

# 銘傳大學八十九學年度轉學生招生考試

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## 統計學(一) 試題

可使用計算機

一、填充題(每格4分):

1. 某次考試共有 1000 名學生參加，其平均分數為 83，變異數為 36，至少有多少學生的成績在 71 分至 95 分之間? \_\_\_\_\_
2. 設 A, B, C 為相互獨立的三事件，已知  $P(A)=1/3$ ,  $P(B)=1/2$ ,  $P(C)=3/5$ ，試求  $P(A \cup B \cup C) =$ \_\_\_\_\_。
3. 不連續隨機變數 X 的機率密度函數定義為

$$f(x) = \binom{4}{x} \left(\frac{1}{4}\right)^x \left(\frac{3}{4}\right)^{4-x}, x = 0, 1, 2, 3, 4 \text{ 試求 } E(X) = \text{_____} \text{ 及 } \text{VAR}(X) = \text{_____}。$$

4. 從一已知變異數  $\sigma^2$  為 100 的常態母體中隨機抽出一組樣本，今知母體平均值  $\mu$  的 95% 信賴區間為 [17.2, 22.8]，則抽取之樣本數為何? \_\_\_\_\_
5. \_\_\_\_\_ 指的是統計量(statistic)的機率密度函數。
6. 在常態分配中，平均數左右一個標準差的範圍約包含 \_\_\_\_\_ % 的觀測值。
7. 線性相關係數 r 的值等於 \_\_\_\_\_，則兩變數為完全線性相關。
8. 不會同時發生的事件，稱為 \_\_\_\_\_ 事件。
9. 若 X 為標準常態分配隻隨機變數，則  $P(X=0)$  為 \_\_\_\_\_。標準常態分配之中位數為 \_\_\_\_\_。
10. 在一假設檢定中，若  $\alpha=0.05$  且  $0.05 < p\text{-值}$ ，則其檢定結果應為 \_\_\_\_\_。
11. 以 t 分配檢定  $H_0: \mu=120$  時，若已知樣本標準差  $S=18$ ,  $n=10$ ,  $\alpha=0.01$ ，則其臨界值應為 \_\_\_\_\_。
12. 以 t 分配檢定二獨立母體之平均值  $H_0: \mu_1 - \mu_2 = 0$  時，若  $n_1 = n_2 = 14$ ，則此 t 分配之自由度為 \_\_\_\_\_。
13. 從直線  $y = -2x - 6$  中取出 10 個點(x, y)，則以這 10 個資料點計算其線性相關係數  $r =$ \_\_\_\_\_。

二、計算題(每小題5分):

1. 隨機從參加考試的男女生中各抽 10 名，他們的英文考試成績如下:

男生	61	75	78	66	56	63	51	72	77	61
女生	71	72	60	50	76	55	74	69	67	52

假設兩組資料都是常態分配，

- (1) 檢定男女生英文考試成績的標準差是否相同? $(\alpha=0.05)$
- (2) 設男女生英文考試成績的標準差相同，請檢定男女生英文考試的平均成績是否相同? $(\alpha=0.05)$

2. 若欲檢定某骰子是否公平，擲 60 次結果出現各種點數的次數如下：(此大題 10 分)

點數	1	2	3	4	5	6
次數	4	13	12	9	12	10

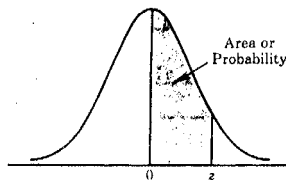
請問在  $\alpha=0.05$  下，是否可說此骰子公平？

3. 收集一資料如下：

在校畢業成績(x)	88.3	73.5	76.7	62.5	73.7	83.5	70.0	62.1
起薪(y, 單位:萬元)	3.2	2.8	2.7	2.3	2.4	3.0	2.1	2.4

- (1) 求  $x, y$  的相關係數。
- (2) 求用  $x$  來預測  $y$  之簡單線性迴歸式。
- (3) 求判定係數  $R^2$ 。
- (4) 試問當  $y$  的資料以元來表示時，其殘差平方和(SSE)的值為何？

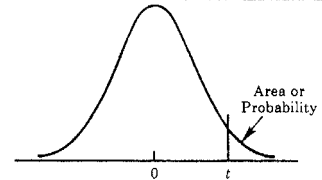
TABLE 1 Standard Normal Distribution



Entries in the table give the area under the curve between the mean and z standard deviations above the mean. For example, for  $z = 1.25$  the area under the curve between the mean and  $z$  is .3944.

