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I.　Multiple Choice (2.5 points each)

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

1.　Which of the following is NOT a benefit of trade?
　　A.　an increase variety of goods
　　B.　lower costs through economies of scale
　　C.　increased competition
　　D.　an ability to control domestic and world prices

2.　When a firm in a competitive market produces 10 units of output, it has a marginal revenue of $5. What would be the firm's total revenue when it produces 3 units of output?
　　A.　$15
　　B.　$50
　　C.　$65
　　D.　Cannot be determined from the information given.

3.　If a monopolist faces a downward sloping market demand curve, its
　　A.　average revenue is always less than marginal revenue.
　　B.　marginal revenue is greater than the price of the units it sells.
　　C.　average revenue is less than the price of its product
　　D.　marginal revenue is always less than the price of the units it sells.

4.　If an oligopolist is part of a cartel that is collectively producing at the monopoly level of output, then the oligopolist, being self-interested, will
　　A.　lower production and drive up prices.
　　B.　increase production and push prices.
　　C.　do nothing thus allowing the cartel to realize monopoly profits.
　　D.　none of the above

5.　In monopolistically competitive markets, the attribute of free entry suggests that
　　A.　all firms earn zero economic profits in the long run.
　　B.　some firms will be able to earn economic profits in the long run.
　　C.　some firms will be forced to incur economic losses in the long run.
　　D.　The market structure will eventually be characterized by perfect competition in the long run.

6.　The efficient scale of the firm is the quantity of output that
　　A.　maximizes marginal product.
　　B.　minimizes average total cost.
　　C.　minimizes average fixed cost.
　　D.　minimizes average variable costs.

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7. The table below contains data for the country of Batterland, which produces only waffles and pancakes. The base year is 2006.

Year	Price of Waffles	Quantity of Waffles	Price of Pancakes	Quantity of Pancakes
2005	$2	100	$1	100
2006	$2	120	$2	150
2007	$3	150	$3	200
2008	$4	180	$3	220

Refer to the table above. In 2007, Batterland's real GDP was

A. $540.

B. $700.

C. $810.

D. $1050.

8. In an imaginary economy, consumers buy only sandwiches and magazines. The fixed basket consists of 20 sandwiches and 30 magazines. In 2006, a sandwich cost $4 and a magazine cost $2. In 2007, a sandwich cost $5. The base year is 2006. If the consumer price index in 2007 was 125, then how much did a magazine cost in 2007?

A. $0.83.

B. $2.25.

C. $2.50.

D. $3.00.

9. The Bank of Highland reduced inflation to its announced goal of 5%. However, people were expecting inflation to fall to 7% and there was a favorable supply shock. In the short run which of the following made unemployment lower than otherwise?

A. both people expecting inflation to fall to 7% instead of 5%, and the favorable supply shock

B. neither people expecting inflation to fall to 7% instead of 5%, and the favorable supply shock

C. only the favorable supply shock

D. only people expecting inflation to fall to 7% instead of 5%

10. Two drivers-Tom and Jerry-each drive up to a gas station. Before looking at the price, each places an order. Tom says, "I'd like 10 gallons of gas." Jerry says, "I'd like $10 worth of gas." What is each driver's price elasticity of demand?

A. 0, 1.

B. 1, 0.

C. 0, infinity.

D. 1, infinity.

11. Assume that a college student purchases only Ramen noodles and textbooks. If Ramen noodles are an inferior good and textbooks are a normal good, then the substitution effect associated with a decrease in the price of Ramen noodles, by itself, will result in

    A. a decrease in the consumption of textbooks and a decrease in the consumption of Ramen noodles.
    B. a decrease in the consumption of textbooks and an increase in the consumption of Ramen noodles.
    C. an increase in the consumption of textbooks and an increase in the consumption of Ramen noodles.
    D. an increase in the consumption of textbooks and a decrease in the consumption of Ramen noodles.

12. If the reserve requirement is 5 percent, a bank desires to hold no excess reserves, and it receives a new deposit of $800, it

    A. must increase required reserves by $40.
    B. will initially see reserves increase by $800.
    C. will be able to use this deposit to make new loans amounting to $760.
    D. All of the above are correct.

