

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
------	-----	-----	--------	------	-----------------

### 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.

備

註

- 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	$a, 1$	$b, 0.5$
	Bottom	$1, c$	$2, d$

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.

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	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.

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	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?

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	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.

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	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 ( $\Delta I$ ). What is the resulting increase in aggregate demand?

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	系所別	企業管理學研究所 MBA 學位學程甲組	考試時間	> 月 / > 日 (三) 第 4 節
------	-----	-----	------------------------	------	---------------------

第一大題(3pt for each, please write down the item numbers and answers in order)

1. The mean, as a measure of central location, would be inappropriate for which one of the following?

- (a) Ages of adults at a senior citizen center
- (b) Incomes of lawyers
- (c) Number of pages in textbooks on statistics
- (d) Marital status of college students at a particular university

2. Which descriptive summary measures are resistant statistics?

- (a) The sample mean and standard deviation
- (b) The interquartile range and range
- (c) The mode and variance
- (d) The median and interquartile range

3. Which of the following is true?

- (a) The distribution of the sample mean has a standard deviation that is larger than the standard deviation of the distribution of the population from which it was sampled
- (b) The distribution of the sample mean has a standard deviation that is smaller than the standard deviation of the distribution of the population from which it was sampled
- (c) The distribution of the sample mean has a mean that is larger than the mean of the distribution of the population from which it was sampled
- (d) None of the above

4. Suppose that  $X$  is a normal variable with mean 5. If  $P(X > 9) = 0.1977$ , approximately what is variance of  $X$ ?

- (a) 13.23
- (b) 4.71
- (c) 22.15
- (d) 47.68

5. Suppose that in a certain hypothesis test the null hypothesis is rejected at the 0.10 level; it is also rejected at the 0.05 level; however, it cannot be rejected at the 0.01 level. The most accurate statement that can be made about the  $p$ -value for this test is that:

- (a)  $p$ -value = 0.01
- (b)  $p$ -value = 0.10
- (c)  $0.01 < p$ -value  $< 0.05$
- (d)  $0.05 < p$ -value  $< 0.10$

考試科目	統計學	系所別	企業管理學研究所 MBA 學位學程甲組	考試時間	2月12日(三) 第4節
------	-----	-----	------------------------	------	--------------

6. The life expectancy in the United States is 75 with a standard deviation of 7 years. A random sample of 49 individuals is selected. What is the probability that the sample mean will be larger than 77 years?

- (a) Smaller than 0.01
- (b) Larger than 0.05
- (c) Between 0.05 and 0.03
- (d) Smaller than 0.025

7. Five types of apples are displayed side by side in several supermarkets in the city of Miami. It was noted that in one day, 180 customers purchased apples. Of these, 30 picked type A, 40 picked type B, 25 picked type C, 35 picked type D, and 50 picked type E. Which of following method can be applied for testing the preferred type of apples?

- (a) Test of independent
- (b) Test the equality of multiple proportions
- (c) Goodness of fit test
- (d) ANOVA test

8. David's gasoline station offers 5 cents off per gallon if the customer pays in cash and does not use a credit card. Past evidence indicates some customers are willing to pay in cash. What type of distribution can be used to model the number of customers who pay in cash within one-hour period?

- (a) Uniform distribution
- (b) Poisson probability distribution
- (c) Binomial probability distribution
- (d) Hypergeometric probability distribution

9. A 95% confidence interval for the mean  $\mu$  of a population is computed from a random sample and found to be  $9 \pm 2$ . We may conclude

- (a) There is a 99% probability that  $\mu$  is between 6 and 12
- (b) There is a 95% probability that  $\mu$  is between 7 and 11
- (c) If we took many, many additional random samples and from each computed a 95% confidence interval for  $\mu$ , approximately 95% of these intervals would contain  $\mu$
- (d) All of the above

10. Two different companies have applied to provide cable television service in a certain region. Let  $p$  denote the proportion of all potential subscribers who favor the first company over the second. Consider testing  $H_0: p \leq 0.5$  versus  $H_1: p > 0.5$  based on a random sample of 25 individuals. Let  $X$  denote the number in the sample who favor the first company. Which of the following rejection regions is most appropriate?

