

考試科目	經濟學	系所別	商學院共同科	考試時間	2 月 12 日(三) 第二節
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I. Multiple Choice (1 points each)

Identify the letter of the choice that best completes the statement or answers the question.

- Holding all other forces constant, when the price of gasoline rises, the number of gallons of gasoline demanded would fall substantially over a ten-year period because
 - buyers tend to be much less sensitive to a change in price when given more time to react.
 - buyers tend to be much more sensitive to a change in price when given more time to react.
 - buyers will have substantially more real income over a ten-year period.
 - the quantity supplied of gasoline increases very little in response to an increase in the price of gasoline.
- Suppose that Mike is filling out a survey. The survey asks him what he would do if the price of his favorite shaving gel increased. Mike reports that he would switch to a different brand. The survey then asks what he would do if the price of all shaving gels increased. Mike reports that he must use shaving gel, so he would have to adjust his spending elsewhere. These examples illustrate the importance of
 - changes in total revenue in determining the price elasticity of demand.
 - the definition of a market in determining the price elasticity of demand.
 - a necessity versus a luxury in determining the price elasticity of demand.
 - the time horizon in determining the price elasticity of demand.
- Suppose that Elmer's hourly wage increases, and he decides to work fewer hours. For Elmer, the substitution effect of the wage change is
 - greater than the income effect.
 - equal to the income effect.
 - smaller than the income effect.
 - We do not have enough information with which to answer the question.
- In the work-leisure trade-off analysis, if tax reductions induce a consumer to work more, an explanation for this occurrence is that
 - leisure is an inferior good.
 - leisure is a Giffen good.
 - the substitution effect dominates the income effect.
 - the income effect dominates the substitution effect.

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- 作答於試題上者，不予計分。
- 試題請隨卷繳交。

考試科目	經濟學	系所別	商學院共同科	考試時間	2月12日(三)第二節
------	-----	-----	--------	------	-------------

5. Which of the following production functions exhibits constant returns to scale?

- A. $Q = K \cdot L$.
- B. $Q = K^{0.4} \cdot L^{0.4}$.
- C. $Q = K + L - 2$.
- D. $Q = 2K + 3L$.

6. Consider a market demand function $Q = e^{3600 + \ln \frac{1}{(p+8)^3}}$. There is a monopolist in the market with no fixed cost, and its marginal cost is \$8 at all levels of output. What price will it charge to maximize its profits?

- A. 20
- B. 12
- C. 10
- D. 16

7. Josh sells mojos as a monopolist in a market with two consumers, Lyle and Yu-Min. Lyle's demand function for mojos is $Q_L = 20 - P_L$. Yu-Min's demand function is $Q_Y = 10 - P_Y$. Josh only knows there are two consumers but does not know who has a higher demand. Therefore, he decides to offer two options $O_1 = (q_1, m_1)$ and $O_2 = (q_2, m_2)$. If a consumer chooses O_i , he pays m_i dollars to buy q_i mojos. Consumers can only choose one offer, and resale is not allowed. If Josh wants to practice 2nd-degree price discrimination, which of the following offers should he use?

- A. $O_1 = (20, 200)$ and $O_2 = (10, 50)$
- B. $O_1 = (20, 125)$ and $O_2 = (8, 48)$
- C. $O_1 = (20, 140)$ and $O_2 = (6, 42)$
- D. $O_1 = (20, 165)$ and $O_2 = (4, 32)$

8. In the game matrix below, the first payoff in each pair goes to player A who chooses the row, and the second payoff goes to player B, who chooses the column. Let a, b, c and d be positive constants.

Player B

	Left	Right
Player A	Top	Bottom
	$a, 1$	$b, 0.5$
	$1, c$	$2, d$

If the game only has a mixed-strategy Nash equilibrium, then we can conclude that

- A. $b > a$ and $d > c$.
- B. $a > 1$ and $d < 0.5$.
- C. $a < 1$ and $b > 2$.
- D. None of the above is correct.

