UDAAN

2025

Arithmetic Progression

Mathematics | Lecture – 01

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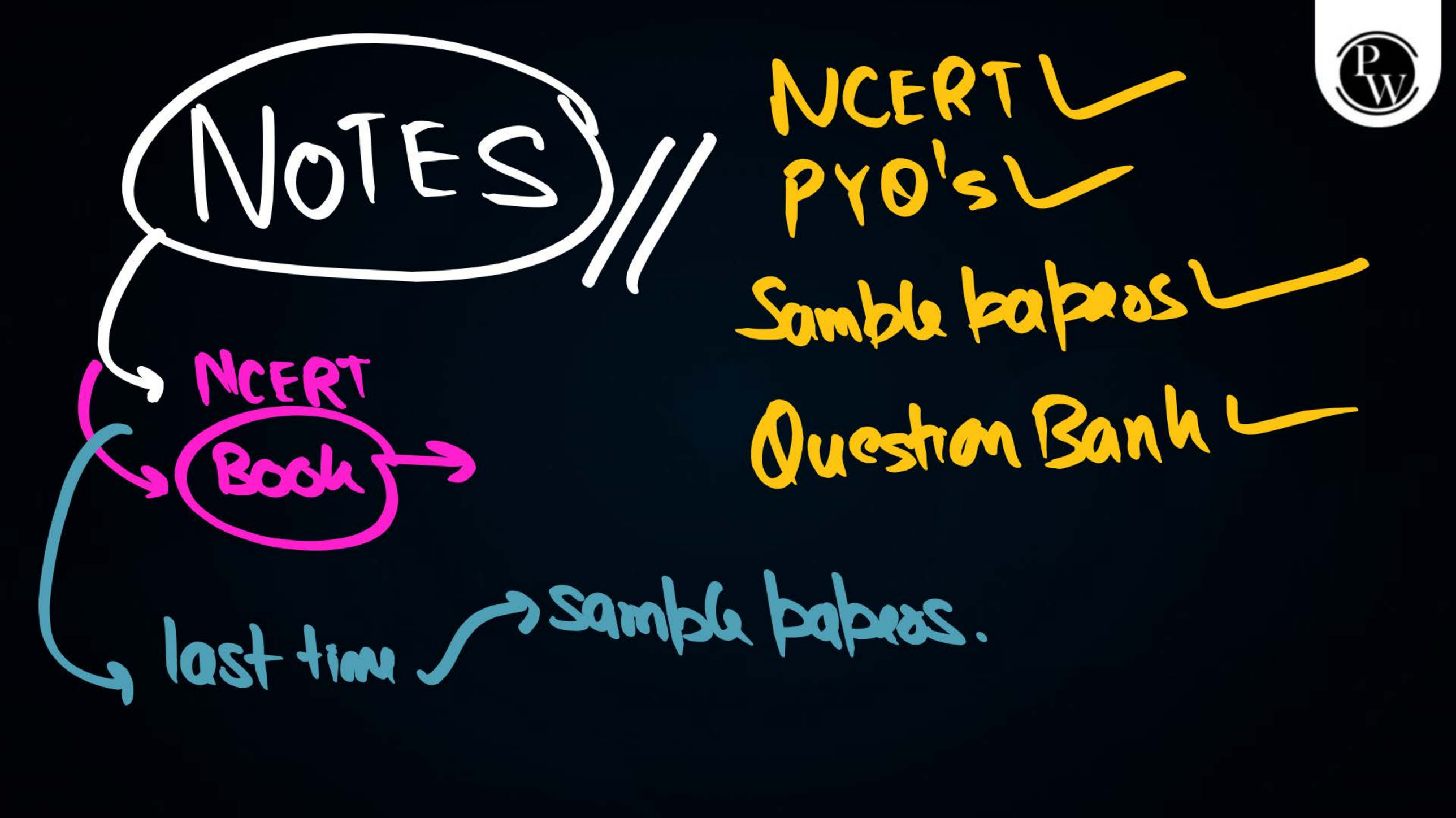
Topics

to be covered

2. Meaning of Sequence
3. What is Arithmetic Progression?
4. General Term of an A.P.


WORK HARD
DREAM BIG
NEVER GIVE UP !!


