ONLINE MATHS CLASS - X - 06 (29 / 06 /2021)

1. ARITHMETIC SEQUENCE - CLASS 4

What did we study in the last class ?

⭐ A sequence got by starting with any number and adding a fixed number repeatedly is called an *arithmetic sequence* .

⭐ An arithmetic sequence is a sequence in which we get the same number on subtracting from any term , the term immediately preceding it .

⭐ In an arithmetic sequence , we get the same number on subtracting from any term , the term immediately preceding it . This constant difference is called the *common difference* of an arithmetic sequence .

Activity 1

First term of an arithmetic sequence is 30 and its second term is 50 . Find its common difference and third term ?

By adding common difference to the first term we get the second term of an arithmetic sequence .

Common difference = 50 – 30 = 20

Third term = Second term + common difference = 50 + 20 = 70

NOTE :

By adding common difference to the first term , we get the second term of an arithmetic sequence . Adding common difference once more we get the third term .

That is , by adding two times the common difference to the first term , we get the third term .

(If we continue like this ,

By adding three times the common difference to the first term , we get the fourth term

By adding four times the common difference to the first term , we get the fifth term .

By adding five times the common difference to the first term , we get the sixth term .

By adding six times the common difference to the first term , we get the seventh term .

By adding seven times the common difference to the first term , we get the eighth term

By adding eight times the common difference to the first term , we get the ninth term .

By adding nine times the common difference to the first term , we get the tenth term .

Activity 2

First term of an arithmetic sequence is 30 and its third term is 50 . Find its common difference and second term ?

By adding two times the common difference to the first term , we get the third term of an arithmetic sequence .

That is , by adding two times the common difference to 30 , we get 50 here .

That is , two times the common difference = 50 – 30 = 20

$$\text{Common difference} = \frac{20}{2} = 10$$

(Here 2 is the position difference of the terms . That is , term difference is two times the common difference or position difference x common difference .)

Second term = first term + common difference = 30 + 10 = 40

Activity 3

Third term of an arithmetic sequence is 30 and its seventh term is 50 . Find its common difference and write the sequence ?

(By adding common difference to the third term , we get the fourth term of an arithmetic sequence .

By adding **two times the common difference to the third term , we get the fifth term**

By adding three times the common difference to the third term , we get the sixth term

By adding four times the common difference to the third term , we get the seventh term)

Here , by adding four times the common difference to 30 , we get   50 .

That is , four times the common difference   = 50 – 30 = 20

$$\text{Common difference} \ = \ \frac{20}{4} \ = 5$$

(Here 4 is the position difference of the terms . That is , **term difference is 4 times the common difference or position difference x common difference .   )**

By adding two times the common difference to the first term , we get the third term .

That is , if we subtract two times the common difference from third term , we get the first term .

First term   = Third term - 2 x common difference

= 30 – 2 x 5 = 30 – 10 = 20

Sequence = 20 , 25 , 30 , 35 , 40 , . . .

Activity 4

Tenth term of an arithmetic sequence is 30 and its twentieth term is 50 .

Find its common difference and write the sequence   ?

(By adding adding common difference to the 10th term , we get the 11th term of an arithmetic sequence .

By adding adding two times the common difference to the 10th term , we get the 12th term

By adding adding three times the common difference to the 10th term , we get the 13th term

By adding adding four times the common difference to the 10th term , we get the 14th term

If we continue like this ,

By adding adding 10 times the common difference to the 10th term , we get the 20th term)

Here , by adding 10 times the common difference to 30 , we get 70 .

That is , 10 times the common difference = 70 – 30 = 40

$$\text{Common difference} = \frac{40}{10} = 4$$

(Here 10 is the position difference of the terms . That is , **term difference is 10 times the common difference or position difference x common difference**)

By adding 9 times the common difference to the first term , we get the 10th term .

That is , if we subtract 9 times the common difference from 10th term , we get the first term .

First term = 10th term - 9 x common differences

= 30 – 9 x 4 = 30 – 36 = - 6

Sequence = - 6 , - 2 , 2 , 6 , 10 , . . .

Finding

For any two terms of an arithmetic sequence ,

term difference = position difference x common difference

Conclusion

The difference between any two terms of an arithmetic sequence is the product of the difference of positions and the common difference

NOTE :

We can state the above finding in another way as follows

In an arithmetic sequence , term difference is proportional to position difference and the constant of proportionality is the common difference .

$$Common \ difference \ = \frac{Term \ difference}{Position \ difference}$$

Activity 5

Is 100 a term of the arithmetic sequence 4 , 7 , 10 , . . . ? Give reasons .

Answer

Common difference = 7 – 4 = 3

Term difference   = 100 – 4 = 96 = 32 x 3 = 32 x common difference

Here term difference is a multiple of the common difference . So 100 is a term of this sequence .

More Activity

(1) In each of the arithmetic sequences below, some terms are missing and their positions are marked with ◯. Find them.

i) 24, 42, ◯, ◯, ...   ii) ◯, 24, 42 , ◯, ...

iii) ◯, ◯, 24, 42, ...   iv) 24, ◯, 42, ◯, ...

v) ◯, 24, ◯, 42, ...   vi) 24, ◯, ◯, 42, ...

(2) The terms in two positions of some arithmetic sequences are given below. Write the first five terms of each:

i) 3rd term 34   ii) 3rd term 43   iii) 3rd term 2
     6th term 67 6th term 76 5th term 3

iv) 4th term 2   v) 2nd term 5
     7th term 3 5th term 2

(3) The 5th term of an arithmetic sequence is 38 and the 9th term is 66. What is its 25th term?

(4) Is 101 a term of the arithmetic sequence 13, 24, 35, ...? What about 1001?

(5) How many three-digit numbers are there, which leave a remainder 3 on division by 7?

SARATH A S , GHS ANCHACHAVADI , MALAPPURAM