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	.2518	.2549
.7	.2580	.2612	.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	.4462	.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	.4978	.4979	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986

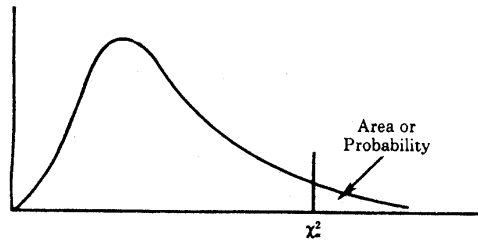
TABLE 2 t Distribution



Entries in the table give t values for an area of probability in the upper tail of the t distribution. For example, with 10 degrees of freedom and a .05 area in the upper tail,  $t_{.05} = 1.612$ .

Degrees of Freedom	Area in Upper Tail				
	.10	.05	.025	.01	.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	2.068	2.500	2.763
24	1.318	1.711	2.064	2.492	2.797
25	1.316	1.708	2.060	2.485	2.787
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.771
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.756
30	1.310	1.697	2.042	2.457	2.750
40	1.303	1.684	2.021	2.423	2.704
60	1.296	1.671	2.000	2.390	2.660
120	1.289	1.658	1.980	2.358	2.617

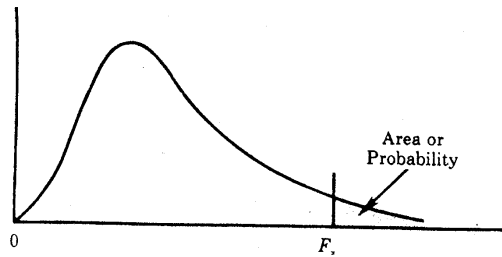
TABLE 3 Chi-Square Distribution



Entries in the table give  $\chi^2_\alpha$  values, where  $\alpha$  is the area or probability in the upper tail of the chi-square distribution. For example, with 10 degrees of freedom and a .01 area in the upper tail,  $\chi^2_{.01} = 23.2093$ .

Degrees of Freedom	Area in Upper Tail									
	.995	.99	.975	.95	.90	.10	.05	.025	.01	.005
1	$392.704 \times 10^{-10}$	$157.088 \times 10^{-9}$	$982.069 \times 10^{-9}$	$393.214 \times 10^{-8}$	.0157908	2.70554	3.84146	5.02389	6.63490	7.87944
2	.0100251	.0201007	.0506356	.102587	.210720	4.60517	5.99147	7.37776	9.21034	10.5966
3	.0717212	.114832	.215795	.351846	.584375	6.25139	7.81473	9.34840	11.3449	12.8381
4	.206990	.297110	.484419	.710721	1.063623	7.77944	9.48773	11.1433	13.2767	14.8602
5	.411740	.554300	.831211	1.145476	1.61031	9.23635	11.0705	12.8325	15.0863	16.7496
6	.675727	.872085	1.237347	1.63539	2.20413	10.6446	12.5916	14.4494	16.8119	18.5476
7	.989265	1.239043	1.68987	2.16735	2.83311	12.0170	14.0671	16.0128	18.4753	20.2777
8	1.344419	1.646482	2.17973	2.73264	3.48954	13.3616	15.5073	17.5346	20.0902	21.9550
9	1.734926	2.087912	2.70039	3.32511	4.16816	14.6837	16.9190	19.0228	21.6660	23.5893

TABLE 4 F Distribution



Entries in the table give  $F_{\alpha}$  values, where  $\alpha$  is the area or probability in the upper tail of the F distribution. For example, with 12 numerator degrees of freedom, 15 denominator degrees of freedom, and a .05 area in the upper tail,  $F_{.05} = 2.48$ .

Table of  $F_{\alpha}$  Values

Denominator Degrees of Freedom	Numerator Degrees of Freedom																		
	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	$\infty$
1	161.4	199.5	215.7	224.6	230.2	234.0	236.8	238.9	240.5	241.9	243.9	245.9	248.0	249.1	250.1	251.1	252.2	253.3	254.3
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40	19.41	19.43	19.45	19.45	19.46	19.47	19.48	19.49	19.50
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.74	8.70	8.66	8.64	8.62	8.59	8.57	8.55	8.53
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.91	5.86	5.80	5.77	5.75	5.72	5.69	5.66	5.63
5	6.59	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.68	4.62	4.56	4.53	4.50	4.46	4.43	4.40	4.36
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	4.00	3.94	3.87	3.84	3.81	3.77	3.74	3.70	3.67
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.57	3.51	3.44	3.41	3.38	3.34	3.30	3.27	3.23
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.28	3.22	3.15	3.12	3.08	3.04	3.01	2.97	2.93
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.07	3.01	2.94	2.90	2.86	2.83	2.79	2.75	2.71
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.91	2.85	2.77	2.74	2.70	2.66	2.62	2.58	2.54
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.79	2.72	2.65	2.61	2.57	2.53	2.49	2.45	2.40
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.69	2.62	2.54	2.51	2.47	2.43	2.38	2.34	2.30
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.60	2.53	2.46	2.42	2.38	2.34	2.30	2.25	2.21
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.53	2.46	2.39	2.35	2.31	2.27	2.22	2.18	2.13

試題完