U6 Chapter 3

Sequences and Series

Chapter Overview

1. Sequences

2. Arithmetic Series

3. Geometric Series

4. Sigma Notation

5. Recurrence Relations

6. Combined Sequences

7. Classifying Sequences



Sequences

A sequence is an ordered set of mathematical objects. Each element in the sequence is called a term.

$u\_{n}=$

$$n=$$

Arithmetic Sequences

Examples

1. The $n$th term of an arithmetic sequence is $u\_{n}=55-2n$.

1. Write down the first 3 terms of the sequence.
2. Find the first term in the sequence that is negative.

2. Find the $n$th term of each arithmetic sequence.

1. 6, 20, 34, 48, 62
2. 101, 94, 87, 80, 73

3. A sequence is generated by the formula $u\_{n}=an+b$ where $a$ and $b$ are constants to be found. Given that $u\_{3}=5$ and $u\_{8}=20$, find the values of the constants $a$ and $b$.

4. For which values of $x$ would the expression $-8, x^{2}$ and $17x$ form the first three terms of an arithmetic sequence.

Test Your Understanding



Extension

[STEP I 2004 Q5] The positive integers can be split into five distinct arithmetic progressions, as shown:

A: 1, 6, 11, 16, …

B: 2, 7, 12, 17, …

C: 3, 8, 13, 18, …

D: 4, 9, 14, 19, …

E: 5, 10, 15, 20, …

Write down an expression for the value of the general term in each of the five progressions. Hence prove that the sum of any term in B and any term in C is a term in E.

Prove also that the square of every term in B is a term in D. State and prove a similar claim about the square of every term in C.

1. Prove that there are no positive integers $x$ and $y$ such that $x^{2}+5y=243723$
2. Prove also that there are no positive integers $x$ and $y$ such $x^{4}+2y^{4}=26081974$

Ex 3A Pg 61