TD Test 3

Name : **Surname :** **Group :**

Question from the class (2 points)

Let (u_n) be a geometric sequence with common ratio $q \in \mathbb{R}\backslash\{1\}$ and (v_n) be an arithmetic sequence with common difference $r \in \mathbb{R}$.
Give the expression of $u_0 + u_1 + \cdots + u_n$ and $v_0 + v_1 + \cdots + v_n$.

Question from the class (2 points)

Let (u_n) be a real sequence and $\ell \in \mathbb{R}$. Give the precise definition, with the quantifiers, of « (u_n) converges to ℓ ».

Exercise 1 (2 points)

Let (u_n) be defined by $u_0 = 1$ and for all $n \in \mathbb{N}$, $u_{n+1} = 7u_n + 12$. Determine, for all $n \in \mathbb{N}$, u_n as a function of n.

Exercise 2 (4 points)

Let $(u_n)_{n\in\mathbb{N}^*}$ be defined for all $n \in \mathbb{N}^*$ by $u_n = \frac{1}{2} \times \frac{3}{4} \times \cdots \times \frac{2n-1}{2n}$

1. Give the expression of u_{n+1} in terms of n ?

2. Study the monotony of (u_n) by using $\frac{u_{n+1}}{u_n}$.

3. Is (u_n) convergent ? Justify your answer.