Section 3 Problems

Econ 50 - Stanford University - Winter Quarter 2015/16

Friday, January 29, 2016

Problem 1: Utility function deep dive: Demand derivations

(From Midterm, Winter 2015)

Suppose Wilson's preferences over X and Y are summarized by the utility function

$$u(x, y) = (x^{-1} + y^{-1})^{-1}$$

As usual, he has a total of $\$I$ available to spend on X and Y at prices P_x and P_y per unit, respectively.

(a) Find Wilson's marginal rate of substitution ($MRS_{x,y}$).

(b) Derive Wilson's demand functions, $x^*(P_x, P_y, I)$ and $y^*(P_x, P_y, I)$.

(c) Now assume Wilson's income is $I = \$288$ and the price of good Y is $P_y = \$1$ per unit. Find the quantity of X and Y that Wilson will choose to buy if $P_x = 9$ and if $P_x = 4$.

(d) Use the two points from part (b) to sketch a reasonable price-consumption curve for X (i.e., PCC_X) and demand curve in two carefully-drawn diagrams. *Be sure to label your axes!*

(e) Does Wilson view these two goods as complements or substitutes? How do you know?