

Always use 3 decimal places.

GROUP I

1. One knows the following information on the distribution of companies by employment size classes in a given region.

Table: Distribution of companies by employment size classes

Employment size classes	% firms
0-9	55
10-49	26
50-249	11
250-499	6
≥ 500	2

Source: Survey

- (1,50 val) a) Depict graphically the simple and cumulative frequencies of this distribution.
- (1,00 val) b) Compute the mean and median value of the distribution.
- (1,00 val) c) Compute the standard deviation and the coefficient of variation of this distribution.
- (0,50 val) d) Taking into account the measures computed, analyse and explain the behaviour of the distribution in term of symmetry.
- (1,00 val) e) Analyse the behaviour of this distribution using the box and whiskers plot.

2. The following table shows the distribution of sales of a given product in two markets.

- (2,00 val) a) Analyse and compare the degree of concentration of these markets using the Gini coefficient and the Lorenz curves.

Table: Indicators of sales distribution in two markets

Position measures	Cumulative % of sales	
	Market 1	Market 2
D1	3%	7%
Q1	9%	19%
Me	20%	42%
Q3	45%	60%
D9	59%	83%

Source: Statistical office

GROUP II

1. Consider the following information on the evolution of the quotation of a given company.

Table: Evolution of the quotation of a given company

Year	2010	2011	2013	2014	2015
<i>Rate of change of quotation (%)</i>	2.1	-0.6	1.9	3.2	4.5

Source: INE

- (1,25 val) a) Knowing that between 2009 and 2013 the quotation increased 4,8%, compute the rate of growth of the quotation in 2012.
- (1,00 val) b) Which was the rate of change of the quotation between 2012 and 2015?
- (1,00 val) c) Which shall be the rate of change of the quotation in 2016 in order to have a value of the quotation at the end of that year 15% higher than in 2013.
- (1,25 val) d) Compute, for the different years, the 2013 fixed base index of the quotation.

GROUP III

1. One knows the following information about the evolution of sales of a given company.

Table: Information on the evolution of sales of a given company

	2012	2013	2014	2015
Nominal growth (%)	2.1	3.5	2.7	2.5
Price index (fixed base 2011)	101.3	102.4	103.2	103.1

Source: Company reports

- (1,00 val) a) Compute for each year the 2011 fixed base index of nominal sales.
- (1,50 val) b) Compute for each year the real growth of sales.
- (1,50 val) c) Knowing that sales were 2.73 million of euros in 2013, compute the value of sales in 2015 at current and at 2013 fixed prices.
- (1,50 val) d) If in 2016 sales experience a real growth of 1.2% and prices increase 1%, compute the value of sales in 2016 at current and 2011 constant prices.

GROUP IV

1. The head of the department of marketing of a given company is analysing the relationship between the expenditure in marketing and the sales of the company. For that purpose he collected info on the expenditure and sales in several years and got the following table.

Table: Information on marketing expenditure and sales of a given company

Marketing expenditure (thousand euros)	470	530	340	720	630	580	440	360
Sales (million euros)	5,5	5,8	4,3	6,1	6,2	5,9	5,4	5,6

Source: Survey

- (2,00 val) a) Compute the regression line that better represents the relationship between these two variables and comment it.
- (1,00 val) b) Verify if the relationship is strong and taking the results and data into account comment to what extent it seems that the marketing policy seems to be effective.