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考試科目	經濟學	系所別	商學院共同科	考試時間	2月12日(三) 第二節
------	-----	-----	--------	------	--------------

9. Concerts in Taipei Dome cause noise and earthquake-like vibrations for surrounding residents. According to an estimation, there are 1,000 residents affected, and the average mental damage per concert for each resident is $D_R = 5 + Q$, where Q stands for the number of concerts per month. On the other hand, the monthly concert revenue of Taipei Dome is $R_T = 10,000Q - 1,000Q^2$. The marginal cost of holding each concert is 1,000. What is the socially optimal number of concerts?

- A. 1
- B. 3
- C. 5
- D. 7

10. Which of the following is not a characteristic of a public good?

- A. It is not excludable.
- B. It is not diminished or depreciated as additional people consume the good.
- C. Its benefits cannot be withheld from anyone.
- D. Because it is a free good, there is no opportunity cost.

11. Which of the following events would decrease the unemployment rate?

- A. A decrease in the labor force combined with an increase in the total population.
- B. A decrease in the labor force, with no change in the number of employed workers.
- C. A decrease in the number of employed workers, with no change in the labor force.
- D. An increase in the labor force, with no change in the number of employed workers.

12. Which of the following policies is considered quantitative easing?

- A. The central bank prints money and directly transfers it to financial institutions.
- B. The central bank purchases short-term government bonds.
- C. The central bank sells short-term government bonds.
- D. The central bank purchases long-term government bonds.

13. In the long run, what is the primary cause of inflation?

- A. Increase in the minimum wage.
- B. Government's currency manipulation.
- C. Growth in the money supply.
- D. Protective trade policies and high tariff rates.

14. All else being equal, which of the following outcomes would we expect from a decrease in Taiwan's interest rates?

- A. Citizens decide to hold more foreign bonds.

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考試科目	經濟學	系所別	商學院共同科	考試時間	2 月 12 日(三) 第二節
------	-----	-----	--------	------	-----------------

- B. Citizens choose to hold more currency.
- C. Domestic business owners decide to invest in new equipment for their factory.
- D. All of the above are correct.

15. If inflation expectations rise, the short-run Phillips curve shifts:

- A. to the right, so that at any inflation rate, unemployment is higher in the short run than before.
- B. to the left, so that at any inflation rate, unemployment is higher in the short run than before.
- C. to the right, so that at any inflation rate, unemployment is lower in the short run than before.
- D. to the left, so that at any inflation rate, unemployment is lower in the short run than before.

16. In a world described by the classical dichotomy, assuming GDP and the price level are given, if President Trump raises U.S. import tariffs while all other factors remain unchanged, how will this policy affect Taiwan's loanable funds market?

- A. The real interest rate will increase.
- B. The real interest rate will decrease.
- C. The real interest rate will stay the same.
- D. It will shift both the demand and supply of loanable funds simultaneously.

17. Consider a partial equilibrium model for good *A* in Taiwan. If President Trump raises U.S. import tariffs on that good, thereby reducing Taiwan's export prices, and assuming Taiwan is a small country and the U.S. is a large country in the market for good *A*, how will this affect Taiwan's consumer surplus?

- A. It will increase.
- B. It will decrease.
- C. It will stay the same.
- D. The change will be ambiguous.

18. If President Trump raises U.S. import tariffs, assuming all other factors remain unchanged, how will this policy affect Taiwan's economy according to the classical Keynesian model?

- A. The output will decrease but the price level will increase.
- B. Both the output and price level will decrease.
- C. The output will decrease but the price level will stay the same.
- D. The output will increase but the price level will stay the same.

19. If President Trump raises U.S. import tariffs and leads to workers in the associated industries in Taiwan losing their jobs and other things being equal, how will this affect the natural rate of unemployment in Taiwan?

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考 試 科 目	經濟學	系 所 別	商學院共同科	考 試 時 間	2 月 12 日(三) 第二節
---------	-----	-------	--------	---------	-----------------

- A. It will increase.
- B. It will decrease.
- C. It will stay the same.
- D. It depends on how the cyclical unemployment rate changes.

