考試科目	個體經濟學	所別	經濟學系	考試時間	2 月 26 日(六) 第二節

1. **(25%)** An individual has the utility function $U(h,c) = \min\{h,c\} + c$ (h: leisure, c: consumption, P_c: price of c and it is \$1). There are 24 hours in a day, and w is the market wage rate per hour ($w >$ \$1). Non-earned income is \$$I$.
   a. Are the preferences represented by the utility function complete, transitive, and continuous?
   b. Find the individual's labor supply function and indirect utility function.
   c. Suppose the government decides to impose an income tax on both wage and non-earned income. The income tax rate is 50%. Please compute the substitution effects and income effects to the hours worked. What are the compensating variation and equivalent variation to this individual from this tax policy?

2. **(25%)** An exchange economy has three consumers and three goods. Consumers' utility functions ($U^i(.)$) and initial endowments (e^i) are as follows:

$$U^1(x_1, x_2, x_3) = \min(x_1, x_2), \quad e^1 = (1,0,0)$$
$$U^2(x_1, x_2, x_3) = \min(x_2, x_3), \quad e^2 = (0,1,0)$$
$$U^3(x_1, x_2, x_3) = \min(x_1, x_3), \quad e^3 = (0,0,1)$$

   a. Define the Pareto efficient allocations for this economy.
   b. Define the Walrasian equilibrium allocations for this economy.
   c. Given a clear statement of the First Welfare Theorem.
   d. Give a clear statement of the Second Welfare Theorem.
   e. Briefly discuss why the First and Second Welfare Theorem are considered economically significant.
   f. Find <u>all</u> the Walrasian equilibrium allocations for this economy.

3. **(20%)** There are two firms, Izuz and Eker, in an industry of hardware, called *Netlet*. The market size is \$16 billion. Each firm can choose whether to advertise. Advertising costs \$4 billion for each firm that chooses to do so. If one firm advertises and the other does not, then the former captures the whole market. If both firms advertise, they split the market equally and pay for the advertising. If neither advertises, they split the market equally but without the expense of advertising. We assume zero production costs for both firms.
   a. Write down a payoff table for Izuz and Eker in the Netlet market, and find out the equilibrium when both firms move simultaneously.
   b. Use the story in part (a), are Izuz and Eker better in the case that they meet each other twice? Explain your answer.
   c. From the joint perspective of Izuz and Eker, how could these two firms do better? Elaborate why the solution you propose is sustainable.

請注意：背面還有試題。

備註	試題隨卷繳交

考試科目	個體經濟學	所別	經濟學系	考試時間	2 月 26 日(六) 第二節

4. **(30%)** Macroware has two types of customers for its computer design software: home users and business users. Each user will purchase only one copy of the software. Macroware is considering producing two versions of the software. Version X contains full features of the Macroware software. Version Y is the same as version X in every aspect except that it does not allow users to design in color. Willingness to pay of business and home users for Macroware's software is given below:

Version	X	Y
Business	$4,000	$2,000
Home	$1,600	$1,300

There are 100 business users and 100 home users. For simplicity, assume also that Macroware incurs zero costs for both versions.

a. If Macroware can tell business and home users apart and can charge them different prices, what prices of version X will Macroware set for business and home users?
b. Continue on part (a), how will Macroware deal with version Y? Compare your answers with those in part (a).
c. Now suppose that Macroware cannot distinguish business and home users and thus cannot charge them different prices for the same version. However, Macroware can charge different prices for version X and version Y. How much will Macroware charge for version X? How much for version Y? Write down Macroware's objective function and associated constraints before solving the problem.
d. How might your analysis in part (c) change if there were 150 business users and 50 home users?

備註	試題隨卷繳交

考試科目	總體經濟學	所別	經濟研究所	考試時間	2月26日(星期六)第三節

選擇題 (共 40 題, 每題 2.5 分)　選擇題請在答案卡上作答，否則不予計分。

1) When the price level decreases, which of the following is a response would occur to help explain the positive slope of the aggregate supply curve?

