

**Always use 3 decimal places.**

**GROUP I**

1. One economist from the Competition Authority in a given country is analysing the market in a given industry and has the following information:

**Table: Distribution of firms by sales class**

Sales (euros)	% companies
0 – 50.000	35
50.000 – 500.000	27
500.000 – 2.500.000	17
2.500.000 – 10.000.000	13
10.000.000 – 25.000.000	7
>25.000.000	1

Source: Business association

- (1,50 val) a) Depict graphically the simple and cumulative frequencies of the 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 the distribution.
- (0,50 val) d) Taking into account the measures computed, analyse and explain the behaviour of the distribution in terms of symmetry.
- (1,50 val) e) Taking into account that the Competition Authority is concerned with the possibility that large firms have a dominant position in this market discuss that issue, considering the appropriate indicators.
- (1,50 val) f) Considering the data on new born firms and firms that close, that economist estimates that in the current year a number of firms corresponding to 15% of the stock in the previous year are born, all of them belonging to the first class of sales. In the same period a number of firms corresponding to 10% of the stock in the previous year is going to close, being these firms that die uniformly distributed across size classes. Compute the mean of the new distribution

## GROUP II

1. Consider the following information on the evolution of sales of a given firm.

**Table: Information on sales**

Year	2009	2010	2012	2013	2014
Sales growth (%)	-3,0	2,2	1,2	-1,3	2,5

Source: Management reports

- (1,00 val) a) Compute for those years that is possible the chain index and 2011 fixed base index of sales.  
 (1,00 val) b) Which was the sales growth rate between 2011 and 2014?  
 (1,00 val) c) Which was the annual average growth rate of sales between 2012 and 2014?  
 (1,50 val) d) How much have sales to grow in 2011 in order to having sales growing 3.1% between 2008 and 2014.

## GROUP III

1. Another company sells basically two products. The following table presents some details about the structure and evolution of sales.

**Table: Information on the evolution of sales**

	Value of sales in 2013 (thousand euros)	Products price index in 2013 (2014=100)	2014 index of quantities (2010=100)	2013 index of quantities (2010=100)
Product A	1.680	98,6	103,1	100,1
Product B	2.569	101,1	105,3	111,3

Source: Management reports

- (1,00 val) a) Compute the rate of change of quantities sold of product A in 2014.  
 (1,00 val) b) Compute the sales value of product A in 2013 at 2014 prices.  
 (1,00 val) c) Compute the nominal rate of change of sales of product B in 2014.  
 (1,25 val) d) Compute the value of sales in 2014 at current and 2013 prices.  
 (1,25 val) e) If you can, compute the Laspeyres price index of the products of this company for 2014 with base in 2013.

## GROUP IV

1. In the same company it was decided to analyse the relationship between the expenses in marketing/publicity and the evolution of sales.

**Table: Information on the evolution of sales and expenses in marketing/publicity**

Sales (thousand euros)	2.600	3.000	3.150	3.560	3.700	3.600
Expenses in marketing (thousand euros)	130	160	155	161	170	165

Source: Company reports

- (1,50 val) a) Present the equation of the line that better adjusts to this data.  
 (1,50 val) b) Comment to what extent the relationship between the two variables is strong and forecast the growth rate of sales if expenses in marketing/publicity increase 5% in the next year.