

考試科目	經濟學	系所別	商學院共同科	考試時間	2 月 18 日 (一) 第一節
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一、Multiple Choice (1 point each)

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

1. One would expect to observe diminishing marginal product of labor when
  - A. workers are discouraged about the lack of help from other workers.
  - B. crowded office space reduces the productivity of new workers.
  - C. union workers are told to reduce their work effort in preparation for a new round of collective bargaining talks.
  - D. only new workers are trained in using the most productive capital.
  
2. Comparing marginal revenue to marginal cost
  - (i) reveals the contribution of the last unit of production to total profit.
  - (ii) is helpful in making profit maximization production decisions.
  - (iii) always reveals whether a firm is making an economic profit.
  - (iv) tells a firm whether its fixed costs are too high.
  - A. (i) and (ii) only
  - B. (iii) only
  - C. (ii) and (iii) only
  - D. All of the above are correct.
  
3. The monopolist's profit-maximizing quantity of output is determined by the intersection of which of the following two curves?
  - A. marginal cost and demand
  - B. average cost and demand
  - C. marginal cost and marginal revenue
  - D. average cost and marginal revenue
  
4. One key difference between an oligopoly market and a competitive market is that
  - A. oligopolistic firms are interdependent while competitive firms are not.
  - B. oligopolistic firms sell completely unrelated products while competitive firms do not.
  - C. oligopolistic firms sell their product at a price equal to marginal cost while competitive firms do not.
  - D. oligopolistic firms are price takers while competitive firms are not.

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- 一、作答於試題上者，不予計分。
- 二、試題請隨卷繳交。

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5. When advertising encourages customers to become more informed about all firms in the market,
- demand curves for specific brands in the market are likely to become less elastic.
  - each firm is likely to have less market power.
  - firms are able to foster stronger brand loyalty.
  - the market power of individual firms is strengthened.
6. David faces choices between Apple and Banana. He feels that having five apples and three bananas (5,3) is not different from having four apples and six bananas (4,6). Which following statement(s) is (are) possibly correct if Ethan's indifferent curves are downward-sloping?
- Ethan feels (4, 4.8) is as good as (5, 3).
  - Ethan feels (6, 2) is as good as (4, 6).
- (i)
  - (ii)
  - (i) and (ii)
  - None of the above is correct.
7. John and Ethan both work eight hours a day. In one day, John can make 4 cakes or 8 ice cream, whereas Ethan can make 2 cakes or 5 ice cream. Given this, which statement(s) is (are) correct?
- Ethan has a lower opportunity cost in producing ice cream than John.
  - John has an absolute advantage in producing both goods.
  - It is not beneficial for John to trade with Ethan.
- (i) and (ii)
  - (i) and (iii)
  - (ii) and (iii)
  - (i), (ii), and (iii)
8. Which following statement(s) is (are) correct?
- A Giffen good is always an inferior good.
  - A Giffen good is a good that its income effect is larger than its substitution effect.
- (i)
  - (ii)
  - (i) and (ii)
  - None of the above is correct.

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9. John, Ethan, and Mary decide to buy a bike together and share the ownership. Their willingness to pay for each choice is in the following table

	John	Ethan	Mary
Bike A	\$800	\$300	\$500
Bike B	\$700	\$450	\$500
Bike C	\$600	\$500	\$500
Bike D	\$500	\$550	\$500
Bike E	\$400	\$650	\$500

They will choose the bike that all three agree to buy. Which following statement(s) is(are) correct?

- (i) The bike will be a public good among them.  
(ii) If three people share the cost and all bikes have the same price, \$1500, the choice that maximizes aggregate surplus will be chosen.

- A. (i)  
B. (ii)  
C. (i) and (ii)  
D. None of the above is correct.

10. Suppose Country A proposes to impose a tax on a good. One report from an economist argues that this tax will increase producers' before-tax total revenue and make the producers bear relatively more tax burden than consumers. Which following statement is correct for the good?

