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## Arithmetic Sequences

Unit 4 Lesson 7

# ARITHMETIC SEQUENCES

## Students will be able to:

Identify the arithmetic sequences, find the next terms and  $n^{th}$  terms in an arithmetic sequence

## Key Vocabulary:

- Sequence
- Terms
- Arithmetic Sequence
- Common Difference
- $n^{th}$  Term



# ARITHMETIC SEQUENCES

## What is a Sequence?

A sequence is a set of numbers in a specific order.

## Terms in a Sequence

The terms in a sequence are the numbers (or fractions or decimals) in a sequence.

## Arithmetic Sequence

It is a numerical sequence that increases or decreases with a constant rate.

## ARITHMETIC SEQUENCES

### Common Difference

The common difference is the difference between any two consecutive terms in an arithmetic sequence. Its value must be same for any two consecutive terms.

### Writing Arithmetic Sequences

If we are given some terms in an arithmetic sequence, we find the common difference and write the arithmetic sequence by adding the common difference in each last term.

## ARITHMETIC SEQUENCES

**Problem 1: Determine whether the sequence below is an arithmetic sequence. If yes, find the next two terms also.**

**-13, -9, -7, -5, ...**

## ARITHMETIC SEQUENCES

**Problem 1: Determine whether the sequence below is an arithmetic sequence. If yes, find the next two terms also.**

**-13, -11, -9, -7, ...**

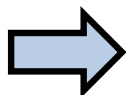
The common difference between terms is:

$$-13 - (-11) = +2$$

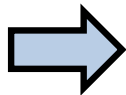
$$-11 - (-9) = +2$$

$$-9 - (-7) = +2$$

So, the sequence is an **arithmetic sequence**. Next two terms are:



$$-7 + 2 = -5$$



$$-5 + 2 = -3$$



## ARITHMETIC SEQUENCES

### $n^{th}$ Term in a Sequence

In an arithmetic sequence, the  $n^{th}$  term in a sequence is:

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

Where,

$a_n = n^{th}$  term of the sequence

$a_1 = 1^{st}$  term of the sequence

$d$  = common difference

$n$  = term number

## ARITHMETIC SEQUENCES

**Problem 2: Find the 9<sup>th</sup> term in the sequence given below.**

**7, 11, 15, 19, ...**



## ARITHMETIC SEQUENCES

**Problem 2: Find the 9<sup>th</sup> term in the sequence given below.**

**7, 11, 15, 19, ...**

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

The common difference between terms is:

$$11 - 7 = +4$$

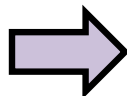
$$15 - 11 = +4$$

$$19 - 15 = +4$$

For  $n = 9$ ,

$$a_n = 7 + (9 - 1) \cdot 4$$

$$a_n = 7 + 32$$



$$a_n = 39$$