中级微观经济学 2020 年秋季学期期末考试

姓名_____ 学号_____

Unless otherwise noted, all commodities are assumed to be income normal. All firms are assumed to be profit-maximizing.

除特别说明外，该试卷中出现的商品都假设为正常品，所有厂商都以利润最大化为目标。

Number of pages: 14. Check the pages before you start. (本试卷一共 14 页，在开始答题之前务必检查确认)

Total score: 100 points (满分为 100 分)

一、 单项选择题（选择正确或是最接近正确答案的选项，$30 \times 2'$）

1. A competitive, cost-minimizing firm has the production function $f(x_1, x_2) = 2x_1 + 3x_2$. It uses positive amounts of both inputs to produce y* output units, at a cost denoted by C*. Now suppose the price of x_1 doubles and the price of x_2 triples. What will be the cost of producing y* output units?

   假设完全竞争市场中的某家企业生产函数为$f(x_1, x_2) = 2x_1 + 3x_2$。通过观察发现，这家企业同时使用两种要素来生产 y*单位的产品，且生产成本为 C*。现在假设要素 1 的价格变为之前的两倍，要素 2 的价格变为之前的三倍。那么生产 y*的成本将会是____

   A. C*

   B. 2C*

   C. 3C*

   D. 0, because the firm will shut down (产量为 0，企业不发生任何成本)

2. Which of the following statements is **False**?

   下列哪一选项中的陈述是不正确的？

   A. Colluding firms will make as least as much profit as they would if they conduct Cournot competition (合谋企业的总利润不低于它们在进行古诺竞争时所赚取的总利润)

   B. A Stackelberg leader will make at least as much profit as he would if were a Cournot duopolist (斯塔克伯格领导者的利润不低于它在进行古诺竞争时所赚取的利润)

   C. If a profit-maximizing competitive firm has constant returns to scale, then its long-run profit must be zero (如果某家完全竞争企业的规模报酬不变，那么这家企业的长期经济利润为 0)

   D. If the production function production $f(x_1, x_2)$ exhibits increasing-returns-to-scale, the marginal product of x_1 can not diminish as x_1 increases (如果生产函数$f(x_1, x_2)$的规模报酬递增，那么要素 1 的边际产量一定不能递减)

3. A firm's production function is given by $f(x_1, x_2) = x_1^{1/3} x_2^{1/3}$. The price of output is 1. The prices of factors

1 and 2 are ω_1 and ω_2, respectively. What is the profit-maximizing level of input x_1?

企业的生产函数为$f(x_1, x_2) = x_1^{1/3} x_2^{1/3}$，产品的价格为 1，要素 1 和要素 2 的价格分别为ω_1和ω_2。那么利润最大化时要素 1 的投入量为_____?

A. $1/(9\omega_1^2\omega_2^2)$

B. $1/(9\omega_1\omega_2^2)$

C. $1/(27\omega_1\omega_2^2)$

D. $1/(27\omega_1^2\omega_2)$

4. Suppose that the production function is $f(x_1, x_2, x_3) = (x_1^\alpha + x_2^\alpha)^\beta x_3^\gamma$, where α, β, and γ are positive constants. For what positive values of α, β, and γ are there increasing returns to scale.

生产函数为$f(x_1, x_2, x_3) = (x_1^\alpha + x_2^\alpha)^\beta x_3^\gamma$，其中$\alpha$, β, γ均为正数。下面哪一条件成立时，该生产函数满足规模报酬递增?

A. $\alpha\beta\gamma > 1$

B. $\alpha\beta + \gamma > 1$

C. $\alpha + \beta + \gamma > 1$

D. None of the above (上述选项都不对)

5. Consider the following game, where each player has three possible strategies.

		Player B		
		B1	B2	B3
Player A	A1	5,4	3,0	4,2
	A2	3,3	8,4	2,4
	A3	5,0	0,0	0,0

How many pure-strategy Nash Equilibria does this game have?

上述博弈有多少个纯策略纳什均衡?