(a) The owners of the Orange King, a restaurant, bought new tables when interest rates fell.

(b) Janet buys more artwork when prices fall, because the money she was holding is now worth more.

(c) Samuel hires fewer workers because the price of his output falls, but his workers' wages are fixed by contract.

(d) The exchange rate falls so French restaurants in Paris buy more delicious pork chops from Iowa.

2) If aggregate output is below the natural rate level, advocates of discretionary policy would recommend that the government,

(a) Do nothing.

(b) Try to eliminate the high unemployment by attempting to increase the aggregate supply.

(c) Try to eliminate the high unemployment by attempting to increase the aggregate demand.

(d) Try to eliminate the high unemployment by attempting to decrease the aggregate demand.

3) As the interest sensitivity of investment spending increases,

(a) monetary policy has a larger effect on output.

(b) fiscal policy has a larger effect on output.

(c) the multiplier increases.

(d) all of the above.

(e) both (a) and (b) of the above.

4) Which of the following would cause the inflation rate to rise and unemployment to fall in the short run?

(a) The central bank sells bonds in the market.

(b) The central bank buys bonds in the market.

(c) The price of oil increases.

(d) The price of oil decreases.

(e) Both (b) and (d) are correct.

考試科目	總體經濟學	所別	經濟研究所	考試時間	2月26日(星期六)第三節

5) According to the principle of monetary neutrality, which of these variables will increase when the money supply increases?

(a) The wage you get each hour on your pay check.

(b) The price of oranges relative to the price of gasoline.

(c) The dollar price of oranges.

(d) The amount of goods you can purchase with the wage you get each hour.

(e) Both (a) and (c) are correct.

6) If government purchases increase by 100, and the purchases are financed by an increase in autonomous net taxes of 100, and the marginal propensity to consume is 0.5, then in the simple Keynesian model

(a) Aggregate output will increase by 200.

(b) Aggregate output will increase by 100.

(c) Aggregate output will decrease by 100.

(d) Aggregate output will not change.

(e) The effect on aggregate output cannot be determined without further information.

7) According to aggregate demand and supply analysis, the negative supply shocks of 1973-1975 and 1978-1980 had the effect of

(a) Increasing aggregate output, lowering unemployment, and raising the price level.

(b) Decreasing aggregate output, raising unemployment, and raising the price level.

(c) Increasing aggregate output, raising unemployment, and raising the price level.

(d) Decreasing aggregate output, raising unemployment, and lowering the price level.

(e) Increasing aggregate output, lowering unemployment, and lowering the price level.

8) Who would be included in the labor force?

(a) Mary, an unpaid homemaker.

(b) Peter, a full-time student who is not looking for a job.

(c) John, does not have a job, but is looking for work.

(d) None of the above are included in the labor force.

備註	試題隨卷繳交

考試科目	總體經濟學	所別	經濟研究所	考試時間	2月26日(星期六)第三節

9) The local Chevrolet dealership has an increase in inventory of 25 cars in 2003. In 2004, it sells all 25 cars.

(a) The value of increased inventory will be counted as part of GDP in 2003, but the value of the cars sold in 2004 will not cause GDP to increase.

(b) The value of the increased inventory will not affect 2003 GDP, but will be included in 2004 GDP.

(c) The value of the increased inventory will be counted as 2003 GDP and the value of the cars sold in 2004 will increase 2004 GDP.

(d) None of the above are correct.

10) Monetarists contend that

(a) Wages are sufficiently flexible so that the wage and price adjustment process is reasonably rapid.

(b) The aggregate supply curve does not move quickly to restore the economy to the natural rate of unemployment.

(c) Active government policy is required to restore the economy to full employment when unemployment is high.

(d) None of the above are correct.

11) Oscar deposited $500 into an account two years ago. The first year he earned 10% interest and the second year he earned 5% interest. How much money does Oscar have in his account now?

(a) $577.5.

(b) $580.

(c) $575

(d) None of the above are correct.

12) Using the one-period valuation model, assuming a year-end dividend of $11.00, an expected sale price of $110, and a required rate of return of 10%, the current price of the stock would be

(a) $121.

