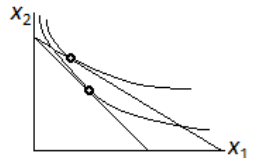
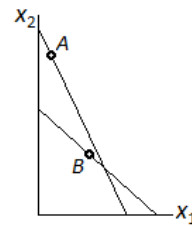


Full Name: a

Student Number: Class:

[illegible]

- Which of the following production functions exhibits increasing returns to scale?
 - $f(x_1, x_2) = x_1 x_2 / 6$.
 - $f(x_1, x_2) = 6(x_1 + x_2)$.
 - $f(x_1, x_2) = x_1^{0.6} + x_2^{0.6}$.
 - None of the other answers is correct.
- Input 1 costs €3 per unit, and the firm sells its product at €7 per unit. With the current production plan the marginal product of input 1 is 0.6. Then:
 - The firm can increase profit by using more input 1.
 - The firm can increase profit by using less input 1.
 - The current quantity of input 1 is the optimal one.
 - The information is insufficient to answer.
- To maximise profit a competitive firm must produce a quantity such that marginal cost equals the price and:
 - Is constant.
 - Is decreasing.
 - Is increasing.
 - It does not matter whether the marginal cost is decreasing, constant, or increasing.
- The industry long-run supply curve is:
 - The horizontal sum of the firms' long-run supply curves.
 - The vertical sum of the firms' long-run supply curves.
 - Approximately horizontal at the firms' minimum average cost.
 - The vertical sum of the firms' short-run supply curves.
- The area underneath the marginal cost curve equals:
 - The producer surplus.
 - The variable cost.
 - The total cost.
 - The average total cost.
- Average cost is decreasing if:
 - Average variable cost is decreasing.
 - Marginal cost is decreasing.
 - Marginal cost is lower than the average cost.
 - None of the other alternatives is correct.
- In the context of an exchange economy, the Walras' law states that:
 - Any competitive equilibrium is Pareto efficient.
 - Any Pareto-efficient allocation can be reached by a competitive market if preferences are convex.
 - At any allocation in the contract curve all consumers have the same marginal rate of substitution.
 - None of the other alternatives is correct.
- Ana has strictly convex preferences. Bundles A and B have positive quantities of both goods, are on her budget line and on the same indifference curve. Then:
 - Both bundles are optimal.
 - None of the bundles is optimal.
 - At least one of the bundles is optimal.
 - The information is insufficient to answer.

- For Ana $u(x_1, x_2) = 2u(y_1, y_2)$. Then:
 - Ana is indifferent between (x_1, x_2) and $(2y_1, 2y_2)$.
 - Ana is indifferent between (x_1, x_2) , $(2y_1, y_2)$, and $(y_1, 2y_2)$.
 - Ana is indifferent between $(2x_1, 2x_2)$ and (y_1, y_2) .
 - None of the other alternatives is correct.
- If preferences are strictly convex, and bundles (2, 8) and (3, 7) are on the same indifference curve, bundle (4, 6) is:
 - On a lower indifference curve.
 - On the same indifference curve.
 - On a higher indifference curve.
 - The information is insufficient to answer.
- If Ana's marginal rate of substitution is -2 at any bundle:
 - She has Cobb-Douglas preferences.
 - She has quasilinear preferences.
 - The goods are perfect substitutes to her.
 - None of the other answers is correct.
- What type of goods are those in the figure?
 
 - Both are ordinary goods.
 - 1 is a normal good; 2 is a Giffen good.
 - 1 is a Giffen good; 2 is an ordinary good.
 - Both are inferior goods.
- The figure shows two budget lines and the bundle chosen when facing each of them. Then:
 
 - The choices violate the weak axiom of revealed preference.
 - A is directly revealed preferred to B.
 - B is directly revealed preferred to A.
 - None of the bundles is revealed preferred to the other.
- Ana is a net seller of good X, and its price rises. Then she:
 - Will remain a net seller of X and will be better off.
 - Will remain a net seller of X and will be worse off.
 - May switch to net buyer of X, in which case she will be better off.
 - May switch to net buyer of X, in which case she will be worse off.
- Ana can lend and borrow at interest rate r . Her income is m_1 in period 1 and m_2 in period 2. The most she can consume in period 1 is:
 - None of the other alternatives is correct.
 - $(1 + r)m_1 + m_2 / (1 + r)$.
 - $m_1 + (1 - r)m_2$.
 - $(1 + r)m_1 + m_2$.
- Ana is indifferent between having her income fall by €120 or having the price of good X rise by €3 per unit. Then when the price of good X rises by €3/unit, €120 is:
 - The income effect.
 - The compensating variation.
 - The equivalent variation.
 - None of the other alternatives is correct.

