



Always use 3 decimal places.

GROUP I

1. In the following table it is shown the distribution of income for 2592 households of a given region of the European Union.

Table: Distribution of household income

Income class(€)	Number of households
Below 600	68
600-1800	1829
1800-3000	534
3000-5000	115
Over 5000	46
Total	2592

Source: Statistical office

- (1,00 val) a) Compute the mean and median value of the distribution of household income.
- (1,00 val) b) Compute the standard deviation and the coefficient of variation.
- (0,50 val) c) Taking into account the measures computed, analyse and discuss the behaviour of this distribution in terms of symmetry.
- (1,25 val) d) Assume that you are given, additionally the total income earned by each income class.

Income classes (€)	Total income (€)
Below 600	31.577
600-1800	2.179.463
1800-3000	1.207.785
3000-5000	421.455
Over 5000	323.918
Total	4.164.198

Compute the mean of the distribution taking this new information into account and explain eventual differences with respect to the value found in a).

- (1,75 val) e) Considering the information for total income by income class given in d) analyse the degree of income concentration in this region.
- (1,50 val) f) Comment the following sentence: "The index of concentration is appropriate to study characteristics, such as wealth or income, where one can consider two extreme situations: the total sum can be equally distributed among the different individuals or it can belong only to one individual".

GROUP II

1. The sales of a given product from a technology company were the following:

Table: Sales

	2005	2009	2010
Sales (thousands €)	8.531	11.292	10.162

Source: Firm reports

- (0,50 val) a) Compute the annual rate of change of sales in 2010.
(0,50 val) b) Compute the sales rate of change between 2005 and 2010.
(0,50 val) c) Compute the annual average sales rate of change between 2005 and 2010.
(1,00 val) d) Compute, for the years possible, the chain and 2005 fixed base index of sales.
(2,00 val) e) Knowing that between 2004 and 2007 sales have grown at an annual average rate of 5,2% and that between 2007 and 2009 at an annual average rate of 9,8%, compute the annual average sales rate of change between 2004 and 2009 and compute the value of sales in 2004. Can you, with the available information, compute the value of sales in 2008?

GRUPO III

1. Consider the following table with data on the quotations of a given stock and the change of general index of prices in the period 2005-2010.

Table: Quotations and price evolution

Year	2005	2006	2007	2008	2009	2010
Quotation (euros)	12,25	12,62	12,97	13,32	13,81	14,23
Prices rate of change (%)	2,5	2,8	3	1,8	-0,8	1,3

Source: Stock Exchange dataset and National Statistical Office

- (1,00 val) a) Compute, for each year, the 2008 fixed base index of prices.
(1,00 val) b) Compute, for each year, the quotation at 2008 constant prices.
(1,00 val) c) Assess the nominal and real change in the quotations of this company stocks between 2006 and 2009.
(1,00 val) d) Assuming that the price target for this stock in 2011 is 14,87€ and that the prices are expected to grow by 1,4% which will be the real gains from investing in this company.?
(1,50 val) e) Compute the value of the stock in 2010 at 2004 prices and in 2005 at 2010 prices.

GROUP IV

1. A researcher intends to analyse the correlation between the prices of the stocks of two important national companies. With that purpose he has information of those qprices for 7 years. Naming x and y the prices of the stocks, expressed in euros, and after making the appropriate computations he has the following results:

$$\text{Mean of } x = 7,84$$

$$\text{Mean of } y = 2,26$$

$$\text{Variance of } x = 4,364$$

$$\text{Variance of } y = 0,378$$

$$\text{Covariance between } x \text{ and } y = 1,48$$

- (0,75 val) a) Taking those values into account compute and analyse the correlation between x and y .
(1,00 val) b) Compute the regression line parameters and relate the line with the linear correlation coefficient computed in a).
(1,25 val) c) Explain the difference between the covariance and the linear correlation coefficient. What is the relevance of the information give by the linear correlation coefficient and to what extent is different form the one given by the covariance?