

所別： 工業工程與管理 組別： _____ 科目： 統計學

注意： 准 不准 使用計算器，考試時間總計： 100 分鐘。 試題共 4 頁，第 1 頁

1. 今有 30 筆樣本資料如下表，其平均 10.297、標準差 1.443

7.8	8.3	8.7	8.9	9.0	9.3	9.3	9.4	9.5	9.6
9.6	9.6	9.7	9.7	9.8	9.8	9.9	10.1	10.2	10.9
11.1	11.2	11.3	11.3	11.7	12.0	12.0	12.3	12.4	14.5

(a) 作直方圖 (取 6 組) (10%)

(b) 作盒鬚圖 (10%)

(c) 資料偏態為何? (5%)

(d) 若另一組數據 $n=20, s=1$, 平均 12, $\max=14$, 請問此二組數據中之最大值那個數字相對最大, why? (10%)

2. 設兩個事件 A 和 B, $P(A) = 0.4, P(B) = 0.60$ 且 $P(A \cap B) = 0.20$. 問 A 和 B 是否獨立? 為什麼? (10%)

3. $X = [1.2, 2.3, 3.2, 4.4, 5.6], Y = [11, 19, 28, 47, 50]$. 已知其線性迴歸方程式及其判定係數如下 (Minitab 16 之輸出), 試問

(a) 此配適是否恰當? 說明之。(5%)

(b) $R\text{-Sq}(\text{adj}) = 94.5\%$ 代表之意義為何? (5%)

(c) $\beta = 9.704$, 求其 99% 信賴區間。(10%)

4. 假設某生產線的不良率有 20%, 但主管未警覺到這問題。今品管部門拿 100 個組件來檢驗品質, 發現此抽樣之不良品的比例為 \hat{p} 。

(a) 顯示 \hat{p} 的抽樣分配。(5%)

(b) 如果測試顯示 \hat{p} 超過 0.1 時將停產, 那麼檢驗後“不”停產的機率為何? (10%)

The regression equation is
 $Y = - 1.41 + 9.70 X$

Predictor	Coef	SE Coef	T	P
Constant	-1.413	4.271	-0.33	0.763
X	9.704	1.161	8.36	0.004

S = 4.00665 R-Sq = 95.9% R-Sq(adj) = 94.5%

Analysis of Variance

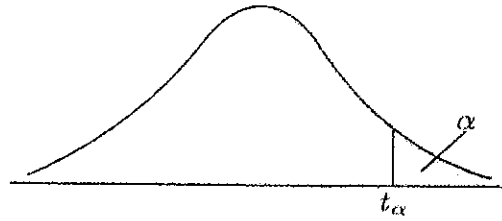
Source	DF	SS	MS	F	P
Regression	1	1121.8	1121.8	69.88	0.004
Residual Error	3	48.2	16.1		
Total	4	1170.0			

5. 某廠商決定採用新的設計, 由一 100 人的樣本所顯示的設計偏好為 $A=40, B=24, C=36$ 。寫出假說並以 $\alpha=0.05$ 檢定對這三種設計的偏好是否有差別。(20%)

