

**Always use 3 decimal places.**

**GROUP I**

1. In a given public programme that supports private investment the distributions of firms that got incentives according to their size in terms of employees was the following:

**Table: Distribution of firms that got incentives by size**

Number of workers	Number of firms
0 – 10	4006
10 – 50	3244
50 - 250	2417
$\geq 250$	811

Source: Management reports

- (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 of firms.
- (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) Analyse the degree of concentration of this distribution.
- (1,50 val) f) Discuss to what extent the incentives of this programme are concentrated on Small and Medium Enterprises.

## GROUP II

1. Consider the following information about the market value of a given company.

**Table: Market value**  
(end of period values)

Year	2008	2009	2013	2014
Market value (million euros)	123.8	145.3	125.4	126.5

Source: market reports

- (1,00 val) a) If you know that between 2009 and 2012 market value diminished 4.7%, which was the change of market value in 2013?
- (1,00 val) b) Which was the rate of change of market value between 2009 and 2014 and which was the average annual rate of change of market value between 2008 and 2014?
- (1,25 val) c) Which should be the change of market value in 2015 in order to have the market value of this company in the end of the year 5 percentage points higher than in 2008.
- (1,25 val) d) Knowing that between 2005 and 2008 market value increased at a pace 3.2 p.p. higher than between 2009 and 2014, compute the market value in 2005.

## GROUP III

1. With respect to the same company mentioned in Group II, one knows the evolution of stock quotations in the market.

**Table: Information on the evolution of stock quotations of the company mentioned in group II**

$r_{2008,2007}$	$\delta_{2009,2007}$	$i_{2010,2008}$	$i_{2011,2010}$	$\delta_{2012,2009}$	$r_{2013,2012}$	$i_{2014,2008}$
2.5%	4.7%	100.3	104.1	-3.2%	-1.9%	96.2

Source: market reports

- (1,50 val) a) Compute the 2007 fixed base index of quotations.
- (1,50 val) b) Compute for those years that you can the market value of this company at 2009 constant prices.
- (1,00 val) c) Compute the market value of this company in 2014 at 2013 and 2010 prices.
- (1,50 val) d) If in 2015 the price of this stock increases 3.2% and the volume of stocks in the market increases 2% compute the market value in 2015 at current and 2007 prices.

## GROUP IV

1. The incentives given by programme mentioned in Group I depend on the quality of the projects. One researcher got information on the quality and support rate for different projects.

**Table: Information on the quality and incentive rate of several projects**

Quality	4,5	3,8	2,4	4,7	4,2	3,3
Incentive rate (%)	60	67	0	70	70	50

Source: Management reports

- (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 analyse the system in place to compute the incentive rate.