

Sequence

A sequence is a set of numbers arranged in a specific order, where each number follows a certain rule.

Examples:

Even numbers: 2, 4, 6, 8, 10, ...

Odd numbers: 1, 3, 5, 7, 9, ...

Multiples of 3: 3, 6, 9, 12, ...

1. Term-to-Term Rule:

Each term is found by applying a rule to the previous term.

Example: 2, 4, 6, 8, ... (Each term is found by adding 2).

2. Position-to-Term Rule:

A formula is used to find the value of a term using its position. We use the position number (1st, 2nd, 3rd, ...) to make a formula.

Example: If the rule is $2 \times \text{position}$,

- 1st position $\rightarrow 2 \times 1 = 2$
- 2nd position $\rightarrow 2 \times 2 = 4$
- 3rd position $\rightarrow 2 \times 3 = 6$

The sequence is: 2, 4, 6, 8, ...

Linear Sequences

A **linear sequence** is a sequence where **the difference between each term is the same**.

This difference is called the **common difference**.

Rule:

Each term increases or decreases by the **same number**.

Example 1:

3, 6, 9, 12, 15, ...

Common difference = +3

Example 2:

20, 15, 10, 5, ...

Common difference = -5

Non-Linear Sequences

A **non-linear sequence** is a sequence where **the difference between terms is not the same**.

The pattern could involve:

- Multiplying or dividing
- Squaring numbers
- Doubling or halving
- Other rules

Example 1 (Multiplying):

2, 4, 8, 16, 32, ... → multiply by 2 each time

Example 2 (Squares):

1, 4, 9, 16, 25, ... → 1^2 , 2^2 , 3^2 , 4^2 , 5^2