A. 0

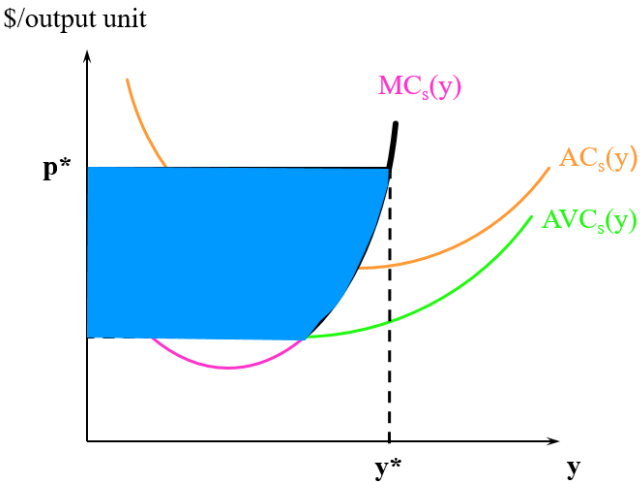
B. 1

C. 2

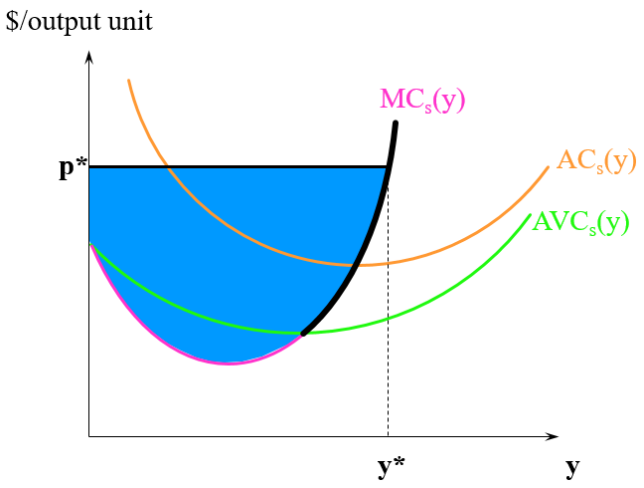
D. 3

6. Consider a firm that is operating in a competitive market, where the market price is p*. Which of the following shaded areas does not represent the firm's producer surplus?

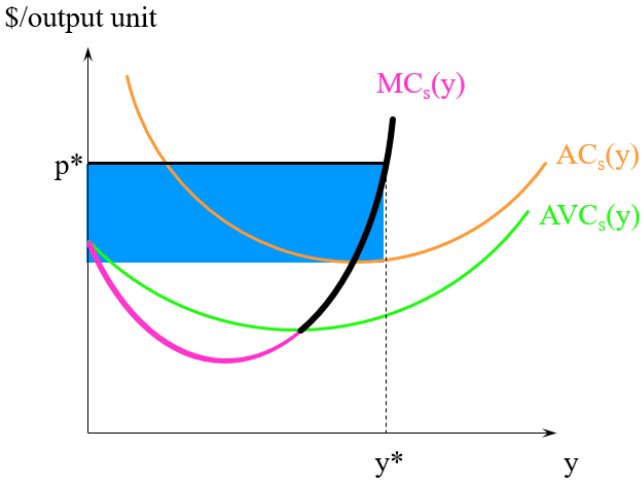
假设完全竞争市场中的产品价格为 p*。下列哪一个选项中的阴影部分不代表单个厂商的生产者剩余?



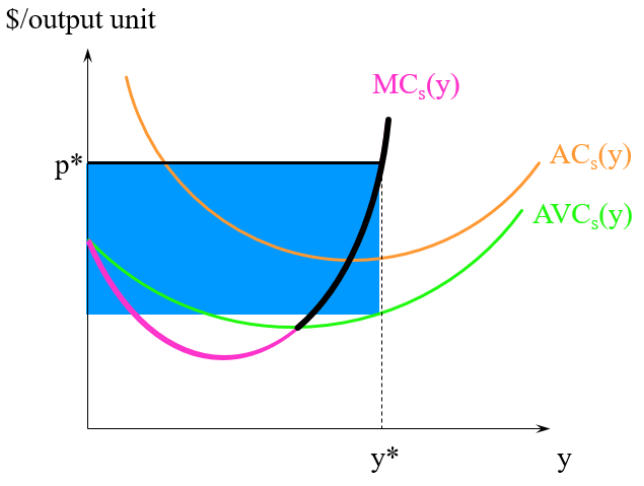
(A)



(B)



(C)



(D)

7. Mei is good at baking bread. Her bread is made from wheat-flavor, peanut oil, and butter. The number of loaves of bread that she makes is $f(w,p,b) = \min\{w, 3p + 2b\}$, where w is the number of bags of wheat flavor, p is the number of bottles of peanut oil, and b is the number of pieces of butter that she uses. The price of a bag of flavor is ￥12. The price of a bottle of peanut oil is ￥9. The price of a piece of butter is ￥5. If Mei makes bread in the cheapest way possible, how much does it cost to make 60 loaves of bread?