- A. The price elasticity of demand is 1.8; the price elasticity of supply is 0.8.  
B. The price elasticity of demand is 0.9; the price elasticity of supply is 0.3.  
C. The price elasticity of demand is 0.6; the price elasticity of supply is 1.4.  
D. There is not enough information to answer the question.

11. In a certain economy, when income is \$1000, consumer spending is \$800. The value of the multiplier for this economy is 2.5. It follows that, when income is \$1060, consumer spending is

- A. \$815.  
B. \$836.  
C. \$900.  
D. \$950.

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12. Which of the following is not a reason that paying efficiency wages may increase a firm's profit?
- Efficiency wages increase worker health and therefore increase worker productivity.
  - Efficiency wages decrease worker turnover and therefore decrease hiring and training costs.
  - Efficiency wages decrease worker shirking and therefore increase worker productivity.
  - Efficiency wages are below the equilibrium wage rate but still attract high quality workers.
13. If the Federal Reserve accommodates an adverse supply shock,
- inflation expectations may rise which shifts the short-run Phillips curve shifts right.
  - inflation expectations may rise which shifts the short-run Phillips curve shifts left.
  - inflation expectations may fall which shifts the short-run Phillips curve shifts right.
  - inflation expectations may fall which shifts the short-run Phillips curve shifts left.
14. If a local bank decides to convert some of its U.S. Treasury securities into cash, which it will hold in its vault, what impact will this have on the bank's balance sheet?
- Reserves would increase, liabilities would stay the same, and owner's equity would decrease.
  - Reserves would increase, liabilities would stay the same, and owner's equity would increase.
  - Reserves would decrease, liabilities would decrease, and owner's equity would decrease.
  - Reserves would decrease, liabilities would stay the same, and owner's equity would decrease.
15. Matilda just graduated from college. In order to devote all her efforts to college, she didn't hold a job. She is going to tour around the country on her motorcycle for a month before she starts looking for work. Other things the same, the unemployment rate
- increases, and the labor-force participation rate decreases.
  - and the labor-force participation rate both increase.
  - increases, and the labor-force participation rate is unaffected.
  - and the labor-force participation rate are both unaffected.
16. In an IS-LM model, if the government adopts a loose monetary policy and a tight fiscal policy simultaneously,
- interest rate increases, while output stays the same.
  - interest rate stays the same, while output decreases.
  - interest rate change is uncertain, while output increases.
  - interest rate decreases, while output changes is uncertain.

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17. In a small open economy, a loose fiscal policy coupled with an increase in import tariff will cause domestic currency to

- A. increase.
- B. decrease.
- C. remain the same.
- D. change in an uncertain direction.

18. Assuming, in a two-period model, that the nominal wage rate increases from \$10/hour to \$15/hour; the expected price level increases from 1 to 3; and the actual price level increases from 4 to 5, we can deduce that

- A. nominal wage rate decreases.
- B. expected real wage rate increases.
- C. actual real wage rate increases.
- D. All of the above are correct.

19. Suppose the objective function of a government is described by  $W(u, \pi) = (u + 5\pi^2)$  where  $u$  is the unemployment rate, and  $\pi$  is the inflation rate, while the Phillips curve is described by  $\pi = \pi^e - 2(u - u^*)$  where  $\pi^e$  is the expected inflation rate, and  $u^*$  is the natural rate of unemployment. Which of the following inflation rate is a credible promise that the government can make?

- A. 0%
- B. 2%
- C. 5%
- D. 10%

20. If the central bank announces a decrease in money supply while keeping the actual money supply unchanged, the rational expectations theory would predict

- A. both output and price remain unchanged.
- B. output increases, while price decreases.
- C. output decreases, while price increases.
- D. output remains unchanged, while price decreases.

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## 二、Problems and Short-essay Questions

Please answer the following questions IN SEQUENCE. All questions may be answered in either Chinese or English.