(b) $110.

(c) $99.

(d) $91.

考試科目	總體經濟學	所別	經濟研究所	考試時間	2月26日(星期六)第三節

13) Holding other factors constant, which of the following would increase the size of the U.S. current account deficit?

(a) A decline in American's net investment income.

(b) An increase in the amount of services purchased from foreigners.

(c) An increase in unilateral transfers from Americans to foreigners.

(d) All of the above.

14) Important implications of the efficient markets hypothesis include:

(a) Future changes in stock prices should, for all practical purposes, be unpredictable.

(b) Stock prices will respond to announcements only when the information in these announcements is new.

(c) Sometimes a stock price declines when good news is announced.

(d) All of the above.

(e) Only (a) and (b) of the above.

15) Other things the same, as the maturity of a bond becomes longer, the bond will pay

(a) Less interest because it has less risk.

(b) Less interest because it has more risk.

(c) More interest because it has more risk.

(d) There is no relation between term to maturity and risk.

16) An unsterilized intervention in which domestic currency is sold to purchase foreign assets leads to

(a) a gain in international reserves.

(b) a decrease in the money supply.

(c) a depreciation in the domestic currency.

(d) only (a) and (b) of the above.

(e) only (a) and (c) of the above.

備註	試題隨卷繳交

考試科目	總體經濟學	所別	經濟研究所	考試時間	2月26日(星期六)第三節

17) According to the Big Mac index reported by the Economists in July 2010, the price of the big Mac is US$3.73 in the US and C$4.17 in Canada. If the law of one price holds, the exchange rate of the Canadian dollar in terms of the US dollars should be

(a) 0.89.

(b) 0.95.

(c) 1.02.

(d) 1.8.

18) According to the uncovered interest parity condition, if the domestic interest rate is 12 percent and the foreign interest rate is 10 percent, then

(a) the expected appreciation of the foreign currency must be 4 percent.

(b) the expected appreciation of the foreign currency must be 2 percent.

(c) the expected depreciation of the foreign currency must be 2 percent.

(d) the expected depreciation of the foreign currency must be 4 percent.

19) Recently, China has continuously _____ the required reserve ratio on deposits. In the attempt to _____ the inflation, the increase in the required reserve ratio will cause a _____ in the money supply and a _____ in the interest rate.

(a) Reduce, reduce, decrease, decrease.

(b) Raise, raise, increase, decrease.

(c) Raise, reduce, decrease, increase.

(d) Reduce, raise, increase, increase.

20) Which investment bank filed for bankruptcy on September 15, 2008 making it the largest bankruptcy filing in the US history?

(a) Lehman Brothers.

(b) Merrill Lynch.

(c) Bear Stearns.

(d) Goldman Sachs.

考試科目	總體經濟學	所別	經濟	考試時間	2 月 26 日(六) 第 3 節

21. Which of the following statement is correct according to the convergence hypothesis?
(a) Poorer and less developed countries have higher capital/labor ratios than richer countries.
(b) Poorer and less developed countries have higher output/labor ratios than richer countries.
(c) Poorer and less developed countries will catch up with richer ones in terms of capital/labor ratios.
(d) Poorer and less developed countries will catch up with richer ones in terms of saving rate.

22. According to the Solow growth model, which of the following items is not a cause of economic growth in the long run?
(a) An increase in the money supply.
(b) An increase in the labor productivity.
(c) An increase in the technology.
(d) An increase in the quality of capital and labor.

23. According to the Solow growth model, an economy will transition to a steady state at a higher level of output per capita if there is an increase in
(a) the rate of capital depreciation.
(b) the rate of population growth.
(c) the marginal propensity to consume.
(d) the saving rate.

24. The golden-rule saving rate is the saving rate that
(a) maximizes the level of long-run consumption per capita.
(b) maximizes the level of long-run investment per capita.
(c) maximizes the level of the capital/labor ratio.
(d) maximizes the level of the labor quality.

