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ECON 203 - Problem Set 2

1. Titus and Lucius consume only two goods, X and Y . They can trade only with each other and there is no production. The total endowment of good X equals the total endowment of good Y .

(a) Titus' utility function is $U(x_A, y_A) = \min x_A, y_A$ and Lucius' utility function is $U(x_B, y_B) = \max x_B, y_B$. In an Edgeworth box for Titus and Lucius, find the set of Pareto optimal allocations.

(b) What if Lucius' utility function changes to $U(x_B, y_B) = \max 2x_B, y_B$?

2. In a pure exchange economy, Çetin's utility function is $U(x, y) = 3x + y$ and Cemil's utility function is $U(x, y) = xy$. Çetin's initial allocation is 1 x and no y 's. Cemil's initial allocation is no x 's and 2 y 's. Draw an Edgeworth box for Çetin and Cemil. Put x on the horizontal axis and y on the vertical axis. Measure goods for Çetin from the lower left and goods for Cemil from the upper right. Mark the initial allocation with the letter W . Describe Pareto optimal allocations in words or formulas and show them on your graph.

3. Consider an economy with two representative consumers with the utility functions: $U_A = x_A + y_A$, $U_B = x_B + 2y_B$. The initial endowments of the consumers are $(x_A, y_A) = (10, 10)$ and $(x_B, y_B) = (10, 10)$. Draw the Edgeworth box for this economy and plot the contract curve.

4. In an exchange economy with two consumers A and B , the initial endowment of goods X and Y are: $x_A = 1$, $x_B = 2$, $y_A = 2$ and $y_B = 1$. Their utility functions are $U_A = x_A^\alpha y_B^{1-\alpha}$ and $U_B = x_B^\beta y_B^{1-\beta}$. Obtain the excess demand functions for each good. Find the equilibrium price ratio and allocation of goods.

5. Ms. A and Mr. B; and there are only two goods, good 1 and good 2. Also, x_i^A denotes an amount of good i for Ms. A, and x_i^B denotes an amount of good i for Mr. B. And, ω_i^A denotes the initial endowment of good i for Ms. A, and ω_i^B denotes the initial endowment of good i for Mr. B.

Ms. A's utility function is $u_A(x_1^A, x_2^A) = \sqrt{x_1^A} + x_2^A$, while Mr. B's utility function is $u_B(x_1^B, x_2^B) = x_1^B + \sqrt{x_2^B}$.

(a) Find the competitive (Walrasian) equilibrium in this economy when $\omega_1^A = 2$, $\omega_1^B = 0$, $\omega_2^A = 1$, $\omega_2^B = 2$ and $p_2 = 1$.

(b) Show that this competitive equilibrium allocation is indeed Pareto efficient?

(c) Suppose that the government of this economy has a desire for the equilibrium allocation to be $(x_1^A, x_2^A, x_1^B, x_2^B) = (\frac{1}{8}, \frac{5}{2}, \frac{15}{8}, \frac{1}{2})$. Is this allocation Pareto efficient?