Critical Values of the F Distribution at a 1 Percent Level of Significance

Degrees of Freedom for the Numerator

Degrees of Freedom for the Denominator	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40
1	4052	5000	5403	5625	5764	5859	5928	5981	6022	6056	6106	6157	6209	6235	6261	6287
2	98.5	99.0	99.2	99.2	99.3	99.3	99.4	99.4	99.4	99.4	99.4	99.4	99.4	99.5	99.5	99.5
3	34.1	30.8	29.5	28.7	28.2	27.9	27.7	27.5	27.3	27.2	27.1	26.9	26.7	26.6	26.5	26.4
4	21.2	18.0	16.7	16.0	15.5	15.2	15.0	14.8	14.7	14.5	14.4	14.2	14.0	13.9	13.8	13.7
5	16.3	13.3	12.1	11.4	11.0	10.7	10.5	10.3	10.2	10.1	9.89	9.72	9.55	9.47	9.38	9.29
6	13.7	10.9	9.78	9.15	8.75	8.47	8.26	8.10	7.98	7.87	7.72	7.56	7.40	7.31	7.23	7.14
7	12.2	9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72	6.62	6.47	6.31	6.16	6.07	5.99	5.91
8	11.3	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91	5.81	5.67	5.52	5.36	5.28	5.20	5.12
9	10.6	8.02	6.99	6.42	6.06	5.80	5.61	5.47	5.35	5.26	5.11	4.96	4.81	4.73	4.65	4.57
10	10.0	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94	4.85	4.71	4.56	4.41	4.33	4.25	4.17
11	9.65	7.21	6.22	5.67	5.32	5.07	4.89	4.74	4.63	4.54	4.40	4.25	4.10	4.02	3.94	3.86
12	9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39	4.30	4.16	4.01	3.86	3.78	3.70	3.62
13	9.07	6.70	5.74	5.21	4.86	4.62	4.44	4.30	4.19	4.10	3.96	3.82	3.66	3.59	3.51	3.43
14	8.86	6.51	5.56	5.04	4.69	4.46	4.28	4.14	4.03	3.94	3.80	3.66	3.51	3.43	3.35	3.27
15	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89	3.80	3.67	3.52	3.37	3.29	3.21	3.13
16	8.53	6.23	5.29	4.77	4.44	4.20	4.03	3.89	3.78	3.69	3.55	3.41	3.26	3.18	3.10	3.02
17	8.40	6.11	5.18	4.67	4.34	4.10	3.93	3.79	3.68	3.59	3.46	3.31	3.16	3.08	3.00	2.92
18	8.29	6.01	5.09	4.58	4.25	4.01	3.84	3.71	3.60	3.51	3.37	3.23	3.08	3.00	2.92	2.84
19	8.18	5.93	5.01	4.50	4.17	3.94	3.77	3.63	3.52	3.43	3.30	3.15	3.00	2.92	2.84	2.76
20	8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46	3.37	3.23	3.09	2.94	2.86	2.78	2.69
21	8.02	5.78	4.87	4.37	4.04	3.81	3.64	3.51	3.40	3.31	3.17	3.03	2.88	2.80	2.72	2.64
22	7.95	5.72	4.82	4.31	3.99	3.76	3.59	3.45	3.35	3.26	3.12	2.98	2.83	2.75	2.67	2.58
23	7.88	5.66	4.76	4.26	3.94	3.71	3.54	3.41	3.30	3.21	3.07	2.93	2.78	2.70	2.62	2.54
24	7.82	5.61	4.72	4.22	3.90	3.67	3.50	3.36	3.26	3.17	3.03	2.89	2.74	2.66	2.58	2.49
25	7.77	5.57	4.68	4.18	3.85	3.63	3.46	3.32	3.22	3.13	2.99	2.85	2.70	2.62	2.54	2.45
30	7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07	2.98	2.84	2.70	2.55	2.47	2.39	2.30
40	7.31	5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.89	2.80	2.66	2.52	2.37	2.29	2.20	2.11
60	7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72	2.63	2.50	2.35	2.20	2.12	2.03	1.94
120	6.85	4.79	3.95	3.48	3.17	2.96	2.79	2.66	2.56	2.47	2.34	2.19	2.03	1.95	1.86	1.76
∞	6.63	4.61	3.78	3.32	3.02	2.80	2.64	2.51	2.41	2.32	2.18	2.04	1.88	1.79	1.70	1.59

考試科目 Course	統計學	系級	統計所	日期 Date, Period	月 日 第 節	授課編號 Course No.

