

## 選擇題（選出正確答案，單選題，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. In a standard normal distribution, the range of values of z is from
  - a. minus infinity to infinity
  - b. -1 to 1
  - c. 0 to 1
  - d. -3.09 to 3.09
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. Consider a binomial probability experiment with  $n = 3$  and  $p = 0.1$ . Then, the probability of  $x = 0$  is
  - a. 0.0000
  - b. 0.0001
  - c. 0.001
  - d. 0.729
5. A population has a mean of 80 and a standard deviation of 7. A sample of 49 observations will be taken. The probability that the sample mean will be larger than 82 is
  - a. 0.5228
  - b. 0.9772
  - c. 0.4772
  - d. 0.0228
6. A random sample of 16 statistics examinations was taken. The average score, in the sample, was 76.2 with a variance of 144. The 99% confidence interval for the true average examination score is
  - a. 49.677 to 102.723
  - b. 73.99 to 78.41
  - c. 67.359 to 85.041
  - d. 67.437 to 84.963

(背面仍有題目,請繼續作答)

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7. For a one-tailed test (upper tail), a sample size of 18 at 95% confidence,  $t =$
- 2.12
  - 2.12
  - 1.740
  - 1.740
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 AA**

Salary information for a random sample of male and female employees of a large company is shown below.

	Male	Female
Sample Size	64	36
Sample Mean Salary (in \$1,000)	44	41
Sample Variance	128	72

9. Refer to Exhibit AA. The standard error for the difference between the two means is
- 4
  - 7.46
  - 4.24
  - 2.0
10. Refer to Exhibit AA. The 95% confidence interval for the difference between the means of the two populations is
- 0 to 6.92
  - 2 to 2
  - 1.96 to 1.96
  - 0.92 to 6.92

**Exhibit BB**

A statistics teacher wants to see if there is any difference in the abilities of students enrolled in statistics today and those enrolled five years ago. A sample of final examination scores from students enrolled today and from students enrolled five years ago was taken. You are given the following results.

	Today	Five Years Ago
Mean	82	88
Variance	112.5	54
Sample Size	45	36

11. Refer to Exhibit BB. The point estimate for the difference between the means of the two populations is
- 58.5
  - 9
  - 9
  - 6

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12. Refer to Exhibit BB. The point estimate for the standard deviation of the difference between the means of the two populations is
- 12.9
  - 9.3
  - 4
  - 2
13. A sample of 41 observations yielded a sample standard deviation of 5. If we want to test  $H_0: \sigma^2 = 20$ , the test statistic is
- 100
  - 10
  - 51.25
  - 50

**Exhibit CC**

In order to determine whether or not a particular medication was effective in curing the common cold, one group of patients was given the medication, while another group received sugar pills. The results of the study are shown below.

	Patients Cured	Patients Not Cured
Received medication	70	10
Received sugar pills	20	50

We are interested in determining whether or not the medication was effective in curing the common cold.

14. Refer to Exhibit CC. The test statistic is
- 10.08
  - 54.02
  - 1.96
  - 1.645
15. Refer to Exhibit CC. The hypothesis is to be tested at the 5% level of significance. The critical value from the table equals
- 3.84
  - 7.81
  - 5.99
  - 9.34

(背面仍有題目,請繼續作答)

**Exhibit DD**

You want to test whether or not the following sample of 30 observations follows a normal distribution.

The mean of the sample equals 11.83, and the standard deviation equals 4.53.

2	3	5	5	7	8	8	9	9	10
11	11	12	12	12	12	13	13	13	14
15	15	15	16	16	17	17	18	18	19

16. Refer to Exhibit DD. The calculated value for the test statistic equals
- a. 0
  - b. 1.67
  - c. 2
  - d. 6
17. Refer to Exhibit DD. The hypothesis is to be tested at the 5% level of significance. The critical value from the table equals
- a. 1.645
  - b. 1.96
  - c. 7.815
  - d. 12.592
18. Refer to Exhibit DD. The conclusion of the test is that the
- a. data follows a normal distribution
  - b. data does not follow a normal distribution
  - c. test is inconclusive
  - d. None of these alternatives is correct.

**Exhibit EE**

Part of an ANOVA table is shown below. (hint: you need to fill the table first)

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F
Between Treatments	64			8
Within Treatments			2	
Error				
Total	100			

19. Refer to Exhibit EE. If at 95% confidence we want to determine whether or not the means of the populations are equal, the critical value of F is
- 5.80
  - 2.93
  - 3.16
  - 2.90
20. Refer to Exhibit EE. The conclusion of the test is that the means
- are equal
  - may be equal
  - are not equal
  - None of these alternatives is correct.
21. In a regression model involving more than one independent variable, which of the following tests must be used in order to determine if the relationship between the dependent variable and the set of independent variables is significant?
- t test
  - F test
  - Either a t test or a chi-square test can be used.
  - chi-square test

**Exhibit FF**

A regression and correlation analysis resulted in the following information regarding a dependent variable (y) and an independent variable (x).