NOTES
NCERT
Book
last time
sample papers.
NCERT
PYO's
Sample papers
Question Bank

Topic : What is a sequence

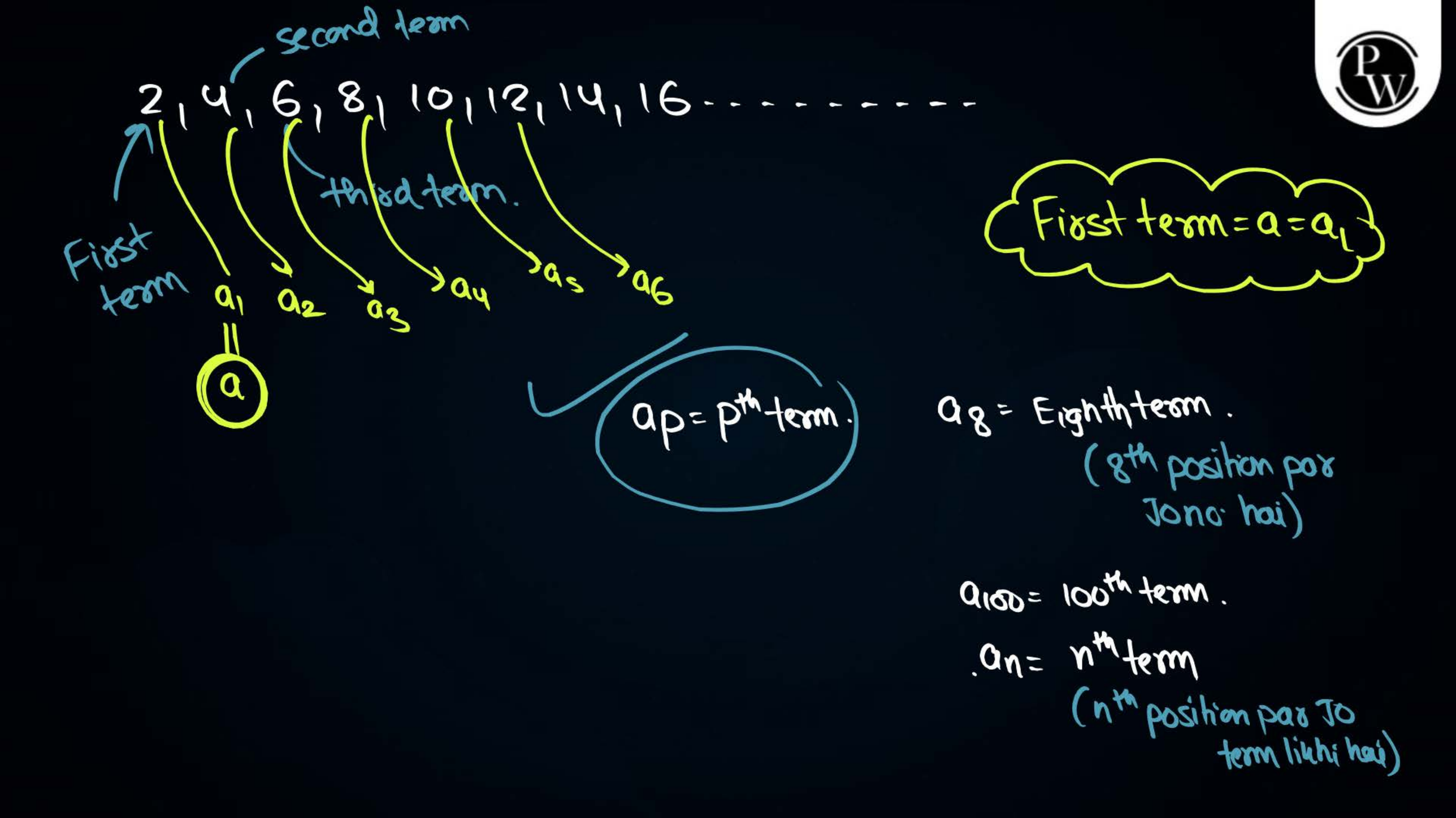
A sequence is an arrangement of numbers in a definite order according to some rule.

3, 6, 9, 12, 15, 18, 21 . . . . . .

7, 11, 15, 19, 23, 27, 31, 35 .

1, 4, 9, 16, 25, 36, 49, 64 . . . → Squares of Natural nos.