Answer all of the following questions by True (T), False (F), or Uncertain (U), and give a brief explanation or proof.

1. (5%) In a least squares regression of Y on X, observations for which X is far from its mean will have more effect on the estimated slope than observations for which X is close to its mean value.

2. (5%) Heteroscedasticity in the errors leads to biased estimates of the regression coefficients and their standard errors.

3. (5%) The correlation between two ratios which have the same denominator is always biased upward.

4. (5%) Serial correlation in the errors U leads to biased estimates and biased standard errors when the regression equation $Y=a+bX+U$ is estimated by ordinary least squares.

5. (5%) The Durbin-Watson test for serial correlation is not applicable if there are lagged dependent variables as explanatory variables.

6. (5%) In multiple regression, a high correlation in the sample among the regressors (multicollinearity) implies that the least squares estimators of the coefficients are biased.

7. (5%) In a simultaneous equation system, the more the number of exogenous variables the better.

8. (5%) the Cramer-Rao lower bound is a lower limit for the variance of any unbiased estimator providing we can specify the function form of the parent distribution. And the Cramer-Rao lower bound can always be attained by a certain unbiased estimator.

9. (5%) In the setting of dummy variables, we have to have four dummy variables in order to check the seasonal effects.

10. (5%) While the R-squares is always positive, the adjusted R-squares could be negative.

考試科目 Course	個体經濟學	系組	經濟二班	日期 Date, Period	4月23日 第一節	試題編號 CourseNo.	120

個體經濟學第一部份

※請務必用圖形或數學式作爲輔助工具來回答

一、詳答題：

根據傳統訂價理論，獨占廠商通常會利用「MR=MC」單一定價法來追求最大利潤。現若該獨占廠商不滿足上述定價法所得之利潤，她是否可利用兩部訂價（2-part tariff）法與第二級差別取價（級距式差別取價或數量折扣）來增加其利潤？（20分）

二、是非（簡答）題：

1、在現實社會裡，若同一廠商在天母與木柵設分店，且對同一品質的產品收取不同價格，其背後原因絕對只是天母店面租金比木柵的高所導致。（10分）

2、假設你（妳）是風險逃避者，且獨資經營一家企業。假設今年該獨資企業的稅前盈餘爲200萬；適用的所得稅率爲30%；被查稅的機率爲20%；若有漏報盈餘，且被查到時，除了應補繳稅款外，每漏報1元盈餘，還要繳罰款0.6元。面對上述情況，你（妳）明年申報時會否漏報盈餘？（10分）

3、雖然教育部以優惠利率僅針對「學分與學雜費」貸予大學生助學貸 款，此一政策亦會影響大學生的跨期消費決策。（10分）

三、（25分）在一個經濟社會裡，存在兩個消費者（A與B）以及兩種財貨（x與y），其中消費者A與B對此兩種財貨之效用函數分別爲：

$U_A = x_A y_A$

$U_B = x_B y_B$

而消費者A與B對此兩種財貨之稟賦分別爲：

$\bar{x}_A = 90$ ， $\bar{y}_A = 35$ ， $\bar{x}_B = 30$ ， $\bar{y}_A = 25$

令y財貨之價格爲1，x財貨之價格爲P_x，

（1）試寫出消費者A與B之預算限制式（5分）。

（2）試分別求出消費者A對財貨x與y之需求函數（5分）。

（3）試分別求出消費者B對財貨x與y之需求函數（5分）。

（4）試求出均衡價格P_x（5分）。

（5）試求出消費者A與B 對此兩種財貨之消費量以及效用水準（5分）。

考試科目 Course	個體經濟學	系組	經濟乙組	日期 Date, Period	月 日 第 節	試題編號 CourseNo.

