＊注意：請作答於試卷內的「選擇題作答區」。

I. 單選題 (每題5分)

1. A regression model $Y_i = \alpha + \beta X_i + \varepsilon_i$ for which the following assumptions are all satisfied:

(a) Normality : ε_i is normally distributed
(b) Zero mean : $E(\varepsilon_i) = 0$.
(c) Homokedasticity : $Var(\varepsilon_i) = \sigma^2$.
(d) Nonautocorrelation : $Cov(\varepsilon_i \varepsilon_j) = 0, \quad (i \neq j)$.
(e) Nonstochastic X: X is a nonstochastic variable with values fixed in repeated samples and s.t. for any sample size n, $\frac{1}{n}\sum_i (X_i - \overline{X})^2 \neq 0$ and its limit is a finite number.

Suppose additional information is given as follows:

$\overline{X} = 70$　　$\sum x_i' y_i' = -3550$　　$x_i' = (X_i - \overline{X})$　　$y_i' = (Y_i - \overline{Y})$

$\overline{Y} = 100$　　$\sum x_i'^2 = 2250$　　$\sum y_i'^2 = 6300$　　$n = 12$

Based on the above information, the estimated sample regression line is

(A) $\hat{Y}_i = 200.48 - 1.468 X_i$　　(B) $\hat{Y}_i = 210.46 - 1.578 X_i$

(C) $\hat{Y}_i = 110.57 - 1.644 X_i$　　(D) $\hat{Y}_i = 110.57 + 1.644 X_i$

2. Based on question 1, at the point of $X_i = \overline{X} = 70$, the price elasicity of demand η is estimated as

(A) -1.812　　(B) -0.931
(C) -0.122　　(D) -1.105

3. Based on question 1, the estimates of the standard errors of $\hat{\alpha}$ and $\hat{\beta}$ are

(A) $s_{\hat{\alpha}} = 12.563$ and $s_{\hat{\beta}} = 0.176$　　(B) $s_{\hat{\alpha}} = 11.132$ and $s_{\hat{\beta}} = 1.176$

(C) $s_{\hat{\alpha}} = 11.132$ and $s_{\hat{\beta}} = 0.962$　　(D) $s_{\hat{\alpha}} = 13.352$ and $s_{\hat{\beta}} = 2.437$

見背面

4. Based on question 1, R^2 is
(A) 0.992　　(B) 0.889
(C) 0.776　　(D) 0.934

5. Based on question 1, suppose we wish to predict the demand for Y at $X=110$, the predicted value of Y will be
(A) 26.44　　(B) 36.88
(C) 35.49　　(D) 22.77

6. Which of the following is <u>not</u> test for homoskedasticity?
(A) The Goldfield-Quandt test.　　(B) The Breush-Pegan test.
(C) The White test.　　(D) The portmanteau Q test.

7. Which of the following statements is <u>incorrect</u>?
(A) The most widely used test for the absence of autocorrelation is Durbin-Watson test although it is not applicable to regression equations in which the place of the explanatory variable is taken by the lagged value of the dependent variable.
(B) In addition to Durbin-Watson test, there are two other tests that are also commonly used to test first-order autocorrelation. These are: the von Neumann ratio and the Berenblut-Webb test.
(C) Durbin-Watson test is a test of the hypothesis of nonautoregression against the hypothesis of autoregression of the first order; however, there is no evidence that this test is also reasonably powerful against higher order autoregression.
(D) Durbin-Watson test is meaningless for corss-section data.

8. Which of the following statements is correct?
(A) Heteroskedasticity in the errors leads to biased estimates of the regression coefficients and their standard errors.
(B) An investigator estimating a demand function in levels and first differences obtained R^2 of 0.90 and 0.80, respectively. He chose the equation in levels because he got a higher R^2. This is a valid reason for choosing between the two models.
(C) Consider the model $Y_t = \alpha Y_{t-1} + \beta X_t + \varepsilon_t$, where the errors are autoregressive. Even if the ordinary least square method gives inconsistent estimates of the paremeters, we can still use the equation for purpose of prediction if the evolution of X_t during the prediction period is the same as in the estimation period.
(D) Serial correlation in the errors leads to biased and inefficient forecasts.

