Institute for Management and Planning Studies (IMPS)

Advanced Micro II, General Equilibrium Theory

SS 2013

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Problem set 0

Robinson Crosue Economy

Exercise 4.1

Consider a simple Robinson Crusoe economy with two goods. There is an initial endowment of 1 day of endowed time, T, per day of calendar time. There is no leisure. Time can be used to produce guavas, x, or oysters, y. Let T_x denote the time devoted to guavas and T_y denote the time devoted to oysters. The production function of guavas is $x = \sqrt{T_x}$ and that of oysters is $y = \sqrt{T_y}$. The resource constraint is characterized as $T_x + T_y = 1$. We can summarize these relations as $x^2 + y^2 = 1$, $x \geq 0$, $y \geq 0$ or

$$y = (1 - x^2)^{\frac{1}{2}}, x \geq 0, y \geq 0.$$

Preferences are characterized by the utility function $U(x, y) = x \cdot y^2$.

(i) Find the Pareto-efficient allocation(s) for this economy.

(ii) What are equilibrium prices that will support the efficient allocation as an equilibrium? (You can set one price arbitrarily at unity as numeraire. Why?)