

系所組別：資源工程學系丙組

考試科目：統計學

考試日期：0219，節次：3

※ 考生請注意：本試題 可 不可 使用計算機

請勿在本試題紙上作答，否則不予計分
選擇題（選出正確答案，每題四分）

1. If A and B are independent events with $P(A) = 0.65$ and $P(A \cap B) = 0.26$, then, $P(B) =$
 - a. 0.400
 - b. 0.169
 - c. 0.390
 - d. 0.650
2. A six-sided die is tossed 3 times. The probability of observing three ones in a row is
 - a. $1/3$
 - b. $1/6$
 - c. $1/27$
 - d. $1/216$
3. A simple random sample of 100 observations was taken from a large population. The sample mean and the standard deviation were determined to be 80 and 12 respectively. The standard error of the mean is
 - a. 1.20
 - b. 0.12
 - c. 8.00
 - d. 0.80
4. Which of the following is an example of nonprobabilistic sampling?
 - a. simple random sampling
 - b. stratified simple random sampling
 - c. cluster sampling
 - d. judgment sampling
5. Which of the following is(are) point estimator(s)?
 - a. σ
 - b. μ
 - c. s
 - d. α

Exhibit AA

The following information was obtained from independent random samples.
Assume normally distributed populations with equal variances.

	Sample 1	Sample 2
Sample Mean	45	42
Sample Variance	85	90
Sample Size	10	12

6. Refer to Exhibit AA. The 95% confidence interval for the difference between the two population means is
 - a. -5.36 to 11.36
 - b. -5 to 3
 - c. -4.86 to 10.86
 - d. -2.65 to 8.65
7. Refer to Exhibit AA. The null hypothesis to be tested is $H_0: \mu_1 - \mu_2 \geq 0$. The test statistic for the difference between the two population means is
 - a. .186
 - b. .32
 - c. .748
 - d. 1

(背面仍有題目,請繼續作答)

系所組別：資源工程學系丙組

考試科目：統計學

考試日期：0219 第 4 頁 3

※ 考生請注意：本試題 可 不可 使用計算機

8. The producer of a certain medicine claims that their bottling equipment is very accurate and that the standard deviation of all their filled bottles is 0.1 ounce or less. A sample of 20 bottles showed a standard deviation of 0.11. The test statistic to test the claim is
- 400
 - 22.99
 - 4.85
 - 20

Exhibit BB

The table below gives beverage preferences for random samples of teens and adults.

	Teens	Adults	Total
Coffee	50	200	250
Tea	100	150	250
Soft Drink	200	200	400
Other	<u>50</u>	<u>50</u>	<u>100</u>
	400	600	1,000

We are asked to test for independence between age (i.e., adult and teen) and drink preferences.

9. Refer to Exhibit BB. With a .05 level of significance, the critical value for the test is
- 1.645
 - 7.815
 - 14.067
 - 15.507
10. Refer to Exhibit BB. The expected number of adults who prefer coffee is
- 0.25
 - 0.33
 - 150
 - 200

Exhibit CC

SSTR = 6,750

SSE = 8,000

 $n_T = 20$ $H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$ $H_a: \text{at least one mean is different}$

11. Refer to Exhibit CC. The test statistic to test the null hypothesis equals
- 0.22
 - 0.84
 - 4.22
 - 4.5
12. Refer to Exhibit CC. The null hypothesis is to be tested at the 5% level of significance. The critical value from the table is
- 2.87
 - 3.24
 - 4.08
 - 8.7
13. In regression analysis, if the dependent variable is measured in dollars, the independent variable
- must also be in dollars
 - must be in some unit of currency
 - can be any units
 - can not be in dollars

系所組別：資源工程學系丙組

考試科目：統計學

考試日期：0219 · 節次：3

※ 考生請注意：本試題 可 不可 使用計算機**Exhibit DD**

You are given the following information about y and x.

y Dependent Variable	x Independent Variable
5	15
7	12
9	10
11	7

14. Refer to Exhibit DD. The least squares estimate of b_0 equals
- 0.7647
 - 1.3
 - 164.1176
 - 16.41176
15. Refer to Exhibit DD. The coefficient of determination equals
- 0.99705
 - 0.9941
 - 0.9941
 - 0.99705
16. If the coefficient of correlation is a positive value, then
- the intercept must also be positive
 - the coefficient of determination can be either negative or positive, depending on the value of the slope
 - the regression equation could have either a positive or a negative slope
 - the slope of the line must be positive
17. In multiple regression analysis, the general linear model
- can not be used to accommodate curvilinear relationships between dependent variables and independent variables
 - can be used to accommodate curvilinear relationships between the independent variables and dependent variable
 - must contain more than 2 independent variables
 - None of these alternatives is correct.
18. A graph showing the probability of accepting the lot as a function of the percent defective in the lot is
- a power curve
 - a control chart
 - an operating characteristic curve
 - None of these alternatives is correct.
19. A control chart that is used when the output of a production process is measured in terms of the percent defective is
- a P chart
 - an X bar chart
 - a process chart
 - None of these alternatives is correct.

