

## PRACTICE CLASS Nr7

**MRS  $y,x$ , Consumer Choice, Substitution and Income Effects (Chap.10 + Appendix to Chap.10)**

**Classroom exercises:**

AP7-1

AP7-2

AP7-3

AP7-4

AP7-5

AP7-6

AP7-7

**Home exercises:**

AP7-8- a AP7-15

### Classroom Exercises

#### AP7-1-

**CYU 11-2, 1.** (pg. 286, 2nd edition. Note: it does not exist in the 3rd and 4th editions of the textbook)

**Lucinda and Kyle each consume 3 comic books and 6 video games. Lucinda's marginal rate of substitution of books in place of games is 2 and Kyle's is 5.**

- For each person, find another consumption bundle that yields the same total utility as the current bundle. Who is less willing to trade games for books? Is a diagram with books on the horizontal axis and games on the vertical axis, how would this be reflected in differences in slopes of their indifference curves at their current consumption bundles?
- Find the relative prices of books in terms of games at which Lucinda's current bundle is optimal. Is Kyle's bundle optimal given this relative price? If not, how should Kyle rearrange his consumption?

**AP7-2-**

**Two goods, X and Y, are perfect substitutes if:**

- a) Consumers buy equal quantities of both.
- b) For every additional unit of X consumption of Y has to fall by one unit in order to keep utility unchanged.
- c) The marginal rate of substitution between the two goods is always the same regardless of how much one consumes of each good.
- d) The consumer's utility increases whenever he substitutes good Y for good X.

*(Intermediate test 11/9/2008 EM.8)*

**AP7-3-**

**Suppose that the consumption bundles  $A = (x_A, y_A)$  and  $B = (x_B, y_B)$  are both on the same indifference curve and budget line. The marginal rate of substitution is decreasing. Then:**

- a) The two consumption bundles cost the same and the consumer is indifferent between them, so they are both optimal bundles.
- b) Only one of the consumption bundles is optimal.
- c) None of the consumption bundles is optimal.
- d) The information is insufficient to ascertain whether any of the two consumption bundles is optimal.

*(Intermediate test 06/12/2010, A; EM.6)*

**AP7-4-**

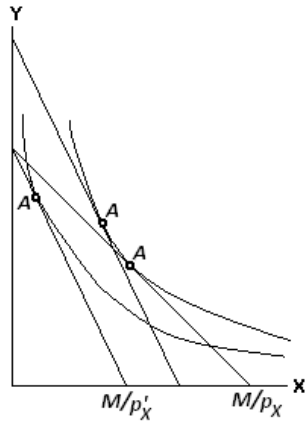
**A consumer buys goods X and Y, the quantities of which are represented by  $x$  and  $y$ . The prices of the goods are  $p_X = 2$  and  $p_Y = 1$ . The consumer has an income  $M = 100$  to spend on the two goods. The consumer's utility is given by  $U(x,y) = 2xy$ .**

- a) Find the optimal consumption bundle.
- b) Suppose the price of good X increases to  $p_X = 3$ .
  - a. What income would allow the consumer to keep buying the consumption bundle you found in part a)?
  - b. Without calculating the new consumption bundle show that with the new price of good X and the income you found in part b.i) the consumption bundle you found in part a) is no longer optimal.
- c) Suppose prices and income are again the same as in part a), but the utility function is now  $U(x,y) = 2x + y$ . Find the new optimal consumption bundle.

*(Final Exam 14/01/2013, Q.1)*

**AP7-5-**

The accompanying figure shows indifference curves and budget lines faced by a consumer. Points marked A are tangency points, and lines that look parallel are indeed parallel. The figure shows the effects of an increase of price of good X from  $p_x$  to  $p'_x$  while the price of good Y and income  $M$  remain the same. Are the goods normal or inferior?



- a) Both goods are normal.
- b) Both goods are inferior.
- c) Good X is normal and good Y is inferior.
- d) Good X is inferior and good Y is normal.

*(Final Exam 27/01/2014, EM.8)*

**AP7-6-**

Joana consumes ordinary goods X and Y only. The unit prices of these goods are respectively €2 and €1. Joana is spending all her income on a particular bundle and her marginal rate of substitution of good X in place of Y is 3. Is her present consumption bundle optimal?

- a) We cannot tell whether the present consumption bundle is optimal.
- b) It is not optimal; the optimal consumption bundle has more good X and less good Y.
- c) It is not optimal; the optimal consumption bundle has more good Y and less good X.
- d) It is not optimal, but we cannot tell whether the optimal consumption bundle has more or less goods X or Y.

*(Final Exam, 06/1/2014)*

### AP7-7-

A consumer buys goods  $x$  and  $y$ , and his utility function is  $U(x,y) = xy$ . The prices of the goods are  $p_x = 4$  and  $p_y = 10$ , and the consumer's income is  $M = 100$ .

- Find the optimal consumption bundle.
- Find the expression for the marginal rate of substitution. Calculate its value at the optimal bundle and interpret the result.
- With the price of good  $x$  still  $p_x = 4$  what price of good  $y$  makes the optimal quantity of good  $y$  equal to 4? Will the consumer move to a lower or higher indifference curve? Explain.