四、（10分）存在一家廠商，爲勞動市場中之勞動獨買者（monopsonist），而勞動供給者有男性與女性之分，其中男性勞動者之勞動供給爲：

$$L_m = 10W_m^2$$

而女性勞動者之勞動供給爲：

$$L_f = 200W_f$$

假設此一廠商所生產之商品，其單位價格爲$6（固定不變），且每小時男性與女性勞動者之商品生產量均爲3單位：

（1）若獨買者能對男性與女性勞動者訂定不同之工資水準，試問男性與女性勞動者之工資水準與雇用量分別爲何（5分）？

（2）若政府不允許該廠商有工資上的歧視，但仍允許該廠商有訂定工資的權力，試問男性與女性勞動者之工資水準與雇用量分別爲何（5分）？

五、（15分）假設存在n家同質廠商，而代表性廠商（representative firm）i之總成本函數如下：

$$C(q_i) = F + cq_i + dq_i^2$$

其中F表固定成本，q_i表廠商i之產量，c與d表係數且爲正值。

（1）試求出代表性廠商之最低有效生產規模（minimum efficient scale, MES）（5分）？

（2）若市場之需求曲線爲

$$P = a - b\sum_{i=1}^{n} q_i$$

且在短期下，廠商無法進出市場，試求出Cournot 競爭下之短期均衡價格與廠商之產量（5分）？

（3）若在長期下，廠商可自由進出市場，試求出Cournot 競爭下之廠商家數（5分）？

考試科目 Course	總體經濟學	系級	經濟系3組	日期 Date, Period	4月25日 第8:30-10:00節	試題 Cours

一、 (25 分)

(1). (5 分)

請說明在「實質景氣循環模型(The real business cycle model)」中有關勞動供給的設定。請輔以勞動供給方程式解說之。

(2). (5 分)

承本大題的第(1)小題，請以名目工資(w)為縱軸，就業量(N)為橫軸，描繪勞動市場均衡的情況，並進一步解析實質利率(r)上升對工資和就業量的影響。

(3). (5 分)

能讓勞動市場均衡，且同時滿足生產函數的所有實質利率(r)及產出(y)組合的連線形狀為何？為什麼？

(4). (10 分)

承本大題的第(3)小題，令所有r 和y 組合的連線以$y=S(r)$表示，若有一總體模型如下：

$$y=C(y)+I(r)\ ,$$

$$\frac{M}{P}=L(y,r)\ ,$$

$$y=S(r)\ 。$$

式中，y：實質產出； r：實質利率； C：實質消費；

M：貨幣供給； P：物價。

請以圖形輔助分析地震造成資本設備受損後，產出和實質利率將如何變動？

二、 (25 分)

1. (2 分)

央行面臨台幣升值情況下，若擬在外匯市場逆勢干預，則應如何做？

2. (3 分)

承本大題的第(1)小題，央行在外匯市場的這種干預行為將導致貨幣供給如何變動？央行要如何透過公開市場操作抵銷此一變動？

3. (10 分)

一經濟體系若從封閉走向開放，且採行浮動匯率制度，則擴張性貨幣政策對產出之影響效果將如何變動？請以圖形輔助分析之。

4. (10 分)

一個採行浮動匯率制度的國家，若放寬資本管制，致國際資本移動性變大，則擴張性財政政策對產出之影響效果將如何變動？請以圖形輔助分析之。

三、對於貨幣政策的角色，凱因斯學派與貨幣學派各以什麼為指標？在什麼情況下這兩個學派的指標會不一致——以貨幣供需圖形表示之。如果使產出的波動為最小，央行應選擇釘住利率或貨幣數量——以IS-LM圖形分析之。(25分)

四、利率在一般認為會使投資減少，為什麼？以凱因斯學派、加速因子、新古典、現金流量、及Tobin q等投資理論說明之(可輔以圖形說明)。(25分)

考試科目 Course	經濟學	系組	經濟系	日期 Date, Period	月 第	日 節	試題編 Course

1. (20%) 若新政府爲重建 921 震災，向民間發行公債 200 億元，爲期十年，年息 8%，甲案:每半年計息一次；乙案:連續複利計息；請問兩案需支付之利息相差多少? (無計算式者不給分) 舉公債對於總體消費有無影響? 爲什麼?

