Microeconomics — class 1

1. Prove propositions:
a) if there exists a utility function representing $\succeq$, then $\succeq$ is rational;
b) if the the preference relation $\succeq$ is rational, then the indifference relation is an equilvalence relation and $\succeq$ is a linear order on the set of indifference curves.

2. Prove monotone transformation theorem.

3. Examine, how the Walrasian budget set on plane changes if
a) the price of x_1 increases,
b) the income increases,
c) both prices of goods increase with relation between them preserved.

4. How the original Walrasian $B_{\mathbf{p},m}$ budget set on plane changes if additional constraints are imposed.

a) Special-purpose fund (food, children products or education) – from income m amount $\bar{m}$ can be spent only on x_1.

b) Rationing - coupons (meet, petrol etc.) – strict rationing.
The agent cannot buy more x_1 then K (the number on the coupon).

c) Rationing - coupons (meet, petrol etc.) – non strict rationing. (with "black market" or special shops with higher market prices).
It is possible to buy more x_1 than K, but for the surplus K the price is $\bar{p}_1 > p_1$.

d) One or two goods consumed in integer amounts.

e) Goods whose consumption is mutually expclusive.

5. Write the budget set of labour supply as Walrasian:

I have $\bar{L}$ hours for work L or leisure R. The wage is w. The money I earned I can use to buy consumption c (for simplicity of price 1).

Try to interpret economically the equation (as Walrasian set).

Hint:

Consider leisure and consumption as goods.

Interpret R, w and $\bar{L} \cdot w$ based on their position in the inequality – leisure is a good which I buy at price w, and my income is the value of my time.

6. How the Walrasian budget set changes in the following situations.

a) Official constraints of working time of type "at least $L_{\min}$" or "at most $L_{\max}$".

b) Higher wage rate for overtime: for every hour above $\tilde{L} < \bar{L}$ – official working time – the wage is $p_N > p$.

c) Progressive income tax with thresholds: for simplicity for earnings above $\bar{c}$ (the threshold) I have to pay tax of rate t.

7. Intertemporal choice ("frictionless" version) as Walrasian budget set.

An agent earns Y_0, next year Y_1 and this is fixed *a priori*. He decides about consumption now c_0 and next year c_1. He can freely borrow from the bank (and pay it back in a year with an interest) or save and the interest rate for both is identical r.

Write two of equivalent inequalities defining the bugdet set which have obvious interpretation. The terms which appaer are related to as future value and the present value (with discounting).

8. Evolution of a finansial market from none to ideal.

Draw the subsequent budget sets

a) I live on a desert island and my income is in bananas – what is not eaten, is wasted.

b) I live on a desert island and my income is in coconuts – I can store them.

c) I live on a desert island and my income is in corn, which I can sow it – then I for each seed I obtain $1 + r$ seeds next year.

d) I live in contemporary Poland where every bank takes a commission, and, consequently, the savings rate r_l is lower than the borrowing rate r_k.

9. Are the following preference relations on $\mathbb{R}^2_+$ described verbally below rational? If the answer is "yes", draw the indifference maps (some indifference curves and the direction in which preferences grow).

Can these relations be represented by a utility function? If the answer is "yes", write one.

a) Satiation.

The bundle 2 chocolates and one glass of milk is ideal for Johny. If mum gives him any other bundle, it is worse and further from the ideal one (in Euclidean distance) means worse. Bundles equally distant form the ideal one are equally good.

b) Unwanted goods – "bads".

Patrick likes beer and can drink every possible amuount of it with satisfaction growing as the amount increases, but he doesn't like herrings. However, every amount of beer compensates eating the same amount of herrings.

c) From every two potential boyfriends Ann prefers the one, who is more handsome and more intelligent (and that's all).

d) Perfect substitutes – substitutes in constant ratio.

(i) The engin can run identically using petrol and LPG.

(ii) Notes 10zł i 20zł.

e) Perfect complements – consumed in constant ratio.

(i) Right and left shoes.

(ii) Jack drinks coffee with milk always in proportion 1:2. The higher amuont of his favourite drink, the better, but if the ingredients are not in the perfect ratio, then the excess amount is just poured out.

f) The preferences of Mary Antoinette concerning bread and cookies are defined by the fact that she eats cakes herself (and the more is the better) while bread is for the people (and, being a generous queen, as long as she doesn't have to constrain her consumption, she wants the people to be satisfied).

g) A party with beer and wine. Mark wants to drink as much as possible, doesn't matter which of these two, but he never mixes.