1. Suppose there is a small country. It imports apples at the price of \$10 per bag. The demand curve is  $D = 400 - 10P$ . The supply curve is  $S = 50 + 5P$ . The country imposes a specific tariff so that the import is 50 bags. Answer the following questions.

- (5 points) Calculate the tariff imposed by the country.
- (5 points) Calculate the tariff revenue.
- (5 points) Calculate the consumption distortion loss.
- (5 points) Calculate the production distortion loss.

2. Suppose the demand curve of a specific kind of flower for Country A is  $Q^D = 200 - P$ , where  $Q^D$  is the quantity demanded and  $P$  is the price. The supply curve in the same market is  $Q^S = 3P$ , where  $Q^S$  is the quantity supplied.

A. (15 points) Suppose scientists find that the scent of this specific kind of flower can cure mental disorders. Hence, for each unit of the quantity demanded brings \$80 external benefit. Assume the world price  $P^W$  is \$60 and is not affected by Country A's policies. Considering this external benefit, should Country A export or import how many units of this good? Please draw a graph and label all relevant points. Also, please show your calculation.

B. (5 points) How can the government deal with the issue of the external benefit that is described above? Please clearly explain your answer.

3. In an imaginary economy, consumers buy only sandwiches and magazines. In 2016, the base year, a sandwich cost \$5 and a magazine cost \$4. The consumers bought 20 sandwiches and 25 magazines at these prices. In 2017, a sandwich cost \$6.

A. (8 points) If the consumer price index in 2017 was 125, then how much did a magazine cost in 2017?

B. (12 points) Suppose that consumers bought 30 sandwiches and 25 magazines in 2017. What was the growth rate of nominal GDP between 2016 and 2017? What was the growth rate of real GDP between 2016 and 2017? What was the GDP deflator in 2017?

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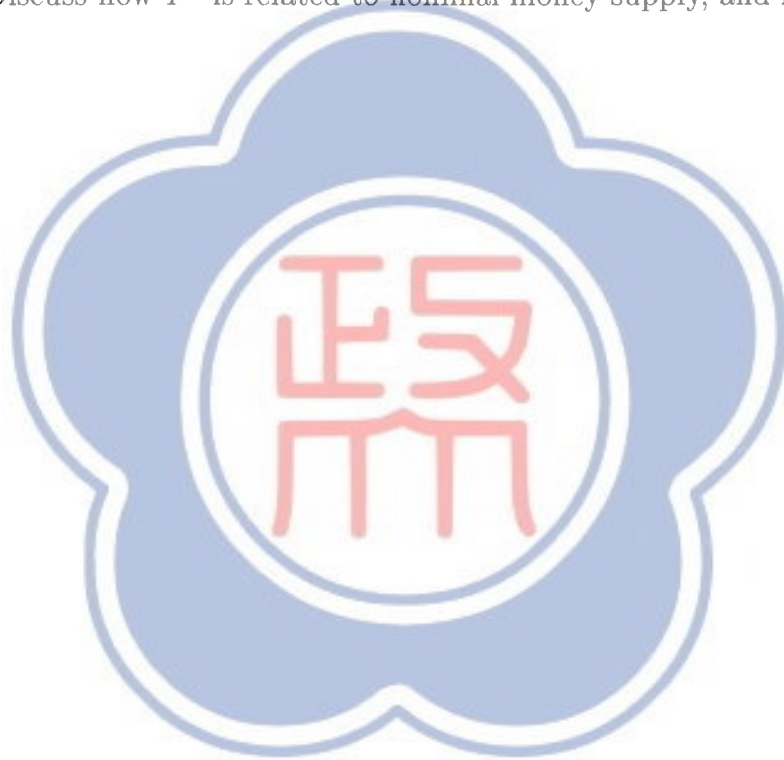
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4. Consider an economy with a consumption function  $C = C_0 + c \cdot Y_d$ , where  $Y_d$  represents disposable income; an investment function  $I = I_0 - b \cdot r$ , where  $r$  represents interest rate; tax revenue  $T = T_0 + t \cdot Y$ , where  $t$  represents tax rate; transfer payment  $TP$ ; a money demand function  $L = k \cdot Y - h \cdot r$ ; a money supply function,  $M = M_0/P$ , where  $M_0$  is the nominal money supply controlled by the central bank, and  $P$  represents the general price level.

