Econ 301
Intermediate Microeconomics
Prof. Marek Weretka

Problem set 4

(due ' Tuesday, February 21 , before class)

Problem 1

As in the previous problem set, Benjamin spends his time either watching movies (x_1) (as you know he is taking advantage of "on demand" option, cable TV) or listening to the songs - MP3 downloaded from the Internet (x_2)His preferences are

$$U(x_1, x_2) = 4 \ln x_1 + \ln x_2.$$

His total income is $m = 100$, the price of MP3 is one dollar (per each song) $(p_2 = 1)$. Suppose that the price of a movie drops from $p_1 = 10$ to $p_1 = 5$.

a) By how much the "consumption" of movies changes due to the price drop?

b) Are movies ordinary or Giffen goods? Explain why.

c) By how much x_1 changes because movies are cheaper relative to MP3 (find substitution effect)

d) How about the effect of increased purchasing power of Benjamin's income? (find income effect)

e) Is the income effect in d) positive or negative? Why? (Hint: is a movie a normal of inferior good?)

f) Show the total change, and the substitution and income effects on the graph.

Problem 2

Consider Trevor from our previous problem set. He begins a day with a strawberry milkshake (milk and strawberries mixed in proportion 1:5). His income is equal to $m = 200$, and one strawberry costs $p_2 = 1$. Suppose the price of milk drops from $p_1 = 15$ to $p_1 = 5$.

a) What is the total change in demand for milk.

b) What is a substitution effect

c) How about income effect

Problem 3

Miriam has quasilinear preferences over consumption of coffee (x_1) and muffins (x_2) given by $U(x_1, x_2) = 5 \ln x_1 + x_2$. Her income is equal to $m = \$10$, and $p_2 = \$1$.

a) Find MRS as a function of consumptions of two commodities. Write down two secrects of happiness.

b) Find optimal consumption of x_1 and x_2 for arbitrary value of p_1, p_2, m using two secrets of happiness from a) (assume interior solution)

c) Suppose price of coffee drops from $p_1 = \$5$ to $p_1 = \$1$. Find substitution effect.

d) Find income effect

Problem 4

Dave is initially endowed with 20 apples and 20 oranges $\omega = (20, 20)$

a) Assume $p_1 = p_2 = 2$.Write down Dave's budget constraint, and plot budget constraint in the graph. Mark all bundles on budget line for which Dave is selling apples and is buying oranges.

b) Suppose $U(x_1, x_2) = x_1 x_2$. Find indifference curve that passes though endowment point analytically and find its slope (MRS) at endowment point. Depict the curve and the slope in the graph.

c) Assume $p_2 = 2$ and find optimal choices of Dave under three scenarios: $p_1 = 1, p_1 = 2$ and $p_1 = 3$. Determine net demands of Dave for apples and oranges.

d) Is Dave buying or selling apples on the market under the three scenarios? Explain why he is using such trading strategy by comparing MRS at the endowment point with relative price.

e) Connect the three optimal bundles to obtain price offer curve and plot it in the graph with indifference curve passing though endowment poin. Is your price offer curve located above the indifference curve?

Problem 5

Kate is not sure how many hours she should spend at work and we have to help her. Her total available time is 24h. She has no other source of income but salary. She is a lawyer, and a current wage rate for lawyers (per hour) is $w = \$100$. She only consumes bananas that cost $p_c = \$5$ per pound.

a) what is her real wage rate (wage rate in terms of bananas?)

b) show her budget set on the graph.

Suppose her utility function is

$$U(C, R) = R \times C$$

where R is leisure (or relaxation time) and C is consumption of bananas.

c) find her optimal time spent at work, the relaxation time and consumption of bananas.

d) How your answer in c) would change if her wage rate was w=\$200. How would you explain the change (or possibly no change) in her labor supply?