Notes of Online class

Session 6

Let us consider an arithmetic sequence of its terms and common difference counting numbers.
Example $1, 5, 9, 13, 17 \cdots$
The common difference of this sequence is 4. When the terms are divided by the common difference we get the same remainder.
In this example the remainder is 1 always .
Note that all terms of this sequence are counting numbers and the common differ ence is also a counting number.
■ When the terms of an arithmetic sequence are divided by its common difference we get the same remainder , provided the terms and common difference are count ing numbers.

Examples

1) Consider the arithmetic sequence $7, 10, 13, 16, 19 \cdots$

   a) What is the common difference?

   b) What is the remainder when the terms are divided by its common differ ence?

   c) What is the first three digit term of this sequence?

   d) What is the first four digit term of this sequence?

Answer

a) $d = 10 - 7 = 3$

b) 1

c) 100
On dividing 100 by 3 we get the remainder 1 . So we can say 100 is the first three digit term of this sequence

d) 1000
On dividing 1000 by 3 we get the remainder 1 . So we can say 1000 is the first four digit term of this sequence

2) Algebraic form of an arithmetic sequence is $3n + 4$

   a) Write the sequence

b) What is the remainder when the terms are divided by the common difference ?

c) What is the first three digit term of this sequence ?

d) What is the first four digit term of this sequence?

Answer

a) $3 \times 1 + 4, 3 \times 2 + 4, 3 \times 3 + 4 \cdots$

b) 1

c) 100
On dividing 100 by 3 we get the remainder 1 . So we can say 100 is the first three digit term of this sequence

d) 1000
On dividing 1000 by 3 we get the remainder 1 . So we can say 1000 is the first four digit term of this sequence

Note that quesions given above are same)

3) Multiply $1, 2, 3 \cdots$ by 7 and add 3 .

a) Write the sequence

b) What is the remainder when the terms are divided by the common difference ?

c) What is the first three digit term of this sequence ?

d) What is the first four digit term of this sequence?

Answer

a) $7 \times 1 + 3, 7 \times 2 + 3, 7 \times 3 + 3 \cdots$

b) Common difference is 7. When the terms are divided by 7 we get the remainder 3

c) 101 is the first three digit term. When 101 is divided by 7 we get the remainder 3.

d) 1001 is the first four digit term .On dividing 1000 by 7 we get 994 quotient. $994 + 3 = 997$ is the term just below 1000. So we can say $997 + 7 = 1004$ is the first four digit number.

4) Tenth term of an arithmetic sequence is 34 and 20 th term is 64.

a) What is the common difference?

b) What is the first term of this sequence? 3

c) Write the algebraic form of this sequence ?

d) Write the sequence numerically

e) What is the remainder when the terms are divided by its common difference ?

f) Is 500 a term of this sequence?

Answer

a) $10d = 64 - 34 = 30, d = 3$

b) $f = x_{10} - 9d = 34 - 9 \times 3 = 34 - 27 = 7$

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

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

e) 1

f) No. When we divide 500 by 3 we get 2 as the remainder. The remainder is not 1. So we can say 500 is not a term of this sequence.

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