25. Which of the following statement is true for the Solow growth model without technological progress? The growth rate of output per capita is equal to zero in the long run because
(a) the rate of population growth is constant over time.
(b) the saving rate is constant over time.
(c) the production function exhibits constant returns to scale in capital and labor.
(d) the capital depreciation rate is constant over time.

26. Suppose that the production of economy A is given as
$Y_A = K^{\alpha}(eL)^{1-\alpha},\ 0 < \alpha < 1,$

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where Y_A is output, K is the capital stock, L is labor (population), and eL is the effective level of labor (e is the productivity of labor). The economy's saving rate is equal to s and labor grows at a rate of n ($n > 0$). Moreover, the labor productivity grows at a rate g and capital depreciates at a rate of δ ($\delta > 0$).`` If $g = 0$ (and hence e is a constant), then the golden-rule saving rate is equal to

(a) α.

(b) $1 - \alpha$.

(c) n.

(d) $(\frac{Ae^{1-\alpha}}{\delta+n})^{\frac{\alpha}{1-\alpha}}$.

(e) none of the above.

27. (continued from 26)If $g = 0$, then the growth rate of the total output Y_A in the long run is equal to

(a) 0.

(b) e.

(c) n.

(d) s.

(e) none of the above.

28. (continued from 26) If $g > 0$, then the growth rate of the output per capita in the long run is equal to

(a) 0.

(b) g.

(c) $g + n$.

(d) $g + n + \delta$.

(e) none of the above.

29. (continued from 26) Consider an economy B whose production function is given as $Y_B = K^{\alpha}(eL)^{1-\alpha}$, $0 < \alpha < 1$. In this economy, $e = \bar{K}$, where $\bar{K}$ is the average capital stock. Again, the economy B saves a constant fraction of output for capital investment and labor grows at a rate n. Based on economy A (with the case of $g > 0$) and economy B, which of the following statement is correct?

(a) The growth rate of output per capita in the long run is endogenous in economy A and exogenous in economy B.

(b) The growth rate of output per capita in the long run is endogenous in economy B and exogenous in economy A.

(c) The growth rate of output per capita in the long run is exogenous in both economies.

(d) The growth rate of output per capita in the long run is endogenous in both economies.

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30. (continued from 26) Consider an economy C whose production function is given as $Y_C = K^{\alpha}M^{1-\alpha}$, $0 < \alpha < 1$, where K is physical capital and M is a factor can be accumulated (such as government infrastructure investment). Suppose that economy C saves a constant fraction of output for capital investment and the government of economy C invests a constant fraction of output for the infrastructure. Based on economies B and C, which of the following statement is correct?
(a) The growth rate of output per capita in the long run is exogenous in economy B and endogenous in economy C.
(b) The growth rate of output per capita in the long run is exogenous in economy C and endogenous in economy B.
(c) The growth rate of output per capita in the long run is exogenous in both economies.
(d) The growth rate of output per capita in the long run is endogenous in both economies.

31. (continued from 26.) Suppose that the growth rate of labor productivity g is greater than 0 in economy A. Moreover, the following table is taken from economy A:

years	Output growth $\Delta Y_A/Y_A$	Capital growth $\Delta K/K$	Labor growth $\Delta L/L$
1948-2002	2.5%	1.2%	1.2%
1948-1972	4.0%	1.2%	1.0%
1972-1995	3.2%	1.3%	1.4%
1995-2002	3.7%	1.7%	0.9%

Suppose that $\alpha = 0.5$. Then, the growth rate of labor productivity in years of 1948-2002 in country A is approximately equal to
(a) 0.1%.
(b) 1.3%.
(c) 2.6%.
(d) 3.7%.
(e) none of the above.

32. Which of the following statement related to GDP and GNP is always correct? For any given year,
(a) GDP is less than GNP.
(b) nominal GDP is greater than real GDP.
(c) nominal GNP is greater than real GNP.
(d) GDP deflator is greater than 100 if nominal GDP is greater than real GDP.