1, 8, 27, 64, 125, ... → Natural nos ka Cube.


second term
2, 4, 6, 8, 10, 12, 14, 16 - - - - - - - - - -
First term
third term.
a_1 a_2 a_3 a_4 a_5 a_6
a
First term = a = a_1
a_p = p^{th} term.
a_8 = Eighth term.
(8^{th} position par Jono hai)
a_{100} = 100^{th} term.
a_n = n^{th} term
(n^{th} position par JO term likhi hai)

1, 4, 9, 16, 25, 36, 49, 64, 81, 100 . . . . . .

$a_n = n^2$

n^{th} term.

n^{th} term aapko koi bhi term de sakta hai.

General term.

a_{12} = 12^{th} term.
(12th position par jo term likhi hain)

$2, 4, 6, 8, 10, 12, 14, 16 \cdots\cdots$

$a_n = 2n$

$a_{500} = 2(500) = 1000$

$a_{101} = 2(101) = 202$

$1, 8, 27, 64, 125, 216 \cdots$

$a_n = n^3$

Topic : Questions on Sequence

#Q. Write the first three terms in each of the sequence defined by the following:

(i) $a_n = 3n + 2$

$a_n = 3n+2$

$a_1 = 3(1)+2 = 5$

$a_2 = 3(2)+2 = 8$

$a_3 = 3(3)+2 = 11$

5, 8, 11, 14, 17, 20, 23 ……

(ii) $a_n = n^2 + 1$

$a_1 = (1)^2+1 = 2$

$a_2 = (2)^2+1 = 5$

$a_3 = (3)^2+1 = 10$

$a_4 = (4)^2+1 = 17$

2, 5, 10, 17, 26, 37 ……

+3 +5 +7 +9 +11

Topic : Questions on Sequence

#Q. Write the first five terms of the sequence defined by $a_n = (-1)^{n-1} \cdot 2^n$.

$a_n = (-1)^{n-1} \cdot 2^n$

$a_1 = (-1)^{1-1} \cdot 2^1$

$a_1 = (-1)^0 \cdot 2$

$a_1 = 1 \cdot 2$

$\boxed{a_1 = 2}$

$a_2 = (-1)^{2-1} \cdot 2^2$

$a_2 = (-1)^1 \cdot 4$

$a_2 = -1 \cdot 4$

$\boxed{a_2 = -4}$

$a_3 = (-1)^{3-1} \cdot 2^3$

$a_3 = (-1)^2 \cdot 8$

$a_3 = 1 \cdot 8$

$\boxed{a_3 = 8}$

$a_4 = (-1)^{4-1} \cdot 2^4$

$a_4 = (-1)^3 \cdot 16$

$a_4 = -1 \cdot 16$

$\boxed{a_4 = -16}$

$\boxed{a_5 = 32}$

Topic : Questions on Sequence

#Q. What is 18^{th} term of the sequence defined by $a_n = \frac{n(n-3)}{n+4}$.

$$a_{18} = \frac{18(18-3)}{18+4}$$

$$a_{18} = \frac{\cancel{18}^{9} \cdot 15}{\cancel{22}_{11}}$$

$$a_{18} = \frac{135}{11}$$

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, ...

↳ Sequence hai, (poimenoska)

Topic : Progression

A progression is a special type of sequence for which it is possible to obtain a formula for the n^{th} term. The Arithmetic Progression is the most commonly used sequence in maths with easy to understand formulas.

