

計算題，每題 10 分。(以下個題均需明列計算過程。若僅陳述答案，不予計分)。

1. 假設  $f(x) = \frac{2x+5}{x+1}$ ，請問  $f(x)$  是否在  $\mathcal{R}$  上處處可微。

2. 請試圖描繪下列函數的圖形： $y = \frac{|2x-2|}{x-2}$

3. 已知  $y = x^5 + x$ ，請找出  $\frac{dx}{dy}$ 。

4. 已知

$$y_1 = 2x_1 + 3x_2$$

$$y_2 = 4x_1^2 + 12x_1x_2 + 9x_2^2$$

請求出 Jacobian 行列式之值。

5. 已知  $z = f(x, y, t)$  且  $x = \ln t, y = a + b \cdot t$ ，請求出  $z$  對  $t$  之全微分。

6. 試利用泰勒展開法 (Taylor's Expansion)，將  $\ln(x)$  在  $x = 1$  處做二階泰勒展開。

7. 求  $\int \frac{x}{1+x^2} dx$ 。

8. 求  $\int x \ln(x) dx$ 。

9. 利用 L'Hospital 法則求下列極限： $\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$ 。

10. 請問  $f(x_1, x_2) = x_1^2 + x_2^2$  是凸性或凹性函數。

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以下申論，共計四題，每題 25 分，請詳答。

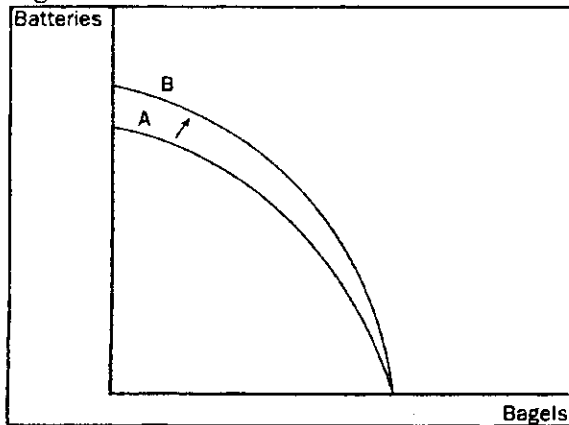
- 1、 何謂民主？民主理論指出民主制度有許多可能的問題，請任說明三個可能的問題與原因。
- 2、 我國憲政體制為以下何者：內閣、總統、雙首長制？請說明該制度之運作方式與問題。
- 3、 政治經濟學思想大師馬克思有哪些重要主張？試說明並舉例。
- 4、 何謂全球化？請說明並分析全球化之可能問題。

**Multiple Choice**

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

- \_\_\_ 1. One component necessary for markets to work is
- government intervention.
  - a benevolent society.
  - property rights.
  - abundant resources.

**Figure 1**



- \_\_\_ 2. Refer to Figure 1. The shift of the frontier from A to B was most likely caused by which of the following?
- technological improvement in the production of batteries
  - more labor available in the economy
  - a general technological breakthrough
  - more capital available in the economy
- \_\_\_ 3. Mike and Sandy are two woodworkers who both make tables and chairs. In one month, Mike can make 4 tables or 20 chairs, where Sandy can make 6 tables or 18 chairs. Given this, we know that
- Mike has a comparative advantage in tables.
  - Sandy has an absolute advantage in chairs.
  - Mike has an absolute advantage in tables.
  - Sandy has a comparative advantage in tables.
- \_\_\_ 4. Two goods are substitutes if a decrease in the price of one good
- increases the demand for the other good.
  - reduces the demand for the other good.
  - reduces the quantity demanded of the other good.
  - increases the quantity demanded of the other good.
- \_\_\_ 5. Along a linear demand curve, slope
- and elasticity are both constant.
  - changes but elasticity is constant.
  - and elasticity both change.
  - is constant but elasticity changes.