20. In the long run, assuming GDP and price level are given, if investors in Taiwan fear that President Trump will raise the U.S. import tariff in the near future and other things equal, how will this affect Taiwan's economics?

- A. An increase in net export of Taiwan and a rise in the real interest rate
- B. A drop in net export of Taiwan and a rise in the real interest rate
- C. An increase in net export of Taiwan and a drop in the real interest rate
- D. A drop in net export of Taiwan and a drop in the real interest rate

II. Problems and Short-essay Questions

1. A competitive market currently has 120 firms, all of which has a total cost function of $TC(q) = 9 + 11q + q^2$, where q denotes the quantity produced by each firm.

a. (10 points) Currently, the market price $p = 19$. What is the total quantity supplied in the market? How much profit does each firm make in the short-run equilibrium?

b. (5 points) What is the long-run equilibrium price? Suppose the market demand is given by $p = 35 - \frac{1}{30}Q$, where Q denotes the market quantity demanded. How many firms are there in the long-run equilibrium?

c. (5 points) Suppose now the government levies a \$2 specific tax on each unit of the output produced. How many firms are there in the long-run equilibrium?

2. An industry has two firms, A and B , producing output at constant unit costs of 1 and $C > 1$ per unit, respectively. The demand function for the industry is

$$Q = \frac{V}{P}$$

with $V > C$.

a. (10 points) Suppose two firms are Cournot competitors. Find the equilibrium price, quantities produced, and profits for two firms.

b. (10 points) Suppose two firms are Bertrand competitors. Moreover, when both firms set identical prices, all consumers purchase from the more cost-efficient firm. Find the equilibrium price, quantities produced, and profits for two firms.

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考試科目	經濟學	系所別	商學院共同科	考試時間	2月12日(三)第二節
------	-----	-----	--------	------	-------------

3. Consider consumers in Country *A* and Country *B*, who each consumes 2 units of bananas and 5 units of pizza every year. The currency unit of Country *A* is AD, and the currency unit of Country *B* is BD. Please answer the following questions in detail:

a. (10 points) Assume that in year 2000, the prices of bananas and pizza in Country *A* were 3 AD and 5 AD, respectively, and the prices of these items in Country *B* were 2 BD and 2 BD. Suppose the purchasing power parity holds between the two countries. What was the nominal exchange rate of AD in terms of BD in year 2000?

b. (5 points) Does the law of one price hold according to the information in (a)? Why or why not?

c. (5 points) In 2001, the price of bananas and pizza in Country *A* became 2 AD and 6 AD, respectively. Please calculate the CPI index of Country *A* in 2001, using 2000 as the base year.

4. In this question, we will examine the monetary and fiscal policies of Country *Z*. The economy of Country *Z* is described by the following equations:

$$Y = C + I + G$$

$$C = 100 + 0.5(Y - T)$$

$$I = 300 - 50r$$

where Y is GDP, C is consumption, I is investment, G is government spending, T is taxes, and r is the real interest rate (for example, if the real interest rate is $q\%$, then $r = q$).

Country *Z* has recently experienced a significant negative economic shock. The president plans to implement policies aimed at stimulating the economy. At first, the president considers an expansionary fiscal policy and the corresponding multiplier effect.

a. (2 points) What is the marginal propensity to consume (MPC) in this economy?

b. (3 points) Calculate the fiscal multiplier.

c. (5 points) Suppose Country *Z* receives foreign aid, which enables an increase in government spending without raising taxes. Given a change in government spending ($\Delta G = 50$) and no change in taxes ($\Delta T = 0$), what is the resulting increase in aggregate demand?

In Country *Z*, the nominal interest rate is fixed at 8%. The current growth rate of the money supply is 7%, and the current inflation rate is 5%. To stimulate investment, the central bank increases the growth rate of the money supply to 9%.

d. (2 points) What is the inflation rate after the central bank's monetary policy?

e. (3 points) Referring to the Fisher effect (Fisher equation), calculate the new real interest rate after the monetary policy.

f. (5 points) Given the change in the real interest rate, calculate the change in investment (ΔI). What is the resulting increase in aggregate demand?