小梅使用三种原材料来烘焙面包，分别是：小麦面粉、花生油和黄油。她能烘焙的面包个数可表示为$f(w,p,b) = \min\{w, 3p + 2b\}$。这里w表示所用小麦面粉的袋数、p表示花生油的瓶数、b表示黄油的块数。如果小麦面粉的价格为 12 元/袋、花生油价格为 9 元/瓶，黄油价格为 5 元/块，且小梅用最经济实惠的方式来烤面包，那么烘焙 60 个面包的成本是_____

A. ￥720

B. ￥870

C. ￥900

D. ￥1,320

8. Mei's preferences over hot pot and LV bags can be expressed by the utility function $U(h,b) = \ln(h) + 4\ln(b)$, where h and b are the units of hot pot and LV bags that she consumes. The prices of hot pot and LV bags are $p_h = 200$ and $p_b = 8000$, respectively. If Mei earns a salary of ￥40,000 per month and spends it all on hot pot and LV bags, how many bags will she purchases in each month?

   小梅喜欢火锅和 LV 的包包。她对这两种商品的偏好可由效用函数$U(h,b) = \ln(h) + 4\ln(b)$表示，其中 h 和 b 分别表示火锅和包包的数量。如果火锅价格为$p_h = 200$，包包价格为$p_b = 8000$，小梅月工资为 40,000 元，那么她每月会买几个包包？

   A. 1

   B. 2

   C. 4

   D. 6

9. The production function of a competitive firm is described by $f(x_1, x_2) = 4x_1^{1/2}x_2^{1/2}$. The prices of factors 1 and 2 are $\omega_1 = 1$ and $\omega_2 = 36$, respectively. The firm's marginal cost is ____

   某家完全竞争厂商的生产函数为$f(x_1, x_2) = 4x_1^{1/2}x_2^{1/2}$。两种生产要素的价格分别为：$\omega_1 = 1$ and $\omega_2 = 36$。那么该厂商的边际成本将____

   A. decreasing and then increasing as output level increases (随产量的增加先下降后上升)

   B. constant for all output levels (不随产量的改变而改变)

   C. always decreasing as output level increases (随产量的增加而下降)

   D. always increasing as output level increases (随产量的增加而上升)

10. Suppose Xiaoniu and Aima are duopolists in the electric vehicle industry. The two firms compete with each other by setting output levels simultaneously. The market demand for electric vehicles is given by $p = 420 - 0.2Q$, where p is the price measured in yuan and Q is the quantity sold. Xiaoniu has constant marginal costs of ￥60 and Aima has constant marginal costs of ￥30. What is the price of electric vehicle in equilibrium?

    小牛和艾玛是电动车行业的双寡头，它们同时设定电动车的产量来进行竞争。市场需求可表示为$p = 420 - 0.2Q$，这里 p 是以元为单位的电动车价格、Q 是电动车的销售总量。假设小牛的边际成本等于 60 元，艾玛的边际成本为 30 元，那么市场均衡时的电动车价格是多少？

    A. ￥170

    B. ￥310

    C. ￥280

    D. ￥210

11. Suppose LGM is the only producer of chili sauce in the market. The demand for its product is given by $Q = 700 - 5P$. LGM's production function is given by $Q = \min\{L, C/4\}$ where L is hours of labor and C

is the amount of chili used. Factors prices are given by $\omega_L = 20$ and $\omega_C = 2$, respectively. What will be the profit-maximizing output level and price?

假设老干妈是市场中唯一的辣酱生产商。市场对辣酱的需求函数为$Q = 700 - 5P$，老干妈的生产函数为$Q = \min\{L, C/4\}$，这里的 L 和 C 分别代表生产辣酱所使用的劳工和辣椒的数量。单位劳工的工资为$\omega_L = 20$，单位辣椒的价格为$\omega_C = 2$。请问使老干妈利润最大化的辣酱产量和价格分别是多少？

A. Q = 265，P = 87

B. Q = 280，P = 84

C. Q = 300，P = 80

D. Q = 330，P = 74

12. The market demand for a good y is given by $y = 256/p^2$. Only two firms produce this good, firm 1 and firm 2. Their cost functions are $c_1(y_1) = (y_1)^2$ and $c_2(y_2) = (y_2)^2$, respectively. If firm 1 and firm 2 agree to collude to maximize their joint profits, how much will each firm produce?

