Exercises - Part 1

EXERCISES ON THE SUMMATION

Exercise 1. Re-write each of the following expressions using the summation symbol:

1. $x_1^2 + x_2^2 + x_3^2 + x_4^2 + \ldots + x_{15}^2$
2. $ax_1 + ax_2 + ax_3 + \ldots + ax_4$
3. $(x_1 + y_1) + (x_2 + y_2) + \ldots + (x_8 + y_8)$
4. $b_1 x_1^3 + b_2 x_2^3 + \ldots + b_{40} x_{40}^3$
5. $\frac{2a_1+2a_2+2a_3+2a_4+2a_5}{b_1+b_2+b_3+b_4+b_5}$
6. $\frac{2a_1}{b_1} + \frac{2a_2}{b_2} + \frac{2a_3}{b_3} + \frac{2a_4}{b_4} + \frac{2a_5}{b_5}$
7. $x_1 + x_2^2 + x_3^3 + x_4^4 + x_5^5$

Exercise 2. Consider the following data:

a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	a_9	a_{10}	a_{11}	a_{12}	a_{13}	a_{14}	a_{15}
2	3	1	2	2	4	8	5	5	3	4	6	3	5	0

and solve the following expressions:

1. $\sum_{i=1}^{15} a_i$
2. $\sum_{i=1}^{5} a_i^2$
3. $\sum_{i=5}^{8} a_i$
4. $\sum_{i=10}^{13} 3a_i$
5. $\frac{\sum_{i=1}^{4} a_i}{\sum_{i=2}^{8} a_i}$
6. $\sum_{i=1}^{3} a_i^i$
7. $\sum_{i=1}^{5} a_i + \sum_{i=6}^{8} a_i$
8. $\sum_{i=2}^{5} (a_i - 2)^2$

EXERCISES ON THE DISTRIBUTIONS

Exercise 1. A group of 120 students participates to a memory test. For each individual, the number of errors is recorded (X); the error distribution follows:

x_i	n_i
1	12
2	48
3	12
4	36
5	6
6	6
Total	120

1. Report the cumulative frequency distribution.
2. Compute the relative frequency distribution.
3. What is the mode?
4. What is the median number of errors?

5. Compute the average number of errors?

6. Produce the new frequency distribution according to the following class organization:

x_i	n_i
$0 \dashv 3$	
$3 \dashv 5$	
$5 \dashv 6$	
Total	120

Exercise 2. The following table includes data about the cholesterol concentration in a sample of patients:

Concentration (mg/dl)	f_i
$0 \dashv 20$	0.05
$20 \dashv 40$	?
$40 \dashv 60$	0.30
$60 \dashv 200$	0.45
Total	1.00

1. Fill the table.

2. Given that the sample is constituted of 300 patients, recover the distribution of the absolute frequencies.

3. How many patients have a cholesterol concentration that is not less than 40 mg/dl?

4. Compute the midpoint of each class.

5. Compute the frequency density for each class.

6. Compute the average concentration of cholesterol.

7. Determine the modal class.

8. Determine the median.