(背面仍有題目,請繼續作答)

系所組別：資源工程學系丙組

考試科目：統計學

考試日期：0219 頁數：3

※ 考生請注意：本試題 可 不可 使用計算機

Exhibit EE

$$f(x) = (1/10) e^{-x/10} \quad x \geq 0$$

20. Refer to Exhibit EE. The mean of x is
- 0.10
 - 10
 - 100
 - 1,000
21. Refer to Exhibit EE. The probability that x is between 3 and 6 is
- 0.4512
 - 0.1920
 - 0.2592
 - 0.6065
22. A population has a mean of 300 and a standard deviation of 18. A sample of 144 observations will be taken. The probability that the sample mean will be between 297 to 303 is
- 0.4332
 - 0.8664
 - 0.9332
 - 0.0668

Exhibit FF

In a regression analysis involving 25 observations, the following estimated regression equation was developed.

$$\hat{Y} = 10 - 18X_1 + 3X_2 + 14X_3$$

Also, the following standard errors and the sum of squares were obtained.

$$S_{b1} = 3 \quad S_{b2} = 6 \quad S_{b3} = 7$$

$$SST = 4,800 \quad SSE = 1,296$$

23. Refer to Exhibit FF. If you want to determine whether or not the coefficients of the independent variables are significant, the critical value of t statistic at $\alpha = 0.05$ is
- 2.080
 - 2.060
 - 2.064
 - 1.96
24. Refer to Exhibit FF. The coefficient of X_2
- is significant
 - is not significant
 - can not be tested, because not enough information is provided
 - None of these alternatives is correct.
25. Refer to Exhibit FF. The multiple coefficient of determination is
- 0.27
 - 0.73
 - 0.50
 - 0.33

系所組別：資源工程學系丙組

考試科目：統計學

考試日期：0219，節次：3

※ 考生請注意：本試題 可 不可 使用計算機

標準常態機分分配之面積或機率

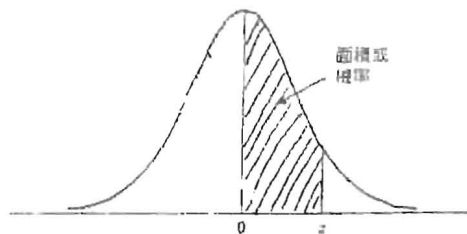


表 右尾面積的 z 分配表。例如，若自由度為 10，則：



	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
1	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
2	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
3	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
4	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
5	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
6	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2518	0.2549
7	0.2612	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
8	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
9	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
10	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
11	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
12	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
13	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
14	0.4207	0.4223	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
15	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
16	0.4463	0.4474	0.4484	0.4492	0.4503	0.4515	0.4525	0.4535	0.4545
17	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
18	0.4644	0.4652	0.4660	0.4667	0.4675	0.4683	0.4690	0.4699	0.4706
19	0.4714	0.4721	0.4728	0.4735	0.4742	0.4750	0.4756	0.4761	0.4767
20	0.4773	0.4780	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
21	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
22	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
23	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
24	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
25	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
26	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
27	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
28	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
29	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
30	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990

自由度	0.10	0.05	0.025	0.01
1	3.078	6.314	12.706	31.8
2	1.886	2.920	4.303	6.96
3	1.638	2.353	3.182	4.54
4	1.533	2.132	2.776	3.75
5	1.476	2.015	2.571	3.36
6	1.440	1.943	2.447	3.14
7	1.415	1.895	2.365	2.97
8	1.397	1.860	2.306	2.86
9	1.383	1.833	2.262	2.80
10	1.372	1.812	2.228	2.75
11	1.363	1.796	2.201	2.71
12	1.356	1.782	2.179	2.68
13	1.350	1.771	2.160	2.66
14	1.345	1.761	2.145	2.64
15	1.341	1.753	2.131	2.63
16	1.337	1.746	2.120	2.62
17	1.333	1.740	2.110	2.61
18	1.330	1.734	2.101	2.60
19	1.328	1.729	2.093	2.59
20	1.325	1.725	2.086	2.58
21	1.323	1.721	2.080	2.57
22	1.321	1.717	2.074	2.56
23	1.319	1.714	2.069	2.56
24	1.318	1.711	2.064	2.55
25	1.316	1.708	2.060	2.55
26	1.315	1.706	2.056	2.54
27	1.314	1.703	2.052	2.54
28	1.313	1.701	2.048	2.54
29	1.311	1.699	2.045	2.54
30	1.310	1.697	2.042	2.53
40	1.303	1.684	2.021	2.42
60	1.296	1.671	2.000	2.39
120	1.289	1.658	1.980	2.35
∞	1.282	1.645	1.960	2.32