A. (10 points) Derive the equilibrium output level  $Y^*$  when the goods market and the money market are in equilibrium simultaneously.

B. (10 points) Discuss how  $Y^*$  is related to nominal money supply, and how this relationship is affected by  $h$ .



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**Part I. Multiple Choice Questions (40%, 4% each)**

1. The risk-free rate, average rates of return, standard deviations, and betas for three portfolios and S&P 500 index are given below.

Portfolio	Average Rate of Return	Standard Deviation	Beta
<i>A</i>	15%	30%	1.05
<i>B</i>	25%	35%	1.6
<i>C</i>	20%	25%	1.1
<i>S&amp;P 500</i>	15%	20%	
<i>r<sub>f</sub></i>	5%		

What is the Treynor measure for *Portfolio A*?

- A. 9.52%  
 B. 14.29%  
 C. 33.33%  
 D. 15.38%
2. Based on question 1, *Portfolio B* has a superior return of \_\_\_\_\_ as compared to the *S&P 500* in terms of  $M^2$  measure.  
 A. -3.33%  
 B. 1.43%  
 C. 10%  
 D. 7.69%
3. Based on question 1, \_\_\_\_\_ is preferred if the stock will be combined into a well-diversified portfolio.  
 A. *Portfolio A*  
 B. *Portfolio B*  
 C. *Portfolio C*  
 D. *S&P 500*
4. A company can increase its dividends to solve the information asymmetry problem between corporate insiders and outside investors. The primary reason supporting this argument is that:  
 A. paying dividends when excess cash is available.  
 B. paying dividends can be used to signal a firm's optimistic outlook.  
 C. manager can pay dividends to keep cash from bondholders.  
 D. more dividends appeal to income-seeking investors.

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5. A company pays a fair value to acquire a target firm. If the acquisition does not create any value (such as synergy), then
- A. the earnings per share of the acquiring firm will be the same before and after the acquisition.
  - B. the earnings per share of the acquiring firm may change, but the stock price of the acquiring firm will not change.
  - C. the stock price of the acquiring firm will increase, but the price-earnings ratio of the acquiring firm will not change.
  - D. the earnings per share of the acquiring firm may change, but the price-earnings ratio of the acquiring firm will not change.
6. Which one of the following statements about convertible bond are true?
- I. The longer the call protection on a convertible, the less the security is worth.
  - II. The more volatile the underlying stock, the greater the value of the conversion feature.
  - III. The smaller the spread between the dividend yield on the stock and the yield-to-maturity on the bond, the more the convertible bond is worth.
  - IV. Issuing convertible bonds can reduce agency problem.
  - V. A convertible bond has an option value equal to the market value of the convertible bond minus the maximum of the straight bond value or conversion value.
- A. II and IV
  - B. II, IV, and V
  - C. II, III, and IV
  - D. III, IV, and V
  - E. I, II, III, IV, and V
7. A company files a Chapter 7 bankruptcy. Based on The Absolute Priority Rule (APR), company shareholders receive payment, if funds are remaining after
- A. bankruptcy administrator but before the creditors.
  - B. secured creditors but before the unsecured creditors.
  - C. unsecured creditors but before the IRS.
  - D. the employees but before the IRS.
  - E. after all other parties have been paid.