接次頁

9. A regression model is specified as $Y_i = \alpha + \beta X_i + \varepsilon_i$.
Which of the following statements is incorrect?

(A) Suppose X is nonstochastic and independent of ε, least square estimate $\hat{\beta}$ is unbiased and efficient.

(B) Suppose X is stochastic but independent of ε, least square estimate $\hat{\beta}$ is unbiased and consistent.

(C) Suppose X is stochastic and not independent of ε, but contemporaneously uncorrelated with ε, least square estimate $\hat{\beta}$ is still unbiased and consistent.

(D) Suppose X is stochastic and X and ε are neither independent nor contemporaneously uncorrelated, least square estimate $\hat{\beta}$ is biased and inconsistent.

10. Which of the following statements is incorrect?

(A) The simple regression line of Y against X coincide with the simple regression line of X against Y if and only if $r^2 = 1$ (where r is the sample correlation coefficient between X and Y).

(B) In the regression model $Y_i = \alpha + \beta X_i + \varepsilon_i$, if the sample mean $\overline{X}$ of X is zero, then $\text{cov}(\hat{\alpha}, \hat{\beta}) = 0$, where $\hat{\alpha}$ and $\hat{\beta}$ are the least square estimators of α and β.

(C) In a multiple regression, a high correlation in the sample among the regressors (multicollinearity) implies the least square estimators of the coefficients are biased.

(D) The relevent question to ask if there is high multicollinearity is not what variables to drop but what other information will help.

II、每題5分

11. Many people think that a national lobby's successful fight against gun control legislation is reflecting the will of a minority of Americans. A previous random sample of 4000 citizens yielded 2250 who are in favor of gun control legislation. How many citizens would need to be sampled if a 98% confidence interval was desired to estimate the true proportion to within 1%?

A) 13,361　　B) 12,487　　C) 14,116　　D) 13,573

12. Many people think that a national lobby's successful fight against gun control legislation is reflecting the will of a minority of Americans. A random sample of 4,000 citizens yielded 2,250 who are in favor of gun control legislation. Estimate the true proportion of all Americans who are in favor of gun control legislation using a 90% confidence interval.

A) .5625 ± .4048　　B) .4375 ± .4048　　C) .4375 ± .0129　　D) .5625 ± .0129

見背面

13. Researchers have claimed that the average number of headaches during a semester of Statistics is 10. Statistics professors dispute this claim vehemently. Statistic professors believe the average is much more than this. They sample n = 25 students and find the sample mean is 15 and the sample standard deviation is 2. Which of the following represent the null and alternative hypotheses that the professors wish to test?

A) $H_0: \mu = 10$ vs. $H_a: \mu > 10$　　B) $H_0: \mu = 10$ vs. $H_a: \mu \neq 10$

C) $H_0: \mu < 10$ vs. $H_a: \mu = 10$　　D) $H_0: \mu = 10$ vs. $H_a: \mu < 10$

14. A survey claims that 9 out of 10 doctors (i.e., 90%) recommend brand Z for their patients who have children. To test this claim against the alternative that the actual proportion of doctors who recommend brand Z is less than 90%, a random sample of 100 doctors results in 87 who indicate that they recommend brand Z. The test statistic in this problem is approximately:

A) 1.00　　B) -1.00　　C) -0.66　　D) -0.50

15. When blood levels are low at an area hospital, a call goes out to local residents to give blood. The blood center is interested in determining which sex, males or females, is more likely to respond. Random independent samples of 60 females and 100 males produce the following results. A success is defined as a person who responds to the call and donates blood. The computer printout for this analysis appears below:

TWO-SAMPLE PROPORTION TEST

	SAMPLE 1	SAMPLE 2
SAMPLE SIZE	60	100
SUCCESSES	45	60
PROPORTION	0.75000	0.60000

NULL HYPOTHESIS: P1 = P2
ALTERNATIVE HYP: P1 <> P2

DIFFERENCE	0.15000
SE (DIFF)	0.07756
Z	1.93

95% CONFIDENCE INTERVAL OF DIFFERENCE

LOWER LIMIT	-0.00202
UPPER LIMIT	0.30202

Identify the point estimate for estimating the true difference in the population proportions.