- (a)  $\{X < 7\}$  or  $\{X > 18\}$
- (b)  $\{X < 7\}$
- (c)  $\{X > 18\}$

考試科目	統計學	系所別	企業管理學研究所 MBA 學位學程甲組	考試時間	2月12日(三) 第4節
------	-----	-----	------------------------	------	--------------

(d) None of them

第二大題(25%, 5pts for each)

(a) The weight of corn chips dispensed into a 10-ounce bag by the dispensing machine has a mean of 10.5 ounces and a standard deviation of 0.2 ounce. Suppose 100 bags of chips are randomly selected. Find the probability that the mean weight of these 100 bags exceeds 10.45 ounces

(b) Suppose weights of baby giraffes are normally distributed with mean 50 kg and standard deviation 15 kg. To be at the 95<sup>th</sup> percentile in weight, how much must a baby giraffe weigh?

(c) Verizon's contract with the MTA states that at it must keep at least 96% of subway payphones in proper working order at all times. A random sample of 16 subway phones are tested and it is found that 11 are working. We are interested in whether or not Verizon is fulfilling its contract. Test  $H_0: p \leq 96\%$  vs.  $H_1: p > 96\%$ , where  $p$  is the true proportion of subway payphones in proper working. Find the **test statistic**

(d) A computer program is simulating the number of heads in the toss of two independent coins. The experiment is repeatedly done 50 times, and the results are as follows. Based on this data, report the **test statistic** for the hypothesis that the probability of heads for each of the two coins is 0.5 in every simulation.

0 heads	9
1 head	28
2 heads	15

(e) The average cost of tuition, room and board at small private liberal arts colleges is reported to be \$8,500 per term, but a financial administrator believes that the average cost is higher. A study conducted using 16 small liberal arts colleges showed that the average cost per term is \$8,745 with a standard deviation of \$1,000. Report the **p-value** for this test? Ps. use the following tables to obtain a possible range of  $p$ -value

第三大題(20%)

A national manufacturer of ball bearings is experimenting with two different processes for producing precision ball bearings. It is important that the diameters be as close as possible to an industry standard. The output from each process is sampled, and the results are presented here. Please use  $\alpha = 0.05$  to do the following testing problems.

**Ps., your answers should include the hypotheses, test statistic and conclusion**

Process A : 15,20,25,20,30,25,25,30,30,35,35,35,35,35,35,30

Process B : 20,25,30,25,30,35,20,35,20,25,30,35

考試科目	統計學	系所別	企業管理學研究所 MBA 學位學程甲組	考試時間	2月12日(三) 第4節
------	-----	-----	------------------------	------	--------------

	Process A	Process B
Sample mean	28.75	27.5
Sample deviation	6.455	5.839

- (5pt) The researcher is interested in determining whether there is evidence that the two processes yield different population standard deviations.
- (7pt) The researcher is interested in determining whether or not the two processes have the different population means. Do the ANOVA table and conclude the test
- (8pt) The item is defective if its diameter  $\geq 30$ . Please use the Chi-square test to determine that two processes yield different defective rates?

第四大題(10%)

In a least square regression  $\hat{E}(Y) = \beta_0 + \beta_1 X$ , we find the estimates of  $\beta_0$  and  $\beta_1$  are 2 and 1, respectively. Suppose the sample size is 10. Suppose now we get two new variables,  $X^*$  and  $Y^*$  with the following relationship:  $Y^* = 2Y + 1, X^* = 5X - 3$ . Then in the least square regression model  $E(Y^*) = \gamma_0 + \gamma_1 X^*$ , please find the estimates of  $\gamma_0$  and  $\gamma_1$ . Show your work to get the points