市场对于某种商品的需求函数为$y = 256/p^2$。只有两家企业在这一市场中经营，记为企业 1 和企业 2。这两家企业的成本函数分别为$c_1(y_1) = (y_1)^2$ 和 $c_2(y_2) = (y_2)^2$。如果它们进行合谋以最大化总利润的话，每一家企业会生产多少单位的产品？

A. 2

B. 5

C. 10

D. 12

13. Suppose Xiaoniu is the dominant producer of electric vehicles. After making ￥10,000 fixed investment, Xiaoniu is able to produce an additional vehicle at the cost of ￥500. In addition to Xiaoniu, there are 5 other firms which also produce electric vehicles. However, since these firms are much smaller than Xiaoniu, they just take whatever price set by Xiaoniu as given. Suppose each small firm faces the cost function $C(y) = 1000y + 5y^2$. The total market demand for electric vehicle is $Q = 1000 - P/10$. Xiaoniu is aware of the cost functions of its competitors. What price will Xiaoniu set for an electric vehicle?

小牛是电动车行业的领导者。在进行了价值 10,000 元的固定投资后，小牛可以以 500 元的成本生产一辆电动车。除了小牛之外市场中还存在其它 5 家电动车生产商。然而这些企业远小于小牛，因此它们接受小牛制定的市场价格。每一家小企业的生产函数为$C(y) = 1000y + 5y^2$。市场总需求函数为$Q = 1000 - P/10$。小牛知道其它竞争者的成本函数。请问小牛制定的价格是多少？

A. 1,250

B. 800

C. 1,500

D. 1,140

14. After several years of rapid expansion, Xiaoniu has become the only supplier of electric vehicles in both

China and the US. The demand for electric vehicle in China is $Q_1 = 200 - p_1$ where $p_1$is the price in China. The demand in the US is $Q_2 = 150 - p_2/2$, where p_2 is the price in the US. Suppose the two markets are separated and resales are not possible. Xiaoniu now faces a cost function given by $C(Q) = 40Q + Q^2$, where $Q = Q_1 + Q_2$. Then the difference between the price charged in China and that charged in the US will be____

经过了几年的快速扩张之后，小牛成为了中美两国唯一的电动车生产商。此时，中国市场对电动车的需求函数为$Q_1 = 200 - p_1$,这里的p_1是中国的电动车价格;美国的需求函数为$Q_2 = 150 - p_2/2$，这里的p_2是美国的价格。假定中美两个市场相互隔离，一国的消费者无法将他们购买的电动车转手卖给另外一个国家。小牛的成本函数变为$C(Q) = 40Q + Q^2$，这里的$Q = Q_1 + Q_2$。请问小牛在中美两国设定的价格之差是多少？

A．14

B．32

C．50

D．None of the above (上述选项都不对)

15. Consider a company that produces instant noodles at a constant marginal cost. This company is the only supplier in the industry and sells its products to two separate markets. Suppose the firm can set different prices in the two markets. The demand function in market 1 is $q_1 = 200p^{-4}$ and the demand function in market 2 is $q_2 = 200p^{-2}$. Then the price ratio $\frac{p_1}{p_2}$ will be ____?

某家公司是泡面行业的唯一供货商，该公司的边际成本不随产量改变而改变。假设该公司的产品销往两个独立的市场，因此该公司可在这两个市场设定不同的价格。市场 1 的需求函数为$q_1 = 200p^{-4}$，市场 2 的需求函数为$q_2 = 200p^{-2}$。请问该公司在两个市场设定的价格之比$\frac{p_1}{p_2}$为多少？

A. 1/2

B. 2

C. 2/3

D. No enough information to determine (信息不足，无法判断)

16. A monopolist faces a cost function given by $c(y) = y^2$. The market demand is $D(p) = 120 - p$, where p is the price. Suppose the government imposes a tax of ￥20 on each unit of product produced by the monopolist. How much of this tax will pass through to consumers?

