University of Ottawa
Department of Economics
ECO 2144
Spring 2019
Assignment # 1 (due date: July 3,2019)
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Due date: July 3-2019 (Wednesday in class).

1. (5 marks) One model in economics is the permanent income hypothesis, which basically states that a household's expenditures will not react to a change in income unless that change in income is viewed as being permanent. How would you use this model to predict the expenditure patterns over the course of a year of a real estate agent who only sells homes during the months of April through July?

2. (5 marks) The local lemon market has the following supply and demand relationships:
   $Q_D = 100 - 5p - p_O + 2I$
   $Q_S = 4p$
   where p is the price of lemons (per pound), Q is the quantity of lemons in pounds, I is the average consumer income, and p_O is the price per pound of oranges. Derive the equilibrium price and quantity of lemons as functions of the price of oranges and average consumer income. Use the calculus method of comparative statics to compute the effects of income and the price of oranges on the equilibrium price and quantity of lemons.

3. Suppose the Ontario cannabis market of a particular specie consists of the following supply and demand curves:
   $Q_D = 150 - 20p$
   $Q_S = 40p$
   where Q is the number of packs of cannabis per year (in millions!), and p is the price per pack.

a. (5 marks) Compute the market equilibrium price and quantity.
b. (5 marks) Calculate the price elasticities of each curve at the equilibrium price/quantity.
c. (5 marks) Ontario imposes a tax on cannabiss of $0.90 per pack. Suppliers pay this tax to the government. Compute the after-tax price and quantity. How much do suppliers receive net of tax (per pack)?
d. (5 marks) Demand for cannabiss is generally more elastic over longer periods of time as consumers have more time to kick the habit. What does this imply about the tax incidence in the long run as compared to the short run?

4. Compute the MRS for the following utility functions. Based on your results, explain the curvature of indifference curve associated with each function.

i. (5 marks) $U(X,Y) = a\ln(X) + b\ln(Y)$
ii. (5 marks) $U(X,Y) = X^aY^b$
iii. (5 marks) $U(X,Y) = aX + bY$,

where a and b are strictly positive constants.

5. (5 marks) Explain the difference between the marginal rate of substitution and the marginal rate of transformation.
6. (5 marks) Lisa consumes only pizzas (P) and burritos (B). Her utility function is $U = P^{0.5} B^{0.5}$. The price of per pizza is \$10 and the price per burrito is \$5. In equilibrium, Lisa consumes four pizzas. Using Lisa's utility function, calculate how many burritos she consumes.
7. A consumer has the following utility function for goods X and Y:
   $U(X,Y) = 5XY^3 + 10$
   The consumer faces prices of goods X and Y given by p_X and p_Y and has an income given by I.
   a. (5 marks) Solve for the Demand Equations, $X^*(p_X,p_Y,I)$ and $Y^*(p_X,p_Y,I)$
   b. (5 marks) Calculate the income, own-price and cross-price elasticities of demand for X and Y.