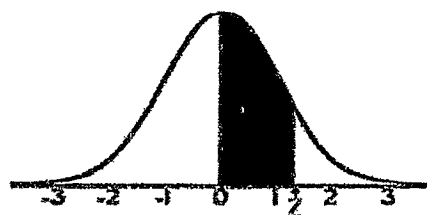
第五大題(15%)

Suppose a box contains 4 balls,  $\theta$  white balls and  $(4 - \theta)$  black balls. Test  $H_0: \theta = 2$  against  $H_1: \theta \neq 2$  as follows: Draw 2 balls with replacement and reject  $H_0$  if balls are the same color; otherwise do not reject

- (4pt) State the definitions of the Type I and II errors
- (2pt) Find the probability of making Type I error for the test
- (6pt) 若可以選擇取後不放回，試問這兩種取法，何者較好？請說明原因
- (3pt) Find another test that has a zero probability of making Type I error

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	系所別	企業管理學研究所 MBA 學位學程甲組	考試時間	2月12日(三) 第4節
------	-----	-----	------------------------	------	--------------



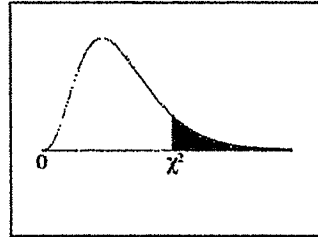
### STANDARD NORMAL TABLE (Z)

Entries in the table give the area under the curve between the mean and  $z$  standard deviations above the mean. For example, for  $z = 1.25$  the area under the curve between the mean (0) and  $z$  is 0.3944.

	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	0.0190	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	0.2969	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	0.3513	0.3554	0.3577	0.3529	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	0.4632
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

考試科目	統計學	系所別	企業管理學研究所 MBA 學位學程甲組	考試時間	2月12日(三) 第4節
------	-----	-----	------------------------	------	--------------

Chi-Square Distribution Table



The shaded area is equal to  $\alpha$  for  $\chi^2 = \chi^2_{\alpha}$ .

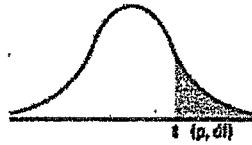
df	$\chi^2_{0.995}$	$\chi^2_{0.990}$	$\chi^2_{0.975}$	$\chi^2_{0.950}$	$\chi^2_{0.900}$	$\chi^2_{0.800}$	$\chi^2_{0.700}$	$\chi^2_{0.625}$	$\chi^2_{0.500}$	$\chi^2_{0.400}$
1	0.000	0.000	0.001	0.004	0.016	2.706	3.841	5.024	6.635	7.879
2	0.010	0.020	0.051	0.103	0.211	4.605	5.991	7.378	9.210	10.597
3	0.072	0.115	0.216	0.352	0.581	6.251	7.815	9.348	11.345	12.838
4	0.207	0.297	0.484	0.711	1.061	7.779	9.488	11.143	13.277	14.860
5	0.412	0.551	0.831	1.145	1.610	9.236	11.070	12.833	15.086	16.750
6	0.676	0.872	1.237	1.635	2.201	10.645	12.592	14.449	16.812	18.548
7	0.989	1.239	1.690	2.167	2.833	12.017	14.067	16.013	18.475	20.278
8	1.344	1.646	2.180	2.733	3.490	13.362	15.507	17.535	20.090	21.955



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	系 所 別	企業管理學研究所 MBA 學位學程甲組	考 試 時 間	2 月 12 日(三) 第 4 節
---------	-----	-------	------------------------	---------	-------------------