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8. A Treasury Inflation-Protected Security (TIPS) is issued at par value for \$1,000. The bond has a 3% coupon paid annually. Inflation turns out to be 2%, 3%, and 4% over the next 3 years. The annual coupon income will be received in year 2 is \_\_\_\_\_.
- A. \$30
  - B. \$32.70
  - C. \$32.78
  - D. \$31.52
9. The sustainable growth rate \_\_\_\_\_.
- A. assumes there is no external financing of any kind.
  - B. is the maximum rate at which a firm can grow while the debt-equity ratio is variable.
  - C. is based on receiving additional external debt and equity financing.
  - D. assumes the dividend payout ratio is equal to zero.
  - E. is equal to the internal growth rate when the company has no debt.
10. Which one of the following statement is correct given the information of a project?
- I. Internal rate of return: 8.5%
  - II. Net present value: -\$393
  - III. Payback period: 3.54 years
  - IV. Required rate of return: 9.5%
- A. The discount rate used in computing the net present value is less than 8.5%
  - B. The discounted payback period should be less than 3.54 years.
  - C. This project should be rejected because the profitability index is less than 1.
  - D. This project should be rejected based on the payback period.
  - E. This project should be accepted based on the internal rate of return.

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**Part II. Calculations and Essays (60%, 10% each)**

1. (10%) Some financial records for Company XYZ in 2017 are in the followings.

Quantity sold = 200,000 units

Anticipated sales = \$600,000

Total fixed cost = \$75,000

Variable cost = \$200,000

Total interest expenses = \$75,000

Profit margin = 5%

Total debt = \$100,000

Leverage ratio (debt to equity ratio) = 0.25

Shares of common stock outstanding = 10,000 shares

Current price per share = \$51

Retention rate = 40%

Calculate the following:

- (1) (2%) The break-even quantity (EBIT = \$0)
- (2) (2%) The return on total asset.
- (3) (2%) The P/E ratio for common stock.
- (4) (2%) The pay-out ratio for dividend.
- (5) (2%) Total asset turnover.

2. (10%) A mutual fund manager uses three securities to form a portfolio. The first security is Apple Inc. stock, the second security is a corporate bond issued by IBM, and the third security is 3-month T-bill that yields a sure rate of 3%. The correlation between the fund returns is 0.5. The expected rates of return and risks for risky securities are:

	Expected Return	Standard Deviation
Apple Stock	18%	0.4
IBM Bond	8%	0.2

- (1) (6%) If the fund manager wants to form a portfolio on the best feasible capital allocation line (CAL) with expected return of 10%, what are the weights for Apple stock, IBM bond, and 3-month T-bill in his three-security portfolio?
- (2) (4%) What is the standard deviation of the three-security portfolio constructed in (1)?

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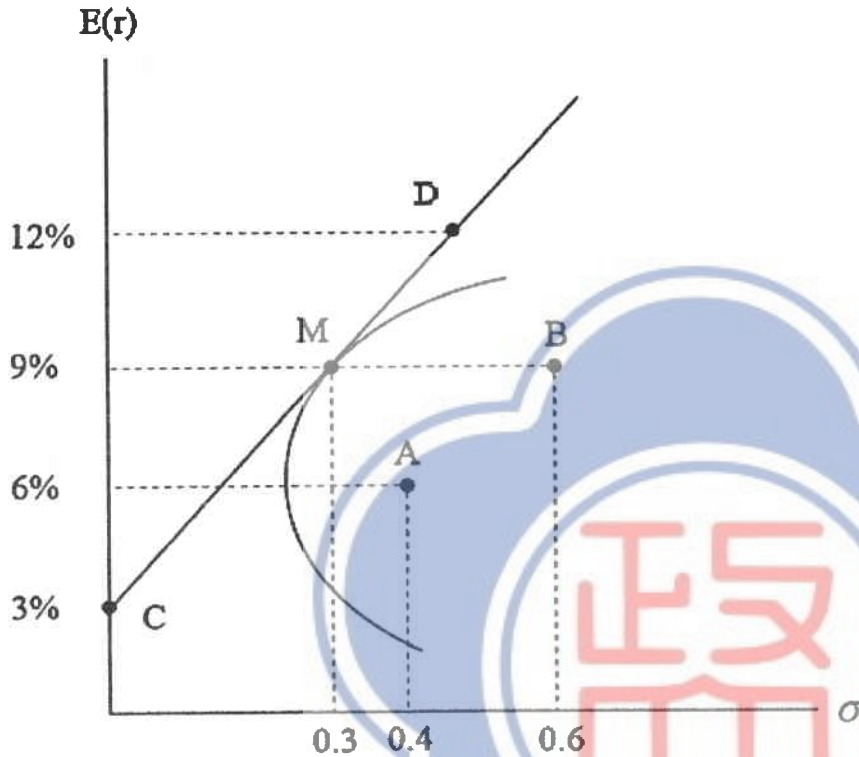
3. (10%) Given the information of the stock and stock options for Wal-Mart Stores Inc., please answer the following questions.

