Notes of Online class

Session 5

All number sequences are generated from counting numbers.
Consider the sequence $5, 7, 9, 11 \cdots$.
$5 = 2 \times 1 + 3$
$7 = 2 \times 2 + 3$
$9 = 2 \times 3 + 3$
$11 = 2 \times +3$
.This sequence is written by multiplying the numbers $1, 2, 3 \cdots$ by 2 and adding 3.
n th term is $2 \times n + 3$ആണ്. n th term is called algebraic form of the sequence.
The algebraic form of an arithmetic sequence can be written easily . On adding $n-1$ common differences to the first term we get n th term.
n th term $= f + (n-1)d$.
This can be written as $f + nd - d$ or $nd + (f - d)$.
n th term $x_n = dn + (f - d)$

Example

1) Common difference of an arithmetic sequence is 4, first term 11

   a) Write the algebraic form of the sequence .

   b) What is the 10 th term of the sequence .

   c) What is the 20 th term of the sequence ?

Answer

a) $x_n = dn + (f - d) = 4n + (11 - 4) = 4n + 7$

b) $x_{10} = 4 \times 10 + 7 = 47$

c) $x_{20} = 4 \times 20 + 7 = 87$

2) Consider the arithmetic sequence with first term 7 and common difference 4. [2]

a) Write the sequence .

b) Write the algebraic form of the sequence .

c) How can we understand common difference in the algebraic form?

d) What about the first term in the algebraic form?

Answer

a) $7, 11, 15, 19, 23 \cdots$

b) $x_n = dn + (f - d) = 4n + (7 - 4) = 4n + 3$

c) In the algebraic form $an + b$ the coefficent of n , that is a is the common difference .

d) First term is $a + b = 7$

3) 12 th term of an arithmetic sequence is 28 and its 16 th term 36.

a) What is the common difference ?

b) What is the first term of the sequence ?

c) Write the algebraic form of the sequence .

d) What is the 30 th term of the sequence?

Answer

a) $4d = 36 - 28 = 8, d = 2$

b) $f = x_{12} - 11d = 28 - 11 \times 2 = 28 - 22 = 6$

c) $x_n = dn + (f - d) = 2n + (6 - 2) = 2n + 4$

d) $x_{30} = 2 \times 30 + 4 = 64$

4) First term of an arithmetic sequencs is 7 and its 10 th term is 34.

a) What is the common difference ?

b) Write the sequence ?

c) Write the algebraic form of the sequence

d) Write the 50 th term of the sequence .

Answer

a) $9d = 34 - 7 = 27, d = \frac{27}{9} = 3$

b) $7, 10, 13, 16 \cdots$

c) $x_n = dn + (f - d) = 3n + (7 - 3) = 3n + 4$

d) $x_{50} = 3 \times 50 + 4 = 154$

5) Algebraic form of an arithmetic sequence is $7n + 4$

a) What is the common difference ?

b) What is the first term ?

c) What is the difference between 10 th term and 18 th term

d) Can the difference between two terms 123?

Answer

a) $d = 7$

b) $f = 7 + 4 = 11$

c) $x_{18} - x_{10} = 8d = 8 \times 7 = 56$

d) Divide 123 by 7 . 123 is not divisible by 7 . So 123 cannot be the difference .

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[1]Compiler : John P.A, sjpuzzles@gmail.com , jpavpz@gmail.com | 9847307721