14.121 Problem Set #4

Due October 12, 2005

1. A consumer has a continuous, strictly increasing, quasi-concave utility function. You know that the consumer's expenditure function is $e(p_1, p_2, u) = \frac{p_1 p_2}{p_1 + p_2} u$.

(a) Show that by considering what happens when one price goes to infinity it is easy to find $u(x_1, 0)$ and $u(0, x_2)$.

(b) For what values of x_1 does there exist a nonnegative x_2 such that $u(x_1, x_2) = u_0$?

(c) Let x_1 be in the range you identified in part (b). By fixing $p_1 = 1$ and considering what happens when the consumer faces prices $(1, p_2)$ and has wealth $e(1, p_2, u_0)$ you can find a set of values of x_2 for which $u(x_1, x_2) \leq u_0$. What do you know about the largest x_2 in this set? Use this approach to describe the indifference curve $u(x_1, x_2) = u_0$, i.e. find the function $x_2(x_1, u_0)$ such that $u(x_1, x_2(x_1, u_0)) = u_0$?

(d) Can you see how to use this information to very quickly find $u(x_1, x_2)$?

2. MWG Exercise 4.D.5.