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考 試 科 目	財務管理	系 所 別	金融學系金融管理組	考 試 時 間	2 月 12 日(三) 第三節
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Answer the questions in the order presented.

1. (20 points) Describe the steps involved in the portfolio optimization process, incorporating three types of assets: one risk-free and two risky assets. Additionally, explain how investor utility is used to determine the optimal portfolio.
2. (15 points) Explain the rationale behind the requirement for common stocks to offer a risk premium over risk-free investments.
3. (15 points) What is an event study, and what is its significance in testing market efficiency? Describe the process of conducting an event study in detail.
4. (15 points) Explain the differences between mutual funds and ETFs (exchange-traded funds). Provide examples and discuss the advantages, disadvantages, and key considerations for investors.
5. (20 points) What is the difference between solicited and unsolicited mergers and acquisitions? Discuss the key practical issues that companies face in both types of mergers and acquisitions.
6. (15 points) What is the difference between the internal rate of return (IRR) and the net present value (NPV)? Explain the advantages and limitations of each method.

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考 試 科 目	統計學 A	系 所 別	金融系	考 試 時 間	2 月 12 日(三) 第 4 節
---------	-------	-------	-----	---------	-------------------

- (20%) Suppose you roll a fair 6-sided die 40 times (independently), and you get \$5 every time you roll a 2. Let X_1 be the number of dollars you win on rolls 1 through 10. Let X_2 be the number of dollars you win on rolls 11 through 20. Let X_3 be the number of dollars you win on rolls 21 through 30. Let X_4 be the number of dollars you win on rolls 31 through 40. Let $Y = X_1 + X_2 + X_3 + X_4$ be the total number of dollars you win over all 40 rolls.
 - Describe the probability mass (density) function of Y . (6%)
 - Compute the expectation and variance of Y . (7%)
 - Let $Z = 4X_1$. Compute the expectation and variance of Z . (7%)
- (23%) A VP of Consumer Credit of a bank monitors the default rate on personal loans at their member banks. One of her standard's is "no more than 5% of personal loans should be in default." On each Friday, the default rate is calculated for a sample of 500 personal loans.
 - Last Friday's sample contained 30 defaulted loans. Based on the information, please confirm whether the VP's standard is correct at the 0.01 significance level. (7%)
 - Compute the power for part (1) when the true default rate on personal loans is 7%. (10%)
 - At a 95% confidence level, the VP would like to have a margin of error for the loan default estimate being within 1%. Find the required sample size. (6%)
- (17%) A bank's policy requires consistent, uniform training of employees at all bank branches. Consequently, the VP of Human Resources orders a survey of mean employee training time in the Southeast region (indicated as population 1) and the Southwest region (indicated as population 2). His staff randomly selected personnel records of 15 employees from each region, and reported the following: $\bar{x}_1 = 30$ hours, $\bar{x}_2 = 27$ hours, $s_1 = 6$, and $s_2 = 5$.
 - Conduct a test to decide whether the population variances for training time in both regions are equal at the 0.05 significance level. (7%)
 - Conduct a test to decide whether the population mean training time in the Southeast region is greater than that of the Southwest region at the 0.01 significance level. (10%)
- (15%) A bank manager believes that number of customers arriving at his branch have a Poisson distribution. He collected a random sample and constructed the following frequency distribution to investigate his hypothesis.

Customers per 15 minute interval	0	1	2	3	4	≥ 5
Observed Frequency	5	15	17	12	10	8

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考試科目	統計學 A	系所別	金融系	考試時間	2 月 12 日(三) 第 4 節
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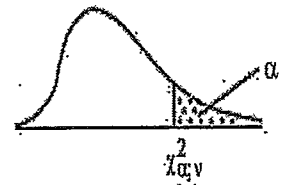
Please conduct the appropriate decision to examine whether the observed data follow a Poisson distribution at the 0.01 significance level. (Note: $e^1 = 2.718$)

5. (25%) The following ANOVA table is from a multiple regression analysis with $n = 25$ and four explanatory variables.

