

Sujet n°1

Please do not write on the subject paper and don't forget to give back the examination paper at the end of the test

SEQUENCES

Introduction :

In mathematics, ordered set of mathematical quantities called terms builds a sequence.

A sequence is said to be known if a formula can be given for any particular term using the preceding terms or using its position in the sequence.

For example, the sequence 1, 1, 2, 3, 5, 8, 13, ... (the Fibonacci sequence) is formed by adding any two consecutive terms to obtain the next term.

A sequence may be either finite or infinite (which has no final term and thus continues indefinitely).

Special types of sequences are commonly called progressions.

In maths we can meet two different specific types of progressions : arithmetic or geometric

Adapted from thefreedictionary.com

Questions :

A water Lily is growing on the surface of a pond. Each day, it becomes twice larger.

On the 1st of May, a 2cm radius waterlily is born on the middle of the 50m radius pond.

1. What is the waterlily area on the 1st of May ? Label this A_1 .
2. If we label A_n the waterlily area ($n-1$) days after the 1st of May, so that it means that A_{24} is the area on the 24th of May. What will be the value of A_2 ? Express A_{n+1} in terms of A_n .
3. What type of progression is the (A_n) sequence ?
4. Express A_n in terms of n and A_1 .
5. We want to know on which day the water lily will completely cover the pond. Compute this date.

NB :

a water lily : un nénuphar

a pond : un étang