(背面仍有題目,請繼續作答)

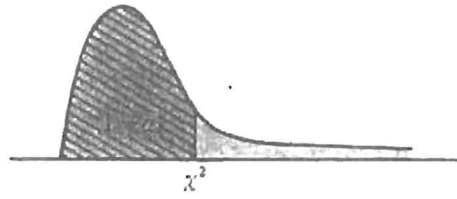
系所組別：資源工程學系丙組

考試科目：統計學

考試日期：0219，節次：3

※ 考生請注意：本試題 可 不可 使用計算機

附表 χ^2 分佈



自由度	概 率 $1 - \alpha$							
	.005	.010	.025	.050	.950	.975	.990	.995
1004	3.84	5.02	6.63	7.88
2	.01	.02	.05	.10	5.99	7.38	9.21	10.60
3	.07	.11	.22	.35	7.81	9.35	11.34	12.84
4	.21	.30	.48	.71	9.49	11.14	13.28	14.86
5	.41	.55	.83	1.15	11.07	12.83	15.09	16.75
6	.68	.87	1.24	1.64	12.59	14.45	16.81	18.55
7	.99	1.24	1.69	2.17	14.07	16.01	18.48	20.28
8	1.34	1.65	2.18	2.73	15.51	17.53	20.09	21.96
9	1.73	2.09	2.70	3.33	16.92	19.02	21.67	23.59
10	2.16	2.56	3.25	3.94	18.31	20.48	23.21	25.19
11	2.60	3.05	3.82	4.57	19.68	21.92	24.72	26.76
12	3.07	3.57	4.40	5.23	21.03	23.34	26.22	28.30
13	3.57	4.11	5.01	5.89	22.36	24.74	27.69	29.82
14	4.07	4.66	5.63	6.57	23.68	26.12	29.14	31.32
15	4.60	5.23	6.26	7.26	25.00	27.49	30.58	32.80
16	5.14	5.81	6.91	7.96	26.30	28.85	32.00	34.27
17	5.70	6.41	7.56	8.67	27.59	30.19	33.41	35.72
18	6.26	7.01	8.23	9.39	28.87	31.53	34.81	37.16
19	6.84	7.63	8.91	10.12	30.14	32.85	36.19	38.58
20	7.43	8.26	9.59	10.85	31.41	34.17	37.57	40.00
21	8.03	8.90	10.28	11.59	32.67	35.48	38.93	41.40
22	8.64	9.54	10.98	12.34	33.92	36.78	40.29	42.80
23	9.26	10.20	11.69	13.09	35.17	38.08	41.64	44.18
24	9.89	10.86	12.40	13.85	36.42	39.36	42.98	45.56
25	10.52	11.52	13.12	14.61	37.65	40.65	44.31	46.93
26	11.16	12.20	13.84	15.38	38.89	41.92	45.64	48.29
27	11.81	12.88	14.57	16.15	40.11	43.19	46.96	49.64
28	12.46	13.56	15.31	16.93	41.34	44.46	48.28	50.99
29	13.12	14.26	16.05	17.71	42.56	45.72	49.59	52.34
30	13.79	14.95	16.79	18.49	43.77	46.98	50.89	53.67
40	20.71	22.16	24.43	26.51	55.76	59.34	63.69	66.77
50	27.99	29.71	32.36	34.76	67.50	71.42	76.15	79.49
60	35.53	37.48	40.48	43.19	79.08	83.30	88.38	91.95
70	43.28	45.44	48.76	51.74	90.53	95.02	100.43	104.22
80	51.17	53.54	57.15	60.39	101.88	106.63	112.33	116.32
90	59.20	61.75	65.65	69.13	113.14	118.14	124.12	128.30
100	67.33	70.06	74.22	77.93	124.34	129.56	135.81	140.17