某垄断厂商的成本函数为$c(y) = y^2$，市场需求函数为$D(p) = 120 - p$。现在政府打算对垄断厂商的每单位产品征收 20 元的从量税，请问该税收中由消费者承担的部分为多少？

A. ￥0

B. ￥5

C. ￥10

D. ￥20

17. Shen Teng and Jia Ling are the only consumers in an exchange economy. Shen Teng has utility $U^S(x_1^S, x_2^S) = 3x_1^S + x_2^S$ and endowment $(\omega_1^S, \omega_2^S) = (4,2)$. Jia Ling has utility $U^J(x_1^J, x_2^J) = x_1^J + x_2^J$ and endowment $(\omega_1^J, \omega_2^J) = (0,2)$. If Shen Teng's origin is in the bottom-left corner and Jia Ling's origin is in the top-right corner of the Edgeworth box, which of the following best describes the contract curve?

沈腾和贾玲是一个交换经济中仅有的两位消费者。沈腾从两种商品获取的效用为$U^S(x_1^S, x_2^S) = 3x_1^S + x_2^S$，其初始禀赋为$(\omega_1^S, \omega_2^S) = (4,2)$。贾玲的效用函数为$U^J(x_1^J, x_2^J) = x_1^J + x_2^J$，其初始禀赋为$(\omega_1^J, \omega_2^J) = (0,2)$。如果沈腾的消费以左下边角为原点、贾玲的消费以右上边角为原点来分别进行度量，那么下列哪一选项正确描述了二人的契约曲线？

A. A diagonal line from Shen Teng's origin to Jia Ling's origin (连接沈腾和贾玲原点的对角线)

B. The upper edge and the bottom edge of the Edgeworth box (埃奇沃斯的上边框和下边框)

C. The upper edge and the left edge of the Edgeworth box (埃奇沃斯方框图的上边框和左边框)

D. The bottom edge and the right edge of the Edgeworth box (埃奇沃斯方框图的下边框和右边框)

18. Which of the following statements about game theory is TRUE?

下列哪一个关于博弈论的陈述是正确的?

A. A game must have at least one Nash Equilibrium, which could be in pure strategy or mixed strategy (一个博弈至少存在一个纳什均衡，它可能是纯策略、也可能是混合策略纳什均衡)

B. A game cannot have more than one pure-strategy Nash Equilibrium (一个博弈的纯策略纳什均衡数量不能超过 1 个)

C. There always exists a Nash Equilibrium that maximizes the total payoffs of all participants (总是存在一个使得参与人总收益最大化的纳什均衡)

D. Dominant strategy equilibrium may not be Pareto efficient (占优策略均衡可能不是帕累托有效率的)

Answer questions 19-21 based on the following information.

根据下面的信息回答第 19-21 题。

Suppose that a honey farm is located next to an apple orchard. Let the amount of apples produced be measured by A and the amount of honey produced be measured by H. The cost functions of the two firms are $C_H(H) = \frac{H^2}{100}$, and $C_A(A) = \frac{A^2}{100} - 2H$. Both the honey and the apple markets are competitive markets. The prices of honey and apples are both \$2.

假设一个养蜂场位于苹果园旁边，苹果的产量记为 A，蜂蜜的产量记为 H。养蜂场和苹果园的成本函

数分别为：$C_H(H) = \frac{H^2}{100}$, and $C_A(A) = \frac{A^2}{100} - 2H$。蜂蜜和苹果市场均为完全竞争市场。蜂蜜和苹果的价格均为 2。

19. If the two firms operate independently, the equilibrium amount of honey produced will be ____

    如果这两家企业独立运营，均衡处的蜂蜜产量为多少？

    A．50

    B．100

    C．150

    D．200

20. Suppose that the honey and apple firms merged. What would be the profit-maximizing output of apples for the combined firm?

    若两家企业进行了合并，那么合并后企业利润最大化的蜂蜜产量为____？

    A． 50

    B． 100

    C． 150

    D． 200

21. Suppose the two firms stayed separate, how much would honey production have to be subsidized to induce a socially efficient supply, i.e. a quantity of supply that maximizes total profits of the two firms?

    假设两家企业仍然独立经营，那么政府需要对每单位蜂蜜进行多少生产补贴以使得蜂蜜的产量达到社会最优 (社会最优产量是使得两家企业总利润最大化的产量)？

    A． 0

    B． 1

    C． 2

    D． 3

Use the following information to answer questions 22-23.

根据下列信息回答 22-23 题。

There are multiple firms operating in a competitive market. Each firm has a long-run cost function given by $LTC = q^3 - 12q^2 + 40q$, where q is the output level of each individual firm. The market demand function is given by $D(p) = 40 - p$, where p is the price.

