

University of Rome "Tor Vergata" – Master MESCI
Course: Microeconomics
Instructor: Loredana Mirra
Final exam - January 19th, 2021

Notes. Dear students, you have 90 minutes to complete your work. You have to keep the camera on for the whole exam time and to mute the microphone. At the end of the available time, you have to take a picture of the exam paper and send the relative jpg or pdf file (within 10 minutes) to both the following addresses:

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You will exit Teams only when we confirm the proper reception of your email.

Consumer theory (max 10 points)

Consider a consumer who has a utility function $u(x, y) = x^{1/2}y^{1/2}$.

- a. Determine the consumer's demand for goods x and y, if the consumer's income is $m = 150$, the unit price of good x is $p_x = 1$ and the unit price of good y is $p_y = 2$
- b. Define the concepts of consumer's ordinary demand (also known as Marshallian or Walrasian demand function) and the indirect utility function.
- c. Describe an alternative way to solve the consumer's problem and define briefly the expenditure function and the Hicksian demand function.

2. Cost functions and profit maximization (max 10 points)

Consider a firm who has a cost function $C(y) = 8y^2 + 30y + 3$

- a. Determine the firm's average and marginal cost functions and sketch their graphs.
- b. Determine the firm's output, revenues, costs and profits if the unit price of good y is $p_y = 138$ on the assumption of perfect competition.
- c. What would you expect in the long run with respect to profit and why?

3. Theory of production (max 10 points)

Consider a firm who has a production function $y = 8K^{1/4}L^{3/4}$ where L indicates Labour and K indicates capital.

- a. Define the notion of marginal product of capital and labour (MPK and MPL).
- b. What are the conditions that have to hold in order to obtain the maximum profit if the prices of labour and capital are respectively $w = 2$ and $r = 4$ and the output price is $p = 4$? Is this a short run or long run framework?
- c. Define the notion of returns to scale describing all possible cases and indicate which kind of returns to scale characterizes the firm's production function.

BONUS QUESTIONS (Max 2 points per question)

4. In perfect competition how do you get the industry supply function?
5. What is consumer's surplus? How can it be computed?