PRODUCTION AND COMPARATIVE ADVANTAGE

Problem 1

Paul and John want to consume 60 pieces of fruit (x) and 60 pieces of veggies (y) each. Paul is able to produce 10 pieces of fruit or 30 pieces of veggies per week. John is able to produce 30 pieces of fruit or 10 pieces of veggies per week.

a) Specify Paul's and John's comparative advantage.

b) Assuming that Paul and John do not help each other, how many weeks does each of them have to work to meet their demand?

c) Now assume that Paul and John decide to cooperate in a possibly most efficient way. How many weeks will each of them have to work now?

Problem 2

On the Veritas Island, it is illegal to trade with other countries. Only 2 goods are consumed on this island: milk and wheat. The production possibility frontier in the north takes the form $m = 60 - 6w$, while in the south, it is $m = 40 - 2w$, where m is the amount of milk and w is the amount of wheat. The economy remains in competitive equilibrium, and 1 unit of wheat is exchanged for 4 units of milk.

a) At the given equilibrium prices, will the northern and southern farms specialize in the production of which good?

b) Friendly Vikings discovered the possibility to trade with Veritas and offered exchange at the rate: 1 unit of wheat for 3 units of milk. If the Veritas Island permits free trade with the Vikings, the new price ratio will appear on the island. How will the production (output) of the farmers in the north and the south change?

c) Specify the interval of exchange rates that may be proposed by the Vikings, under which Veritas farmers will not change their decision regarding the choice of the good they produce.

Problem 3

A country consists of regions A and B that produce goods X and Y. The production functions for region A are given by $X_A = L_{AX}^{1/2}$ and $Y_A = L_{AY}^{1/2}$, where L_{AX} and L_{AY} denote labor devoted in region A to the production of goods X and Y, respectively. Similarly, production functions for region B are given by $X_B = 0.5L_{BX}^{1/2}$ and $Y_B = 0.5L_{BY}^{1/2}$, where L_{BX} and L_{BY} denote labor devoted in region B to the production of goods X and Y, respectively. Moreover, it is known that $L_{AX} + L_{AY} = 100$ and that $L_{BX} + L_{BY} = 100$.

a) Specify the formulas describing production possibility frontiers in both regions.

b) With no labor mobility between the regions, what condition must be fulfilled for the economy to be in a Pareto efficient state?

c) Specify the formula for the production possibility frontier for the entire country, assuming again no labor mobility. If the total production amount of X is 12, what is the technically efficient production level of Y?

d) For region A, what is the value of the marginal rate of transformation if $X_A = 8$? Interpret the value you obtained.

Problem 4

The couple that lives together "produces" cleaning and cooking (so produces clean space (C) and meals for them to eat (M)). They also "consume" these two goods- gain utility from living in clean space and eating the meals. Production possibility frontiers of these two people are given by $C + M = 40$ and $C + 2M = 60$, respectively. Because of close relationships between the individuals in this economy (of them living together and having one household), we can speak of utility from the point of view of their joint consumption.

a) Provide the production possibility frontier for the entire economy (the household) in an algebraic and graphical form.

b) Assuming that the utility function is given by the formula $U(C,M) = CM^2$, find the optimum consumption levels of both goods.

c) Assuming that the utility function is given by the formula $U(C,M) = CM$, find the optimum consumption levels of both goods.

Problem 5

Robinson has just finished few IT courses and can start working as a beginner free-lancer IT-specialist. He has decided that he will spend exactly 10 hours per day working. He can spend this time solving simple IT tasks working in a C++ language (C) or in Python (P). He is able to solve 2 tasks in Python or 3 in C++ in one hour. Solving these tasks will give him utility because he likes what he's doing, and at the end it will give him money to live. Robinson's utility function is $U(P,C) = 3P^{0.6}C^{0.3}$.

a) How many tasks in Python, and how many in C++ he should solve so that he maximizes his utility? Illustrate the solution with a graph.

b) One day his friend calls him and tells him that she has also just finished these courses and is ready to do similar job. She offers him a trade: 3 solved tasks in Python for 1 solved task in C++. However, the trade is not free: regardless of the amounts traded, the trade costs 1 task in Python (the monetary equivalent of it), which must be paid prior to the exchange.

   − Will Robinson decide to trade? Justify your answer.

   − What will Robinson produce?

   − What will Robinson consume?

   − If Robinson decides to trade, calculate his consumption levels, and compare his prior-trade and post-trade utility levels.