A) 1.93　　B) .15　　C) .30202　　D) .07756

16. Which supermarket has the lowest prices in town? All claim to be cheaper, but an independent agency recently was asked to investigate this question. The agency randomly selected 100 items common to each of two supermarkets (labelled A and B for confidentiality) and recorded the prices charged by each supermarket. The summary results are provided below:

$\bar{x}_A = 2.09$　$\bar{x}_B = 1.99$　$\bar{d} = .10$
$s_A = 0.22$　$s_B = 0.19$　$s_d = .03$

Assuming the data represent a matched pairs design, calculate the confidence interval for comparing mean prices using a 95% confidence level.

A) .10 ± .056975　　B) .10 ± .00588　　C) .10 ± .1255　　D) .10 ± .004935

接次頁

17. The FDA wants to compare the mean caffeine contents of two other brands of 6-oz. cola, Brand A and Brand B. Independent random samples of 6-oz. cans of each brand were selected and the caffeine content of each can determined. The study provided the following summary information.

	Brand A	Brand B
Sample size	15	10
Mean (ounces)	18	20
Variance	1.2	1.5

How many cans of each soda would need to be sampled in order to estimate the difference in the mean caffeine content to within .10 ounces with 90% reliability?

A) $n_1 = n_2 = 104$　　B) $n_1 = n_2 = 1038$　　C) $n_1 = n_2 = 731$　　D) $n_1 = n_2 = 74$

18. Calculate the test statistic F to test the claim that $\sigma_1^2 > \sigma_2^2$. Two samples are randomly selected from populations that are normal. The sample statistics are given below. Use $\alpha = 0.01$.

$n_1 = 16$　　$n_2 = 13$

$s_1^2 = 1600$　　$s_2^2 = 625$

A) 2.560　　B) 0.391　　C) 1.600　　D) 6.554

19. A local consumer reporter wants to compare the average costs of grocery items purchased at three different supermarkets, A, B, and C. Prices (in dollars) were recorded for a sample of 60 randomly selected grocery items at each of the three supermarkets. In order to reduce item-to-item variation, the prices were recorded for each item on the same day at each supermarket.

Item		A	B	C
1)	paper towels	1.21	1.41	1.36
2)	cereal	2.74	3.19	2.94
3)	floor cleaner	5.93	5.81	6.82
⋮	⋮	⋮	⋮	⋮
59)	shaving cream	0.97	0.87	0.93
60)	canned green beans	0.39	0.54	0.31

The results of the ANOVA are summarized in the following table.

Source	df	Anova SS	Mean Square	F Value	Pr > F
Supermkt	2	2.6412678	1.3206399	39.23	0.0001
Item	59	215.5949311	3.6541514	108.54	0.0001
Error	118	3.9725322	0.0336655		
Corrected Total	179	222.2087311			

What is the value of the test statistic for determining whether the three supermarkets have the same average prices?

A) 108.54　　B) 1.3206　　C) 0.0001　　D) 39.23

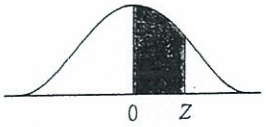
20. The contingency table below shows the results of a random sample of 200 state representatives that was conducted to see whether their opinions on a bill are related to their party affiliation.

	Opinion		
Party	Approve	Disapprove	No Opinion
Republican	42	20	14
Democrat	50	24	18
Independent	10	16	6

Find the chi-square test statistic, χ^2, to test the claim of independence.

