

EC301 - Microeconomics I
Fall 2014
Final Exam
11/03/2014
Time: 150 minutes

Name: _____
Student ID: _____

Professor: Andrés Castaño Zuluaga *M.Sc. (c)*

This exam contains two pages and a total of 12 questions. Next to each question is its weighting according to a maximum of 60 points (10 base points). Enter the required information at the top of the sheet. Questions 11 and 12 are multiple-choice with a single answer (the option chosen must be justified). Remember that you cannot use any material from the class. A calculator is allowed.

Notes: The questions that require math, either algebraic or numerical, must be solved on the blank sheets provided (do not solve on the exam sheets.).

1. (3 points) Mateo and Carmen are at the market where they buy goods 1 and 2. Mateo's utility function is $U(x_1, x_2) = x_1^2 x_2$, and it is known that he is maximizing his utility by acquiring the combination of goods $x_1 = 14$ and $x_2 = 6$. Carmen has regular preferences, and we know that she has chosen a combination of goods where the slope of her indifference curve equals -2 . Is Carmen maximizing her utility?
2. (3 points) A consumer has the utility function $U(x_1, x_2) = x_1 x_2^2$, and faces prices $p_1 = 10$ and $p_2 = 20$ with an income $m = 180$ (Chilean pesos). Should she accept if she has been offered four units of good 1 for a single payment of 20 pesos? Explain your reasoning analytically.
3. (4 points) Tamara's budget constraint is determined by $m = 500$; $p_1 = 1$; $p_2 = 2$. For each item below, explain analytically how her budget constraint function changes if:
 - A. The government applies a specific tax of 0.1 to good 1
 - B. The government applies an ad valorem tax of 10% to good 1
 - C. if the relative price is 1
4. (4 points) If the utility function is $U = (X_1 - 9)^2 + (X_2 - 9)^2$, $p_1 = 9$, $p_2 = 9$ and $m = 99$, determine (mathematically) if the optimal is interior or a corner solution.
5. (24 points) If Pedro's utility function is of the form: $U = x_1^{\frac{1}{2}} x_2^{\frac{1}{3}}$ and his level of income and price of goods are: m , p_1 and p_2 .
 - A. Determine the ordinary (Marshallian) demands for the two goods. What happens to the opportunity cost of x_2 if p_2 increases by 20%? How do quantities demand change?
 - B. Find the consumption price curve of x_2 . Does it depend on the amount of x_1 consumed?
 - C. Suppose Pedro's income is increased by 20%. How does Marshallian demand for goods x_1 and x_2 change? What will be the new income-consumption curve?
 - D. What does Pedro's Engel curve tell us about the good x_1 ?
 - E. Suppose that Pedro starts a rigorous diet on x_1 and x_2 such that he modifies his utility function, which becomes $U = \text{Min}(x_2 + 2x_1; x_1 + 2x_2)$ What would be their ordinary demands on the goods? What will the price consumption curve and the income-consumption curve be? Find the Engel curve for good x_1 ?
 - F. If $p_1 = 10$, $p_2 = 30$ and $m = 1000$, what are the Marshallian demands?
 - G. If p_1 increases up to 30, decompose the changes experienced by demand using insights from the Slutsky theorem and determine what type of good is x_1 . Show results analytically and graphically
6. (2 points) If the utility function is Cobb-Douglas, what is the cross demand curve for good 2? What is the cross demand curve for good 1? (you can assume any Cobb-Douglas type of function to answer)

7. (2 points) In the case of goods that are perfect complements, what does the Engel curve look like? (show your results graphically)
8. (8 points) Explain, graph and develop algebraically (if necessary):
- A. What problems does the calculation of the price elasticity of demand raise and how are they solved?
 - B. What are the differences between arc elasticity and point elasticity?
 - C. Mention four applications of elasticity and explain them (they must be examples applied to the case of the city of Antofagasta)
9. (4 points) Using insights from the theory of the firm and production, answer the following:
- A. Explain and graph the stages of production and how they relate to the marginal product curve (MP), average product curve (AP), and marginal cost curve (MC)
 - B. Explain what implications it has for firm profit maximization to be in the short or long-run
10. (2 points) Explain how you can approximate the value of a firm under certainty and uncertainty.
11. (2 points) A firm will increase the use of the input X if:
- A. The marginal product of that factor is higher than that of the others
 - B. The income you get from using it is greater than its cost
 - C. The marginal productivity of that factor is positive
 - D. None of the above
12. (2 points) Production with economic loss:
- A. It implies a lack of rationality in the firm
 - B. It is only possible in the long term
 - C. It occurs when it allows to recover part of the fixed costs
 - D. None of the above

"Genius is made up of two percent talent and ninety-eight percent persevering application." - H. Ludwig van Beethoven