BADJI MOKHTAR UNIVERSITY – ANNABA

Faculty of Technology

Second-Year Science and Technology

Academic Year: 2026–2027

SERIES 2: DESCRIPTIVE STATISTICS FOR TWO VARIABLES

Exercise 1

We consider 10 players and define the following variables:

X: The variable representing the gain or loss (+1 if the player wins 10 DA, −1 if the player loses 10 DA, and 0 otherwise).

Y: The variable representing the number of games played by a player.

We are given the following contingency table:

X \ Y	**1**	**2**	**3**	**4**
−1	**0**	**1**	**2**	**2**
0	**1**	**1**	**0**	**1**
1	**0**	**1**	**1**	**0**

-Calculate the parameters of the marginal distributions of X and Y.

-Calculate the covariance of the pair (X, Y).

-Determine the equation of the regression line of Y as a function of X.

-Calculate the linear correlation coefficient between X and Y. Interpret the result.

-Find the conditional distribution of X given that Y = 2.

Exercise 2

The following contingency table represents the relationship between the monthly salary X and the length of service Y of workers in a company.

X \ Y	[0; 8[	[8; 16[	[16; 24[	[24; 32[
[20; 30[	5	6	1	0
[30; 40[	2	4	3	3
[40; 50[	0	2	4	10

-Calculate the parameters of the marginal distributions of X and Y.

-Calculate the covariance of the pair (X, Y).

- Find the conditional distribution of Y given that $X \in [40; 50[$.

Exercise 3

A statistical study is conducted on 10 e-commerce websites to investigate the number of visits and the number of orders over a period of one week. The following table is obtained:

Website number (i)	Number of visits (x_i)	Number of orders (y_i)
1	80	30
2	100	50
3	115	62
4	110	56
5	70	8
6	125	80
7	105	62
8	90	50
9	110	62
10	95	38

-Calculate the marginal means of the statistical variables X and Y.

-Calculate the standard deviations of the statistical variables X and Y.

-Calculate the covariance between X and Y.

-Calculate the linear correlation coefficient between X and Y. Comment on the result.

-Determine the regression line of X on Y, in the form $X = aY + b$.

-Estimate the number of visits (X) when the number of orders is equal to 90.

-Plot the scatter diagram.