Series Nº 2 : Graphs and measures of position and variability

Exercise 01 ★ :

1. For the sample data set $\{-1, 0, 1, 4\}$ find $\sum x_i, \quad \sum x_i^2, \quad \sum(x_i - 1), \quad \sum(x_i - 1)^2$

2. For each of the following, find the mean, the median, the mode, the rang, the variance, and the standard deviation :

   A. 13, 11, 10, 5, 4, 2, 10, 6

   B. 2, 0, 0, 4, 6, 10, 0

   C. -12, -10, -20, -24, -14

3. Find the mean, the median, the mode, the rang, the variance, and the standard deviation for each sample data represented by the following **frequency table** :

   A.
Values x_i	1	2	7
Frequencies n_i	1	2	1

   B.
Values x_i	-1	0	1	4
Frequencies n_i	1	1	3	1

4. Find the mean, the median, the mode, the rang, the variance, and the standard deviation for each sample data represented by the following **frequency table** :

   A.
Values x_i	$[10, 20[$	$[20, 30[$	$[30, 40[$	$[40, 50[$
Frequencies n_i	3	5	10	2

   B.
Values x_i	$[7, 12[$	$[12, 18[$	$[18, 22[$	$[22, 30[$
Frequencies n_i	1	1	3	1

   Draw the frequency histogram and the ICF curve for each sample data.

Exercise 02 (quantitative discrete data) : The number of passengers in each of 120 randomly observed vehicles during morning rush hour was recorded, with the following results :

Values	1	2	3	4	5
Frequency	84	29	3	3	1

1. Determine the sample of intrest, its size (total number), the variable, and its type.

2. Draw the frequency diagram (bar chart) of the data set.

3. Plot the increasing cumulative frecuency curve of this data set.

4. Find the mean, the median, the quartiles, and the mode.

5. Find The rang, the variance, and the standard deviation.

Exercise 03 (quantitative continuous data) : A survey of 200 families on their summer vacation budget gave the following results :

Classes	$[800, 1400[$	$[1400, 1600[$	$[1600, \beta[$	$[\beta, 2400[$	$[2400, \alpha[$
Centre of classes					
Frequency					
Frequency cumulative					
Relative frequency					
Relative frequency cumulative	0.22	0.38	0.64	0.73	1

1. Calculate the missing bound α knowing that the range of this data is equal to 3200.

2. Calculate the missing bound β if the average (mean) budget is equal to 2012.

3. Complete the table.

4. Draw the frequency (or relative frequency) curve and the frequency histogram of this data.

5. Calculate the mode, the median, the quartiles, q_1 and q_3, the variance, the standard deviation, and the coefficient of variation.

Exercise 04 (box-whisker plot) : Construct the box plot (or box-whisker plot) for each the following set of data (use one number line for both box plots) :

A. 32, 32, 45, 55.5, 56, 56, 59, 68, 70, 72, 77, 78, 79, 80, 81, 84, 84.5, 90, 90, 99

B. 25.5, 45, 65, 68, 76, 78, 78, 79, 79, 80, 81, 81, 83, 84.5, 85, 88, 89, 90, 90, 98, 98, 98

Which box plot has the wider spread for the middle 50% of the data ? (calculate IQR for each set of data).

Exercise 05 (quantitative continuous data) ★ : The frequency histogram below shows the height distribution in cm of basketball players in a sports club.

1. Draw up the frequency table corresponding to this frequency histogram.

2. Find the percentage of the basketball players with height between $185cm$ and $210cm$.

3. Calculate the mean, the median, the mode, the variance, and the standard deviation.
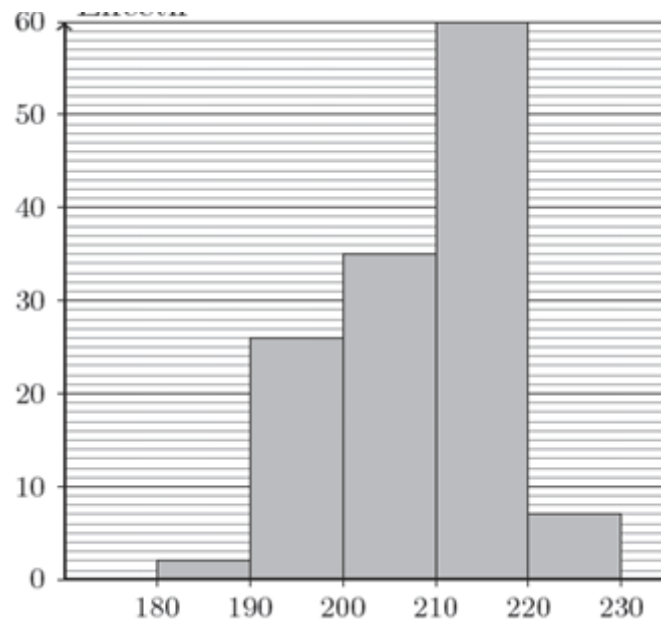
Exercise 06 (quantitative continuous data) :

The age distribution of a group of persons is given in the following table :

Age	< 9	< 11	< 13	< 15	< 17	< 21
Number	0	12	25	33	37	40

1. Draw the diagram for this data.

2. Calculate the median and the quartiles. Draw the box plots.

3. Find $N_{x=12} \uparrow$ and find the proportion of persons with age between 12 and 15 years.

4. ⋆ Calculate the mean, the variance, standard deviation, and the coefficient of variability.

5. ⋆ On note $Y = \dfrac{X - 14}{2}$ such as X is the variable studied. Find the mean $\bar{y}$, the variance $Var(Y)$, and standard deviation σ_Y of a new data.