

People's Democratic Republic of Algeria
Ministry of Higher Education and Scientific Research

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Faculty of Economics, Commerce and Management Sciences

Department of Basic Education



Level: 1st year Bachelor degree

Section: 1st and 2nd section

Subject: Mathematics 01

Exercises serie n :02

Exercise 01 :

1/ Determine the first 4 terms of the following sequences:

$$U_n = 2n^2 - n + 3 \text{ and } V_n = \frac{3n+5}{2-3n}$$

1.1/ Calculate $U_{n+1} - U_n$, what do you conclude?

2/ Let $(U_n)_{n \in \mathbb{N}}$ the sequence defined by: $\begin{cases} u_0 = 1 \\ u_{n+1} = u_n - 7 \end{cases} \forall n \in \mathbb{N}$

2.1/ Calculate: U_1, U_2, U_3 .

2.2/ Calculate $U_{n+1} - U_n$, what do you conclude?

Exercise 02 :

Study the direction of the following sequences:

1/ $U_n = 2n + 1$

2/ $V_n = 5 \times 3^n$

3/ $W_n = 4 \times 3^n + 9$

Exercise 03 :

Let the arithmetic sequence $(U_n)_{n \in \mathbb{N}}$ be defined on \mathbb{N} , with reason $r = -2$ and the first term $U_0 = 15$.

1/ Write U_{n+1} in terme of U_n .

2/ Write U_n in terme of n .

3/ Calculate U_1, U_{10}

4/ Calculate the sum $S_{10} = U_0 + U_1 + \dots + U_{10}$

Exercise 04 :

Let $(U_n)_{n \in \mathbb{N}}$ a geometric sequence such that: $U_1 = \frac{3}{2}$ and $U_4 = \frac{3}{16}$

1/ Determine the reason 'q'.

2/ Write U_n in terme of n .

3/ Calculate the sum $S_{15} = U_0 + U_1 + \dots + U_{15}$.

Exercise 05 :

We consider two sequences (U_n) and (V_n) defined for all $n \in \mathbb{N}$ by:

$$U_n = \frac{3 \times 2^n - 4n - 3}{2}, V_n = \frac{3 \times 2^n + 4n - 3}{2},$$

1/ Let (W_n) be the sequence defined by $W_n = U_n + V_n$.

Prove that (W_n) is a geometric sequence.

2/ Let (T_n) be the sequence defined by $T_n = U_n - V_n$.

Prove that (T_n) is an arithmetic sequence.

3/ Prove that for all $n \in \mathbb{N}$, $U_n = \frac{W_n + T_n}{2}$.

Exercise 06 :

Let $(U_n)_{n \in \mathbb{N}}$ an arithmetic sequence such that: $U_1 = 3$ and $U_3 = 9$

1/ Determine the reason 'r'

2/ Write U_n in terms of n .

3/ Calculate U_5, U_{20}

3/ Calculate the sum $S_{20} = U_5 + U_6 + \dots + U_{20}$.