

**1102-Microeconomics**  
**First Mid-Term – Fall 2012/2013**

**I**  
**(6 Questions – 12,5 points)**

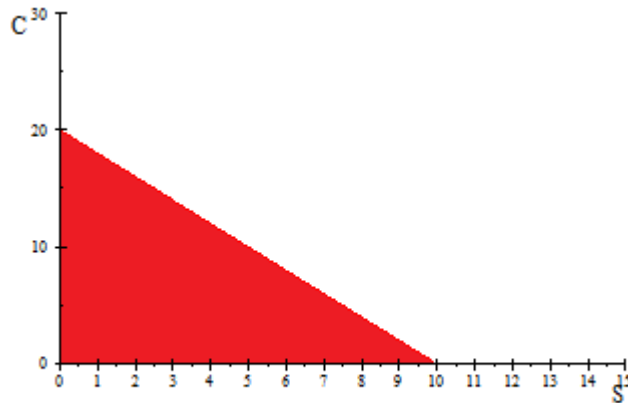
Toni has 200€ available to spend in Tickets for Soccer Matches (S) and Caviar (C). His preferences can be represented by  $U(S; C) = S^{0.5}C^{0.5}$  and the prices of the goods are, respectively,  $P_S = 10; P_C = 20$ .

1. Represent analytically and graphically Toni's set of consumption's possibilities. Explain why Toni's optimal choice makes the budget constraint hold with equality in the optimal choice. (2 points)

$$M \geq P_S S + P_C C$$

$$200 \geq 10S + 20C$$

$$C \leq 10 - \frac{1}{2}S$$



Well behaved preferences are monotonic: “more is better than less”. Note that for any bundle  $x$  strictly inside the set of consumption's possibilities, it is possible to find another bundle that has more of the goods, and so  $x$  cannot be an optimal choice. The choice model is only between (two) goods. Time and therefore saving choices are excluded from this model. Under these assumptions optimal choice has to spend the entire budget available.

2. Calculate  $MRS_{S,C}(4; 2)$ . Explain what the concept means and interpret the value obtained. Explain why under well behaved utilities the marginal rate of substitution is decreasing when the quantity of one good increases. (2.5 points)

$$-\frac{dC}{dS} = \frac{\frac{\partial U}{\partial S}}{\frac{\partial U}{\partial C}} = \frac{C}{S} = \frac{2}{4} = 0,5$$

MRS at any point of the indifference map is the maximum amount of one good that a consumer is willing to give up in order to obtain one more unit of the other

good. When consuming 4 units of C and 2 of S, Toni is willing to give up 0,5 units of C to have one additional unit of S.

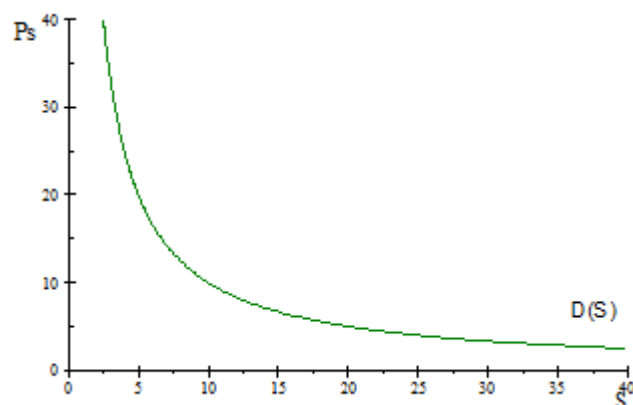
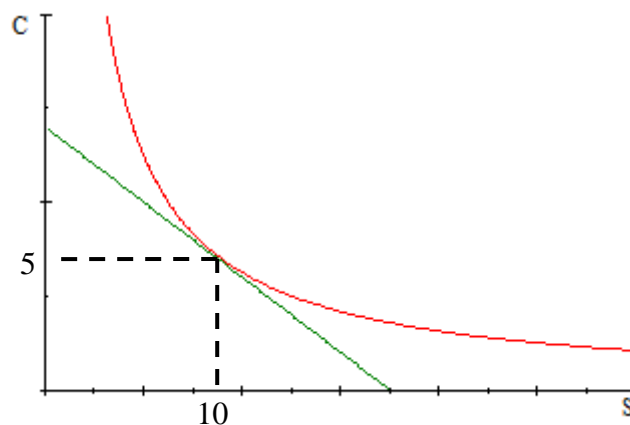
MRS is in mathematical terms the slope of the indifference curve at any point. Assuming that well behaved preferences have strictly convex indifference curves the slope is decreasing when the quantity of one good increases. This incorporates the idea that the consumer prefers bundles with a moderate amount of the goods, instead of a large amount of only one. Therefore, as the quantity of one good increase, the MRS has to decrease because he is not as willing to sacrifice the good for which he has a low quantity.

