73230 Intermediate Microeconomics
Problem Set 2

Anh Nguyen

Due: In-class at 10:30am on February 20, 2019

Problem 1 (80 pts)

Martial consumes only two goods, food and leisure. Martial has $100 to spend and can also choose to go to work to earn extra income. His hourly wage is $20, and he can only work and consume leisure up to 16 hours per day (i.e, if Martial works for 4 hours, he can enjoy leisure for 12 hours).

Let L be the number of hours of leisure, F be the unit of food, and p_F be the price of food. Martial's utility function is given by

$$u(L, F) = L^2 F^2$$

(a) (10 pts) Write down Martial's constrained utility maximization.

(b) (10 pts) If the price of food is $10, how many hours of work and how many unit of food will Martial consume?

(c) (30 pts) The price of food went up to $20 due to adverse weather conditions. How many hours of work and how many unit of food will Martial consume now? Decompose the change into substitution effect and income effect.

(d) (10 pts) Martial's CEO cares about his wellbeing and decided to give him a bonus to help him cope with the increase in the price of food. The CEO would like to make sure Martial's utility level is the same as before (in (b)). How much bonus should the CEO gives to Martial?

(e) (10 pts) The chairman of Martial's company disagrees with the CEO's bonus policy. The chairman thinks it's better to give Martial a food coupon of $210 so that he can buy the same amount of food as under the old price. Between the chairman's policy and the CEO's policy in (d), which policy does Martial prefer? Illustrate your answer on a graph.

(f) (10 pts) The union head of Martial's company disagrees with the CEO's bonus policy as well. He thinks it's better to give Martial a wage raise of $10 (so his new wage is $30/hour) to help Martial cope with the more expensive food. Between the union head's policy and the CEO's policy in (d), which one does Martial prefer?

Problem 2 (20 pts)

Imagine you are working for a consulting firm. Consumers in your world consume only fruit juice (F) and soft drinks (S). Your client sells fruit juice and would like to know more information about the consumer demand for fruit juice. After some surveys, you find out that each consumer has the following utility function:

$$u(F, S) = \sqrt{F} + \sqrt{S}$$

Let p_F denote the price of fruit juice, and p_S denote the price of soft drinks. Let Y denote income of each consumer.

(a) (10 pts) What is the demand of each consumer for fruit juice (in terms of p_F, p_S and Y)?

(b) (10 pts) Your client would like to know whether consumers consider fruit juice and soft drinks are substitutes or complements. Calculate the cross-price elasticity $\left(\dfrac{\frac{\partial F}{\partial p_S}}{\frac{F}{p_S}} \right)$ and answer your client.