



Lisbon School  
of Economics  
& Management  
Universidade de Lisboa

Microeconomics  
Fall 2023-2024  
Practice Midterm 2  
November 2023

**Duration:** 1 hour (60 minutes)

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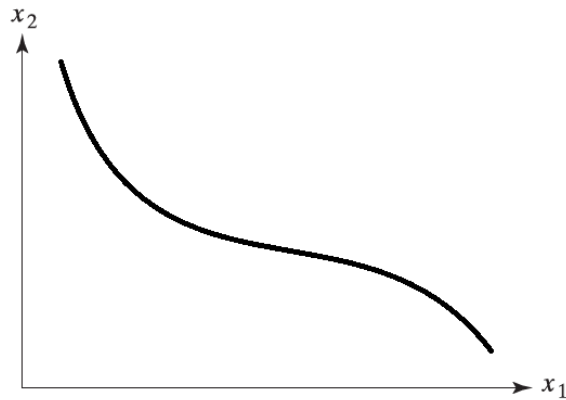
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### General Guidelines

- You may use a calculator;
- You may **not** use a programmable calculator;
- You may **not** use notes or books;
- You may have some food and beverages on your desk;
- All other belongings, including phones, must be on the floor;
- You can only leave the room after 30 minutes into the exam and up unto 15 minutes before the exam ends;
- Write all your answers on the blank answer sheets brought by you;
- Write your name and student number on every answer sheet;
- Number all your answer sheets and hand them in in chronological order;
- If a question does not ask for an explanation, there is no need to give one;
- This exam is to be handed in together with your answer sheets;
- Any form of fraud will, at least, imply an invalid grade for this course.

### 1. Consumer choice (10 points)

Consider a consumer that can choose between the consumption of two goods,  $x_1$  and  $x_2$ . Consider the following indifference curve:



**1.1.** Does this indifference curve violate zero, one, or multiple of the following assumptions: completeness, transitivity, monotonicity, convexity? If so, which one(s)?

Consider now that the consumer has a utility function equal to  $u = x_1^\alpha x_2^{1-\alpha}$ . The consumer has income  $m$ , and the price for good  $x_1$  and  $x_2$  are  $p_1$  and  $p_2$  respectively.

**1.2.** Find the Marshallian demand functions for both  $x_1$  and  $x_2$ .

**1.3.** Under which restriction on  $\alpha$  are both  $x_1$  and  $x_2$  derived in question 1.2 ordinary goods?

**1.4.** Find the indirect utility function.

**1.5.** To find the Lagrange multiplier lambda one can take the derivative of the indirect utility function towards an exogenous variable. Which exogenous variable is this? Find the Lagrange multiplier via this route. Provide a brief economic interpretation for lambda while assuming that  $\alpha = \frac{1}{2}$ ,  $p_1 = 1$ ,  $p_2 = 4$ , and  $m = 10$ .

### 2. Consumer's surplus (10 points)

Consider a consumer with a utility function equal to  $u = \frac{3}{2}x_1^{2/3} + x_2$ . The consumer has income  $m = 100$ , and the price for good  $x_1$  and  $x_2$  are  $p_1 = 1$  and  $p_2 = 2$  respectively.

**2.1.** Consider that  $p_1$  changes from 1 to 2. Find the change in consumer surplus for  $x_1$  by integrating the Marshallian demand function for  $x_1$ .

**2.2.** Use the Slutsky equation to argue that for this utility function the Marshallian demand function  $x_1$  is equal to the Hicksian demand function  $h_1$ .

**2.3.** Use your answer to question 2.2 to explain why the change in consumer surplus for  $x_1$  can be interpreted as an exact measure for welfare change.