The table below shows the percentage of damaged harvest in a certain village, in the even years 1982, 1984 . . . till 1994.

Year	1982	1984	1986	1988	1990	1992	1994
Rank of the year x_i	1	2	3	4	5	6	7
Percentage y_i	3.5	3.8	4.6	6.5	6.9	7.8	9

1- Calculate the means $\overline{X}$ and $\overline{Y}$ of the variables x and y.

2- Represent graphically the scatter plot of the points (x_i , y_i) as well as the center of gravity $G(\overline{X} , \overline{Y})$ in a rectangular system.

3- Calculate the correlation coefficient r and give an interpretation of the value thus obtained.

4- Determine an equation of $D_{y/x}$, the line of regression of y in terms of x.

5- Suppose that the above pattern remains valid till the year 2010.
Estimate the percentage of the damaged harvest in the year 2002.

Question II(5pts):

A bag contains **seven** balls :

one red ball carrying the number 2

two yellow balls each carrying the number 1

four green balls each carrying the number 4 .

Two balls are drawn, simultaneously and at random, from this bag.

1) Prove that the probability of drawing **one** red ball and **one** green ball is equal to $\frac{4}{21}$.

2) Calculate the probability of drawing **two** green balls.

3) Calculate the probability of drawing **two** balls having the same color.

4) Let the following events:

A=″the sum of the numbers on balls equal 3″.

B=″the product of the numbers on balls equal 4″.

C=″the difference between two numbers on the balls equal 0″.

Calculate : P(A) , P(B) , P(C) , P(B∩C) , P(A∪B) , P(B/C).

Question III(10pts):

A)

Let f be the function that is defined, on IR, by: $f(x) = \frac{2x^2+4x-1}{x^2+1}$

and designate by (C) its representative curve in an orthonormal system $(O ; \vec{i} , \vec{j})$.

1) a- Calculate the limits of f(x) .

b- Deduce the asymptote of f.

2) Calculate f '(x) and set up the table of variations of f.

3) Solve f(x)<2 and deduce the relative positions between (C) and the straight-line (d):y=2.

3) Draw (C).

B)

A factory manufactures batteries and the total cost of production, in millions LL, is

expressed by $C(x) = \frac{2x^2+4x-1}{x^2+1}$ +2 where x is the number, in hundreds, of batteries

produced ($0 \leq x \leq 5$).

1) Calculate the fixed costs.

2) Calculate the total cost of manufacturing 2000 batteries.

3) Find the function of the marginal cost .

4) The revenue function is expressed by $(x) = \frac{2x^2+4x-1}{x^2+1} - x^3 + 3x + 2$.

a- Find the profit function.

b- Determine the production level that yields the maximum profit.