1 Exercise I

For the following sets of variables, give the mode, the median, the mean, the standard deviation and the absolute deviation.

1. $(1, 1, 3, 5, 8, 2, 4, 12, 5)$

2. $(1, 4, 5, 9, 2, 2, 3, 4, 9, 9, 9, 12)$

2 Exercise II

The table below represents the typical annual consumption of an inhabitant of Argenton-sur-Creuse (France) :

	Bread		Car		Cheese	
Year	Price	Quantities	Price	Quantities	Price	Quantities
2010	5	110	100	3	30	3
2011	6	120	120	2	40	2
2012	8	135	110	2	60	5

Table 1: Annual consumptions

1. Compute the elementary indexes of the prices of each item (using 2011 as the reference year) for the three years

2. Compute the weights of each item in annual consumption in 2011

3. Derive for the previous question the Laspeyres index in year 2010, 2011 and 2012 (with 2011 as the reference year)

3   Exercise III

The wages of the seven employees of Clementine, a young start-up, are the following :

	Wages	Years of study
Alice	19000	8
Bob	13000	4
Craig	8000	1
Dave	15500	5
Eve	16000	5
Frank	17000	7
Wendy	22000	11

1. Make a regression of *Wages* on *Years of Study*

2. Compute the R^2 and ρ

3. Comment.

4   Exercise IV

A firm has the following wages' distribution :

Wages (in k$)	Frequencies
10 - 20	3
20 - 30	11
30 - 40	16
40 - 50	19
50 - 60	23
60 - 70	11
70 - 80	9
80 - 90	5
90 - 100	1

1. What is the median class ? the modal class ?

2. What are the first and last decile class ?

3. What is the medial ?

4. Gather the nine bins into three of equal width. What is the new wage distribution ?

5. Draw the Lorenz Curve and compute the Gini coefficient.

5 Exercise V

A lab is making experiments on bacteria. Each day, the same proportion of bacteria is reproducing itself. When a bacterium is reproducing itself, it gives birth to a new bacterium which can also reproduce itself the next day. So if there is 4 bacteria and half of it reproduce itself, the next days there are $4 + 4/2 = 6$ bacteria. And the day after $6 + 6/2 = 9$ bacteria. We suppose that this proportion is constant in time and that half of a bacterium gives birth to an other half (so we have no problem with non-integers).
At the beginning of the experiment, the lab grows 100 bacteria in culture. At the end of the experiments, 90 days after, the lab has 230 bacteria.

1. Each day, what is the proportion of bacteria that reproduces itself ?

2. 30 days after the beginning of the experiment, how many bacteria did the lab have ?

6 Exercise VI

Bob is investing $100,000\$$ at 3%, the annual simple interest rate.

1. How many dollars will he have in 5 years ?

2. What should be the interest rate so that he doubles his investment after 10 years ?