	Bid	Ask	Close
Stock	\$84.5	\$85.0	\$85.0
Call (X=\$85), T=0.5year	\$0.50	\$0.55	\$0.55
Call (X=\$90), T=0.5 year	\$0.10	\$0.15	\$0.10
Put (X=\$85), T=0.5 year	\$1.50	\$1.55	\$1.50
Put (X=\$90), T=0.5 year	\$6.50	\$6.60	\$6.60

- (1) (4%) It is believed that the Wal-Mart stock price will be between \$85 and \$95 in the following six months. Please construct a short straddle trading strategy which has the highest profit when stock price is \$90.
- (2) (6%) Please plot the profits of the short straddle trading strategy when the stock price is between \$75 and \$105.
4. (10%) Wenshan Company has a debt-equity ratio of  $1/3$ . The required rate of return on the company's unlevered equity is 16%, and the pretax cost of debt is 8%. Sales revenue for the company is expected to remain stable indefinitely at last year's level of \$40,000,000. The company has no fixed cost, and variable costs amount to 25% of sales. The tax rate is 40%, and the company distributes all of earnings as cash dividends at the end of each year.
- (1) (7%) Use the weighted average cost of capital method to calculate the value of the company. What is the value of the company's equity? What is the value of the company's debt?
- (2) (3%) If the company were financed entirely by equity, how much would it be worth?
5. (10%) NCCU Corporation is going to distribute \$500,000 to its shareholders in terms of extra cash dividends or a share repurchase. NCCU's current earnings per share is \$2.5 and current stock price per share is \$40. There are 200,000 shares of NCCU stock outstanding. Ignore taxes and other imperfections in answering the following questions.
- (1) (5%) What are price per share of stock, EPS, and PE ratio if NCCU chooses dividend payout?
- (2) (5%) What are price per share of stock, EPS, and PE ratio if NCCU chooses share repurchase?

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6. (10%) In the following figure, the solid curve is the minimum variance frontier of risky assets, portfolios A, B, C, D, and M are located in the figure based on their corresponding expected rate of returns and standard deviations. All investments are fairly priced under the CAPM.



- (1) (4%) What are the beta coefficients for portfolio A and portfolio B?
- (2) (6%) If the total risk of a security can be measured by the variance of the security return, what are systematic risk and unsystematic risks for portfolio A and portfolio B?

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1. (15%) It is known that the probability of selecting an adult over 40 years of age with cancer is 0.05. The probability of a doctor correctly diagnosing a person with cancer as having the disease is 0.78 and the probability of incorrectly diagnosing a person without cancer as having the disease is 0.06.
- (1) What is the probability that a person is diagnosed as having cancer? (8%)
- (2) What is the probability that a person diagnosed as having cancer actually has the disease? (7%)

2. (20%) A manager randomly selected 150 large cash transactions at a bank that were made in January. The manager then carefully tracked down the details of these transactions to see that the correct procedures for reporting these large transactions were followed.

