

PURE EXCHANGE, GENERAL EQUILIBRIUM**Problem 1**

For the utility functions (given below) of two consumers (1 and 2) in a pure exchange model with two goods (x and y), and knowing that in the Edgeworth box the initial endowments are: $\omega_{1x} = 10$, $\omega_{1y} = 10$, $\omega_{2x} = 20$, $\omega_{2y} = 20$:

- a) draw indifference curves going through the initial endowments;
- b) in the box depict the area representing possible improvements for both consumers relative to the initial allocation;
- c) determine the formula of the contract curve and draw it in the diagram;
- d) find the equilibrium price ratio and calculate the consumers' demand for each of the two goods.
 - i. $U_1(x,y) = xy$, $U_2(x,y) = x^{0.5} y^{1.5}$
 - ii. $U_1(x,y) = 4x + 2y$, $U_2(x,y) = x + y$
 - iii. $U_1(x,y) = xy$, $U_2(x,y) = x + 3y$ (*hint: combination of i. and ii. – since one person has a linear utility, we automatically have a strict price ratio. It's easy to get the contract curve. Since $MRS_1 = MRS_2 = \text{price ratio}$, and since one MRS is constant we easily get y_1 as a function of x_1).*)
 - iv. $U_1(x,y) = x + 2y$, $U_2(x,y) = \min\{2x, y\}$
 - v. $U_1(x,y) = x^2 y^{0.5}$, $U_2(x,y) = \min\{x, 2y\}$
 - vi. $U_1(x,y) = 2x + \ln(y)$, $U_2(x,y) = x + 2\ln(y)$
 - vii. $U_1(x,y) = 2\ln(x) + \ln(y)$, $U_2(x,y) = \ln(x) + \ln(y)$ (*tip: notice that these are Cobb-Douglas functions); you don't have to draw the Edgeworth box here if you don't want to (but you could practice)*)

Problem 2

For a pure exchange model with two consumers and two goods, are the following statements true or false?

- a) There is no such Pareto efficient allocation in which one consumer has lower utility than the other consumer.
- b) If consumers are in a Pareto efficient allocation, it is impossible to increase the utility of any of them (that is, each of the consumers has reached her highest utility level possible).
- c) If the marginal utility of each good is always positive for both consumers, then a situation in which one of the consumers does not own any of either of the goods is Pareto efficient.
- d) There exists such a Pareto efficient allocation in which the utility of every consumer is higher than in another Pareto efficient allocation.
- e) For every equilibrium allocation, the price ratio is equal to the marginal rate of substitution for both participants of the exchange.