3. **Find Toni's demands for good S and good C, and indicate Toni's optimal choice. Represent the demand curves and the optimal choice graphically.**  
(2.5 points)

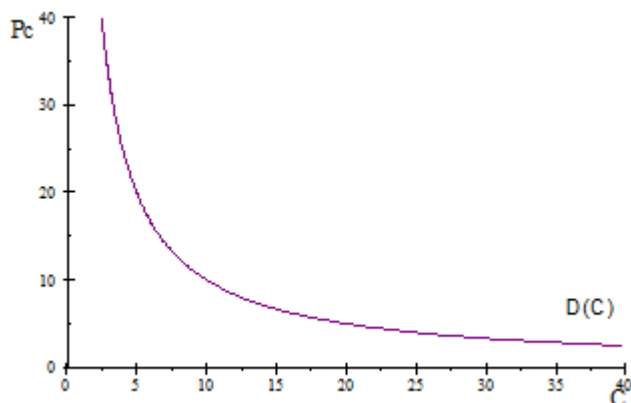
$$\begin{cases} \frac{C}{S} = \frac{P_S}{P_C} \\ M = P_S S + P_C C \end{cases}$$

Solve the system of equations to obtain:

$$C = \frac{0.5M}{P_C} \text{ and } S = \frac{0.5M}{P_S}$$



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For  $P_C = 20$ ,  $P_S = 10$  and  $M = 200$  Toni's optimal choice is  $C = 5$ ;  $S = 10$

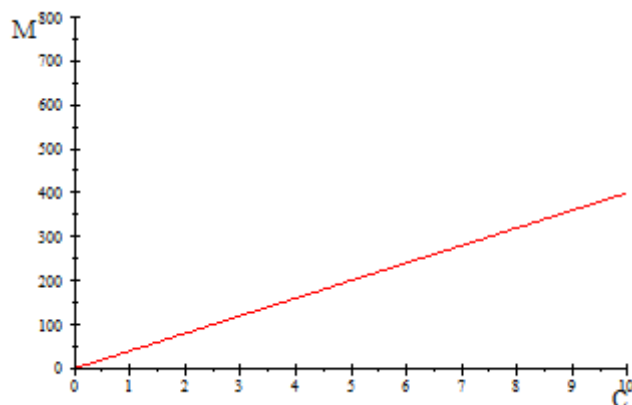
- 4. Calculate the income elasticity of demand of S in Toni's optimal choice. Explain intuitively the result. (1 point)**

$$\xi = \frac{\partial S}{\partial M} \frac{M}{S} = \frac{1}{20} \frac{200}{10} = 1; \text{ When Toni's income increases (decreases) 1\% the consumption of Soccer Matches (S) will increase 1\%.$$

**Note:** Coob-Douglas utility functions have always income elasticity equal to 1.

- 5. Obtain the *Engle Curve* of Caviar, and represent it graphically in the proper space. Classify the good in terms of the relation between income and his demand. (1,5 point)**

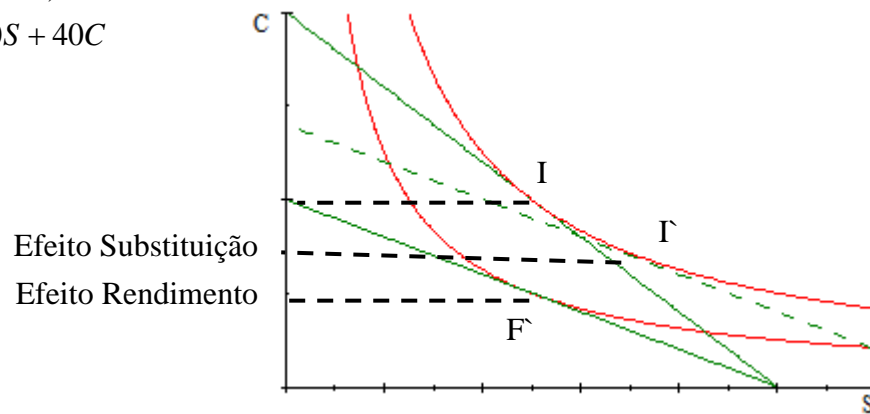
$M = 2P_C C = 40C$  The Engel curve has a positive slope, C is a normal good.



An Austerity Package was applied by Central Authorities taxing the price of Caviar at 100%.