【背面還有試題】

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6. Your younger sister needs \$50 to buy a new bike. She has opened a lemonade stand to make the money she needs. She currently is charging 25 cents per cup, but wants to adjust her price to earn the money faster. If you know that the demand for lemonade is elastic, what is your advice to her?
  - a. Leave the price the same and be patient.
  - b. Raise the price to increase total revenue.
  - c. Lower the price to increase total revenue.
  - d. There isn't enough information given to answer this question.
7. A tax on the sellers of jewelry will cause the price the buyers pay
  - a. and the effective price the sellers receive to rise.
  - b. and the effective price the sellers receive to fall.
  - c. to rise, and the effective price the sellers receive to fall.
  - d. to fall, and the price the sellers receive to rise.
8. In most markets, consumer surplus
  - a. reflects economic well-being.
  - b. reflects the total value that buyers place on goods or services.
  - c. reflects the benefit to buyers mandated by government.
  - d. All of the above are correct.
9. The "invisible hand" refers to
  - a. the marketplace guiding the self-interests of market participants into promoting general economic well-being.
  - b. the marketplace as a place where government looks out for the interests of individual participants in the market.
  - c. the equity that results from market forces allocating the goods produced in the market.
  - d. the automatic maximization of consumer surplus in free markets.
10. When a tax is imposed on a good we know that the losses to buyers and sellers
  - a. are equal to the revenue raised by the government.
  - b. are less than the revenue raised by the government.
  - c. exceed the revenue raised by the government.
  - d. cannot be compared to the tax revenue raised by the government since the amount of the tax will vary from good to good.
11. If the supply of a good is relatively elastic, changing the price causes
  - a. a relatively small change in the amounts that buyers are willing to buy.
  - b. a relatively small change in the amounts sellers are willing to sell.
  - c. a relatively large change in the amounts sellers are willing to sell.
  - d. no change in the amounts sellers are willing to sell.
12. A tariff and an import quota will both
  - a. increase the quantity of imports and raise domestic price.
  - b. increase the quantity of imports and lower domestic price.
  - c. reduce the quantity of imports and raise domestic price.
  - d. reduce the quantity of imports and lower domestic price.
13. When a negative externality exists in a market the cost to producers
  - a. is greater than the cost to society.
  - b. will be the same as the cost to society.
  - c. will be less than the cost to society.
  - d. and society will be different regardless of whether an externality is present.

14. A town engineer comes to the town council with a proposal to build a traffic light at a certain intersection that currently has a stop sign. The benefit of the traffic light is increased safety and will reduce the incidence of fatal traffic accidents by 50 percent per year. Which of the following statements is true?
- The project should definitely be accepted.
  - The decision to install the light is likely to require a complex evaluation of the trade-off between the worth of human life and the lost time waiting for the light to change signals.
  - The full cost of the traffic light will be relatively small since it only includes the purchase and installation costs.
  - The cost will invariably outweigh the benefit.
15. Which of the following statements is most correct?
- A general sales tax on food is regressive when low-income taxpayers spend a larger proportion of their income on food than high-income taxpayers.
  - A general sales tax on food is regressive when middle income taxpayers spend a smaller proportion of their income on food than high-income taxpayers.
  - A general sales tax on food is regressive when high-income taxpayers spend a larger proportion of their income on food than middle income taxpayers.
  - A general sales tax on food is regressive when high-income taxpayers spend a larger proportion of their income on food than low-income taxpayers.
16. When marginal cost is rising, average variable cost
- must be rising.
  - must be falling.
  - must be constant.
  - could be rising or falling.
17. If a competitive firm is currently producing a level of output at which marginal cost exceeds marginal revenue, then
- average revenue exceeds marginal cost.
  - the firm is earning a positive profit.
  - a one-unit decrease in output would increase the firm's profit.
  - All of the above are correct.
18. For a monopoly firm, the level of output at which marginal revenue equals zero is also the level of output at which
- average revenue is zero.
  - profit is maximized.
  - total revenue is maximized.
  - marginal cost is zero.
19. The theory of oligopoly provides a reason as to why
- perfect competition is not a useful object of study.
  - price is less than marginal cost for many firms.
  - all countries can benefit from free trade among nations.
  - firms do not want to capture larger shares of their markets.
20. A monopolistically competitive firm faces the following demand curve for its product:

Price (\$)	10	9	8	7	6	5	4	3	2	1
Quantity	2	4	6	9	10	12	14	16	18	20

- The firm has total fixed costs of \$20 and a constant marginal cost of \$2 per unit. The firm will
- produce nine units; firms will enter the market in the long run.
  - produce 10 units; firms will enter the market in the long run.
  - produce 12 units; firms will enter the market in the long run.
  - produce 10 units; firms will exit the market in the long run.

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21. A competitive firm sells its output for \$45 per unit. It employs 30 workers, and the marginal product of the 30th worker is 4 units of output per day. It pays its workers a wage of \$150 per day.
- The firm's profit would increase if it hired a 31st worker.
  - For the 30th worker, the value of the marginal product of labor is \$600.
  - For the 30th worker, the marginal revenue product is \$600.
  - All of the above are correct.
22. Coal mining is a dangerous and dirty job. Suppose someone developed new machinery that made coal mining safer and cleaner at the same time it made coal miners more productive. We would expect that the wages of coal miners would
- rise.
  - fall.
  - stay exactly the same.
  - rise, fall or stay the same.
23. Because people can borrow when they are young, the life cycle theory would suggest that one's standard of living depends on
- lifetime income rather than annual income.
  - aggregate income rather than annual personal income.
  - annual extended family income rather than annual personal income.
  - income averaged across seasons rather than across years.
24. Because people with hidden health problems are more likely to buy health insurance than are other people,
- the price of health insurance reflects the costs of a sicker-than-average person.
  - the price of health insurance is too low, relative to the socially-optimal price.
  - people in average health may be encouraged to buy too much health insurance, relative to the socially-optimal quantity.
  - there is no problem of asymmetric information in the market for health insurance.
25. A firm produces consumer goods and adds some to inventory in the third quarter. In the fourth quarter the firm sells the goods at a retail outlet which leaves their inventory diminished. As a result of these actions, what component(s) of real GDP change in the fourth quarter?
- only investment and it decreases.
  - only consumption and it increases.
  - Investment decreases and consumption increases.
  - None of the above is correct.
26. Jake loaned Elwood \$5,000 for one year at a nominal interest rate of 10 percent. After Elwood repaid the loan in full, Jake complained that he could buy 4 percent fewer goods with the money Elwood gave him than he could before he loaned Elwood the \$5,000. From this we can conclude that the rate of inflation during the year was
- 2.5 percent.
  - 6 percent.
  - 8 percent.
  - 14 percent.
27. In 2002 real GDP in Latania was 750 billion and the population was 3 million. In 2003 real GDP was 907.5 and the population was 3.3 million. What was the approximate growth rate of real GDP per person?
- 10 percent
  - 14 percent
  - 17 percent
  - 21 percent

