Statistics – B

Exercise 2

1) Five newspapers have the following market shares:

Newspaper	A	B	C	D	E
Market share	0,15	0,1	0,25	0,2	0,3

    a) Calculate CR1, CR2 and CR3.
    b) Determine the Herfindahl-Index of newspaper market.
    c) Interprete (a) and (b).

2) Show that within a model of Cournot competition of n firms with linear marginal costs, the Herfindal-index of this market divided by the demand elasticity equals the sum of the market shares s_i weighted with their profit margins pm_i.

3) Assume a market of n firms with market shares s_i. Show, that the Herfindahl-index can be written as:
$$HI = 1/n + (n-1)\hat{\sigma}^2$$

4) The agricultural holdings in a region have the following sice:

Area [Hectare]	Number
0-5	21
5-10	7
10-20	11
20-50	8
50-250	3

    a) Determine the Lorenz-curve
    b) Determine the Gini-coefficient

5) Show the validity of the formulas
$$GC = 1 - \sum_{i=1}^{n}(F_i - F_{i-1})(G_i + G_{i-1}) = -1 + \sum_{i=1}^{n}(F_i + F_{i-1})(G_i - G_{i-1})$$
for the Gini-coefficient

6) In a country, we have the following income distribution:

	I	II	III	IV
Income p.a. [thousend Euro]	$0 \leq I < 30$	$30 \leq I < 60$	$60 \leq I < 90$	$90 \leq I < 120$
Number of households	1000	500	300	200

a) Calculate the average and median income (use the mid-point of the intervals, which kind of assumption is therefore maid?)
b) Determine the Theil-Index of this distribution
c) Draw the Lorenz-curve of this distribution
d) Calculate the Gini-coefficient
e) Consider a tax allowance of 20.000 Euro. Then from 20.000 Euro up to 60.000 Euro starting from a minimum rate of 20% the tax rate rise linearily up to 40% and after that the tax rate stays constant at 40%. Draw this tax function graphically.
f) Calculate the taxes for every income class and total taxes.
g) Suppose after tax collection, every household receives the same amount of transfers. Calculate the new income of every class.
h) Draw the Lorenz-curve and calculate the Gini-coefficient after the redistribution and compare with the initial situation.
i) Starting with the initial situation, assume an Inflation rate of 10%. Calculate the initial Gini-coefficient and after the redistribution. Interprete!