χ^2 分配表; $P(\chi^2 > x)$

d.f	α							
	0.99	0.95	0.9	0.1	0.05	0.025	0.01	0.005
1	0.00	0.00	0.02	2.71	3.84	5.02	6.63	7.88
2	0.02	0.10	0.21	4.61	5.99	7.38	9.21	10.60
3	0.11	0.35	0.58	6.25	7.81	9.35	11.34	12.84
4	0.30	0.71	1.06	7.78	9.49	11.14	13.28	14.86
5	0.55	1.15	1.61	9.24	11.07	12.83	15.09	16.75
6	0.87	1.64	2.20	10.64	12.59	14.45	16.81	18.55
7	1.24	2.17	2.83	12.02	14.07	16.01	18.48	20.28
8	1.65	2.73	3.49	13.36	15.51	17.53	20.09	21.95
9	2.09	3.33	4.17	14.68	16.92	19.02	21.67	23.59
10	2.56	3.94	4.87	15.99	18.31	20.48	23.21	25.19
11	3.05	4.57	5.58	17.28	19.68	21.92	24.72	26.76
12	3.57	5.23	6.30	18.55	21.03	23.34	26.22	28.30
13	4.11	5.89	7.04	19.81	22.36	24.74	27.69	29.82
14	4.66	6.57	7.79	21.06	23.68	26.12	29.14	31.32
15	5.23	7.26	8.55	22.31	25.00	27.49	30.58	32.80
16	5.81	7.96	9.31	23.54	26.30	28.85	32.00	34.27
17	6.41	8.67	10.09	24.77	27.59	30.19	33.41	35.72
18	7.01	9.39	10.86	25.99	28.87	31.53	34.81	37.16
19	7.63	10.12	11.65	27.20	30.14	32.85	36.19	38.58
20	8.26	10.85	12.44	28.41	31.41	34.17	37.57	40.00
21	8.90	11.59	13.24	29.62	32.67	35.48	38.93	41.40
22	9.54	12.34	14.04	30.81	33.92	36.78	40.29	42.80
23	10.20	13.09	14.85	32.01	35.17	38.08	41.64	44.18
24	10.86	13.85	15.66	33.20	36.42	39.36	42.98	45.56
25	11.52	14.61	16.47	34.38	37.65	40.65	44.31	46.93
26	12.20	15.38	17.29	35.56	38.89	41.92	45.64	48.29
27	12.88	16.15	18.11	36.74	40.11	43.19	46.96	49.64
28	13.56	16.93	18.94	37.92	41.34	44.46	48.28	50.99
29	14.26	17.71	19.77	39.09	42.56	45.72	49.59	52.34
30	14.95	18.49	20.60	40.26	43.77	46.98	50.89	53.67
40	22.16	26.51	29.05	51.81	55.76	59.34	63.69	66.77
50	29.71	34.76	37.69	63.17	67.50	71.42	76.15	79.49
60	37.48	43.19	46.46	74.40	79.08	83.30	88.38	91.95
70	45.44	51.74	55.33	85.53	90.53	95.02	100.43	104.21
80	53.54	60.39	64.28	96.58	101.88	106.63	112.33	116.32
90	61.75	69.13	73.29	107.57	113.15	118.14	124.12	128.30
100	70.06	77.93	82.36	118.50	124.34	129.56	135.81	140.17

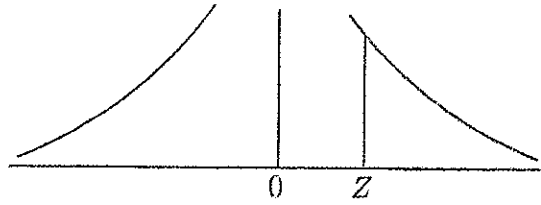
t 分配表



自由度	$t_{.100}$	$t_{.050}$	$t_{.025}$	$t_{.010}$	$t_{.005}$
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
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
35	1.306	1.690	2.030	2.438	2.724
40	1.303	1.684	2.021	2.423	2.704
50	1.299	1.676	2.009	2.403	2.678
60	1.296	1.671	2.000	2.390	2.660
120	1.289	1.658	1.980	2.358	2.617
∞	1.282	1.645	1.960	2.326	2.576

~背面尚有試題~

標準常態 分配表



例如：若 $Z = 1.00$ ，則 0 至 Z 的機率值為 0.3413

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	.2425	.2486	.2518	.2549
0.7	.2580	.2612	.2624	.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	.3468	.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	.4028	.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
3.1	.4990	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993
3.2	.4993	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995
3.3	.4995	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997
3.4	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4998
3.5	.4998									
4.0	.49997									
4.5	.499997									
5.0	.4999997									