2. (20%)總體經濟之三個主要面向(成長、波動、就業)之關連爲何？有無階段之分？ 有何政策組合可達一箭三鵰?

3. (20%) A.何爲邊際遞減法則? B.在現行資訊經濟發展之下是否仍然成立? C.(以資訊產品爲例: 開發一套裝遊戲軟體，花費約 1500 萬，但每增一單位之錄製邊際成本極低) 則理論應如何修正? 試略述己見.

4. (20%)

若公元 2002 年，國民會計帳資料如下表：

消費支出(Consumption)	$500(billion)
投資支出(Investment)	90
政府支出(Government expenditure)	150
進口(Import)	60
出口(Export)	50
公司利潤(Corporate profits)	70
淨稅收(Net taxes)	130

若阿扁請您當主計長，請算出以下：(*無計算式者不給分)

例如) Aggregate Expenditure = C + I +G +(X-M)= 730

a) GDP= _____

b) Net Exports = _____

c) National savings =_____

d) 若有外國人在本國支薪共 30(billion)，且外資占本國全體股權達 50%，則 GNP=_____

5. (20%)某研究生之跨期效用函數爲 U(C1, C2) = Ln (C1) + 1/(1+p) *Ln (C2)，其中 Ln 爲 natural log 函數，p 爲其時間偏好率，C1, C2 分別是其現行與畢業後之消費. 若該研究生現行月入 15000 元工讀金，預計畢業後約月入 40000 元，其時間偏好率(主觀折現率爲 8%)，而學校之助學金貸款爲年息 5%，(每季計息一次，上限 20 萬元)，請問其最佳理財計畫爲何(使效用最大)?

考試科目 Course	數學	系組	經研所	日期 Date, Period	七月二日 第二節	試題編號 CourseNo.	119

1. Let the national –income model be

$Y = C + I + G_0$ (C=Consumption, Y=Income, I=Investment,

$C = a + b(Y - T_0)$ G=Government Expenditure, T=Income Tax)

$I = c + dY$

(a) Identify the endogenous variables.

(b) Write the model in matrix notation and test whether the coefficient matrix is nonsingular.

(c) Solve the system by Gauss-Jodam reduction method. $(\bar{Y}, \bar{C}, \bar{T})$

(d) Find $\partial Y/\partial G_0$, $\partial Y/\partial T_0$. Interpret their meaning and determine their sign. (20%)

2. For the matrix

$$A = \begin{bmatrix} 0 & 2 & 2 \\ 2 & 0 & 2 \\ 2 & 2 & 0 \end{bmatrix}$$

(a) Write the characteristic equation and eigenvalues.

(b) Find the eigenvectors corresponding to the eigenvalues.

(c) Diagonalize A by an orthogonal matrix. (20%)

3. A consumer has utility function

$$u = x_1 x_2$$

And she faces the money-income constraint

$$2x_1 + 3x_2 \le 100$$

And the time constraint

$$x_1 + 4x_2 \le 80$$

Solve for her utility-maximizing consumption bundle and the values of the shadow prices of the constraints. (15%)

4. Given production function Q=Q(L,K)

(a) How would you express algebraically the Isoquant for the output of 260?

(b) Write out the slope of the Isoquant.

(c) Write out the profit function of the firm.

(d) Find the first and second order condition for the optimal combination of inputs.

(e) Find the comparative-static derivatives $\partial \bar{I}/\partial P$, $\partial \bar{L}/\partial P_L$, $\partial L/\partial P_K$

(L=lable, K=capital, P = price of the product, P_L = price of L, P_K = price of K) (20%)

5. Solve $(t + y^2)dy + (y - t^2)dt = 0$ (10%)

6. Evaluate

(a) $\int_0^3 \int_{\sqrt{x}}^3 e^{y^3} dy dx$ (b) $\int_0^1 x \ln x dx$ (15%)

接下頁 7-1

1. (8%) Two groups of people are surveyed. In a sample of 50 drivers who are single people, the drivers average 106 miles per week for pleasure trips. In a sample of 65 married people, the drivers average 68 miles per week for pleasure trips. The sample standard deviations are 15 and 9 miles, respectively. At $\alpha = 0.01$, can it be concluded that single people do more driving for pleasure trips than married people?