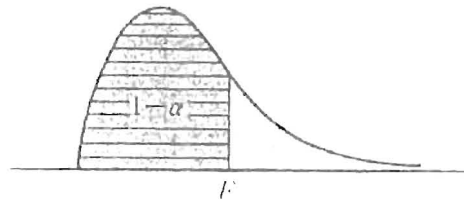
系所組別：資源工程學系丙組

考試科目：統計學

考試日期：0219 頁數：3

※ 考生請注意：本試題 可 不可 使用計算機

附表 F 分配



$1 - \alpha = 0.95$

$\nu_1 \backslash \nu_2$	1	2	3	4	5	6	7	8	9
1	161.45	199.50	215.71	221.58	230.16	233.99	236.77	238.88	240.51
2	18.513	19.000	19.161	19.247	19.296	19.330	19.353	19.371	19.385
3	10.128	9.5321	9.2766	9.1172	9.0135	8.9106	8.8368	8.8152	8.8123
4	7.7086	6.9443	6.5911	6.3883	6.2560	6.1631	6.0942	6.0410	5.9988
5	6.6079	5.7861	5.4095	5.1922	5.0503	4.9503	4.8759	4.8183	4.7725
6	5.9874	5.1433	4.7571	4.5337	4.3874	4.2839	4.2066	4.1468	4.0990
7	5.5911	4.7374	4.3468	4.1203	3.9715	3.8660	3.7870	3.7257	3.6767
8	5.3177	4.4590	4.0662	3.8378	3.6875	3.5806	3.5005	3.4381	3.3881
9	5.1174	4.2565	3.8626	3.6331	3.4817	3.3738	3.2927	3.2296	3.1789
10	4.9646	4.1028	3.7083	3.4780	3.3258	3.2172	3.1355	3.0717	3.0201
11	4.8443	3.9823	3.5874	3.3567	3.2039	3.0946	3.0123	2.9480	2.8962
12	4.7472	3.8853	3.4903	3.2592	3.1059	2.9961	2.9131	2.8486	2.7961
13	4.6672	3.8056	3.4105	3.1791	3.0251	2.9153	2.8321	2.7669	2.7141
14	4.6001	3.7389	3.3439	3.1122	2.9582	2.8477	2.7642	2.6987	2.6458
15	4.5431	3.6823	3.2874	3.0556	2.9013	2.7905	2.7066	2.6408	2.5876
16	4.4940	3.6337	3.2389	3.0069	2.8524	2.7413	2.6572	2.5911	2.5377
17	4.4513	3.5915	3.1968	2.9647	2.8100	2.6987	2.6143	2.5480	2.4943
18	4.4139	3.5546	3.1599	2.9277	2.7729	2.6613	2.5767	2.5102	2.4563
19	4.3808	3.5219	3.1274	2.8951	2.7401	2.6283	2.5435	2.4768	2.4227
20	4.3513	3.4928	3.0984	2.8661	2.7109	2.5990	2.5140	2.4471	2.3928
21	4.3248	3.4668	3.0725	2.8401	2.6848	2.5727	2.4876	2.4205	2.3661
22	4.3009	3.4431	3.0491	2.8167	2.6613	2.5491	2.4638	2.3965	2.3419
23	4.2793	3.4221	3.0280	2.7955	2.6400	2.5277	2.4422	2.3748	2.3201
24	4.2597	3.4028	3.0088	2.7763	2.6207	2.5082	2.4226	2.3551	2.3002
25	4.2417	3.3852	2.9912	2.7587	2.6030	2.4901	2.4047	2.3371	2.2821
26	4.2252	3.3690	2.9751	2.7426	2.5868	2.4711	2.3853	2.3205	2.2655
27	4.2100	3.3541	2.9604	2.7278	2.5719	2.4591	2.3732	2.3053	2.2501
28	4.1960	3.3404	2.9467	2.7141	2.5581	2.4453	2.3593	2.2913	2.2360
29	4.1830	3.3277	2.9340	2.7014	2.5454	2.4324	2.3463	2.2782	2.2229
30	4.1709	3.3158	2.9223	2.6896	2.5336	2.4205	2.3343	2.2662	2.2107
40	4.0848	3.2317	2.8387	2.6060	2.4495	2.3359	2.2490	2.1802	2.1240
60	4.0012	3.1504	2.7581	2.5252	2.3683	2.2540	2.1665	2.0970	2.0401
120	3.9201	3.0718	2.6802	2.4472	2.2900	2.1750	2.0867	2.0161	1.9588
∞	3.8415	2.9957	2.6049	2.3719	2.2141	2.0986	2.0096	1.9381	1.8799