Source	df	SS	MS	F
Regression	(a)	700	(e)	(g)
Error	(b)	(d)	(f)	
Total	(c)	1000		

- (1) Please compute the values (a) to (g) in details, together with the required formulas. (12%)
- (2) Explain the purpose of the F value, and conclude your result at the 0.05 significance level. (6%)
- (3) Show the relationship between F and R^2 . (7%)

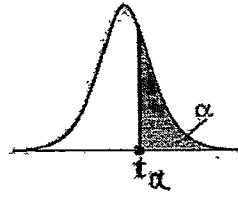
Table of the Chi-square Distribution



$\alpha =$	0.995	0.99	0.98	0.975	0.95	0.90	0.80	0.20	0.10	0.05	0.025	0.02	0.01	0.005	0.001	$=\alpha$
$v=1$	0.000393	0.00057	0.000628	0.000682	0.000933	0.0158	0.0642	1.642	2.706	3.841	5.024	5.412	6.635	7.879	10.827	$v=1$
2	0.0100	0.0201	0.0404	0.0506	0.103	0.211	0.446	3.219	4.605	5.991	7.378	7.824	9.210	10.597	13.815	2
3	0.0717	0.115	0.185	0.216	0.352	0.584	1.005	4.642	6.251	7.815	9.348	9.837	11.345	12.838	16.268	3
4	0.207	0.297	0.429	0.484	0.711	1.064	1.649	5.989	7.779	9.488	11.143	11.668	13.277	14.860	18.465	4
5	0.412	0.554	0.752	0.831	1.145	1.610	2.343	7.289	9.236	11.070	12.832	13.388	15.086	16.750	20.517	5
6	0.676	0.872	1.134	1.237	1.635	2.204	3.070	8.558	10.645	12.592	14.449	15.033	16.812	18.548	22.457	6
7	0.989	1.239	1.564	1.690	2.167	2.833	3.822	9.803	12.017	14.067	16.013	16.622	18.475	20.278	24.322	7
8	1.344	1.646	2.032	2.180	2.733	3.490	4.594	11.030	13.362	15.507	17.535	18.168	20.090	21.955	26.125	8
9	1.735	2.088	2.532	2.700	3.325	4.168	5.380	12.242	14.684	16.919	19.023	19.679	21.666	23.589	27.877	9
10	2.156	2.558	3.059	3.247	3.940	4.865	6.179	13.442	15.987	18.307	20.483	21.161	23.209	25.188	29.588	10
11	2.603	3.053	3.609	3.816	4.575	5.578	6.989	14.631	17.275	19.675	21.920	22.618	24.725	26.757	31.264	11
12	3.074	3.571	4.178	4.404	5.226	6.304	7.807	15.812	18.549	21.026	23.337	24.054	26.217	28.300	32.909	12
13	3.565	4.107	4.765	5.009	5.892	7.042	8.634	16.985	19.812	22.362	24.736	25.472	27.688	29.819	34.528	13
14	4.075	4.660	5.368	5.629	6.571	7.790	9.467	18.151	21.064	23.685	26.119	26.873	29.141	31.319	36.123	14
15	4.601	5.229	5.985	6.262	7.261	8.547	10.307	19.311	22.307	24.996	27.488	28.259	30.578	32.801	37.697	15

考 試 科 目 統計學 A	系 所 別 金融系	考 試 時 間 2 月 12 日 (三) 第 4 節
---------------	-----------	----------------------------

