

淡江大學 103 學年度日間部轉學生招生考試試題

631

系別：統計學系三年級

科目：統計學

考試日期：7月20日(星期日) 第1節

本試題共 6 大題，4 頁

注意事項：第 2, 3, 4, 5 計算題答案，請四捨五入至小數點第 2 位，例如：2.978354 \approx 2.98。

1. (20%) Multiple Choice

- (a) (4%) A random sample of 120 students has a test score average with a standard deviation of 9.2. Find the margin of error if the level of confidence is 0.98.
(1) 1.96 (2) 0.18 (3) 0.84 (4) 0.82
- (b) (4%) What happens to the mean and standard deviation of the distribution of sample means as the size of the sample decreases?
(1) The mean of the sample means stays constant and the standard error increases.
(2) The mean of the sample means stays constant and the standard error decreases.
(3) The mean of the sample means decreases and the standard error increases.
(4) The mean of the sample means increases and the standard error stays constant.
- (c) (4%) Use the confidence interval for population proportion (0.05, 0.13) to find the point estimate of population proportion.
(1) 0.04 (2) 0.08 (3) 0.09 (4) 0.18
- (d) (4%) The random variable X represents the number of boys in a family of three children. Assuming that boys and girls are equally likely, find the mean and standard deviation for the random variable X .
(1) mean: 1.50; standard deviation: 0.87 (2) mean: 2.25; standard deviation: 0.87
(3) mean: 1.50; standard deviation: 0.75 (4) mean: 2.25; standard deviation: 0.75
- (e) (4%) Assume that blood pressure readings are normally distributed with a mean of 120 and a standard deviation of 8. If 100 people are randomly selected, find the probability that their mean blood pressure will be greater than 122.
(1) 0.0062 (2) 0.9938 (3) 0.4013 (4) 0.5987
2. (23%) In a random sample of 10 people, the mean body mass index (BMI) was 27 and the standard deviation was 6.
(a) (6%) Construct a 95% confidence interval for the population mean.
(b) (8%) Based on the p -value, test whether the population mean is different from 24.
(c) (6%) Construct a 95% confidence interval for the population variance.
(d) (3%) What assumption about the population is required for the previous procedures?
3. (20%) In low speed crash tests, the mean bumper repair cost of 6 randomly selected mini cars is \$1621 with a standard deviation of \$493. In similar tests of 9 randomly selected midsize cars, the mean bumper repair cost is \$1895, with a standard deviation of \$648. Assume the populations are normal and the population variances are equal. Use the t test and ANOVA F test ($SS_{total}=4844750.6$) to determine whether the mean bumper repair cost is different between mini cars and midsize cars at $\alpha=0.05$.

本試題雙面印刷

背面尚有試題

淡江大學 103 學年度日間部轉學生招生考試試題

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63-2 科目：統計學

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4. (15%) About 60% of workers in a city are college graduates. You randomly select 100 workers and ask them if they are a college graduate.

(a) (8%) Find the probability that exactly 65 workers are college graduates.

(b) (7%) Find the probability that less than 65 workers are college graduates.

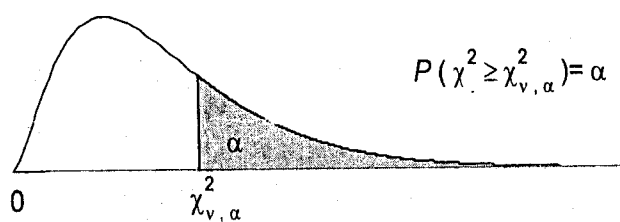
5. (12%) An organization believes that the number of prospective home buyers who want their next house to be larger, smaller or the same size as their current house is uniformly distributed. To test this claim, 300 prospective home buyers are randomly selected and the results are shown in the following table. Can you reject the claim that the distribution is uniform at $\alpha=0.10$?

Response	Larger	Same size	Smaller
Frequency	110	85	105

6. (10%) You wish to estimate, with 90% confidence, the population proportion of adults who say chocolate is their favorite ice cream flavor. Your estimate must be accurate within 3% of the population proportion.

(a) (5%) No preliminary estimate is available. Find the minimum sample size needed.

(b) (5%) Find the minimum sample size needed, using a prior study that found that 30% of adults say that chocolate is their favorite ice cream flavor.



v	Upper Tail Probability α								
	0.005	0.010	0.025	0.050	0.100	0.900	0.950	0.975	0.990
1	7.8794	6.6349	5.0239	3.8415	2.7055	0.0158	0.0039	0.0010	0.0002
2	10.5966	9.2103	7.3778	5.9915	4.6052	0.2107	0.1026	0.0506	0.0201
3	12.8382	11.3449	9.3484	7.8147	6.2514	0.5844	0.3518	0.2158	0.1148
4	14.8603	13.2767	11.1433	9.4877	7.7794	1.0636	0.7107	0.4844	0.2971
5	16.7496	15.0863	12.8325	11.0705	9.2364	1.6103	1.1455	0.8312	0.5543
6	18.5476	16.8119	14.4494	12.5916	10.6446	2.2041	1.6354	1.2373	0.8721
7	20.2777	18.4753	16.0128	14.0671	12.0170	2.8331	2.1673	1.6899	1.2390
8	21.9550	20.0902	17.5345	15.5073	13.3616	3.4895	2.7326	2.1797	1.6465
9	23.5894	21.6660	19.0228	16.9190	14.6837	4.1682	3.3251	2.7004	2.0879
10	25.1882	23.2093	20.4832	18.3070	15.9872	4.8652	3.9403	3.2470	2.5582