Regular Exam — Open Questions

All questions are independent of each other.

- a) [0.7 marks] A firm operates with the production function $y = f(x_1, x_2) = 10x_1^{0.5}x_2^{0.8}$. Explain what the law of diminishing marginal returns is and check whether this production function exhibits it.
- b) [2 marks] A firm operates with the production function $y = f(x_1, x_2) = 4x_1x_2$. Input prices are $w_1 = 1$ and $w_2 = 2$. Find the minimum cost of producing $y = 50$. Explain your reasoning.
- c) [2 marks] A firm operates with the cost function:

$$y = \begin{cases} y^2 + 25 & \text{if } y > 0 \\ 0 & \text{if } y = 0 \end{cases}$$

Find the supply curve and illustrate it in a graph. Explain your reasoning.

- d) [0.8 marks] Will a firm ever accept to operate with a loss? Carefully explain.
- e) [1 mark] Ana's preferences can be described by the utility function $u(x_1, x_2) = x_1^2 + x_2^2$. Are these preferences monotonic and convex? Explain.
- f) [2 marks] Ana's marginal rate of substitution is $MRS = -2x_2/x_1$, and she has income m and faces prices p_1 and p_2 . Find the demand function for good 1. Explain your reasoning.
- g) [2 marks] Ana consumes goods 1 and 2. Her demand functions are $x_1(p_1, p_2, m) = 2m/(2p_1 + p_2)$ and $x_2(p_1, p_2, m) = m/(2p_1 + p_2)$. Her income is $m = 40$. First the prices were $p_1 = 2$ and $p_2 = 4$; then the price of good 1 increased to $p_1' = 3$. Find the substitution and income effects. Explain the concepts and your reasoning. Can you tell what type of goods these are? Explain.
- h) [1.5 marks] In our model where the consumer chooses between consumption and leisure, is it possible for the labour supply curve to be backward bending? That is, that the agent might want to work shorter hours when the wage rate increases. Explain. Namely explain whether this is possible if leisure is a normal good and if leisure is an inferior good.

Answers to Multiple-Choice Question

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
a	a	c	c	b	c	d	b	d	a	c	c	b	a	a	c

Answer Topics to Open Questions

These are just topics. For definitions and explanations see Varian.

- a) Both marginal products are decreasing (they decrease when you increase the input, keeping the other one constant; so both inputs are subject to the law of diminishing marginal returns.
- b) Cost is minimised using $x_1 = 5$ and $x_2 = 2.5$; so cost is 10.
- c) Coincides with marginal cost curve above the minimum average cost curve. $AC(y) = y + 25/y$ (note that the 25 is quasi-fixed cost, not a fixed cost, so the firm need not incur it if they produce zero), is minimised at $y = 5$, and $AC(5) = MC(5) = 10$. So supply is $y(p) = p/2$ if $p \geq 10$, $y(p) = 0$ if $p < 10$.
- d) Yes in the short run if revenue is less than total cost but more than the variable cost.
- e) They are monotonic because marginal utilities are positive, meaning any increase in any of the goods increases utility. They are concave, not convex, as the marginal rate of substitution (in absolute values) increases as you move down along the indifference curve.
- f) Standard utility maximisation problem: from $MRS = -p_1/p_2$ and the equation of the budget line you get $x_1 = 2m/(3p_1)$.
- g) Substitution effect is zero; income effect is -2 for good 1, and -1 for good 2. The goods are perfect complements.
- h) If leisure is an inferior good, labour supply increases with the wage rate. If leisure is a normal good, labour supply may (does not have to) fall as the wage rate increases. The typical answer ignored the substitution effect, which was relevant to the question.