Percentage Points of the t Distribution; $t_{\alpha, v}$
 $P(T > t_{\alpha, v}) = \alpha$



v	α													
	0.40	0.30	0.20	0.15	0.10	0.05	0.025	0.02	0.015	0.01	0.0075	0.005	0.0025	0.0005
1	0.325	0.727	1.376	1.963	3.078	6.314	12.706	15.895	21.205	31.821	42.434	63.657	127.322	636.590
2	0.289	0.617	1.061	1.386	1.886	2.920	4.303	4.849	5.643	6.965	8.073	9.925	14.089	31.598
3	0.277	0.584	0.978	1.250	1.638	2.353	3.182	3.482	3.896	4.541	5.047	5.841	7.453	12.924
4	0.271	0.569	0.941	1.190	1.533	2.132	2.776	2.999	3.298	3.747	4.088	4.604	5.598	8.610
5	0.267	0.559	0.920	1.156	1.476	2.015	2.571	2.757	3.003	3.365	3.634	4.032	4.773	6.869
6	0.265	0.553	0.906	1.134	1.440	1.943	2.447	2.612	2.829	3.143	3.372	3.707	4.317	5.959
7	0.263	0.549	0.896	1.119	1.415	1.895	2.365	2.517	2.715	2.998	3.203	3.499	4.029	5.408
8	0.262	0.546	0.889	1.108	1.397	1.860	2.306	2.449	2.634	2.896	3.085	3.355	3.833	5.041
9	0.261	0.543	0.883	1.100	1.383	1.833	2.262	2.398	2.574	2.821	2.998	3.250	3.690	4.781
10	0.260	0.542	0.879	1.093	1.372	1.812	2.228	2.359	2.527	2.764	2.932	3.169	3.581	4.587
11	0.260	0.540	0.876	1.088	1.363	1.796	2.201	2.328	2.491	2.718	2.879	3.106	3.497	4.437
12	0.259	0.539	0.873	1.083	1.356	1.782	2.179	2.303	2.461	2.681	2.836	3.055	3.428	4.318
13	0.259	0.538	0.870	1.079	1.350	1.771	2.160	2.282	2.436	2.650	2.801	3.012	3.372	4.221
14	0.258	0.537	0.868	1.076	1.345	1.761	2.145	2.264	2.415	2.624	2.771	2.977	3.326	4.140
15	0.258	0.536	0.866	1.074	1.341	1.753	2.131	2.249	2.397	2.602	2.746	2.947	3.286	4.073
16	0.258	0.535	0.865	1.071	1.337	1.746	2.120	2.235	2.382	2.583	2.724	2.921	3.252	4.015
17	0.257	0.534	0.863	1.069	1.333	1.740	2.110	2.224	2.368	2.567	2.706	2.898	3.222	3.963
18	0.257	0.534	0.862	1.067	1.330	1.734	2.101	2.214	2.356	2.552	2.689	2.878	3.197	3.922
19	0.257	0.533	0.861	1.066	1.328	1.729	2.093	2.205	2.346	2.539	2.674	2.861	3.174	3.883
20	0.257	0.533	0.860	1.064	1.325	1.725	2.086	2.197	2.336	2.528	2.661	2.845	3.153	3.850
21	0.257	0.532	0.859	1.063	1.323	1.721	2.080	2.189	2.328	2.518	2.649	2.831	3.135	3.819
22	0.256	0.532	0.858	1.061	1.321	1.717	2.074	2.183	2.320	2.508	2.639	2.819	3.119	3.792
23	0.256	0.532	0.858	1.060	1.319	1.714	2.069	2.177	2.313	2.500	2.629	2.807	3.104	3.768
24	0.256	0.531	0.857	1.059	1.318	1.711	2.064	2.172	2.307	2.492	2.620	2.797	3.091	3.745
25	0.256	0.531	0.856	1.058	1.316	1.708	2.060	2.167	2.301	2.485	2.612	2.787	3.078	3.725
26	0.256	0.531	0.856	1.058	1.315	1.706	2.056	2.162	2.296	2.479	2.605	2.779	3.067	3.707
27	0.256	0.531	0.855	1.057	1.314	1.703	2.052	2.158	2.291	2.473	2.598	2.771	3.057	3.690
28	0.256	0.530	0.855	1.056	1.313	1.701	2.048	2.154	2.286	2.467	2.592	2.763	3.047	3.674
29	0.256	0.530	0.854	1.055	1.311	1.699	2.045	2.150	2.282	2.462	2.586	2.756	3.038	3.659
30	0.256	0.530	0.854	1.055	1.310	1.697	2.042	2.147	2.278	2.457	2.581	2.750	3.030	3.646
40	0.255	0.529	0.851	1.050	1.303	1.684	2.021	2.123	2.250	2.423	2.542	2.704	2.971	3.551
60	0.254	0.527	0.848	1.045	1.296	1.671	2.000	2.099	2.223	2.390	2.504	2.660	2.915	3.460
120	0.254	0.526	0.845	1.041	1.289	1.658	1.980	2.076	2.196	2.358	2.468	2.617	2.860	3.373
∞	0.253	0.524	0.842	1.036	1.282	1.645	1.960	2.054	2.170	2.326	2.432	2.576	2.807	3.291