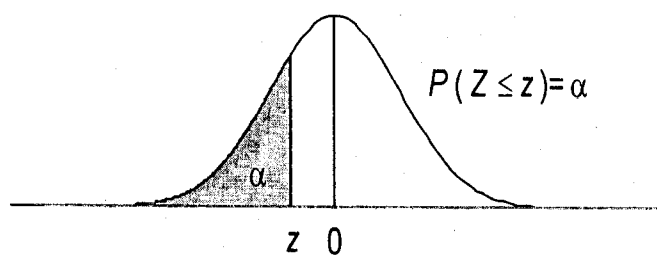
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系別：統計學系三年級

63-3 科目：統計學

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z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
-3.0	0.00135	0.00131	0.00126	0.00122	0.00118	0.00114	0.00111	0.00107	0.00104	0.00100
-2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
-2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
-2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
-2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
-2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	0.0048
-2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
-2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	0.0084
-2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
-2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
-2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
-1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
-1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
-1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
-1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
-1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
-1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
-1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
-1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
-1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
-1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
-0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611
-0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
-0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
-0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
-0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
-0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641

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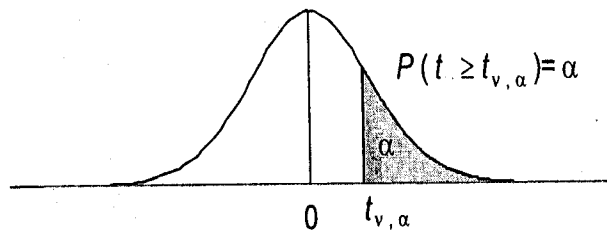
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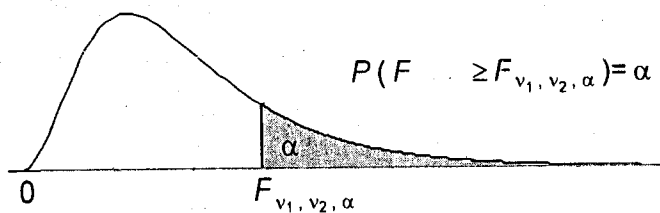
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v	Upper Tail Probability α									
	0.25	0.15	0.10	0.05	0.025	0.010	0.005	0.0025	0.0010	0.0005
1	1.0000	1.9626	3.0777	6.3138	12.7062	31.8205	63.6567	127.3213	318.3088	636.6192
2	0.8165	1.3862	1.8856	2.9200	4.3027	6.9646	9.9248	14.0890	22.3271	31.5991
3	0.7649	1.2498	1.6377	2.3534	3.1824	4.5407	5.8409	7.4533	10.2145	12.9240
4	0.7407	1.1896	1.5332	2.1318	2.7764	3.7469	4.6041	5.5976	7.1732	8.6103
5	0.7267	1.1558	1.4759	2.0150	2.5706	3.3649	4.0321	4.7733	5.8934	6.8688
6	0.7176	1.1342	1.4398	1.9432	2.4469	3.1427	3.7074	4.3168	5.2076	5.9588
7	0.7111	1.1192	1.4149	1.8946	2.3646	2.9980	3.4995	4.0293	4.7853	5.4079
8	0.7064	1.1081	1.3968	1.8595	2.3060	2.8965	3.3554	3.8325	4.5008	5.0413
9	0.7027	1.0997	1.3830	1.8331	2.2622	2.8214	3.2498	3.6897	4.2968	4.7809
10	0.6998	1.0931	1.3722	1.8125	2.2281	2.7638	3.1693	3.5814	4.1437	4.5869
11	0.6974	1.0877	1.3634	1.7959	2.2010	2.7181	3.1058	3.4966	4.0247	4.4370
12	0.6955	1.0832	1.3562	1.7823	2.1788	2.6810	3.0545	3.4284	3.9296	4.3178
13	0.6938	1.0795	1.3502	1.7709	2.1604	2.6503	3.0123	3.3725	3.8520	4.2208
14	0.6924	1.0763	1.3450	1.7613	2.1448	2.6245	2.9768	3.3257	3.7874	4.1405
15	0.6912	1.0735	1.3406	1.7531	2.1314	2.6025	2.9467	3.2860	3.7328	4.0728



v ₂	α	v ₁							
		1	2	3	4	5	6	7	8
13	0.100	3.14	2.76	2.56	2.43	2.35	2.28	2.23	2.20
	0.050	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77
	0.010	9.07	6.70	5.74	5.21	4.86	4.62	4.44	4.30
14	0.100	3.10	2.73	2.52	2.39	2.31	2.24	2.19	2.15
	0.050	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70
	0.010	8.86	6.51	5.56	5.04	4.69	4.46	4.28	4.14
15	0.100	3.07	2.70	2.49	2.36	2.27	2.21	2.16	2.12
	0.050	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64
	0.010	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00