

Always use 3 decimal places.

GROUP I

1. You were commissioned a study to analyse the market of a given product and you received information on the sales (thousands of euros) of the 12 biggest companies in that market.

Table: Sales by company of a given product

Company	A	B	C	D	E	F	G	H	I	J	K	L
Sales	102,6	1003,2	652,5	378,9	751,4	598,3	206,7	1780,9	8650,4	4952,3	6538,6	2689,5

Fonte: Management reports

- (1,50 val) a) Depict graphically the simple and cumulative frequencies of the distribution of sales by company.
- (1,00 val) b) Compute the mean and median value of the distribution of sales per company of these 12 companies.
- (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.
- (1,50 val) e) Assuming that these 12 companies represent 70% of the companies in the market and 90% of the sales of this product analyse the concentration of the **whole** market of this product by computing the Index of Gini and analysing the results.
- (1,50 val) f) Comment the following statement:

The concentration of a distribution is related to the dispersion of the observed values.

GROUP II

1. Consider the following information about the sales of a company of Wifi devices

Table: Sales

Year	2007	2008	2009	2010	2011	2012
Sales (thousands of euros)	8.531	8.877	9.480	10.468	11.292	10.162

Source: Firm reports

- (1,00 val) a) Compute the sales rate of change in 2012.
 (1,00 val) b) Compute the average sales rate of change between 2007 and 2011.
 (1,25 val) c) Compute, for the years that is possible, the chain and 2010 fixed base index of sales.
 (1,25 val) d) Present the formula to compute and compute the average annual rate of growth of sales between 2007 and 2012 as the average of the average rates of growth 2007-2009 and 2009-2012.

GROUP III

1. Consider additionally the following table with information on the evolution of prices of the product mentioned in II

Table: Information on the evolution of prices

Year	2007	2008	2009	2010	2011	2012
Rate of change of prices	1,8	3,1	2,7	3,1	-2,5	1,2

Source: Firm reports

- (1,00 val) a) Compute, for each year, the 2010 fixed base index of prices.
 (1,50 val) b) Compute for each year the values of sales at 2010 constant prices.
 (1,50 val) c) Compute the value of sales in 2009 at 2007 prices.
 (1,50 val) d) Which will be the value of sales in 2013 at current and at 2010 prices if in that year sales increase 2% in real terms and prices increase 1,9%.

GROUP IV

1. A researcher is studying the relationship between the expenditure made using banking debit cards and the level of income in a sub-Saharan. Ho collected the following information (annual values in millions of monetary units).

Table: Information about expenditure with debit cards and income

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Expenditure	11,9	12,1	11,7	11,5	11,8	12,2	12,8	13	13,2	13,5
Income	10800	10700	10650	10900	11100	11500	11500	12000	12500	13000

Source: Monetary and financial statistics

The researcher computed already the values of standard deviation of expenditure (0,663) and income (765,523) as well as the covariance between expenditure and income (470,45).

- (1,00 val) a) The researcher intends to estimate a regression line to the data. Say whether you consider it appropriate.
 (1,00 val) b) Estimate the equation of the regression line that relates expenditure to income.
 (1,00 val) c) Assuming that in 2013 it is forecasted an increase of income of around 4%, which is the value of expenditure you can expect? Discuss whether you can have strong confidence in the value estimated.