備註	試題隨卷繳交

考試科目	總體經濟學	所別	經濟	考試時間	2 月 26 日(六) 第 3 節

33. Country A is a small open economy with trade surplus. Which of the following is NOT true for country A?
(a) $Y > C + I + G$. Y: output; C: consumption, I: investment; G: government spending.
(b) Saving is greater than Investment.
(c) Net capital outflow is less than 0.
(d) Export is greater than import.

34. Which of the following statement is correct? Other things being equal, Fisher equation says that
(a) an increase in the inflation rate leads to an increase in the nominal interest rate.
(b) an increase in the output level leads to an increase in the price level.
(c) an increase in the velocity of money leads to an increase in the price level.
(d) an increase in the inflation rate leads to a decrease in the unemployment rate.

35. According to the quantity theory of money, which of the following statement is correct? Other thing being equal,
(a) an increase in the inflation rate leads to an increase in the nominal interest rate.
(b) an increase in the output level leads to an increase in the price level.
(c) an increase in the velocity of money leads to an increase in the price level.
(d) an increase in the output level leads to an increase in the price level.
(e) an increase in the inflation rate leads to a decrease in the unemployment rate.

36. Other things being equal, if the actual inflation rate is less than the expected one, then which of the following statement is correct?
(a) The unemployment rate is greater than the natural rate of unemployment.
(b) Borrowers will gain in expense of lenders.
(c) Wealth will be transferred from the rich to the poor.
(d) None of the above statement is correct.

37. Which of following statement related to consumption theories is correct?
(a) Keynes conjectured that consumption depends on both income and wealth.
(b) Modigliani's Life-cycle hypothesis emphasizes that consumption depends only on income.
(c) Friedman's hypothesis claimed that consumption depends only on permanent income.
(d) None of the above statement is correct.

38. Suppose that the reserve-deposit ratio in country A is 0.1 and the currency-deposit ratio is 0.8. Based on these figures, the money multiplier of country A is equal to

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(a) 0.9
(b) 1.0
(c) 2.0
(d) none of above.

39. Other things being equal, an increase in the bank's excess reserves will
(a) decrease the money supply.
(b) increase the money supply.
(c) have no effect on money supply.

40. Other things being equal, which of the following statement is correct?
(a) The unemployment rate decreases if the population of discouraged workers increases.
(b) The labor-force participation rate increases if the population of discouraged workers increases.
(c) The labor force increases if the population of discouraged workers increases.
(d) None of the above statement is correct.

備註	試題隨卷繳交

考試科目	統計學	所別	經濟學系	考試時間	2月 26 日(六) 第 四 節

1. A company that employs a large number of salespeople is interested in learning which of the salespeople sell the most: those strictly on commission, those with a fixed salary, or those with a reduced fixed salary plus a commission. The previous month's records for a sample of salespeople are inspected and the amount of sales (in dollars) is recorded for each, as shown in the table. (10%)

Commissioned	Fixed Salary	Commission Plus Salary
$450	$507	$492
$425	$361	$492
$450	$437	$470
$483	$432	$439
$466	$444	
$467		

ANALYSIS OF VARIANCE	DF	SS	MS	F
SOURCE	2	4195	2097.7	3.17
FACTOR	12	7945	662.1	
ERROR TOTAL	14	12140		

Test to determine if a difference exists in the mean sale amounts among the three compensation systems. Test using $\alpha = .025$.

2. A large metropolitan bank has analyzed the amount of time required to process home loans and determined that the times follow a normal distribution with mean time $\mu = 45$ hours. The bank's operations manager has developed a new procedure for processing the loans which involves extensive use of new computer software. He believes that the new procedure will decrease the population mean amount of time required to process home loans. After training a group of loan officers, a random sample of 25 loan applications will be selected and the average amount of time required to process the loans will be determined. If the switch is made to the new procedure, the cost of the additional software will be more than offset by the savings in manpower required to process the loans. Use the hypotheses H_0: $\mu \geq 45$ hours and H_a: $\mu < 45$ hours.
Due to the importance of this decision, the operations manager makes some adjustments in the procedure and decides to look at another random sample of 25 loan applications. If the population mean time required to process a loan has in fact been reduced to $\mu = 41.2$ hours with $\sigma = 5.5$ hours, what is the probability that the test will indicate that there has been no decrease in the population mean time? (Note: The test will still be done using $\alpha = .025$.) Round your answer to 4 decimal places. (10%)