t table



d/f/p	0.40	0.25	0.10	0.05	0.025	0.01	0.005	0.0005
1	0.324920	1.000000	3.077684	6.313752	12.70620	31.82052	63.65674	636.6192
2	0.288675	0.816497	1.895618	2.919985	4.30265	6.96456	9.92484	31.5991
3	0.276671	0.764892	1.637744	2.353363	3.18245	4.54070	5.84091	12.9240
4	0.270722	0.740897	1.533206	2.131847	2.77645	3.74695	4.60409	8.6103
5	0.267181	0.726687	1.475884	2.015049	2.57058	3.36493	4.03214	6.8668
6	0.264835	0.717558	1.439756	1.943180	2.44691	3.14267	3.70743	5.9566
7	0.263167	0.711142	1.414924	1.894579	2.36462	2.99795	3.49948	5.4079
8	0.261921	0.706387	1.396815	1.859548	2.30600	2.89646	3.35539	5.0413
9	0.260955	0.702722	1.383029	1.833113	2.26216	2.82144	3.24984	4.7809
10	0.260185	0.699812	1.372184	1.812461	2.22814	2.76377	3.16827	4.5869
11	0.259556	0.697445	1.363430	1.795885	2.20089	2.71808	3.10581	4.4370
12	0.259033	0.695483	1.356217	1.782268	2.17881	2.68100	3.05454	43178
13	0.258591	0.693829	1.350171	1.770933	2.16037	2.65031	3.01228	4.2208
14	0.258213	0.692417	1.345030	1.761310	2.14479	2.62449	2.97684	4.1405
15	0.257885	0.691197	1.340806	1.753050	2.13145	2.60248	2.94671	4.0728

9




考試科目	統計學	系所別	企業管理學研究所 MBA 學位學程甲組	考試時間	2 月 12 日(三) 第 4 節
------	-----	-----	------------------------	------	-------------------

Save		F-table of Critical Values of $\alpha = 0.05$ for F(df1, df2)																		
DF1=	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	$\infty$	
1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54	241.88	243.91	245.95	248.01	249.05	250.10	251.14	252.20	253.25	254.31	
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	4.37	
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	

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	管理學	系所別	企業管理研究所 (MBA 學位學程)	考試時間	2 月 12 日(三) 第四節
<p>1. 根據你所接觸過的較為系統性的管理學教育資源（如學校課程、進修教育課程、線上課程、管理學課本等），請回答以下三個問題：</p> <p>a. 為什麼管理學需要討論這些知識內容？（9%）</p> <p>b. 這些知識內容的順序安排有什麼道理？（9%）</p> <p>c. 上述的知識內容與順序安排，與你使你成為「卓越的管理者」之間有什麼關聯？（7%）</p> <p>2. In an interview thirty years after publishing <i>The Nature of Managerial Work</i> (1973), Henry Mintzberg was asked whether he believed that we still lack an understanding of how managers manage. He responded:</p> <p><i>We are obsessed with management and we are obsessed with leadership and yet we barely understand the process ... It is remarkable how seldom we actually address the kind of anthropological question about what really goes on, what do managers really do or, as Linda Hill has asked in her book (1990), what happens when people first become managers. These critical questions are barely addressed in a society that is so utterly obsessed with management. I think this leads to all kinds of distortions, the most obvious of which is the whole notion of top management. What is top management? What is top management on top of exactly? Most people would probably agree that organizations should be viewed less as hierarchies than as networks, so when we look at them as top management we get all kinds of distortions, when we look at them as networks we see interacting nature of organization. What happens when we put a manager on top of a network? Just picture it, you have this network and you have top management on top of it. Being on top of a network means being out of it, which in fact is the state of a great deal of management today. Many senior managers are removed from the ongoing daily activities of their organization. This creates all kinds of problems, not the least of which is that we get grand and gloriously simpleminded strategies.</i></p> <p>a. What are the ten managerial roles identified by Henry Mintzberg in <i>The Nature of Managerial Work</i>? (10%)</p> <p>b. What is your interpretation of Henry Mintzberg's responses to the distortions associated with management? What is the difference between hierarchy and network? Do you agree or disagree with it? (15%)</p>					
備註	<p>一、作答於試題上者，不予計分。</p> <p>二、試題請隨卷繳交。</p>				