A) 9.483　　B) 7.662　　C) 11.765　　D) 8.030

見背面



圖表 A-1　標準常態分配表

	Second Decimal Place in z									
z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
3.1	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
3.2	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
3.3	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
3.4	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998
3.5	0.4998									
4.0	0.49997									
4.5	0.499997									
5.0	0.4999997									
6.0	0.499999999									

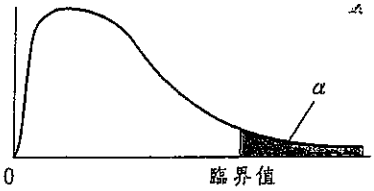
接次頁

圖表 A-2　t 分配之臨界值

	Level of Significance for One-Tailed Test					
	.10	.05	.025	.01	.005	.0005
	Level of Significance for Two-Tailed Test					
d.f.	.20	.10	.05	.02	.01	.001
1	3.078	6.314	12.706	31.821	63.657	636.619
2	1.886	2.920	4.303	6.965	9.925	31.598
3	1.638	2.353	3.182	4.541	5.841	12.941
4	1.533	2.132	2.776	3.747	4.604	8.610
5	1.476	2.015	2.571	3.365	4.032	6.859
6	1.440	1.943	2.447	3.143	3.707	5.959
7	1.415	1.895	2.365	2.998	3.499	5.405
8	1.397	1.860	2.306	2.896	3.355	5.041
9	1.383	1.833	2.262	2.821	3.250	4.781
10	1.372	1.812	2.228	2.764	3.169	4.587
11	1.363	1.796	2.201	2.718	3.106	4.437
12	1.356	1.782	2.179	2.681	3.055	4.318
13	1.350	1.771	2.160	2.650	3.012	4.221
14	1.345	1.761	2.145	2.624	2.977	4.140
15	1.341	1.753	2.131	2.602	2.947	4.073
16	1.337	1.746	2.120	2.583	2.921	4.015
17	1.333	1.740	2.110	2.567	2.898	3.965
18	1.330	1.734	2.101	2.552	2.878	3.922
19	1.328	1.729	2.093	2.539	2.861	3.883
20	1.325	1.725	2.086	2.528	2.845	3.850
21	1.323	1.721	2.080	2.518	2.831	3.819
22	1.321	1.717	2.074	2.508	2.819	3.792
23	1.319	1.714	2.069	2.500	2.807	3.767
24	1.318	1.711	2.064	2.492	2.797	3.745
25	1.316	1.708	2.060	2.485	2.787	3.725
26	1.315	1.706	2.056	2.479	2.779	3.707
27	1.314	1.703	2.052	2.473	2.771	3.690
28	1.313	1.701	2.048	2.467	2.763	3.674
29	1.311	1.699	2.045	2.462	2.756	3.659
30	1.310	1.697	2.042	2.457	2.750	3.646
40	1.303	1.684	2.021	2.423	2.704	3.551
60	1.296	1.671	2.000	2.390	2.660	3.460
120	1.289	1.658	1.980	2.358	2.617	3.373
∞	1.282	1.645	1.960	2.326	2.576	3.291

SOURCE: Abridged from Table III of Fisher and Yates, *Statistical Tables for Biological, Agricultural, and Medical Research*, 6th ed., published by Oliver and Boyd Ltd., Edinburgh, 1963. By permission of the publishers.