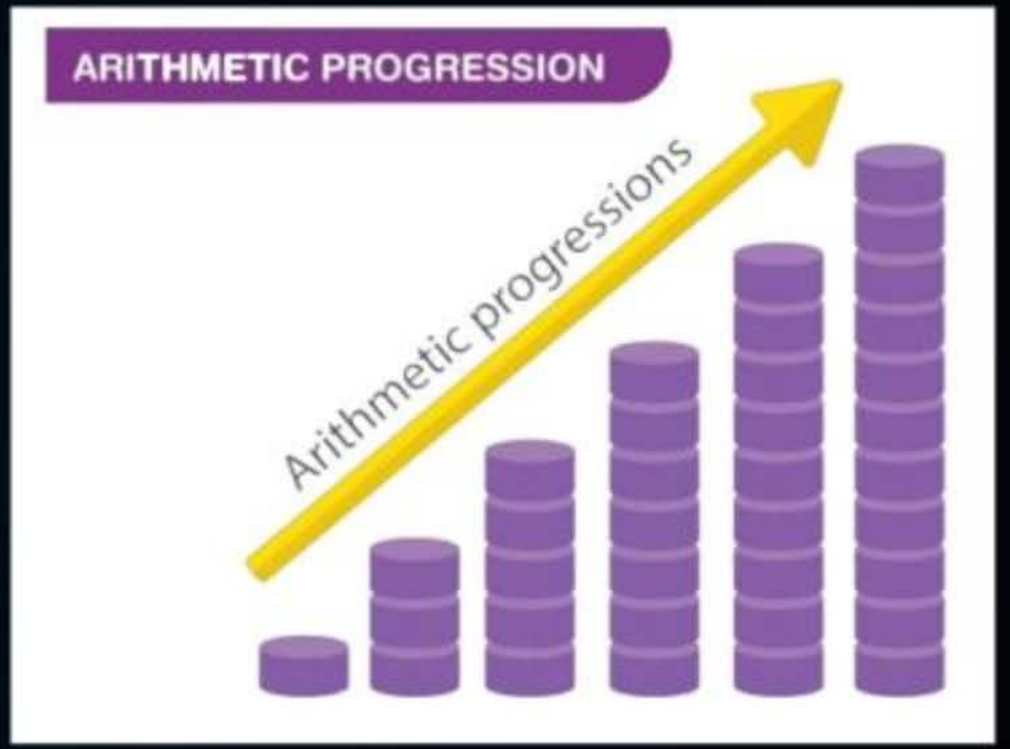
My math teacher trying to explain how to solve the math problem.

me

Sequence

Topic : Arithmetic Progression

An **Arithmetic Progression (AP)** is a sequence of numbers where the differences between every two consecutive terms are the same. In this progression, each term, except the first term, is obtained by adding a fixed number to its previous term. This fixed number is known as the common difference and is denoted by 'd'. The first term of an arithmetic progression is usually denoted by 'a' or 'a_1'.



8, 13, 18, 23, 28, 33, 38, 43, 48 . . . . . .

+5 +5 +5 +5 +5 +5 d=5

First term = a (a_1), Common difference = d

$a, a+2, a+2+2, a+2+2+2 \ldots\ldots$

a_1 a_2 a_3 a_4

$a_{100} = a + 99d$.

$a_{201} = a + 200d$

$a_n = a + (n-1)d$.

$a, a+d, a+d+d, a+d+d+d, a+d+d+d+d; \ldots\ldots\ldots$

$a, a+d, a+2d, a+3d, a+4d, a+5d, a+6d, a+7d \ldots\ldots\ldots$

$a+0d, a+1d, a+2d, a+3d, a+4d \ldots\ldots\ldots$

a_1 a_2 a_3 a_4 a_5

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

n^{th} term

general term.

Topic : Types of A.P.

Finite AP: An AP containing a finite number of terms is called finite AP. A finite AP has a last term.

For example: 3, 5, 7, 9, 11, 13, 15, 17, 19, 21

Infinite AP: An AP which does not have a finite number of terms is called infinite AP. Such APs do not have a last term.

For example: 5, 10, 15, 20, 25, 30, 35, 40, 45...

Topic : Arithmetic Progression

#Q. Show that the sequence defined by $a_n = 5n - 7$ is an A.P, find its common difference.

$a_n = 5n - 7$

$a_1 = 5(1) - 7 = -2$

$a_2 = 5(2) - 7 = 3$

$a_3 = 5(3) - 7 = 8$

$a_4 = 5(4) - 7 = 13$

$a_1, a_2, a_3, a_4 \ldots\ldots\ldots$

$-2, 3, 8, 13 \ldots\ldots\ldots$

$d = 5$

Since there is a common difference between two consecutive terms, so this sequence is an A.P.

Topic : Arithmetic Progression

#Q. Show that the sequence defined by $a_n = 3n^2 - 5$ is not an A.P.

$a_n = 3n^2 - 5$

$a_1 = 3(1)^2 - 5 = -2$

$a_2 = 3(2)^2 - 5 = 7$

$a_3 = 3(3)^2 - 5 = 22$

$a_1, a_2, a_3 \dots\dots$

$-2, 7, 22 \dots\dots$

$a_2 - a_1 = 7 - (-2)$

$= 9$

$a_3 - a_2 = 22 - 7$

$= 15$

Since $a_2 - a_1 \neq a_3 - a_2$

$\therefore$ it is not an A.P.

