

General Algebra 2 Class Worksheet #1 Unit 10 page 1

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

Examples of sequences:

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

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

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

General Algebra 2 Class Worksheet #1 Unit 10 page 2

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

Problems:

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

- $a_n = 2n - 1$ _____
- $a_n = n^2$ _____
- $a_n = 2(3)^{(n-1)}$ _____
- $a_1 = 3$; $a_{n+1} = a_n + 2.5$ _____
- $a_1 = 32$; $a_{n+1} = 0.5a_n$ _____
- $a_1 = 10$; $a_{n+1} = a_n - 2$ _____

Write an explicit formula for each sequence.

- 3, 6, 9, 12, 15, 18, 21, ... _____
- 0, 3, 8, 15, 24, 35, 48, ... _____
- 3, 9, 27, 81, 243, 729, ... _____

Write a recursive formula for each sequence.

- 4, 6, 8, 10, 12, 14, 16, ... _____
- 3, 6, 12, 24, 48, 96, 192, ... _____
- 0, 1, 3, 7, 15, 31, 63, 127, ... _____