13. A Japanese firm buys lumber from the United States and pays for it with yen. Other things the same,

    A. Japanese net exports increase, and U.S. net capital outflow increases.
    B. Japanese net exports increase, and U.S. net capital outflow decreases.
    C. Japanese net exports decrease, and U.S. net capital outflow increases.
    D. Japanese net exports decrease, and U.S. net capital outflow decreases.

14. The country of XYZ has a tax system identical to that of the United States. Suppose someone in XYZ bought a parcel of land for 20,000 silveri (the local currency) in 1960 when the price index equaled 100. In 2002, the person sold the land for 100,000 silveri, and the price index equaled 600. The tax rate on nominal gains was 20 percent. Compute the taxes on the nominal gain and the change in the real value of the land in terms of 2002 prices to find the after-tax real rate of capital gain.

    A. -60 percent
    B. -30 percent
    C. 30 percent
    D. 60 percent

15. An aide to a U.S. Congressman computes the effect on aggregate demand of a $20 billion tax cut. The actual increase in aggregate demand is less than the aide expected. Which of the following errors in the aide's computation would be consistent with an overestimation of the impact on aggregate demand?

    A. The actual MPC was larger than the MPC the aide used to compute the multiplier.
    B. The aide thought the tax cut would be permanent, but the actual tax cut was temporary.
    C. The increase in income shifted money demand less than the aide had anticipated.
    D. The increase in income resulted in investment rising more than the aide had anticipated.

16. Suppose the economy is in long-run equilibrium. If there is a sharp decline in the stock market combined with a significant increase in immigration of skilled workers, then in the short run,

A. real GDP will rise and the price level might rise, fall, or stay the same. In the long-run, real GDP will rise and the price level might rise, fall, or stay the same.

B. the price level will fall, and real GDP might rise, fall, or stay the same. In the long-run, real GDP and the price level will be unaffected.

C. the price level will rise, and real GDP might rise, fall, or stay the same. In the long run, real GDP will rise and the price level will fall.

D. the price level will fall, and real GDP might rise, fall, or stay the same. In the long run, real GDP will rise and the price level will fall

II. Problems

1. The following table provides information related to the production function of each firm.

L	MPL(K=1)	TP(K=1)	MPL(K=2)
1	0.5	1	0.71
2	0.35	1.41	0.5
3	0.29	1.73	0.41
4	0.25	2	0.35
5	0.22	2.24	0.32
6	0.20	2.45	0.29
7	0.19	2.65	0.27

The firms use L (labor) and K (capital) to produce the good. In the table, MPL(K=1) is the marginal product of labor when capital is fixed at one. Analogously, MPL(K=2) is the marginal product of labor when capital is fixed at two. TP(K=1) is the total production when capital is fixed at one. Let P be the market price. Suppose P=2. The market is perfectly competitive. Answer the following questions.

A. (5 points) Suppose the wage is 0.5 and K=1. Will firms start producing the good? Why or why not?

B. (5 points) What is the production level of each firm at equilibrium? Explain briefly.

C. (10 points) Suppose the capital hired by each firm increases to 2. Calculate the wage paid by each firm if it maintains its labor employment.

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2. Consider a small town with only three families: A, B, and C. The town does not currently have any streetlights so it is very dark at night. The three families are considering putting in streetlights on Main Street and are trying to determine how many lights to install. The table below shows each family's willingness to pay for each streetlight.

Number of Streetlights	Family A	Family B	Family C
1	$170	$240	$210
2	130	190	200
3	80	160	170
4	20	65	120
5	0	25	50
6	0	0	10

A. (8 points) Suppose the cost to install each streetlight is $450. How many streetlights should the town install to maximize total surplus from the streetlights? What is the maximum total surplus?

B. (8 points) Suppose the cost to install each streetlight is $450 and the families have agreed to split the cost of the streetlights equally. If the families vote to determine the number of streetlights to install, basing their decision solely on their own willingness to pay (and trying to maximize their own surplus), what is the greatest number of streetlights for which the majority of families would vote "yes?" What is the total surplus now?

C. (4 points) Comparing the total surplus in (B) to the maximum total surplus in (A), what problem has arisen? What is one possible way to correct this problem?

3. Answer the following questions.

A. (6 points) What is Quantitative Easing (QE)?

B. (2 points) How is the QE policy usually conducted?

C. (12 points) With the aggregate demand–aggregate supply (AD–AS) model, describe in detail how a QE policy affect the economy's output and price level. (Your answer must be presented with an AD-AS diagram, and a full explanation in words of how the QE policy changes the diagram and the equilibrium.)

