

# Arithmetic Sequences

A sequence where every successive term is found by **ADDING THE SAME NUMBER** is called **ARITHMETIC**.

**CHECK:** Pick any term, subtract the term before it. If the result is always the same no matter where in the sequence you begin, then the sequence is arithmetic.

## EXAMPLE 1

$$9, 4, -1, -6, \dots$$

The terms are separated by a **COMMON DIFFERENCE** of  $-5$

**EXAMPLE 2** – Find the general term of the following arithmetic sequence

$$2, 5, 8, 11, \dots \quad \text{the common difference is } \underline{\hspace{2cm}} \quad (\text{let's call it "d"})$$

Observe...

1 <sup>st</sup> term	2	$a$
2 <sup>nd</sup> term	$2 + 3$	$a + d$
3 <sup>rd</sup> term	$2 + 3 + 3$	$a + 2d$
4 <sup>th</sup> term	2	$a$
5 <sup>th</sup> term	2	$a$
6 <sup>th</sup> term	2	$a$

*Do you see the pattern?*

**CONCLUSION:** To find the general term of an arithmetic sequence

$$t_n =$$

where  $a$  is the \_\_\_\_\_

$n$  is the \_\_\_\_\_ of the \_\_\_\_\_

and  $d$  is the \_\_\_\_\_

## *Arithmetic Sequences* continued...

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**EXAMPLE 3** – Given the arithmetic sequence 8, 14, 20, 26, ...

a) Find the 20<sup>th</sup> term

b) Which term is 236?

**EXAMPLE 4** – The 3<sup>rd</sup> term of an arithmetic sequence is 8 while the 10<sup>th</sup> term of the same sequence is 4.5.  
Find the general term of the sequence.