*(Exam EN 09/01/2012, 1, part B)*

## Home Exercises

### AP7-8

A consumer has €1000 a month to spend on goods  $X$  and  $Y$ . The prices are  $p_x = 10$  and  $p_y = 20$ .

- Draw the consumer's budget line with appropriate labels.
- Suppose the consumer's monthly income increases to €1200 and the price of good  $X$  increases to €15. Add the new budget line to the graph you drew for part a). What was the change in the relative price of good  $X$  in terms of good  $Y$  ( $p_x/p_y$ )?
- The table below shows the consumer's marginal utilities (MU) for several quantities. Obtain the consumer's optimal consumption bundle for the initial prices and income.

$X$	$MU_x$	$Y$	$MU_y$
10	100	20	320
20	80	25	280
30	60	30	240
40	40	35	200
50	20	40	160
60	10	45	120

- Using the information based on alinea b) [new budget line], if you know that in those conditions, the consumer's optimal bundle is  $(X; Y) = (17,5; 42,5)$ , what is the change in the quantity demanded of  $X$  caused by a change in the relative price, comparing with the initial situation?

*(Intermediate test 30/11/2009, 1)*

### AP7-9-

A consumer faces a price ratio  $p_x/p_y = 3$  and buys the consumption bundle  $A = (x_A, y_A)$ , at which his marginal utility ratio is  $MU_x/MU_y = 5$ . Then:

- His marginal rate of substitution of good  $x$  in place of good  $y$  at bundle  $A$  is equal to 3.
- His marginal rate of substitution of good  $x$  in place of good  $y$  at bundle  $A$  is equal to 5.
- His marginal rate of substitution of good  $x$  in place of good  $y$  at bundle  $A$  does not exist because it must be  $MU_x/MU_y = p_x/p_y$ .
- The information is insufficient to determine the marginal rate of substitution.

*(Intermediate test 06/12/2010, Prova B, EM9)*

### AP7-10-

A consumer's utility function is  $U(x,y) = x^{1/2}y^{1/3}$ , where  $x$  and  $y$  are the quantities of goods  $X$  and  $Y$ . The prices of the goods are  $p_x = 2$  and  $p_y = 3$ , and the consumer's income is €5000 .

- Find the optimal consumption bundle. Show your calculations.
- The price of good  $Y$  falls to 1, and consumer is forced to change to a new job that pays 20% less than the old one. What is the effect of these changes on his utility? Show your calculations.

### AP7-11-

Joana consumes goods 1 and 2 only. She has income 8 to spend on them and a utility function  $u(x_1,x_2) = x_1x_2$ , where  $x_1$  and  $x_2$  are the quantities of goods 1 and 2, respectively. The prices of goods 1 and 2 are respectively  $p_1 = 2$  and  $p_2 = 0.5$ .

- Find Joana's marginal utility from good 1. Explain what this means.
- Find Joana's optimal consumption bundle. Show all the relevant calculations.
- Find Joana's demand curve for good 1.

*(Final Exam 25/06/2015, Q.2)*

### AP7-12

A consumer has €900 to spend on good  $X$  and  $Y$  every month. The price of a unit of  $X$  is €5, and that of a unit of  $Y$  is €10. The consumer's utility function is  $U(X,Y) = X^2Y$ .

- Find the optimal consumption bundle and the corresponding utility level.
- Suppose the price of  $X$  increases to €6.25. What is the new optimal consumption bundle? Can you tell whether the consumer remains in the same indifference curve as before? Explain.

**AP7-13**

**Bernard buys goods X and Y only. X is an inferior good, while Y is a normal good. The price of X increases, while that of Y remains unchanged. Suppose that the substitution effect is larger than income effect. Which of the following two statements is true?**

**1 – Bernard will buy less of good X.**

**2 – Bernard will buy less of good Y.**

- a) Statement 1 is false, and statement 2 is true.
- b) Statement 1 is true, and statement 2 is false.
- c) Both statements are false.
- d) Both statements are true.

*(Intermediate test 10/12/2011)*

**AP7-14**

**When a certain consumer maximises his utility marginal utility of good X is 10 and marginal utility of good Y is 5. The consumer has €20 to spend on the two goods. We know that his budget line intersects the Y-axis at 10. Which of the following may be correct?**

- a) In the optimal bundle  $X=2.5$  and  $Y=5$ .
- b) In the optimal bundle  $X=4$  and  $Y=6$ .
- c) In the optimal bundle  $X=3$  and  $Y=2$ .
- d) In the optimal bundle  $X=6$  and  $Y=6$ .

*(Intermediate test 10/12/2011)*

**AP7-15**

**Rita considers good W as an inferior good. Therefore, when its price increases:**

- a) Rita will buy more of good W.
- b) Rita will buy less of good W.
- c) Rita will buy the same quantity of good W as before.
- d) With only this information, we cannot tell what happens to the quantity of W that Rita buys.

*(Final Exam 03/06/2014 EM.6)*