




Sequences and Series – Arithmetic Sequences

Introduction to (General) Sequences

- **sequence** → a _____ in a _____
where each _____ is called a _____

- sequence notation – $a_1, a_2, a_3, \dots, a_n$

- sequence representations – we can represent a sequence in three ways:

1.) _____ \rightarrow Ex:    , _____ , _____

2.) _____ → Ex: marching , adjusting , thanking , hammering , _____ , _____

3.) _____ \rightarrow Ex: 3, 10, 24, 45, _____, _____

Specific Sequence # 1 – Arithmetic Sequence

Before Getting Started – The following are examples of arithmetic sequences:

1.) 12, 26, 40, 54, _____, _____ Pattern Rule: _____

2.) $\frac{5}{3}, \frac{7}{6}, \frac{2}{3}, \frac{1}{6}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}$ Pattern Rule: $\underline{\hspace{2cm}}$

What do you think happens in arithmetic sequences? _____

- **arithmetic sequence** → a sequence where the _____ between _____ terms is a constant, called _____, the _____

(REMEMBER: *consecutive numbers* are _____)

Example 1: Determine if these sequences are arithmetic. If so, state the common difference.

a.) $3, 7, 11, 15, \dots$

b.) $4, -1, -6, -11, \dots$

c.) $-2, 4, 10, 13, \dots$

Example 2: Find the next four terms of each arithmetic sequence. Write your answer as sequence.

a.) $a_1 = 6$ and $d = 17$

b.) 55, 49, 43, ...

“Nth Term Formula” of Arithmetic Sequence: Used to find ANY term of an arithmetic sequence

Consider an arithmetic sequence whose first term is _____ and whose common difference is _____:

a_1	→	1st term (a_1)
_____	→	2nd term ($a_2 =$ _____)
_____ = _____	→	3rd term ($a_3 =$ _____)
_____ = _____	→	4th term ($a_4 =$ _____)
_____ = _____	→	5th term ($a_5 =$ _____)

(General) nth term Formula: _____ → some important notes about this formula...

- formula will always be a _____
- make sure your final nth term formula is _____

Example 3: Find what is indicated for each arithmetic sequence.

a.) $a_1 = -6$ and $d = 7$, find the 16 th term	b.) Find a_{40} for the sequence $-9, -17, -25, \dots$	c.) Write the nth term formula (equation) for the sequence $8, 17, 26, 35, \dots$
--	---	---

Example 4: Considering all given sequences are arithmetic – Find what is asked.

a.) The 20 th term of the sequence is 101 and the common difference is 3. What is the fourth term?	b.) What is the common difference for the sequence where the first term is 13 and the 28 th term is -149 ?	c.) Which term of the sequence $1, 5, 9, \dots$ is 97?
--	--	---

- **arithmetic means** → represent the _____ of an arithmetic sequence

Ex: Circle the 3 arithmetic means between 30 and 74: $19, 30, 41, 52, 63, 74, 85, 96, \dots$

Example 5: Find the arithmetic means of the arithmetic sequence below.

16 , _____ , _____ , _____ , _____ , 91