

Microeconomics I, 2023/2024  
Master of Science in Economics  
**Problem Set 4**

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**Only the solutions to the Questions 1-4 will be graded, the remaining questions are given to practice new topics.**

**Question 1** Solve Exercise 3.E.7 in Mas Colell-Whinston-Green.

**Question 2** Consider an economy with  $L = 2$ . Let the expenditure function for the price profile  $(p_1, p_2) >> 0$  and the utility level  $\bar{u} \geq 0$ , be given by

$$e(p, \bar{u}) = p_1^{\alpha_1} p_2^{\alpha_2} \exp \bar{u},$$

in which  $\alpha_1, \alpha_2 \geq 0$  and  $\alpha_1 + \alpha_2 = 1$ .

1. Find the Hicksian demand of every good.
2. Compute the associated indirect utility function. How does it vary with respect to  $w$ ?
3. Which property/properties did you use to answer the previous questions?

**Question 3** The substitution matrix of a utility-maximising consumer's demand system at prices  $(8, p)$  is

$$S(p, w) = \begin{bmatrix} a & b \\ 2 & -\frac{1}{2} \end{bmatrix} \text{ Find the values of } a, b, p. \text{ Explain which properties have you used.}$$

**Question 4** Solve Exercise 3.G.2 in Mas Colell-Whinston-Green.

**Question 5** Answer Exercise 5.B.1 of Mas Colell-Whinston-Green.

**Question 6** Derive the profit function  $\pi(p)$  and the supply function  $y(p)$  for the single-output technology with production function  $f(z) = z_1^\alpha z_2^{1-\alpha}$  with  $\alpha \in (0, 1)$ .

**Question 7** Solve Exercise 5.C.10 part a) and b) of Mas Colell-Whinston-Green.

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