

Exercise 1

Choose the right answer and provide a justification for your choice.

- The $\lim_{x \rightarrow +\infty} f(x)$ such that $f(x) = \frac{\sqrt{x}}{\sqrt{x+\sqrt{x}}}$ is:
 1. $+\infty$
 2. Does not exist
 3. 1
 4. 0
- The series $\sum_{n=0}^{+\infty} e^n$ is:
 1. Convergent
 2. Divergent
- The derivative of $f(x) = x^2 e^x$ is:
 1. $2e^x(x + x^2)$
 2. $e^x(2x + x^2)$
 3. None of these
- What is the amplitude of the class $[150 - 159[$?
 1. 8
 2. 9
 3. 10
- The number of children of 5 families is as follows
 $7, 3, 2, 4, 1$

The median is:

1. **2**
 2. **3**
 3. **4**
- The domain of definition of $f(x) = \ln(x - 3)$ is :
 1. $] - \infty, 3[$
 2. $]3, +\infty[$
 3. $[3, +\infty[$

Exercise 2

I. Calculate the following integral:

$$\int_0^1 \sqrt{x} (2 + \sqrt{x})$$

II. Determine a and b such that the function f is continuous on $\mathbb{R}$, where:

$$f(x) = \begin{cases} 6 & \text{if } x \in]-\infty, -1] \\ ax + b & \text{if } x \in]-1, 0[\\ \frac{e^x + e^{-x}}{2} & \text{if } x \in [0, +\infty[\end{cases}$$

Exercise 3

❶ Study the nature of the serie of the general term U_n :

$$U_n = \sqrt{n+1} - \sqrt{n}$$

❷ Study the nature of the following serie:

$$\sum_{n=1}^{+\infty} \left(\frac{\ln n}{n} \right)^n$$

Exercise 4

In a class of **32 students**, the grades obtained in a mathematics exam are distributed as follows:

Grades (Marks)	Number of Students (n_i)
$[2, 5[$	7
$[5, 8[$	6
$[8, 11[$	10
$[11, 14[$	5
$[14, 17[$	4

❶ Determine the character studied and give its nature

❷ Calculate the cumulative absolute frequency $n_i^{c\uparrow}$, relative frequency f_i and cumulative relative frequency $f_i^{c\uparrow}$ (present the calculations in a table).

❸ Calculate mode (M_0), mean ($\bar{x}$) and median (Me).

❹ Calculate the range (e), variance ($V(X)$), standard deviation (σ_X).