$$n = 10$$

$$\Sigma x = 55$$

$$\Sigma y = 55$$

$$\Sigma x^2 = 385$$

$$\Sigma y^2 = 385$$

$$\Sigma xy = 220$$

22. Refer to Exhibit FF. The least squares estimate of  $b_1$  equals
- 1
  - 1
  - 5.5
  - 11
23. Refer to Exhibit FF. The least squares estimate of  $b_0$  equals
- 1
  - 1
  - 5.5
  - 11

(背面仍有題目,請繼續作答)

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24. Refer to Exhibit FF. The point estimate of  $y$  when  $x = 20$  is
- 0
  - 31
  - 9
  - 9
25. Refer to Exhibit FF. The sample correlation coefficient equals
- 0
  - 1
  - +1
  - 0.5

表 標準常態機率分配之面積或機率

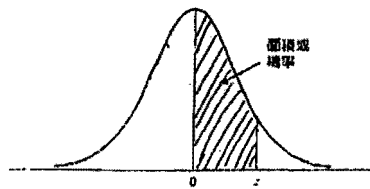
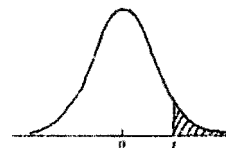


表 右尾面積的 t 分配表，例如，若自由度為 10，則  $t_{0.05} = 2.228$



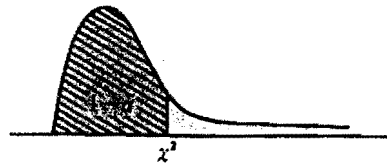
z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	自由度	0.10	0.05	0.025	0.01	0.005
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359	1	3.078	6.314	12.706	31.821	63.657
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753	2	1.886	2.920	4.303	6.965	9.925
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141	3	1.638	2.351	3.182	4.241	5.841
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517	4	1.533	2.132	2.776	3.747	4.604
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879	5	1.476	2.015	2.571	3.365	4.032
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224	6	1.440	1.943	2.447	3.143	3.707
0.6	0.2237	0.2271	0.2304	0.2337	0.2369	0.2402	0.2434	0.2466	0.2498	0.2529	7	1.415	1.895	2.363	2.998	3.499
0.7	0.2580	0.2612	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852	8	1.397	1.860	2.306	2.896	3.355
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133	9	1.383	1.833	2.262	2.821	3.250
0.9	0.3159	0.3186	0.3213	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389	10	1.372	1.812	2.232	2.764	3.169
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621	11	1.363	1.796	2.204	2.718	3.109
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830	12	1.356	1.782	2.179	2.681	3.055
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015	13	1.350	1.771	2.166	2.650	3.012
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177	14	1.345	1.761	2.155	2.624	2.972
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319	15	1.341	1.753	2.143	2.602	2.947
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441	16	1.337	1.746	2.130	2.583	2.921
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545	17	1.333	1.740	2.110	2.567	2.895
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633	18	1.330	1.734	2.101	2.552	2.876
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706	19	1.328	1.729	2.093	2.539	2.861
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767	20	1.325	1.725	2.086	2.528	2.845
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817	21	1.323	1.721	2.080	2.518	2.831
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857	22	1.321	1.717	2.074	2.508	2.819
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890	23	1.319	1.714	2.069	2.500	2.807
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916	24	1.318	1.711	2.064	2.492	2.797
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936	25	1.316	1.708	2.060	2.485	2.787
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952	26	1.315	1.706	2.056	2.479	2.779
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964	27	1.314	1.703	2.052	2.473	2.771
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974	28	1.313	1.701	2.048	2.467	2.763
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981	29	1.311	1.699	2.045	2.462	2.756
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986	30	1.310	1.697	2.042	2.457	2.750
3.0	0.4986	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990	∞	1.282	1.641	1.960	2.326	2.576

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附表 ●  $\chi^2$  分配



自由度	機 率 $1-\alpha$							
	.005	.010	.025	.050	.950	.975	.990	.995
1				.004	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	40.63	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

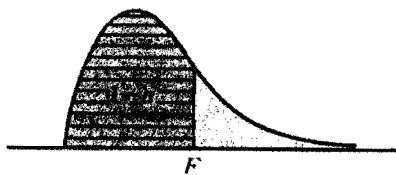
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附表 ● F 分配



$1 - \alpha = 0.95$

	1	2	3	4	5	6	7	8	9
1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54
2	18.513	19.000	19.164	19.247	19.296	19.330	19.353	19.371	19.385
3	10.128	9.5521	9.2766	9.1172	9.0135	8.9406	8.8868	8.8452	8.8123
4	7.7086	6.9443	6.5914	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	5.5914	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	3.0204
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	2.9134	2.8486	2.7964
13	4.6672	3.8056	3.4105	3.1791	3.0254	2.9153	2.8321	2.7669	2.7144
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	3.4434	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	2.4904	2.4047	2.3371	2.2821
26	4.2252	3.3690	2.9751	2.7426	2.5868	2.4741	2.3883	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	2.0164	1.9588
∞	3.8115	2.9957	2.6049	2.3719	2.2141	2.0986	2.0096	1.9384	1.8799