A collection of objects is said to form a **sequence** if the collection is ordered so that it has a first member, a second member, a third member, and so on. Below are two examples of sequences of numbers, the numbers in the sequences are called **terms**.

SEQUENCE 1:	SEQUENCE 2:
3, 6, 9, 12, 15	3, 6, 9, 12, 15, . . .

You can think of a sequence as a function whose domain is a set of consecutive integers. If a domain is not specified, it is understood that the domain starts with 1.

DOMAIN:	1	2	3	4	5	The domain gives the relative position of each term: 1st, 2nd, 3rd, and so on.
RANGE:	3	6	9	12	15	The range gives the terms of the sequence.

Sequence 1 is a **finite sequence** because it has a last term. Sequence 2 is an **infinite sequence** because it continues without stopping. Both sequences have the general rule $a_n = 3n$ where a_n represents the nth term of the sequence, $\{a_n\}_1^\infty$. The general rule can also be written using function notation: $f(n) = 3n$.

1. Write the first 4 terms of the sequence with general terms:

   - $a_n = 3n + 1$

   - $\left\{(-2)^{n+1}\right\}$

2. For each sequence, write a rule for the nth term

   - $-\dfrac{1}{3}, \dfrac{1}{9}, -\dfrac{1}{27}, \dfrac{1}{81}, \ldots$

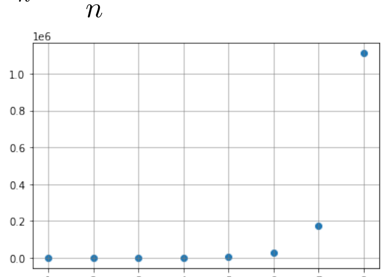
   - $2, 6, 12, 20, \ldots$

If $\{a_n\}$ is a sequence, and if $f(x)$ is a continuous function with $f(n) = a_n$ for all $n > N$ for some number N then

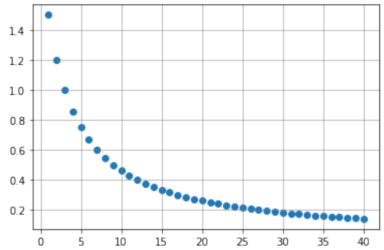
$$\lim_{n\to\infty} a_n = \lim_{x\to\infty} f(x)$$

3. Determine if each sequence converges or diverges

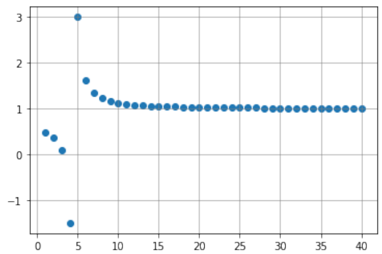
   - $a_n = \dfrac{e^{2n}}{n}$



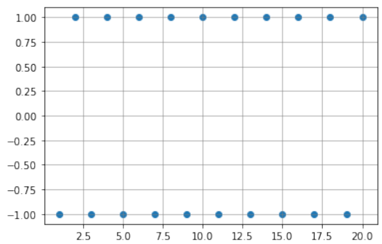
- $a_n = \dfrac{6}{n+3}$



- $a_n = \dfrac{n^2 - 10}{n^2 - 20}$



- $\{(-1)^n\}$



- $\left\{\dfrac{(-1)^n}{n}\right\}$