考 試 科 目	統計學 A	系 所 別	金融系	考 試 時 間	2 月 12 日 (三) 第 4 節
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Table of Probabilities for the F Distribution

Alpha = 0.05

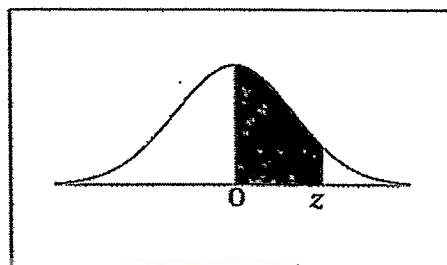
D/N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	20	24	30	40	60	120
1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54	241.88	242.98	243.91	244.69	245.36	245.95	248.01	249.05	250.10	251.14	252.20	253.25
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40	19.40	19.41	19.42	19.42	19.43	19.45	19.45	19.46	19.47	19.48	19.49
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.76	8.74	8.73	8.71	8.70	8.66	8.64	8.62	8.59	8.57	8.55
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.94	5.91	5.89	5.87	5.86	5.80	5.77	5.75	5.72	5.69	5.66
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.70	4.68	4.66	4.64	4.62	4.56	4.53	4.50	4.46	4.43	4.40
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	4.03	4.00	3.98	3.96	3.94	3.87	3.84	3.81	3.77	3.74	3.70
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.60	3.57	3.55	3.53	3.51	3.44	3.41	3.38	3.34	3.30	3.27
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.31	3.28	3.26	3.24	3.22	3.15	3.12	3.08	3.04	3.01	2.97
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.10	3.07	3.05	3.03	3.01	2.94	2.90	2.86	2.83	2.79	2.75
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.94	2.91	2.89	2.86	2.85	2.77	2.74	2.70	2.66	2.62	2.58
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.82	2.79	2.76	2.74	2.72	2.65	2.61	2.57	2.53	2.49	2.45
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.72	2.69	2.66	2.64	2.62	2.54	2.51	2.47	2.43	2.38	2.34
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.63	2.60	2.58	2.55	2.53	2.46	2.42	2.38	2.34	2.30	2.25
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.57	2.53	2.51	2.48	2.46	2.39	2.35	2.31	2.27	2.22	2.18
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.51	2.48	2.45	2.42	2.40	2.33	2.29	2.25	2.20	2.16	2.11
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54	2.49	2.46	2.42	2.40	2.37	2.35	2.28	2.24	2.19	2.15	2.11	2.06
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49	2.45	2.41	2.38	2.35	2.33	2.31	2.23	2.19	2.15	2.10	2.06	2.01
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46	2.41	2.37	2.34	2.31	2.29	2.27	2.19	2.15	2.11	2.06	2.02	1.97
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42	2.38	2.34	2.31	2.28	2.26	2.23	2.16	2.11	2.07	2.03	1.98	1.93
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35	2.31	2.28	2.25	2.22	2.20	2.12	2.08	2.04	1.99	1.95	1.90
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37	2.32	2.28	2.25	2.22	2.20	2.18	2.10	2.05	2.01	1.96	1.92	1.87
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34	2.30	2.26	2.23	2.20	2.17	2.15	2.07	2.03	1.98	1.94	1.89	1.84
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32	2.27	2.24	2.20	2.18	2.15	2.13	2.05	2.01	1.96	1.91	1.86	1.81
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30	2.25	2.22	2.18	2.15	2.13	2.11	2.03	1.98	1.94	1.89	1.84	1.79
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28	2.24	2.20	2.16	2.14	2.11	2.09	2.01	1.96	1.92	1.87	1.82	1.77
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27	2.22	2.18	2.15	2.12	2.09	2.07	1.99	1.95	1.90	1.85	1.80	1.75
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25	2.20	2.17	2.13	2.10	2.08	2.06	1.97	1.93	1.88	1.84	1.79	1.73
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24	2.19	2.15	2.12	2.09	2.06	2.04	1.96	1.91	1.87	1.82	1.77	1.71
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22	2.18	2.14	2.10	2.08	2.05	2.03	1.94	1.90	1.85	1.81	1.75	1.70
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21	2.16	2.13	2.09	2.06	2.04	2.01	1.93	1.89	1.84	1.79	1.74	1.68
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	2.08	2.04	2.00	1.97	1.95	1.92	1.84	1.79	1.74	1.69	1.64	1.58
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04	1.99	1.95	1.92	1.89	1.86	1.84	1.75	1.70	1.65	1.59	1.53	1.47
120	3.92	3.07	2.68	2.45	2.29	2.18	2.09	2.02	1.96	1.91	1.87	1.83	1.80	1.78	1.75	1.66	1.61	1.55	1.50	1.43	1.35