3. It has been estimated that the G-car obtains a mean of 40 miles per gallon on the highway, and the company that manufactures the car claims that it exceeds this estimate in highway driving. To support its assertion, the company randomly selects 49 G-cars and records the mileage obtained for each car over a driving course

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similar to that used to obtain the estimate. The following data resulted: $\bar{x} = 41.5$ miles per gallon, $s = 7$ miles per gallon. Calculate the power of the test if the true value of the mean is 41 miles per gallon. Use a value of $\alpha = .025$. (10%)

4. One indication of how strong the real estate market is performing is the proportion of properties that sell in less than 30 days after being listed. Of the condominiums in a Florida beach community that sold in the first six months of 2006, 75 of the 115 sampled had been on the market less than 30 days. For the first six months of 2007, 25 of the 85 sampled had been on the market less than 30 days. Test the hypothesis that the proportion of condominiums that sold within 30 days decreased from 2006 to 2007. Use $\alpha = .01$. (10%)

5.

		FACTOR B		
Level		1	2	3
FACTOR A	1	4.0, 4.2	5.0, 5.2	6.1, 6.3
	2	5.7, 5.7	5.3, 5.1	8.8, 9.0

The MINITAB ANOVA printout is shown here. Test for interaction at the $\alpha = 0.05$ level of significance. Analysis of variance for response. (10%)

Source	df	SS	MS	F
A	1	0.53777	0.53777	0.11851
B	2	5.02708	2.51334	0.55391
AB	2	13.49334	6.74667	1.48678
Error	6	27.22667	4.53778	
Total	11	46.28486		

備註	試題隨卷繳交

考試科目	統計學	所別	經濟學系	考試時間	2月 26 日(六) 第 四 節

6. Given the linear specification $y_t = \alpha + \beta x_t + u_t$, $t = 1, 2, \cdots, T$, where y_t is the dependent variable, x_t is the explanatory variable and u_t is the error term. Let $\hat{\alpha}$ and $\hat{\beta}$ be the ordinary least square (OLS) estimators and R^2 be the centered coefficient of determination. Suppose that the true model is $y_t = 5x_t + e_t$, where x_t is non-stochastic, and $E(e_t) = 0$, $t = 1, 2, \cdots, T$. (20%)

   (a) Please calculate $E(\hat{\alpha})$ and $E(\hat{\beta})$. Are the OLS estimators $\hat{\alpha}$ and $\hat{\beta}$ unbiased?

   (b) If $y_t^* = 10y_t + 100$ and $x_t^* = 200x_t$ are used as the dependent and explanatory variables in a new specification, what will the resulting OLS estimators and the centered coefficient of determination be affected?

7. Given the linear specification $y_i = \alpha + \beta x_i + u_i$, $i = 1, 2, \cdots, 25$. Let $\hat{\alpha}$ and $\hat{\beta}$ be the OLS estimators. Giving the following sample moments:

$$\sum_{t=1}^{25} y_t = 1250, \sum_{t=1}^{25} x_t = 250, \sum_{t=1}^{25} y_t^2 = 2734, \sum_{t=1}^{25} x_t^2 = 3500, \sum_{t=1}^{25} x_t y_t = 7476.$$

   Suppose that x_t is non-stochastic, $e_t, t = 1, \cdots, 25$, are idenpendent and identically distributed random variables with normal distribution $N(0, 100)$. (20%)

   (a) Please calculate $Var(\hat{\alpha})$ and $Var(\hat{\beta})$.

   (c) Test $H_0 : \beta_0 = -5$ at 5% significance level.

