Instituto Superior de Economia e Gestão
UNIVERSIDADE TÉCNICA DE LISBOA

ECONOMICS I

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EXERCISES

1ST PART

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Exercises

PART 1 — What Is Economics?

1. The print shop PRINTOIMPRESS provides two kinds of commercial printing services: personal business cards (C) and wedding invitations (I). In order to print one thousand wedding invitations, 8 hours of work per week are required, while only one hour of work is needed to print the same amount of personal business cards. Given that a normal working week has 40 hours, the following combinations of cards and invitations in a week can be produced:

I	0	1	2	3	4	5
C	40	32	24	16	8	0

a) Draw the production possibility frontier (PPF).

b) Last week, when PRINTOIMPRESS was producing 3 thousand wedding invitations and 16 thousand personal business cards, it received another order to produce 8 thousand business cards. Could the company satisfy this additional order without compromising the delivery of the wedding invitations? Illustrate this situation in the graphic drawn in a).

c) If, instead, the company was producing the combination (3,8), would it be able to meet the additional order? Illustrate this situation graphically.

d) What is the opportunity cost of increasing the production of invitations in one thousand units when PRINTOIMPRESS is producing 8 thousand personal business cards efficiently? What if it was efficiently producing 24 thousand cards?

e) Write the expression of the line that represents the PPF. Verify that the opportunity cost of producing one thousand additional invitations corresponds to –dC/dI, the slope of the line drawn.

f) Suppose that buying a modern printer would reduce to one half the time needed to produce personal business cards. What is the new expression for the PPF? Represent it graphically.

Now assume that the production possibilities are given in the following table.

I	0	1	2	3	4	5
C	36	35	32	27	20	0

g) Draw the new PPF.

h) Compute the opportunity cost of producing one thousand additional invitations when the production is set at (0,36) and at (3,27). Explain the meaning of the difference between the two values.

i) Consider the expression $C= 36 - I^2$, which allows to generate the values of the above table. Note that the slope at (3,27), given by $-dC/dI$, differs from the opportunity cost computed in i). How do you explain this difference?

2. The number of farmers in a small village amounts to 20 and, in total, the community owns 10 tractors. Each farmer devotes, on average, 150 hours per month to working in agriculture to produce two goods: tomatoes and lettuce. The following table shows the maximum combinations of tomatoes and lettuce that can be produced in a typical month (values in tons):

Tomatoes	*Lettuce*
1.000	0
900	15
800	29
700	42
600	54
500	65
400	75
300	84
200	92
100	99
0	105

a) Draw the production possibility frontier with tomatoes on the vertical axis and lettuce on the horizontal axis.

b) What is the maximum amount of lettuce that can be produced, given that the production of tomatoes amounts to 800 tons?

c) What is the opportunity cost of increasing the monthly production of tomatoes from 300 to 400 tons?

d) What is the opportunity cost of increasing the production of lettuce from 99 to 100 tons?

e) In this case, can we say that the production possibility frontier is increasing?

f) Can 200 tons of tomato and 75 tons of lettuce be produced? Where would this point lie relative to the production possibility frontier? Explain.

g) What would be needed in order to produce 300 tons of tomatoes and 100 tons of lettuce?

PART 2 — Supply and Demand

3. Consider the demand function given by D = 16 – 2p, where D is the quantity demanded in tons per year and p is the price in monetary units.

a) Draw the function D and interpret.

b) If the price increased from 3 to 5 monetary units, would D still be valid?

c) Assume that the growth of the consumers' purchasing power increases, for each price, the number of tons bought in 4 tons/year. How does this reflect in the shape of the function D? Draw the new demand function.

d) If consumers' preferences changed so that they would substitute the consumption of this good by the consumption of another, would the initial demand curve change? Explain.

4. The supply of a good is given by S = 2p, where S is the quantity supplied in tons per year and p is the price in monetary units.

a) Draw the function S and interpret.

b) How is supply affected when the price decreases from p = 7 to p = 5?

c) Suppose that, *ceteris paribus*, the cost of an input increases. Explain how this reflects in the shape of S. Draw the new function S.

5. Let D = 16 – 2p and S = 2p.

a) Define "market equilibrium."

b) Determine market equilibrium when consumers' purchasing power increases the quantity demanded for each price in 4 tons/year.

c) Assuming that the suppliers of this good are able to impose a price of 7 monetary units. What are the consequences of this change in market price? What if the price was set at 3 monetary units?

6. Let the following expressions represent demand and supply:

$$D = 2000 - 10p$$

$$S = 130 + 7p.$$

a) What is the equilibrium price and quantity?

Suppose that the government sets an excise tax of 17% on sales.

b) Determine the new market equilibrium and compute the government revenue collected from this tax.

c) Represent graphically.

7. The following table contains data on the demand of good X:

Price	Quantity
4,4	32.000
4,0	36.000
3,6	40.000
3,2	44.000

a) Draw the demand curve.
b) Compute the price-elasticity of demand using the midpoint method when the price increases from 4,4 to 4,0; from 4,0 to 3,6; and from 3,6 to 3,2.
c) For **each price level** compute the consumers' **total expenditure** and represent graphically in the graph of the demand curve drawn in a). What is the relationship between these values and the elasticities computed in b)?

8. The demand of a good is given by:

$$Qd = 1.200 - 40\,p + 6\,A$$

where *Qd* is the quantity demanded in units, *p* is the price in euros, and *A* represents the amount spent in advertising.

a) Supposing that the price is 20 euros, how many units of this good will be sold when the expenditure in advertising is 80.000 euros? What if, keeping price constant, expenditure increases to 100.000 euros?
b) Compute, using the midpoint method, the price-elasticity of demand relative to the level of expenditure on advertising between the points referred in a).