Right Tailed, D/N = df in denominator = down the rows, df in numerator = across the columns

Note: Table is for an alpha of 0.05

考試科目	統計學 A	系所別	金融系	考試時間	2 月 12 日(三) 第 4 節
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Standard Normal Distribution Table



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	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.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	.3485	.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	.4082	.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	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998

備

註

- 一、作答於試題上者，不予計分。
- 二、試題請隨卷繳交。

考試科目	統計學B	系所別	金融學系財務工程 與金融科技組	考試時間	2月12日(三)第三節
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1. (20 points) A discrete random variable x has the probability mass function that satisfies:
 $\mathbb{P}(x = 1) = \mathbb{P}(x = 3) = \mathbb{P}(x = 5) = \frac{1}{3}$.
 - (a) (10 points) Find the value of $\mathbb{P}(1 < x \leq 4)$.
 - (b) (10 points) Find the value of $\mathbb{P}(1 \leq x \leq 4)$.

2. (10 points) The two independent random variables x and y have Uniform(0, 1) distribution. Let $z = \min(x, y)$. Find the probability density function of z .

3. (20 points) Let x be Uniform(-1, 3) random variable and $y = x^2$.
 - (a) (10 points) Find the probability density function of x .
 - (b) (10 points) Find the probability density function of y .

4. (30 points) Suppose two random variables have joint probability density function

$$f(x, y) = x + y \quad 0 \leq x \leq 1 \text{ and } 0 \leq y \leq 1$$
 - (a) (10 points) Find the probability density function of y .
 - (b) (10 points) Find the value of $\mathbb{P}(y = \frac{1}{3})$.
 - (c) (10 points) Find the value of $\mathbb{P}(x < 0.25 | y = \frac{1}{3})$.

5. (20 points) Let z_1, \dots, z_n be independent and identically distributed as Uniform(0, 1).
 - (a) (10 points) Let $y = \max\{z_1, \dots, z_n\}$. Find $\mathbb{E}[y]$.
 - (b) (10 points) Let $x = \prod_{i=1}^n z_i = z_1 \times \dots \times z_n$. Find $\mathbb{E}[x]$.

備 註

- 一、作答於試題上者，不予計分。
- 二、試題請隨卷繳交。