8. Suppose $x_1, x_2, \cdots, x_{100}$ constitute a random sample from the density

$$f(x) = \frac{\theta^3}{2} e^{-\theta x} x^2, \; x > 0.$$

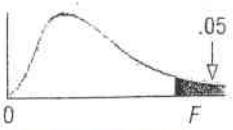
   Knowing that $\bar{x} = 25$, find a maximum likelihood estimate of θ. (10%)

請注意：背面還有試題。

備註	試題隨卷繳交

考試科目	統計學	所別	經濟學系	考試時間	2 月 26 日(六) 第 4 節

Critical values of the F distribution at a 5 percent level of significance



Degrees of Freedom for the Denominator	Degrees of Freedom for the Numerator: 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

備註	試題隨卷繳交

考試科目	統計學	所別	經濟學系	考試時間	2月26日(六) 第4節

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

請注意：背面還有試題。

備註	試題隨卷繳交

考試科目	統計學	所別	經濟學系	考試時間	2月26日(六) 第4節

Critical value of the F distribution at a 2.5 percent level of significance

df_1 / df_2	1	2	3	4	5	6	7	8	9	10	11	12
1	647.8	799	864	900	922	937	948.2	957	963	969	973	977
2	38.51	39	39.2	39.2	39.3	39.3	39.36	39.4	39.4	39.4	39.4	39.4
3	17.44	16	15.4	15.1	14.9	14.7	14.62	14.5	14.5	14.4	14.4	14.3
4	12.22	10.6	9.98	9.6	9.36	9.2	9.074	8.98	8.9	8.84	8.79	8.75
5	10.01	8.43	7.76	7.39	7.15	6.98	6.853	6.76	6.68	6.62	6.57	6.52
6	8.813	7.26	6.6	6.23	5.99	5.82	5.695	5.6	5.52	5.46	5.41	5.37
7	8.073	6.54	5.89	5.52	5.29	5.12	4.995	4.9	4.82	4.76	4.71	4.67
8	7.571	6.06	5.42	5.05	4.82	4.65	4.529	4.43	4.36	4.3	4.24	4.2
9	7.209	5.71	5.08	4.72	4.48	4.32	4.197	4.1	4.03	3.96	3.91	3.87
10	6.937	5.46	4.83	4.47	4.24	4.07	3.95	3.85	3.78	3.72	3.66	3.62
11	6.724	5.26	4.63	4.28	4.04	3.88	3.759	3.66	3.59	3.53	3.47	3.43
12	6.554	5.1	4.47	4.12	3.89	3.73	3.607	3.51	3.44	3.37	3.32	3.28
13	6.414	4.97	4.35	4	3.77	3.6	3.483	3.39	3.31	3.25	3.2	3.15
14	6.298	4.86	4.24	3.89	3.66	3.5	3.38	3.29	3.21	3.15	3.09	3.05
15	6.2	4.77	4.15	3.8	3.58	3.41	3.293	3.2	3.12	3.06	3.01	2.96
16	6.115	4.69	4.08	3.73	3.5	3.34	3.219	3.12	3.05	2.99	2.93	2.89
17	6.042	4.62	4.01	3.66	3.44	3.28	3.156	3.06	2.98	2.92	2.87	2.82
18	5.978	4.56	3.95	3.61	3.38	3.22	3.1	3.01	2.93	2.87	2.81	2.77
19	5.922	4.51	3.9	3.56	3.33	3.17	3.051	2.96	2.88	2.82	2.76	2.72
20	5.871	4.46	3.86	3.51	3.29	3.13	3.007	2.91	2.84	2.77	2.72	2.68
21	5.827	4.42	3.82	3.48	3.25	3.09	2.969	2.87	2.8	2.73	2.68	2.64
22	5.786	4.38	3.78	3.44	3.22	3.05	2.934	2.84	2.76	2.7	2.65	2.6
23	5.75	4.35	3.75	3.41	3.18	3.02	2.902	2.81	2.73	2.67	2.62	2.57
24	5.717	4.32	3.72	3.38	3.15	2.99	2.874	2.78	2.7	2.64	2.59	2.54

備註	試題隨卷繳交