

國立政治大學九十七 學年度研究所^{博碩}士班入學考試命題紙

第一頁，共四頁

考試科目	統計學	所別	財管系	考試時間	3月16日 星期日	第3節
1. (15%) A small town has a "Pick 3" game in which you pick one of the 1000 3-digit numbers between 000 and 999, receiving \$2750 for a winning \$10 bet and nothing otherwise. (1) (5%) Construct the probability distribution of the random variable X = winnings. (2) (6%) Find the mean and variance of the probability distribution. (3) (4%) Based on part (2) and the \$10 cost to play the game, on average, how much can you expected to lose each time you play this lottery? 2. (30%) A fast-food chain wants to compare two ways of promoting a new turkey burger. One way uses a coupon available in the store. The other way uses a poster display outside the store. Before the promotion, their marketing research group matches 50 pairs of stores. Each pair has two stores with similar sales volume and customer demographics. The store in a pair that uses coupons is randomly chosen, and after a month-long promotion, the increases in sales of the turkey burger are compared for the two stores. (1) (8%) The increase was higher for 28 stores using coupons and higher for 22 stores using the poster. Is this strong evidence to support the coupon approach? Make a decision using a 0.05 significance level. (2) (6%) Find and interpret the P-value for this test. (3) (8%) In a separate experiment with 10 pairs of stores, the difference in the month's increased sales between the store that used coupons and the store with outside poster had a mean of \$3000 and standard deviation \$4000. Does this indicate a true difference between mean sales for the two advertising approaches? Make a decision using a 0.05 significance level. (4) (8%) Refer to part (2). Please first construct a 95% confidence interval for the difference between mean sales for the two advertising approaches, and then compare this result with that of part (3).						
備考	試題隨卷繳交					
命題委員：				(簽章)	年	月 日

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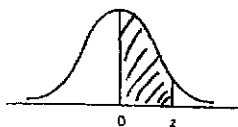
考試科目	統計學	所別	研究所 4171	考試時間	3月16日 星期日 第3節																
3. (20%) A tax assessor wants to estimate the mean property tax bill for all homeowners in a small town. A survey ten years ago got a sample mean and standard deviation of \$1400 and \$1000, respectively. (1) (6%) How many tax records should the tax processor randomly sample in order for a 95% confidence interval for the mean to have a margin error equal to \$100? (2) (7%) In reality, suppose that they'd now got a standard deviation equal to \$1500. Using the sample size you derived in part (1), please find the margin of error. Explain whether and why this margin of error would be less \$100, equal to \$100, or more than \$100. (3) (7%) Refer to part (2). What is the probability that the sample mean falls within \$100 of the population mean? Explain whether and why this probability would be less 0.95, equal to 0.95, or more than 0.95. 4. (15%) A report summarizing scores for students on a verbal aptitude test x and mathematics aptitude test y states that $\bar{x} = 480$, $\bar{y} = 500$, $s_x = 80$, $s_y = 120$, and $r = 0.60$. Here $\bar{x}$ and s_x denote the sample mean and standard deviation of x, respectively, and r is the sample correlation coefficient of x and y. (1) (10%) Find the intercept and slope of the regression line, and state the prediction equation. (2) (5%) Compute the value of R^2 and interpret it. 5. (20%) Consider the following data. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>A</td> <td>27</td> <td>31</td> <td>31</td> <td>29</td> <td>30</td> <td>27</td> <td>28</td> </tr> <tr> <td>B</td> <td>22</td> <td>27</td> <td>25</td> <td>23</td> <td>26</td> <td>27</td> <td>23</td> </tr> </table> (1) (15%) Please first carry out a one-way analysis of variance (ANOVA) analysis for these data, and then make a decision for the resulting ANOVA table using a 0.05 significance level. (2) (5%) What assumptions are required to carry out part (1)?						A	27	31	31	29	30	27	28	B	22	27	25	23	26	27	23
A	27	31	31	29	30	27	28														
B	22	27	25	23	26	27	23														
備考	試題隨卷繳交																				
命題委員：	(簽章) 年 月 日																				

國立政治大學九十七 學年度研究所^{博碩}士班入學考試命題紙

第三頁，共四頁

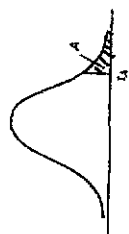
考試科目	統計學	所別	財管4171	考試時間	3月16日 星期日 第3節
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Normal Probabilities



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

Critical Values of t



DEGREES OF FREEDOM	t _{.100}	t _{.050}	t _{.025}	t _{.010}	t _{.005}
1	3.078	6.314	12.706	31.821	63.657
2	1.886	2.920	4.303	6.965	9.925
3	1.638	2.353	3.182	4.541	5.841
4	1.533	2.132	2.776	3.747	4.604
5	1.476	2.015	2.571	3.365	4.032
6	1.440	1.943	2.447	3.143	3.707
7	1.415	1.895	2.365	2.998	3.499
8	1.397	1.860	2.306	2.896	3.355
9	1.383	1.833	2.262	2.821	3.250
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.055
13	1.350	1.771	2.160	2.650	3.012
14	1.345	1.761	2.145	2.624	2.977
15	1.341	1.753	2.131	2.602	2.947
16	1.337	1.746	2.120	2.583	2.921
17	1.333	1.740	2.110	2.567	2.898
18	1.330	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845
21	1.323	1.721	2.080	2.518	2.831
22	1.321	1.717	2.074	2.508	2.819
23	1.319	1.714	2.069	2.500	2.807

備考 試題隨卷繳交

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(簽章)

年

月

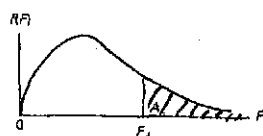
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第四頁，共四頁

考試科目	統計學	所別	研究所 A171	考試時間	3月16日 第3節
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Critical Values of F: $\alpha = .05$ 

ν_2	ν_1	NUMERATOR DEGREES OF FREEDOM								
		1	2	3	4	5	6	7	8	9
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	
8	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88	

備 考 試 題 隨 卷 繳 交

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(簽章)

年

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