28. Suppose that there are diminishing returns to capital. Suppose also that two countries are the same except one has less capital and so less real GDP per person. Suppose that both increase their saving rate from 3 percent to 4 percent. In the long run
- Both countries will have permanently higher growth rates of real GDP per person, and the growth rate will be higher in the country with more capital.
  - Both countries will have permanently higher growth rates of real GDP per person, and the growth rate will be higher in the country with less capital.
  - Both countries will have higher levels of real GDP per person, and the temporary increase in growth in the level of real GDP per person will have been greater in the country with more capital.
  - Both countries will have higher levels of real GDP per person, and the temporary increase in growth in the level of real GDP per person will have been greater in the country with less capital.
29. Stock in Synergistic Corporation is selling at \$25 per share. It had earnings of \$5 a share and a dividend yield of 5 percent. What is the dividend and the price-earnings ratio?
- \$.25, 5
  - \$.25, 6.7
  - \$1.25, 5
  - \$1.25, 6.7
30. Mary put \$6,139 into an account ten years ago. She now has \$10,000 in the account. What will her balance be in another 10 years if she gets the same rate of interest?
- \$16,105.10
  - \$16,139.00
  - \$16,288.95
  - None of the above are correct to the nearest penny.
31. Between 2001 and 2002, the country of Aquilonia reported an increase in the number of people who were employed. It also reported an increase in the unemployment rate. Which of the following would best explain the two reports?
- There was an increase in the size of the labor force between 2001 and 2002.
  - There was a decrease in the size of the labor force between 2001 and 2002.
  - There was an increase in the size of the adult population between 2001 and 2002.
  - The two reports are contradictory and can't be reconciled.
32. The Fed can increase the price level by conducting open market
- sales and raising the discount rate.
  - sales and lowering the discount rate.
  - purchases and raising the discount rate.
  - purchases and lowering the discount rate.
33. If reserve requirements are increased, the reserve ratio
- increases, the money multiplier increases, and the money supply increases.
  - increases, the money multiplier decreases, and the money supply decreases.
  - decreases, the money multiplier increases, and the money supply increases.
  - decreases, the money multiplier decreases, and the money supply increases.
34. Which of the following is not implied by the quantity equation?
- If velocity is stable, an increase in the money supply creates a proportional increase in nominal output.
  - If velocity is stable and money is neutral, an increase in the money supply creates a proportional increase in the price level.
  - With constant money supply and output, an increase in velocity creates an increase in the price level.
  - With constant money supply and velocity, an increase in output creates a proportional increase in the price level.

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35. A Japanese firm buys lumber from the United States and pays for it with yen. Other things the same, Japanese
- net exports increase, and U.S. net capital outflow increases.
  - net exports increase, and U.S. net capital outflow decreases.
  - net exports decrease, and U.S. net capital outflow increases.
  - net exports decrease, and U.S. net capital outflow decreases.
36. Which of the following contains a list only of things that decrease when the budget deficit of the U.S. increases?
- U.S. net exports, U.S. domestic investment, U.S. net capital outflow
  - U.S. supply of loanable funds, U.S. interest rates, U.S. domestic investment
  - U.S. imports, U.S. interest rates, the real exchange rate of the dollar
  - None of the above is correct.
37. An economic contraction caused by a shift in aggregate demand causes prices to
- rise in the short run, and rise even more in the long run.
  - rise in the short run, and fall back to their original level in the long run.
  - fall in the short run, and fall even more in the long run.
  - fall in the short run, and rise back to their original level in the long run.
38. Assuming crowding-out but no multiplier or investment-accelerator effects, a \$100 billion increase in government expenditures shifts aggregate
- demand right by more than \$100 billion.
  - demand right by less than \$100 billion.
  - supply left by more than \$100 billion.
  - supply left by less than \$100 billion.
39. Suppose that Congress changed the laws governing the Fed such that Congress gained control over monetary policy. Shortly after that, Congress decided that it would significantly increase its spending, and it would fund the new spending by printing money. If expectations are completely rational, one might expect that the resulting inflation would
- reduce unemployment substantially in the short run, but not in the long run.
  - probably not have much impact on unemployment in the short run or the long run.
  - reduce unemployment substantially in the short run and in the long run.
  - only reduce unemployment in the long run because it would be anticipated.
40. Suppose that a central bank is required to follow a monetary policy rule to stabilize prices. If the economy starts at long-run equilibrium and then aggregate demand shifts right, the central bank should
- increase the money supply, which causes output to move closer to its long-run equilibrium.
  - increase the money supply, which causes output to move farther from long-run equilibrium.
  - decrease the money supply, which causes output to move closer to its long-run equilibrium.
  - decrease the money supply, which causes output to move farther from long-run equilibrium.