

Sequences

A sequence is an ordered list of numbers

- each number in the sequence is called a term or element; each term is identified by its location (position) numbered using EXAMPLES: natural numbers (1, 2, 3, ...)

Write the first three terms of the sequence whose n^{th} term is given by the explicit formula: $a_n = 2n - 1$

$$1, 3, 5, 7, \dots \begin{array}{c|c|c|c} n & 1 & 2 & 3 & 4 \\ \hline \in & 1 & 3 & 5 & 7 \end{array}$$

Write the 5th and 10th terms of the sequence whose n^{th} term is given by the formula:

$$a_n = \frac{n}{n+1}$$

$$a_5 = \frac{5}{5+1} = \frac{5}{6}$$

$$a_{10} = \frac{10}{10+1} = \frac{10}{11}$$

TRY THESE:

1) Find the first three terms of the sequence: $a_n = n^2 - 1$

$$a_1 = 1^2 - 1 = 0$$

$$a_2 = 2^2 - 1 = 3$$

$$a_3 = 3^2 - 1 = 8$$

2) Find the 12th term of the sequence: $a_n = n(n+2)$

$$a_{12} = 12(12+2) = 168$$

Linear Arithmetic Sequences

If a sequence of values follows a pattern of adding a fixed amount from one term to the next, it is referred to as an arithmetic sequence.

The number added to each term is called the constant difference, d , referring to the fact that the difference between two successive terms yields the constant value that was added.

Formula to find any term of an arithmetic sequence:

$$a_n = a_1 + (n-1)d$$

where a_1 is the first term of the sequence, d is the common difference, and n is the number of the term to find.

Write a formula for the arithmetic sequence 1, 3, 5, 7, ...

$$a_n = 1 + (n-1)2 \quad a_n = 2n - 1$$

Find the common difference for the arithmetic sequence whose formula is $a_n = 6n + 3$.

6 in front of n

Find a_7 for an arithmetic sequence where $a_1 = 3x$ and $d = -1$.

$$a_n = 3x + (n-1)(-1)$$

$$a_7 = 3x - 6$$

Find the 25th term of the sequence -7, -4, -1, 2, ...

$$a_n = -7 + (n-1)3$$

$$a_{25} = -7 + 3(25) = 71$$

A theater has 60 seats in the first row, 68 seats in the second row, 76 seats in the third row, and so on in the same increasing pattern. How many seats are in the 12th row?

$$a_n = 60 + (n-1)8$$

$$a_{12} = 60 + 8(12) = 148$$