2. (8%) A traffic safety commissioner believes the variation in the number of speeding tickets given on Freeway 1 is larger than the variation in the number of speeding tickets given on Freeway 2. Ten weeks are randomly selected; the standard deviation of the number of tickets issued for Freeway 1 is 6.3, and the standard deviation of the number of tickets issued for Freeway 2 is 2.8. At $\alpha = 0.05$, can the commissioner conclude that the variance of speeding tickets issued on Freeway 1 is greater than the variance of speeding tickets issued on Freeway 2?

3. (8%) A study is done to see whether there is a relationship between a student's grade point average (GPA) and the number of hours the student studies per week. The data are shown here. Please predict the GPA of a student who studies 10 hours a week.

Hours	3	12	9	15	5	7	16
GPA	2.1	3.5	3.0	4.0	1.7	3.2	3.7

4. (10%) Students are randomly assigned to three reading classes. Each class is taught by a different method. At the end of the course, a comprehensive reading examination is given, and the results are show here. At $\alpha = 0.05$, is there significant evidence that different teaching method influencing students' reading performance?

Class A	Class B	Class C
87	82	97
92	78	90
61	41	83
83	65	92
47	63	91

科目 Course	統計學	系級		Date, Period	第 節	

5. (8%) A mobile phone manufacturer claims that 65% of the college students have their own mobile phones. A researcher wishes to test the claim and selects a random sample of 80 college students. She finds that 57 have their own mobile phones. At $\alpha = 0.05$, should the claim be rejected?

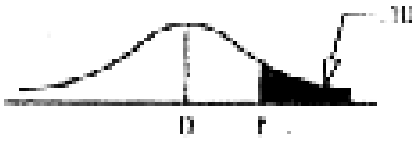
6. (8%) A magazine article stated that the average age of men who were getting divorced for the first time was less than 40 years. A researcher decided to test this theory at $\alpha = 0.025$. She selected a sample of 20 men who were recently divorced and found that the average age was 38.6 years. The standard deviation of the sample was 4 years. Is there enough evidence to support the claim that the average age is less than 40 on the basis of the sample? Assume that the variable is approximately normally distributed.

Areas under the Normal Curve

Example:
If $z = 1.96$, then
$P(0 \text{ to } z) = 0.4750$

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

Student's t Distribution



df	Level of Significance for One-Tailed Test					
	0.100	0.050	0.025	0.010	0.005	0.0005
	Level of Significance for Two-Tailed Test					
	0.20	0.10	0.05	0.02	0.01	0.001
1	3.078	6.314	12.706	31.821	63.657	636.619
2	1.886	2.920	4.303	6.965	9.925	31.599
3	1.638	2.353	3.182	4.541	5.841	12.924
4	1.533	2.132	2.776	3.747	4.604	8.610
5	1.476	2.015	2.571	3.365	4.032	6.869
6	1.440	1.943	2.447	3.143	3.707	5.959
7	1.415	1.895	2.365	2.998	3.499	5.408
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	3.966
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	3.768
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

考試科目 Course	統計學	系別	日期 Date, Period	年 月 日 第 節	試題編號 Course No.

3-5

Critical Values of the F Distribution at a 5 Percent Level of Significance

Degrees of Freedom for the Numerator

Degrees of Freedom for the Denominator	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40
1	161	200	216	225	230	234	237	239	241	242	244	246	248	249	250	251
2	18.5	19.0	19.2	19.2	19.3	19.3	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.5	19.5	19.5
3	10.1	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
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	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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
120	3.92	3.07	2.68	2.45	2.29	2.18	2.09	2.02	1.96	1.91	1.83	1.75	1.66	1.61	1.55	1.50
∞	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