Economics 3010
Intermediate Microeconomics, Fall 2017
Problem Set 2

The following questions are meant to demonstrate your basic understanding of the topics covered. Answer the following questions correctly to receive full credit.
Note: items marked with ** are not required, but recommended

1 Cobb Douglas

Let I, p_x, and p_y represent income and prices. Suppose $U(x, y) = x^a y^b$ where a, $b > 0$

- Calculate the MRS.
- Find the optimal bundle and use a graph to depict the optimum.
- Calculate the elasticity of demand for good x and for good y.
- Calculate the cross price elasticity for good x and for good y.
- Calculate the income elasticity for good x and for good y.

2 Perfect Substitutes

Let I, p_x, and p_y represent income and prices. Suppose $U(x, y) = ax + by$ where a, $b > 0$

- Calculate the MRS.
- Find the optimal bundle and use a graph to depict the optimum.
- Calculate the elasticity of demand for good x and for good y.
- Calculate the cross price elasticity for good x and for good y.
- Calculate the income elasticity for good x and for good y.

3 Perfect Compliments

Let I, p_x, and p_y represent income and prices. Suppose $U(x, y) = minax, by$ where a, $b > 0$

- Calculate the MRS.
- Find the optimal bundle and use a graph to depict the optimum.
- Calculate the elasticity of demand for good x and for good y.
- Calculate the cross price elasticity for good x and for good y.
- Calculate the income elasticity for good x and for good y.

4 Quasi-Linear

Let I, p_x, and p_y represent income and prices. Suppose $U(x, y) = -x^{-1} + y$ where a, $b > 0$

- Calculate the MRS.
- Find the optimal bundle and use a graph to depict the optimum.
- Calculate the elasticity of demand for good x and for good y.
- Calculate the cross price elasticity for good x and for good y.
- Calculate the income elasticity for good x and for good y.

5 Challenging Utility Max

Let I, p_x, and p_y represent income and prices. Suppose $U(x, y) = (\alpha x^\rho + (1 - \alpha)y^\rho)^{1/\rho}$.

- Calculate the MRS.
- **Find the optimal bundle**

6 Demand and Income

Sarah has an income of I and likes to consume apples and bananas. Sarah faces prices of p_a and p_b for apples and bananas respectively. Sarah's utility function for apples and banans is $U(a, b) = ln(a) + 2ln(b)$.

- Solve for Sarah's optimal bundle given this information. Fully characterize the solution.
- Let $p_a = 1$ and $p_b = 4$. Give the equation for the Engel curve as well as the optimal values of a and b in terms of I. Graph both the Engel curve and income consumption curve using the same kind of two-=panel diagram that was used in class.
- Let $I = 4$ and $p_b = 4$. Give the equation for the demand curve as well as the optimal values of a and b in terms of p_a. Graph both the demand curve and price consumption curve using the same kind of two-panel diagram that was used in class.

7 **Extra Problems**

For the utilites in Problem 1, 2, 3, and 4, solve for the Engel curve, Demand curve, PCC, ICC. Graph you answers.