Topic : General Term of an A.P.

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

My **girlfriend** said she needs some **Time** and **Distance**

Is **she** Calculating **Velocity**??

Topic : Arithmetic Progression

#Q. The general term of a sequence is given by $a_n = -4n + 15$. Is the sequence an A.P.? Is so, find its 15^{th} term and the common difference.

$a_n = -4n+15$

$a_1 = -4(1)+15 = 11$

$a_2 = -4(2)+15 = 7$

$a_3 = -4(3)+15 = 3$

$a_4 = -4(4)+15 = -1$

$a_1, a_2, a_3, a_4 \dots\dots$

$11, 7, 3, -1 \dots\dots$

$= a_2 - a_1 \quad = a_3 - a_2 \quad = a_4 - a_3$

$= 7-11 \quad = 3-7 \quad = -1-3$

$= -4 \quad = -4 \quad = -4$

Since, $a_2 - a_1 = a_3 - a_2 = a_4 - a_3$

$\therefore$ this is an A.P.

$d = -4$

$a_{15} = -4(15)+15$

$= -60+15$

$a_{15} = -45$

Topic : Arithmetic Progression

#Q. Write an A.P. whose first term is 10 and common difference is 3.

$a_1, a_2, a_3, a_4 \ldots\ldots$

$a, a+d, a+2d, a+3d, a+4d \ldots\ldots$

$a = 10, d = 3$

10, 13, 16, 19.....

Topic : Arithmetic Progression

#Q. Write the arithmetic progression when first term a and common difference d are as follows: [NCERT]

(i) a = 4, d = −3

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

$4, 4+(-3), 4+2(-3), 4+3(-3) \ldots$

$4, 1, -2, -5 \ldots\ldots\ldots$

(ii) a = −1, d = 1/2

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

$-1, -1+\left(\frac{1}{2}\right), -1+2\left(\frac{1}{2}\right), -1+3\left(\frac{1}{2}\right) \ldots$

$-1, -\frac{1}{2}, 0, \frac{1}{2} \ldots\ldots\ldots$

Topic : Arithmetic Progression

#Q. Find the 12^{th}, 24^{th} and n^{th} term of the A.P. given by 9, 13, 17, 21, 25, ...

