Exercise 1 The table below represents the distribution of the number of vehicles per family

Number of vehicles	Frequency
0	17
1	24
2	28
3	11

1. Determine the studied population, the studied characteristic and its nature, as well as its modalities.
2. On a statistical table, represent the cumulative increasing and decreasing frequency (CIn_i) (CDn_i), the relative frequencies.
3. From the table, determine which frequency of families has at most 1 vehicle? At least 2 vehicles?
4. Determine the three quartiles of the statistical series.
5. Calculate the mean and variance of this statistical series.

Exercise 2

A basket contains 100 oranges. Each orange is weighed, and the number of defects on each orange is counted. Let X denote the mass of each orange in kilograms, and let Y be an integer representing the number of defects per orange. Consequently, the statistical series (see Table below) corresponding to the two variables, which are mass and number of defects, is obtained.

X|Y	$[0.1-0.2[$	$[0.2-0.22[$	$[0.22-0.24[$	$[0.24-0.30[$
0	1	10	15	4
1	8	10	12	20
2	0	2	4	14

- Determine the population, type, and nature of the variables Y and X.
- From the statistical table, calculate all marginal frequencies and determine the distribution tables for each of the two variables Y and X.
- Calculate the mean and variance of each variable.
- Calculate the covariance $\text{cov}(Y, X)$.
- Calculate the equation of linear regression of Y on X.
- calculate the correlation coefficient.

Exercise 3 Suppose a school has two math classes: Advanced and Basic. 30% of the students are in the Advanced class. In the Advanced class, 90% of the students pass their final exam. In the Basic class, only 60% of the students pass the exam.

1. Draw a probability tree for this scenario.
2. Calculate the probability that a randomly selected student passes the exam.
3. Given that a student passed the exam, calculate the probability that they were in the Advanced class.
4. Suppose it is known that a student failed the exam. Calculate the probability that this student was in the Basic class.