(1) In order to use a binomial model in this problem, what assumption are necessary? (6%)

If the chance for a procedural error is 10%, what is the probability that the manager finds more than five such transactions?

(2) Express it using the binomial distribution. (4%)

(3) Approximate it using the normal distribution. (10%)

3. (35%) A large insurance company wants to estimate the difference between the average amount of term life insurance purchased per family and the average amount of whole life insurance purchased per family. The following sample estimates are obtained.

	Term	Whole life
Mean	75,000	45,000
Standard deviation	22,000	15,500
Sample size	25	29

TWD

Assume the amount of insurance is normally distributed.

- (1) How does the relative variability for term and whole life insurance amounts compare? (5%)
- (2) How large a sample should the company take to be within 3,500 of the actual average for the whole life insurance amounts with 99% confidence? (8%)
- (3) Construct a 95% confidence interval to estimate the difference in means for these two groups. (7%)
- (4) Determine whether the variances of term and whole life insurance amounts are the same. Use the 0.05 level of significance. (7%)
- (5) Determine whether the means of term and whole life insurance amounts are the same at the 0.05 level of significance. (8%)

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4. (30%) A random sample of 2,229 loans made by banks for the purchase of new automobiles was studied to identify variables that explain the interest rate charged. The following table shows the estimation result.

Variable	Estimate	t statistic
Intercept	15.47	3.12
Loan size (in TWD)	-0.0015	10.30
Length of loan (in months)	-0.906	4.20
Percent down payment	-0.522	8.35
Cosigner (0=No, 1=Yes)	-0.009	3.02
Unsecured loan (0=No, 1=Yes)	0.034	2.19
Total payment (borrower's monthly installment debt)	0.100	1.37
Total income (borrower's total monthly income)	-0.170	2.37
Bad credit report (0=No, 1=Yes)	0.012	1.99
Young borrower (0=older than 25, 1=25 or younger)	0.027	2.85
Male borrower (0=female, 1=male)	-0.001	0.89
Married (0=No, 1=Yes)	-0.023	1.91
Own home (0=No, 1=Yes)	-0.011	2.73
Years at current address	-0.124	4.21

$$SSTotal=0.502; R^2=0.297$$

- (1) Examine the signs of each of the statistically significant coefficients and give a short explanation of what they tell us. Use the 0.05 level of significance. (18%)
- (2) Construct the ANOVA table for the regression analysis. (8%)
- (3) Compute the standard error of the regression and explain its meaning. (4%)

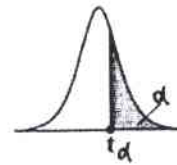
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Table of the standard normal distribution

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9031	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9924	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9958	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986

考試科目	統計學	系所別	財務管理學系	考試時間	二月 18 日(一) 第 3 節
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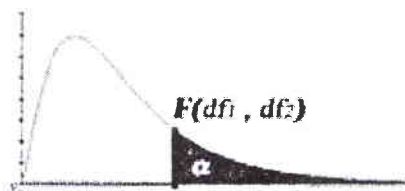
Percentage Points of the  $t$  Distribution;  $t_{v, \alpha}$   
 $P(T > t_{v, \alpha}) = \alpha$



v	$\alpha$													
	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	3.965
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
$\infty$	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	系 所 別 財務管理學系	考 試 時 間 2 月 18 日 (一) 第 3 節
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Table of Probabilities for the F distribution



F Table for  $\alpha = 0.05$

/	df <sub>1</sub> =1	2	3	4	5	6	7	8	9	10	12	15	20	24	30
df <sub>2</sub> =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
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
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	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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22	2.18	2.10	2.03	1.94	1.90	1.85
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
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

備 註

- 一、作答於試題上者，不予計分。
- 二、試題請隨卷繳交。