考試科目	管理學	系所別	企業管理研究所 (MBA 學位學程)	考試時間	2 月 12 日(三) 第四節
<p>3. 2023 年〈臺灣家族企業調查報告〉發現，到了 2030 年，台灣將有 45% 的家族企業掌權者達到 70 歲以上，屆時將進入企業接班高峰期。另一〈華人家族企業關鍵報告〉也指出，有將近 50% 的家族企業認為培育接班團隊為最迫切的需求。請從管理各功能面向闡述：如何有效管理家族企業的接班傳承？(30%)</p> <p>4. 台灣在全球創新供應鏈占有一席之地，但在全球創新企業排行榜上少見台灣公司上榜。創新既為企業成長與競爭優勢的主要驅動力之一，請從「組織」的角度說明如何有效促進企業創新。(20%)</p> 					
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	微積分	系所別	企業管理研究所 (MBA 學位學程)乙組	考試時間	2 月 12 日(三) 第四節
<p><b>Show all your work to earn the credits.</b></p> <p>1. (10 points) Evaluate: <math>\lim_{x \rightarrow \infty} x^{(\ln 2)/(1+\ln x)}</math></p> <p>2. (10 points) If <math>a, b</math> and <math>c</math> are constants such that</p> $\lim_{x \rightarrow 0} \frac{ax^2 + b(e^x - 1) + \sin(cx)}{2x^2 + 3x^5} = 1.$ <p>Find the value of <math>4a + b - c</math>.</p> <p>3. (10 points) Find the derivative <math>f'(x)</math> for the function</p> $f(x) = \frac{\sec x}{1 + \tan x} + \sum_{n=1}^{\infty} \int_{-nx^2}^{nx^2} (\sin u)^{2025} du.$ <p>4. (10 points) Find the derivative <math>g'(x)</math> for the function</p> $g(x) = \sqrt{x + \sqrt{x + \sqrt{x}}}.$ <p>5. (10 points) Evaluate: <math>\int_0^{\frac{\pi}{2}} \frac{\cos x \sin x}{3 + \cos^2 x} dx</math></p> <p>6. (10 points) Evaluate: <math>\int_0^1 x^2 \tan^{-1}(x) dx</math></p> <p>7. (10 points) Let <math>f(x) = xe^{-x^2}</math>. Find the 2025th derivative <math>f^{(2025)}(0)</math> of <math>f</math> at 0.</p> <p>8. A bus company offers sightseeing tours of downtown Taipei. One tour, priced at \$700 per person, had an average demand of about 1,000 customers per week. When the price was lowered to \$600, the weekly demand increased to about 1,200 customers. Let <math>x</math> represent the number of customers per week, and let <math>p</math> represent the price of a tour ticket. Assume that the demand equation is linear.</p> <p>(a) (3 points) Find the weekly demand equation.</p> <p>(b) (3 points) Find the weekly revenue function.</p> <p>(c) (4 points) Find the tour price that should be charged per person to maximize the total revenue each week.</p>					
備註	<p>一、作答於試題上者，不予計分。</p> <p>二、試題請隨卷繳交。</p>				

考試科目	微積分	系所別	企業管理研究所 (MBA 學位學程)乙組	考試時間	2 月 12 日(三) 第四節
------	-----	-----	-------------------------	------	-----------------

9. Students in a Calculus class get  $x$  hours of sleep in the two days leading up to the exam, where  $x$  lies in the range  $0 \leq x \leq T$ . The number of students who got between  $a$  and  $b$  hours of sleep is given by

$$\int_a^b rxdx, \quad \text{for } 0 \leq a \leq b \leq T.$$

- (a) (5 points) What fraction of the students got less than  $T/2$  hours of sleep?
- (b) (5 points) It is known that their scores,  $G(x)$ , are proportional to the amount of sleep  $x$  (in hours) they got, that is,

$$G(x) = 100 \times \frac{x}{T}.$$

Find the (correctly weighted) average score in the class.

10. Approximate the integral

$$\int_0^4 \frac{1}{1+x^3} dx$$

- (a) (5 points) using the Trapezoidal rule with four intervals.
- (b) (5 points) using the Simpson's rule with four intervals.

備

註

- 一、作答於試題上者，不予計分。  
二、試題請隨卷繳交。