	28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24
	29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22
	30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04	
120	3.92	3.07	2.68	2.45	2.29	2.17	2.09	2.02	1.96	
$\infty$	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88	

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試題隨卷繳交

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第 5 頁 共 5 頁  
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(Continued)

		Numerator Degrees of Freedom									
		10	12	15	20	24	30	40	60	120	$\infty$
DENOMINATOR DEGREES OF FREEDOM	1	241.9	243.9	245.9	248.0	249.1	250.1	251.1	252.2	253.3	254.3
	2	19.40	19.41	19.43	19.45	19.45	19.46	19.47	19.48	19.49	19.50
	3	8.79	8.74	8.70	8.66	8.64	8.62	8.59	8.57	8.55	8.53
	4	5.96	5.91	5.86	5.80	5.77	5.75	5.72	5.69	5.66	5.63
	5	4.74	4.68	4.62	4.56	4.53	4.50	4.46	4.43	4.40	4.36
	6	4.06	4.00	3.94	3.87	3.84	3.81	3.77	3.74	3.70	3.67
	7	3.64	3.57	3.51	3.44	3.41	3.38	3.34	3.30	3.27	3.23
	8	3.35	3.28	3.22	3.15	3.12	3.08	3.04	3.01	2.97	2.93
	9	3.14	3.07	3.01	2.94	2.90	2.86	2.83	2.79	2.75	2.71
	10	2.98	2.91	2.85	2.77	2.74	2.70	2.66	2.62	2.58	2.54
	11	2.85	2.79	2.72	2.65	2.61	2.57	2.53	2.49	2.45	2.40
	12	2.75	2.69	2.62	2.54	2.51	2.47	2.43	2.38	2.34	2.30
	13	2.67	2.60	2.53	2.46	2.42	2.38	2.34	2.30	2.25	2.21
	14	2.60	2.53	2.46	2.39	2.35	2.31	2.27	2.22	2.18	2.13
	15	2.54	2.48	2.40	2.33	2.29	2.25	2.20	2.16	2.11	2.07
	16	2.49	2.42	2.35	2.28	2.24	2.19	2.15	2.11	2.06	2.01
	17	2.45	2.38	2.31	2.23	2.19	2.15	2.10	2.06	2.01	1.96
	18	2.41	2.34	2.27	2.19	2.15	2.11	2.06	2.02	1.97	1.92
	19	2.38	2.31	2.23	2.16	2.11	2.07	2.03	1.98	1.93	1.88
	20	2.35	2.28	2.20	2.12	2.08	2.04	1.99	1.95	1.90	1.84
	21	2.32	2.25	2.18	2.10	2.05	2.01	1.96	1.92	1.87	1.81
	22	2.30	2.23	2.15	2.07	2.03	1.98	1.94	1.89	1.84	1.78
	23	2.27	2.20	2.13	2.05	2.01	1.96	1.91	1.86	1.81	1.76
	24	2.25	2.18	2.11	2.03	1.98	1.94	1.89	1.84	1.79	1.73
	25	2.24	2.16	2.09	2.01	1.96	1.92	1.87	1.82	1.77	1.71
	26	2.22	2.15	2.07	1.99	1.95	1.90	1.85	1.80	1.75	1.69
	27	2.20	2.13	2.06	1.97	1.93	1.88	1.84	1.79	1.73	1.67
	28	2.19	2.12	2.04	1.96	1.91	1.87	1.82	1.77	1.71	1.65
	29	2.18	2.10	2.03	1.94	1.90	1.85	1.81	1.75	1.70	1.64
	30	2.16	2.09	2.01	1.93	1.89	1.84	1.79	1.74	1.68	1.62
40	2.08	2.00	1.92	1.84	1.79	1.74	1.69	1.64	1.58	1.51	
60	1.99	1.92	1.84	1.75	1.70	1.65	1.59	1.53	1.47	1.39	
120	1.91	1.83	1.75	1.66	1.61	1.55	1.50	1.43	1.35	1.25	
$\infty$	1.83	1.75	1.67	1.57	1.52	1.46	1.39	1.32	1.22	1.00	

試題隨卷繳交