某完全竞争市场中有多家企业，每一家企业的长期成本函数均为$LTC = q^3 - 12q^2 + 40q$，这里的 q 代

表每一个厂商的产量。市场需求函数为$D(p) = 40 - p$，这里的 p 代表产品的市场价格。

22. What is the long-run equilibrium price in this market?

    该市场的长期均衡价格是多少？

    A. 1

    B. 4

    C. 6

    D. 34

23. What is the long-run equilibrium number of firms in this market?

    在长期市场均衡时，有多少家企业在市场中经营？

    A. 4

    B. 5

    C. 6

    D. 7

24. Consider a 2-good, 2-consumer exchange economy in which good 2 is the numeraire. If the equilibrium price of good 1 is $p_1 = 10$ and the net demand for good 1 is 10, what is the net demand for good 2?

    我们考察一个两种商品、两位消费者情形的纯交换经济，并以商品 2 作为计价物。如果商品 1 的均衡价格为 10、商品 1 的净需求为 10，那么商品 2 的净需求是多少？

    A. 0

    B. -10

    C. -100

    D. None of the above (上述选项都不对)

25. Two stores are located side by side. They attract customers to each other (due to spillover effects) and to themselves by advertising. The profit functions of the two stores are $(45 + x_2)x_1 - 2(x_1)^2$ for store 1 and $(90 + x_1)x_2 - 2(x_2)^2$ for store 2, where x_1 and x_2 are total advertising expenditures by stores 1 and 2 respectively. If each store sets its advertising expenditures independently (as in Nash equilibrium), how much would store 1 spend on advertising?

    两家商店彼此相邻，它们通过打广告的方式来招徕顾客。由于广告具有溢出效应，一家商店的广告支出不仅增加自己的顾客量、还会增加另一家商店的顾客量。商店 1 的利润函数为$(45 + x_2)x_1 - 2(x_1)^2$，商店 2 的利润函数为$(90 + x_1)x_2 - 2(x_2)^2$，这里的x_1和x_2分别为商店 1 和商店 2 的广告支出。如果两家商店同时独立选择各自的广告支出，那么在纳什均衡处商店 1 的广告支出为多少？

    A. 18

    B. 20

C. 15

D. 23

26. A consumer's utility function is $U(x_1, x_2) = (x_1)^{0.2}(x_2)^{0.8}$. The price of good 1 is $p_1 = 1$ and that of good 2 is $p_2 = 1$. If the consumer has an income of 100 yuan and the price of good increases to $p_1' = 2$, while the price of good 2 stays at $p_2 = 1$. Which of the statements is correct about the change in the demand for good 1?

某消费者的效用函数为$U(x_1, x_2) = (x_1)^{0.2}(x_2)^{0.8}$。商品 1 的价格$p_1 = 1$，商品 2 的价格$p_2 = 1$，该消费者收入为 100 元。如果商品 1 的价格上升为$p_1' = 2$，商品 2 的价格保持在$p_2 = 1$不变，下列哪一项有关商品 1 需求变化的陈述是正确的？

A. The substitution effect decreases x_1 by 8 units and the income effects decreases x_1 by 2 units (替代效应使商品 1 的需求减少 8，收入效应使商品 1 的需求减少 2)

B. The substitution effect decreases x_1 by 2 units and the income effects decreases x_1 by 8 units (替代效应使商品 1 的需求减少 2，收入效应使商品 1 的需求减少 8)

C. The substitution effect decreases x_1 by 4 units and the income effects decreases x_1 by 1 unit (替代效应使商品 1 的需求减少 4，收入效应使商品 1 的需求减少 1)

D. The substitution effect decreases x_1 by 1 unit and the income effects decreases x_1 by 4 units (替代效应使商品 1 的需求减少 1，收入效应使商品 1 的需求减少 4)

27. A consumer has a utility function $U(c_1, c_2) = c_1 c_2$, where c_1 and c_2 are the consumption measured in yuan in periods 1 and 2, respectively. The consumer has no income in period 1, but will earn m_2 yuan in period 2. The consumer can borrow and lend at the interest rate r. If the interest rate increases, which of the following will likely occur?

