An **Infinite Sequence** is a **function** whose **domain** is the set of **postitve integers**: {1, 2, 3, 4, 5, 6, …}
The function values $a_1, a_2, a_3, a_4, \dots a_n, \dots$ are the **terms** of the sequence.

If the domain of a function consists of the first n positive integers only, the sequence is a **finite sequence**.

Occasionally it may be convenient to allow the domain to be **whole numbers**: {0, 1, 2, 3, 4, …}
In this case the values are regarded as $a_0, a_1, a_2, a_3, a_4, \dots$

Example: Write the 1st 4 terms of the following sequence: $a_n = 3n - 2$
Solution:
$a_1 = 3(1) - 2 = 1$
$a_2 = 3(2) - 2 = 4$
$a_3 = 3(3) - 2 = 7$
$a_4 = 3(4) - 2 = 10$
The sequence contains elements: 1, 4, 7, 10, …, (3n – 2), …

Example: Write the 1st 5 terms of: $a_n = \frac{(-1)^n}{2n-1}$

Solution: $-1, \frac{1}{3}, -\frac{1}{5}, \frac{1}{7}, -\frac{1}{9}, \dots, \frac{(-1)^n}{2n-1},$

Find the apparent nth term of 3, 5, 7, 9, 11, …
Solution: $a_n = 2n - 1$

Sometimes the nth term is referred to as a **generator**.

Sigma notation, indicated by $\sum_{i=1}^{n} a_i$, may be used to indicate the sum of the terms in a sequence.
When we **add the terms of a sequence**, we build a **series**.

An **Arithmetic Sequence** has a constant difference, d, between terms.
Example: 5, 8, 11, 14, 17, 20, … is an Arithmetic Sequence with d = 3.
The generator is $a_n = 3n + 2$

A **Geometric Sequence** has a constant ratio, r, between terms. That is if we divide any term by its predecessor, we get the same ratio, r, each time.
Example: 3, 6, 12, 24, 48, 96, ,,, is a Geometric Sequence with r = 2.

A sequence can be defined **Recursively** when each successive term is defined in terms of earlier terms. In this case, the 1st term has to be given.
Example: $a_1 = 7$, $a_{n+1} = 2a_n - 3$ will give 7, 11, 19, 35, 67, …

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1. $a_n = 4n - 7$. Write the 1st five terms of the sequence, where n starts at 1

2. $\sum_{n=1}^{5} 4n - 7 =$

3. $a_n = \frac{2n}{n+1}$. Write the 1st five terms of the sequence, where n starts at 1

4. $\sum_{n=1}^{5} \frac{2n}{n+1} =$

5. $a_1 = 6$, $a_{n+1} = 2a_n$ Find a_6 .

6. $\sum_{n=1}^{x} a_n = 3 + 5 + 7 + 9 + ... + 21$. Find the expression for a_n .

7. $\sum_{n=1}^{\infty} a_n = 2 + 5 + 8 + 11 + 14 + 17 + 20 + ...$ Find the expression for a_n .

8. Using the information from #7, write the 219th Term.