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Sequence (informal definition) : A set of numbers in a specific order.

Examples of sequences:

a. 5, 10, 15, 20, 25, 30, 35, 40, 45, ...

b. 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, ...

c. 2, 4, 8, 16, 32, 64, 128, 256, 512, ...

Each number is called a term of the sequence.

Notation

We will use

a_1 to represent the first term of any sequence

a_2 to represent the second term of any sequence

a_3 to represent the third term of any sequence

a_4 to represent the fourth term of any sequence

In general, a_n is used to represent the n^{th} term of any sequence.

There are two common ways used to define sequences.

1. Using an **explicit** formula
2. Using a **recursive** formula

An explicit formula gives a_n as a function of n.

Examples of explicit formulas:

	Definition	Sequence
a.	**$a_n = 5n$**	**5, 10, 15, 20, 25, 30, ...**
b.	**$a_n = 2n + 3$**	**5, 7, 9, 11, 13, 15, ...**
c.	**$a_n = 2^n$**	**2, 4, 8, 16, 32, 64, ...**

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A recursive formula tells you the value of a_1 and also gives a_{n+1} as a function of a_n.

a_{n+1} is the term that follows a_n (the next term).

Examples of recursive formulas:

	Definition		Sequence
a.	$a_1 = 5$	$a_{n+1} = a_n + 5$	**5, 10, 15, 20, 25, 30, ...**
b.	$a_1 = 5$	$a_{n+1} = a_n + 2$	**5, 7, 9, 11, 13, 15, ...**
c.	$a_1 = 2$	$a_{n+1} = 2a_n$	**2, 4, 8, 16, 32, 64, ...**

Problems:

Use the given formula to write the first 5 terms of each sequence.

1. $a_n = 2n - 1$ _____

2. $a_n = n^2$ _____

3. $a_n = 2(3)^{n-1}$ _____

4. $a_1 = 3$; $a_{n+1} = a_n + 2.5$ _____

5. $a_1 = 32$; $a_{n+1} = 0.5a_n$ _____

6. $a_1 = 10$; $a_{n+1} = a_n - 2$ _____

Write an explicit formula for each sequence.

7. **3, 6, 9, 12, 15, 18, 21, ...** _____

8. **0, 3, 8, 15, 24, 35, 48, ...** _____

9. **3, 9, 27, 81, 243, 729, ...** _____

Write a recursive formula for each sequence.

10. **4, 6, 8, 10, 12, 14, 16, ...** _____

11. **3, 6, 12, 24, 48, 96, 192, ...** _____

12. **0, 1, 3, 7, 15, 31, 63, 127, ...** _____