某消费者的效用函数为$U(c_1, c_2) = c_1 c_2$，这里的c_1和c_2分别为该消费者在第 1 期和第 2 期的消费支出(以元为单位)。该消费者在第 1 期没有收入，在第 2 期的收入为m_2元；同时可以 r 的利率自由借贷。如果利率上升，下列哪一种情况最有可能发生？

A. The consumption in period 1 would not change and his consumption in period 2 would increase (第 1 期消费不变、第 2 期消费上升)

B. The consumption in period 1 would decrease and his consumption in period 2 would increase (第 1 期消费下降、第 2 期消费上升)

C. The consumption in period 1 would decrease and his consumption in period 2 would not change (第 1 期消费下降、第 2 期消费不变)

D. The consumption in period 1 would increase and his consumption in period 2 would decrease (第 1 期消费上升、第 2 期消费下降)

28. Consider the production function $f(x, y) = 2(x^{0.1} + y^{0.9})^2$. Which of the following statement is correct?

下列关于生产函数为$f(x, y) = 2(x^{0.1} + y^{0.9})^2$的陈述，哪一项是正确的？

A. It exhibits increasing returns to scale (规模报酬递增)

B. It exhibits decreasing returns to scale (规模报酬递减)

C. It exhibits constant returns to scale (规模报酬不变)

D. None of the above (以上都不对)

29. A monopolist has two factories, denoted by A and B. Their costs functions are $C_A(q_A) = 4q_A^2 + 5$ and $C_B(q_B) = 2q_B^2 + 10$, respectively. The market demand function is $D(p) = 50 - 0.5p$, where p is the price. What is the profit for this monopolist?

某垄断企业拥有 A 和 B 两个工厂，它们的成本函数分别为$C_A = 4q_A^2 + 5$, $C_B = 2q_B^2 + 10$，其中q_A, q_B是两个工厂的产量。市场需求函数为$D(p) = 50 - 0.5p$，这里的 p 为市场价格。请问该垄断企业的利润是多少？

A. 720

B. 730

C. 735

D. 740

30. Consider a consumer who only purchases good 1 and good 2. When the prices were $p_1 = 5$ and $p_2 = 1$, the consumer chose the bundle $(x_1, x_2) = (6,3)$. Now at the new prices, (p_1', p_2'), the consumer chooses the bundle $(x_1, x_2) = (5,7)$. For the consumer's behavior to be consistent with the weak axiom of revealed preference, it must be that: _____

某消费者仅购买两种商品，商品 1 和商品 2。当商品价格为$p_1 = 5$ 和 $p_2 = 1$时，消费者购买的商品组合$(x_1, x_2) = (6,3)$。当商品价格变为(p_1', p_2')时，消费者购买的商品组合为$(x_1, x_2) = (5,7)$。如果消费者的行为与弱显示偏好定理一致，下列哪一选项必须成立？

A. $4p_2' < p_1'$

B. $p_1' < 4p_2'$

C. $5p_2' < p_1'$

D. $p_1' < 5p_2'$

二、 简答计算题（共 3 题，40 分）

1. Consider a market for electric vehicles with demand given by $D(p) = 100 - p$. Xiaoniu is a producer in this market, facing a cost function given by $c(y) = 20y$.

   我们考察一个电动车市场，它的需求函数为$D(p) = 100 - p$。小牛是该市场中的一个生产商，它的成本函数为$c(y) = 20y$。

   1) Suppose Xiaoniu is only supplier in the market. If Xiaoniu performs first-degree price discrimination, how many vehicles will be produced? What will be the producer's surplus? Briefly explain what the deadweight loss will be. (4')

      假设小牛是该市场的唯一生产商。如果小牛进行一级价格歧视，那么小牛生产的电动车数量为多少？生产者剩余为多少？(简要解释)无谓损失为多少？

   2) Suppose in addition to Xiaoniu, another firm, Aima, also produces electric vehicles. The cost function for Aima is given by $c(y) = 30y$. If Xiaoniu and Aima simultaneously set output levels, how many vehicles will be produced by each firm in equilibrium? What is the equilibrium price? (4')

      假设除小牛之外，另一家叫做爱玛的企业也生产电动车。爱玛的成本函数是$c(y) = 30y$。如果小牛和爱玛同时设定产量来进行竞争，那么各企业的均衡产量是多少？均衡市场价格是多少？

   3) Suppose in addition to Xiaoniu, another firm, Aima, also produces electric vehicles. The cost function for Aima is given by $c(y) = 30y$. Xiaoniu is the market leader and set its output level first. Aima set it own output level after observing Xiaoniu' output level. How many vehicles will be produced by each firm in equilibrium? What is the equilibrium price? (4')