6. Find the new consumption bundle. Represent graphically the substitution and income effects of the change in Caviar consumption. (3 points)

$$\begin{cases} \frac{C}{S} = \frac{P_s}{P_c(1+1)} = \frac{10}{40} \\ 200 = 10S + 40C \\ C = 2,5 \\ S = 10 \end{cases}$$



## II

### (3 Questions – 7,5 points)

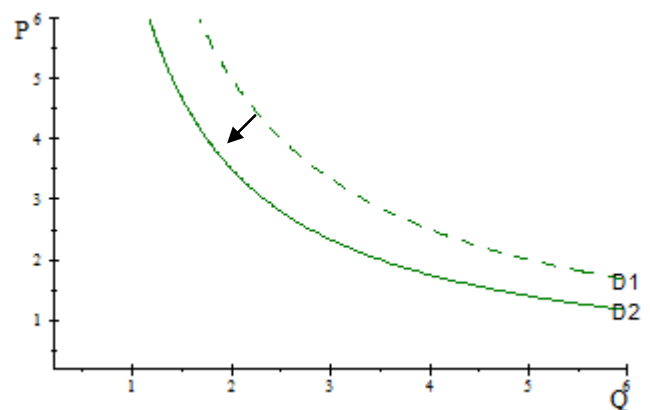
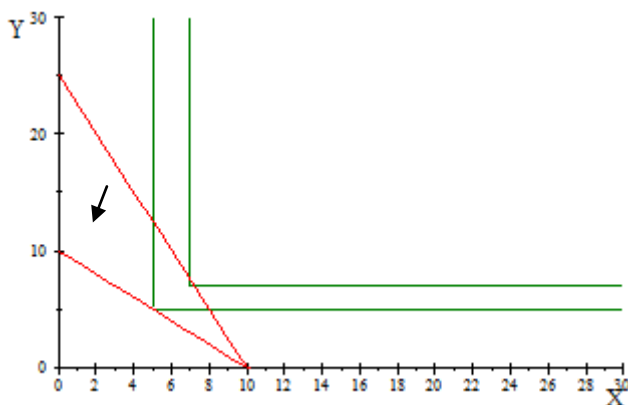
Clearly justify in detail your answers **in, at most, 5 lines (in answers with more than 5 lines only the first 5 lines will be graded)**. Graphs can be used to complement your answer.

1. *True, False or Uncertain? Explain your answer. “When income rises and the price of  $x$  falls, the consumer will always buy more units of  $x$ ”.* (2,5 points)

False, although this is the usual consumer behavior it is not “always” true. If the good is an inferior good, and according to the definition, an increase in income will decrease the amount consumed of that good. If the good is a Giffen good, which means it must also be inferior, a price fall and an increase in income will both have a negative impact on the quantity demanded.

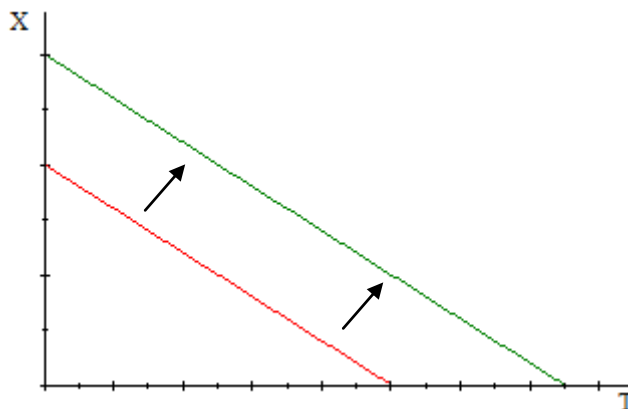
2. *True, False or Uncertain? Explain your answer. “When two goods are complements there is a positive correlation between the price of one good and the demand of the other”.* (2,5 points)

False, “When two goods are complements there is a **negative** correlation between the price of one good and the demand of the other”. The argument is easily understood in the extreme case of perfect complements. If the price of one good increases, the quantity demanded of both goods decreases because they are consumed together (take the example of a consumer that likes to drink coffee with sugar). The other good demand shifts inwards. The correlation is negative.

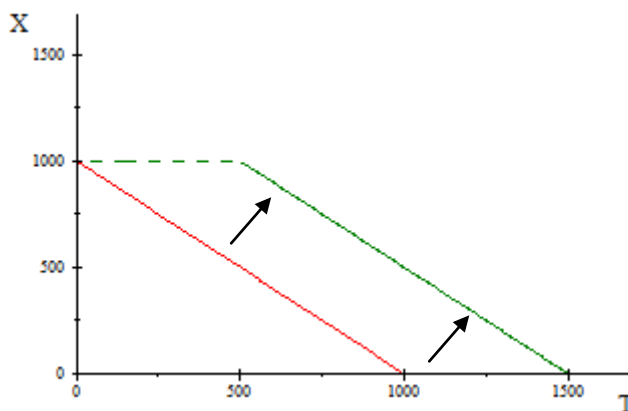


3. *Suppose the government wants to increase families' ability to pay for college education. Would a \$500 income tax refund differ from a \$500 tax credit that can be used exclusively for tuition? Explain. (2,5 points)*

For an \$500 income tax refund all the budget constraint of will shift outside parallel by 500€.



For a “\$500 tax credit that can be used exclusively for tuition” the budget constraint of will also shift parallel by 500€, but only for levels of education that spend 500€ or more in education.



For all consumers that spend more than 500€ in education the both measures have the same impact. For consumers that would spend less than 500€ in education the tax credit measure implies a lower increase in welfare but induces higher levels of education.