

JAMB FREE MATHEMATICS TUTORIAL

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Before we proceed, please TAKE NOTE of the following:

- We strongly recommend you take your time and read this topic. You can read it again and again.
- Make sure you attempt all the exercises on this page.
- This page is also suitable for candidates writing other exams like WAEC/NECO/NABTEB etc.
- Please SHARE THIS PDF WITH YOUR FRIENDS.
- Have you heard of **Allschool VIP JAMB Online Lesson**? The Lesson is strictly based on JAMB Syllabus, which means our teachers focus on the exact things that will most likely come out in JAMB. **Joining the Lesson is one of the surest ways to score high in JAMB.** [Click here](#) to see how to join and other details or visit allschool.com.ng/jamb

Arithmetic Progression (AP)

We will be teaching you ARITHMETIC PROGRESS (AP). Since you can't talk about AP without starting mentioning SEQUENCE and SERIES, we will start by explaining those terms.

Now let's start the tutorial:

In a case where numbers are presented in a given array or in an orderly manner, such set of numbers is regarded as SEQUENCE.

EXAMPLE:

- 1,2,3,4...
- 2,4,6,8,10...
- -3,-2,-1...

Also, when the summation of a series is taken, the process is called SERIES

EXAMPLE:

- $1+2+3+4+\dots$
- $2+4+6+8+10+\dots$

ARITHMETIC PROGRESSION (AP)

AP is a form of sequence in which each term or preceding number is obtained by the addition of a certain number called the COMMON DIFFERENCE.

EXAMPLE 2:

Examine the pattern of the AP below

- 7,9,11,13,15...

SOLUTION

Term	Pattern
7	
9	$= 7 + 2$
11	$= 9 + 2$
13	$= 11 + 2$
15	$= 13 + 2$

Nth TERM OF AN AP

The nth term of an arithmetic progression is usually denoted as “a” and its common difference by “d” while the last term of an AP may be denoted as “n”

We can understand this better by using example 2 above and we can have that:

$$a, \quad a+d, \quad a+2d, \quad a+3d$$

$$1^{\text{st}} \quad 2^{\text{nd}} \quad 3^{\text{rd}} \quad 4^{\text{th}}$$

$$T_1 = 7$$

$$T_2 = 9 = 7 + (2 - 1) 2$$

$$= 7 + 2$$

$$= 9$$

$$T_3 = 11 = 7 + (3 - 1) 2$$

$$= 7 + 4$$

$$= 11$$

.

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$$T_n = 7 + (n - 1) 2$$

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

$$= 7 + 2n - 2$$

$$= 5 + 2n$$

In Summary, the general term of an AP is given as

- $T_n = a + (n - 1) d$

EXAMPLE 3

Find the 4th term of a AP whose first term is 2 and common difference is 0.5

SOLUTION:

$$T_n = a + (n - 1)d \dots \dots \dots (1)$$

Here, $n=4$, $a=2$, $d= 0.5$

Substituting (1) above we have

$$T_4 = 2 + (4 - 1) 0.5$$

$$= 2 + (3)0.5$$

$$= 2 + 1.5$$

$$= 3.5$$

SUM OF AN AP

The sum of an AP refers to the addition of all the terms mentioned or required in a given AP. It is usually denoted by S_n . The formulae is given by

$S_n = n/2 \{2a + (n - 1)d\}$(2) this is used when a, d, and n is given

$S_n = n/2 (a + l)$ (3) this is used when the first term and the last term is given.

EXAMPLE 4:

The first and last term of a linear sequence (A.P) are -12 and 40 respectively if the sum of the sequence is 196, find;

- The number of the terms
- The common difference
- The 12th term

Solution 4:

(1) P last and first term is given by;

$$S_n = n/2(a+L)$$

$$196 = n/2(-12+40)$$

$$196 \times 2 = n(28)$$

$$196 \times 2/28 = n$$

$$14 = n$$

(2) To find d, we apply the general sum formula for AP

$$S_n = n/2\{2a + (n - 1) d\}$$

$$S_{14} \rightarrow 196 = 14/2 \{ 2(-12) + (14 - 1)d\}$$

$$196 = 7(-24 + 13d)$$

$$196/7 = -24 + 13d$$

$$28 + 24 = 13d$$

$$52/13 = d$$

$$4 = d$$

(3) Find the 12th term

$$T_n = a + (n-1)d$$

$$T_{12} = -12 + (12-1)4$$

$$= -12 + (11)4$$

$$= -12 + 44$$

$$T_{12} = 32$$

EXERCISES ON AP

- If -8, m, n, 19 are in AP. Find (m,n)
(a) 1, (b) 10 (c) 3, 13 (d) 4, 16
- The 6th term of an AP is 20 and the 11th term is -5. Find the sum of the first three terms
(a) 45 (b) 85 (c) 120 (d) 150
- Find the nth term of sequence 4, 10, 16, ...
a. $2(3n - 1)$ b. $2(2 + 3n-1)$ c. $2n + 2$ d. $2(3n + 2)$

ANSWERS TO AP: 1. **A(1,10)** 2. **C(120)** 3. **A (2(3n -1))**

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