EC 370
Intermediate Microeconomics II
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Suggested Solution to Assignment 4 (OPTIONAL)

Total Marks: 40

Part B Problem Solving Questions [40 Marks]

Read each part of the question very carefully. Show all the steps of your calculations to get full marks.

B1. [15 Marks]

Two consumers, Sammy and Spencer, have two goods, pizza and ice cream. Sammy and Spencer have an equal allocation of the two goods: each has 5 slices of pizza and 4 gallons of ice cream. However, Sammy and Spencer have very different preferences for these two goods. Sammy loves ice cream but derives no utility from pizza. Spencer loves pizza but derives no utility from ice cream.

a) Is this an efficient allocation of pizza and ice cream? Provide explanation for your answer. [5 marks]

b) Draw the Edgeworth box, the initial allocation, and the indifference curves for Sammy and Spencer. [5 marks]

c) Identify the contract curve. Provide explanation for your answer. [5 marks]

B2. [25 Marks]

Suppose Robinson Crusoe uses only labor (L) and to produce coconuts (C) and fish (F). His production function for fish is

$$F = 6L_F,$$

where L_F denotes the number of hours he spends in catching fish. His production function for coconuts is

$$C = 5(L_C)^{1/2},$$

where L_C denotes the number of hours he spends in collecting coconuts. Suppose that Robinson decides to work 6 hours per day for food collection. Assume that Robinson Crusoe's utility function is $U = F^2C$.

a) Derive the equation of the production possibilities frontier (PPF) for a typical day of Robinson Crusoe's economy. Find the marginal rate of transformation (MRT) between fish and coconuts. Determine whether the MRT shows increasing, decreasing or constant opportunity cost to specialization. Graph the PPF. Clearly identify the intercepts of the PPF. [10 marks]

b) Set up Robinson Crusoe's utility maximization problem. Solve the maximization problem to find the optimal combinations of coconuts and fish collected per day. Illustrate the results on a diagram. [10 marks]

c) Show that the marginal rate of substitution is equal to the marginal rate of transformation at the utility maximizing choice. [3 marks]

d) What is the implicit price ratio between fish and coconuts $\left(\frac{P_F}{P_C}\right)$ at the utility maximizing choice? [2 marks]