見背面

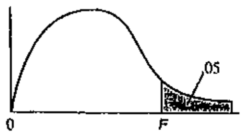


圖表 A-3　卡方分配之臨界值

	Probability Under H_0 that $\chi^2 \geq$ Chi Square				
d.f.	.10	.05	.02	.01	.001
1	2.71	3.84	5.41	6.64	10.83
2	4.60	5.99	7.82	9.21	13.82
3	6.25	7.82	9.84	11.34	16.27
4	7.78	9.49	11.67	13.28	18.46
5	9.24	11.07	13.39	15.09	20.52
6	10.64	12.59	15.03	16.81	22.46
7	12.02	14.07	16.62	18.48	24.32
8	13.36	15.51	18.17	20.09	26.12
9	14.68	16.92	19.68	21.67	27.88
10	15.99	18.31	21.16	23.21	29.59
11	17.28	19.68	22.62	24.72	31.26
12	18.55	21.03	24.05	26.22	32.91
13	19.81	22.36	25.47	27.69	34.53
14	21.06	23.68	26.87	29.14	36.12
15	22.31	25.00	28.26	30.58	37.70
16	23.54	26.30	29.63	32.00	39.29
17	24.77	27.59	31.00	33.41	40.75
18	25.99	28.87	32.35	34.80	42.31
19	27.20	30.14	33.69	36.19	43.82
20	28.41	31.41	35.02	37.57	45.32
21	29.62	32.67	36.34	38.93	46.80
22	30.81	33.92	37.66	40.29	48.27
23	32.01	35.17	38.97	41.64	49.73
24	33.20	36.42	40.27	42.98	51.18
25	34.38	37.65	41.57	44.31	52.62
26	35.56	38.88	42.86	45.64	54.05
27	36.74	40.11	44.14	46.96	55.48
28	37.92	41.34	45.42	48.28	56.89
29	39.09	42.56	46.69	49.59	58.30
30	40.26	43.77	47.96	50.89	59.70

SOURCE: Abridged from Table IV of Fisher and Yates, *Statistical Tables for Biological, Agricultural, and Medical Research*, 6th ed., published by Oliver and Boyd Ltd., Edinburgh, 1963. By permission of the publishers.

接次頁



圖表 A-9 F 分配之臨界值(α = .05)

Degrees of Freedom for Denominator (columns); Degrees of Freedom for Numerator (rows)

n_2	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	∞
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	243.3
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	6.61	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
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.48	2.40	2.33	2.29	2.25	2.20	2.16	2.11	2.07
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54	2.49	2.42	2.35	2.28	2.24	2.19	2.15	2.11	2.06	2.01
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49	2.45	2.38	2.31	2.23	2.19	2.15	2.10	2.06	2.01	1.96
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46	2.41	2.34	2.27	2.19	2.15	2.11	2.06	2.02	1.97	1.92
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42	2.38	2.31	2.23	2.16	2.11	2.07	2.03	1.98	1.93	1.88
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35	2.28	2.20	2.12	2.08	2.04	1.99	1.95	1.90	1.84
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37	2.32	2.25	2.18	2.10	2.05	2.01	1.96	1.92	1.87	1.81
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34	2.30	2.23	2.15	2.07	2.03	1.98	1.94	1.89	1.84	1.78
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32	2.27	2.20	2.13	2.05	2.01	1.96	1.91	1.86	1.81	1.76
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30	2.25	2.18	2.11	2.03	1.98	1.94	1.89	1.84	1.79	1.73
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28	2.24	2.16	2.09	2.01	1.96	1.92	1.87	1.82	1.77	1.71
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27	2.22	2.15	2.07	1.99	1.95	1.90	1.85	1.80	1.75	1.69
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25	2.20	2.13	2.06	1.97	1.93	1.88	1.84	1.79	1.73	1.67
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24	2.19	2.12	2.04	1.96	1.91	1.87	1.82	1.77	1.71	1.65
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22	2.18	2.10	2.03	1.94	1.90	1.85	1.81	1.75	1.70	1.64
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21	2.16	2.09	2.01	1.93	1.89	1.84	1.79	1.74	1.68	1.62
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	2.08	2.00	1.92	1.84	1.79	1.74	1.69	1.64	1.58	1.51
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04	1.99	1.92	1.84	1.75	1.70	1.65	1.59	1.53	1.47	1.39
120	3.92	3.07	2.68	2.45	2.29	2.17	2.09	2.02	1.96	1.91	1.83	1.75	1.66	1.61	1.55	1.50	1.43	1.35	1.25
∞	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88	1.83	1.75	1.67	1.57	1.52	1.46	1.39	1.32	1.22	1.00

SOURCE: Reprinted by permission from *Statistical Methods* by George W. Snedecor and William G. Cochran, 6th edition, © 1967 by Iowa State University Press, Ames, Iowa

試題隨卷繳回