      假设除小牛之外，另一家叫做爱玛的企业也生产电动车。爱玛的成本函数是$c(y) = 30y$。如果小牛是市场领导者、率先选择产量，爱玛在观察小牛的产量后选择自己的产量，那么各企业的均衡产量是多少？市场价格是多少？

4) Suppose in addition to Xiaoniu, two other firms, Aima and Lamborghini, also produce electric vehicles. The cost functions for Aima and Lamborghini are both given by $c(y) = y^2 + 20y$. Xiaoniu is the price leader in the electric vehicle industry. The other firms take the price set by Xiaoniu as given. What is the residual demand function for Xiaoniu? How many vehicles will be produced by each firm in equilibrium? What is the equilibrium price? (5)

假设除小牛之外，另外两家叫做爱玛和兰博基尼的企业也生产电动车。爱玛和兰博基尼的成本函数均为$c(y) = y^2 + 20y$。小牛是电动车行业的价格领导者，爱玛和兰博基尼无条件接受小牛设定的价格。请问小牛的剩余需求函数是什么？各企业的均衡产量是多少？均衡市场价格是多少？

2. Consider the famous two-player game called “Chicken”. Two teenagers (A and B) drive toward each other at great speed. Each player has two possible strategies, Swerve (S) and Drive Straight (D). A player who chooses to Swerve is called “Chicken” and gets a payoff of 0, regardless of what the other player does. A player who chooses to Drive Straight gets a payoff of 2 if the other player swerves and a payoff of−3 if the other player also chooses to Drive Straight. The payoff matrix for the game is the following.

我们考察一个著名的“弱鸡”博弈。两个小年轻(A 和 B)为了证明自己的勇敢，以极高的速度驾驶汽车相向而行。每个小年轻都有两种策略：驶离(S)和直行(D)。无论对方选择哪个策略，选择驶离的人都会被朋友们叫做“弱鸡”、获得收益为 0。如果一个小年轻选择直行、另一个选择驶离，那么直行的小年轻证明了自己、获得收益为 2；如果两个小年轻都选择直行，他们撞车住院、各获得−3的收益。该博弈的收益矩阵如下所示。

		B	
		驶离 S	直行 D
A	驶离 S	0, 0	0, 2
	直行 D	2, 0	-3, -3

1) Find all pure strategy Nash Equilibria. Are these equilibria Pareto efficient? (4')

写出所有的纯策略纳什均衡。这些均衡是帕累托有效率的吗？

2) Find a mix-strategy Nash equilibrium. (4')

求混合策略纳什均衡。

3. Consider an exchange economy with two consumers (A and B) and two goods (x_1 and x_2). Consumer A has utility function $U^A(x_1^A, x_2^A) = (x_1^A)^{2/3}(x_2^A)^{1/3}$ and endowment $(\omega_1^A, \omega_2^A) = (30,60)$. Consumer B has utility function $U^B(x_1^B, x_2^B) = (x_1^B)^{1/3}(x_2^B)^{2/3}$ and endowment $(\omega_1^B, \omega_2^B) = (60,30)$.

我们考察一个仅存在两个消费者(A 和 B)、两种商品(商品 1 和商品 2)的纯交换经济。消费者 A 的效用函数为$U^A(x_1^A, x_2^A) = (x_1^A)^{2/3}(x_2^A)^{1/3}$，A 的初始禀赋为$(\omega_1^A, \omega_2^A) = (30,60)$；消费者 B 的效用函数为$U^B(x_1^B, x_2^B) = (x_1^B)^{1/3}(x_2^B)^{2/3}$，B 的初始禀赋为$(\omega_1^B, \omega_2^B) = (60,30)$。

1) Is the initial endowment Pareto efficient? Explain. (3')

该禀赋点代表的初始分配是帕累托有效率的吗？解释原因。

2) Express the equation for the contract curve in terms of x_1^A and x_2^A. (4')

求契约曲线的方程，将该方程写为x_1^A 和 x_2^A的表达式。

3) Let good 2 be the numeraire. $p_2 = 1$. Find the competitive equilibrium price of good 1, p_1. (5)

将商品 2 看作计价物，因此$p_2 = 1$。求竞争性均衡处商品 1 的价格p_1。

4) What are the equilibrium consumption bundles for A and B? (3')

竞争性均衡时，消费者 A 和 B 的消费组合各为什么？