a_{12} a_{24} a_n

$a = 9, d = 4$

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

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

$a_n = 9 + (n-1)4$

$= 9 + 4n - 4$

$a_n = 4n + 5$

$a_{12} = 9 + (12-1)4$

$a_{12} = 9 + 44$

$a_{12} = 53$

$a_{24} = a + 23d$

$= 9 + 23(4)$

$a_{24} = 101$

Topic : Arithmetic Progression

#Q. The 10^{th} term of the AP: 5, 8, 11, 14, ... is

A 32

B 35

C 38

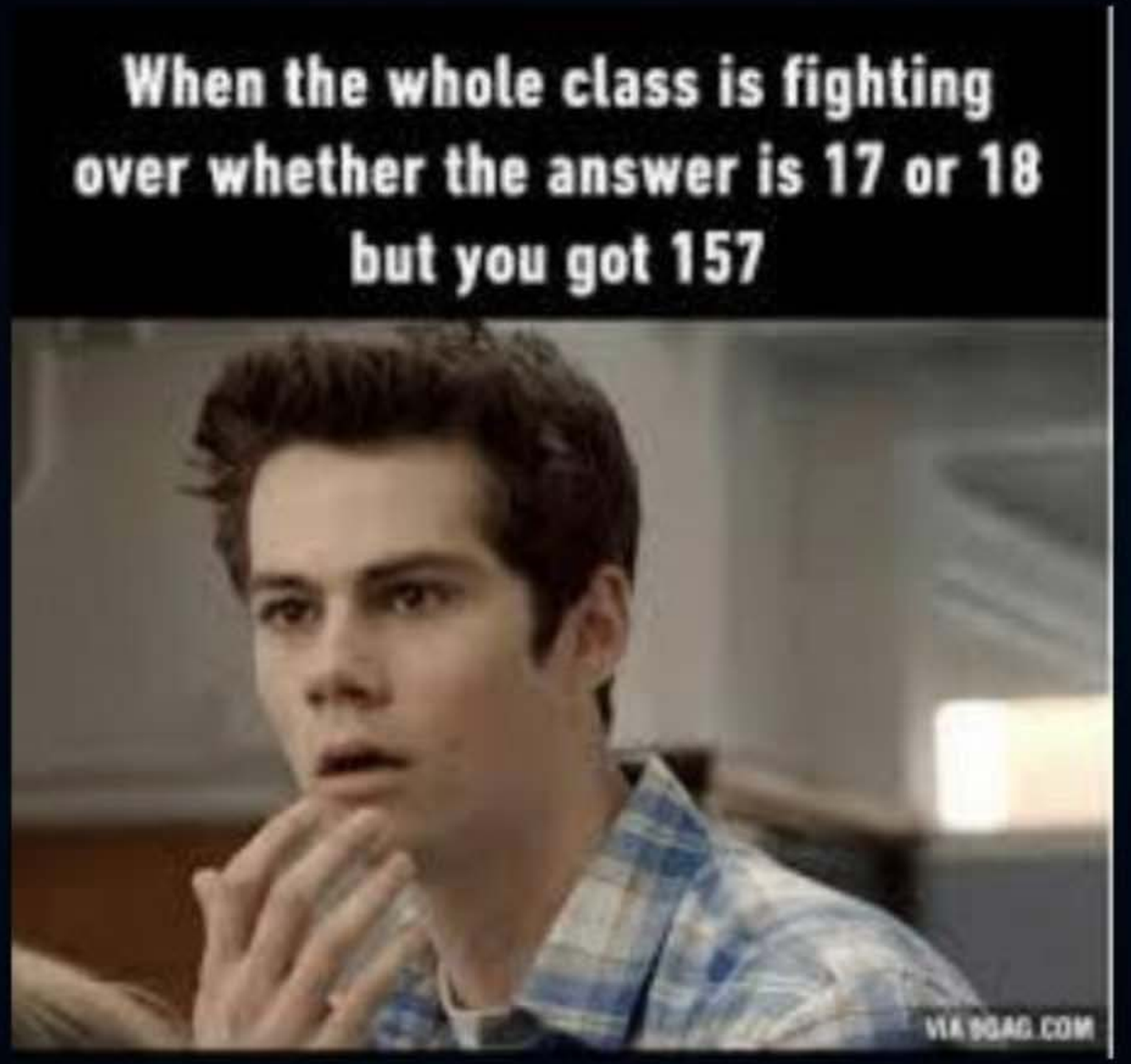
D 185

$a = 5$
$d = 3$

$a_{10} = a + 9d$

$= 5 + 9(3)$

$= \boxed{32}$


When the whole class is fighting
over whether the answer is 17 or 18
but you got 157
VIA 9GAG.COM

Topic : Arithmetic Progression

#Q. In an AP if $a = -7.2$, $d = 3.6$, $a_n = 7.2$, then n is

A 1

B 3

C 4

D 5

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

$7.2 = -7.2 + (n-1)3.6$

$7.2 + 7.2 = (n-1)3.6$

$14.4 = (n-1)3.6$

$\frac{144}{36} = n-1$

$4 = n-1$

$5 = n$

Topic : Arithmetic Progression

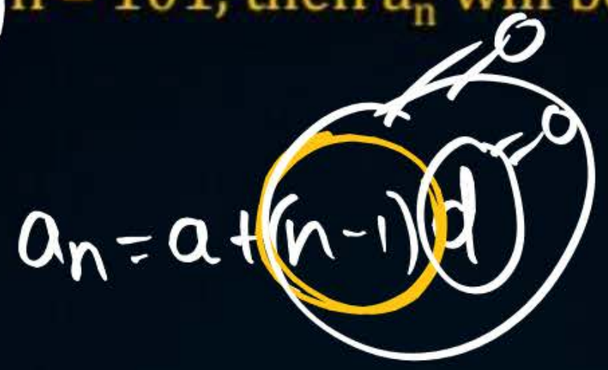
#Q. In an AP, if a = 3.5, d = 0, n = 101, then a_n will be

A 0

B 3.5

C 103.5

D 104.5



$a_n = a$

$a_n = 3.5$

Homework

DPP

THANK YOU