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Part I. (5×10 = 50 pts)

1) $\lim\limits_{h \to 0} \dfrac{\cos\left(\frac{3\pi}{2} + h\right) - \cos\left(\frac{3\pi}{2}\right)}{h} = $ _____.

2) A differentiable function f has the property that $f(5) = 3$ and $f'(5) = 4$. What is the estimate for $f(4.8)$ using the local linear approximation for f at $x = 5$? Answer = _____.

3) Identify all the values of x such that $\sum\limits_{n=1}^{\infty} \dfrac{n3^n}{x^n}$ converges. Answer = _____.

4) What is the third-degree Taylor expansion of $\ln(1-x)$ at $x = 0$? Answer = _____.

5) Three graphs labeled I, II, and III are shown below. One is the graph of f, one is the graph of f', and one is the graph of f''. Which one is the graph of f'' (I or II or III)? Answer = _____.
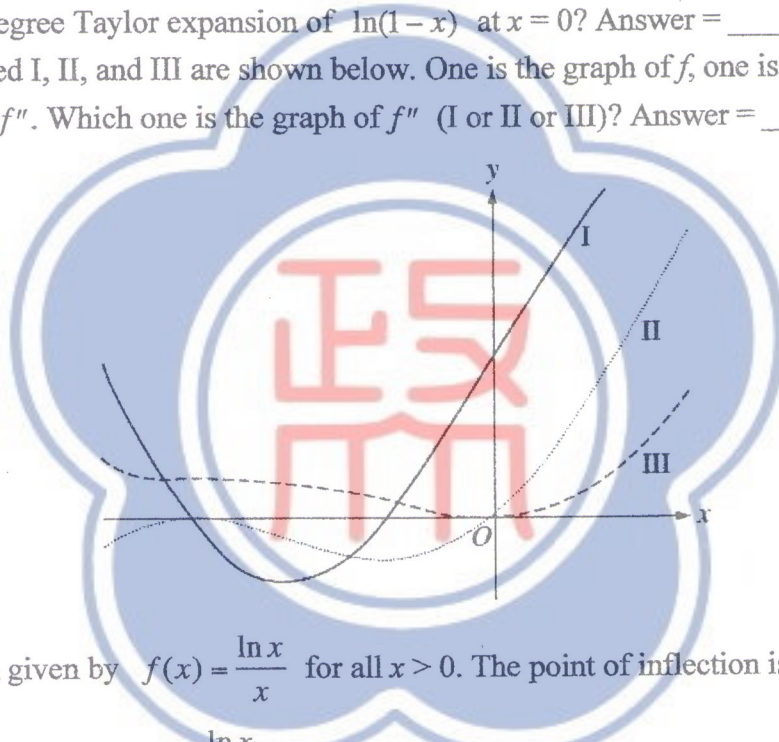
6) Let f be a function given by $f(x) = \dfrac{\ln x}{x}$ for all $x > 0$. The point of inflection is $x = $ _____.

7) Continuing with problem 6), $\lim\limits_{x \to 0^+} \dfrac{\ln x}{x} = $ _____.

8) If $f(x) = x^5 + x + 2$, then $(f^{-1})'(4) = $ _____.

9) If $f(x) = 6x^{4/3} - 3x^{1/3}$, the maximum value of f on the interval $[-1, 1] = $ _____.

10) If $2x^2 + 3y^2 = 5$, then $\dfrac{dy}{dx} = $ _____.

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Part II. (50 pts)

Q1. Find the integral:

(a) Find the arc length of the graph of the equation from P to Q.

$$y = 2(x-1)^{3/2} ; \text{P(1, 0), Q(5, 16)}$$

(b) Find the area of surface obtained by revolving the given curve about the indicated axis.

$$y = 4 - x^2 \text{ on [0, 2]; y-axis}$$

Q2. Find the integral: $\int \tan^5 x\, dx$

Q3. Find the integral: $\int \dfrac{x^6 + 4x^3 + 4}{x^3 - 4x^2}$

Q4. Evaluate the integral $\displaystyle\int_0^4 \dfrac{dx}{(x-1)^{2/3}}$, if it exits.

Q5. Use the definition of limit to prove that $\displaystyle\lim_{n \to \infty} \frac{n}{n+1} = 1$.

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