

## 1. Arithmetic Sequence - Class 4

To view class 

### Position and term

#### Activity 1

**Can you make an arithmetic sequence with 30 and 50 as the first and second terms?**

**Ans)** First term ( $x_1$ ) = 30 , Second term ( $x_2$ ) = 50

$$\begin{aligned}\text{Common difference (d)} &= \text{Second term} - \text{First term} \\ &= 50 - 30 \\ &= 20\end{aligned}$$

$$\begin{aligned}\text{Third term} &= \text{Second term} + \text{Common difference} \\ &= 50 + 20 = 70\end{aligned}$$

$\therefore$  Arithmetic sequence is 30, 50, 70, .....

#### Note:

Second term = First term + Common difference

Third term = First term + 2 × Common difference

Fourth term = First term + 3 × Common difference

Fifth term = First term + 4 × Common difference

Sixth term = First term + 5 × Common difference

⋮

$$x_2 = x_1 + d$$

$$x_3 = x_1 + 2d$$

$$x_4 = x_1 + 3d$$

$$x_5 = x_1 + 4d$$

$$x_6 = x_1 + 5d$$

⋮

#### Activity 2

**Can you make an arithmetic sequence with 30 and 50 as the first and third terms?**

**Ans)** 30, ----- , 50

First term = 30 , Third term = 50

Third term = First term + 2 × Common difference

Third term - First term = 2 × Common difference

$$50 - 30 = 2 \times d$$

$$20 = 2 \times d$$

$$d = \frac{20}{2}$$

$$= 10$$

∴ Arithmetic sequence is 30, 40, 50, 60, .....

### **Activity 3**

**Can you make an arithmetic sequence with 30 and 50 as the third and seventh terms?**

**Ans)** ----, ----, 30, ----, ----, ----, 50,

Seventh term = Third term + 4 × common difference

Seventh term - Third term = 4 × common difference

$$50 - 30 = 4 \times d$$

$$20 = 4 \times d$$

$$d = \frac{20}{4} = 5$$

First term = Third term - 2 × common difference

$$= 30 - 2 \times 5$$

$$= 30 - 10$$

$$= 20$$

∴ Arithmetic sequence is 20, 25, 30, 35, 40, 45, 50, .....

### **Activity 4**

**Can you make an arithmetic sequence with 30 and 70 as the 10<sup>th</sup> and 20<sup>th</sup> terms?**

**Ans)**

20<sup>th</sup> term = 10<sup>th</sup> term + 10 × common difference

20<sup>th</sup> term - 10<sup>th</sup> term = 10 × common difference



(20-10)



**Term difference = Position difference × common difference**

$$70 - 30 = 10 \times d$$

$$40 = 10 \times d$$

$$d = \frac{40}{10} = 4$$

$$\begin{aligned} \text{First term} &= 10^{\text{th}} \text{ term} - 9 \times \text{common difference} \\ &= 30 - 9 \times 4 = 30 - 36 = -6 \end{aligned}$$

∴ Arithmetic sequence is  $-6, -2, 2, 6, 10, \dots$

### Observations

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

We can put it like this also:

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

In any arithmetic sequence ,

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

$$\text{Term difference} = \text{Position difference} \times \text{Common difference}$$

**Term difference is a multiple of common difference**

To check whether a given number is a term of a given arithmetic sequence.

**Activity 5**

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

**Give reasons .**

**Ans)** Common difference =  $7 - 4 = 3$

Term difference =  $100 - 4 = 96$

$$\frac{96}{3} = 32$$

$$96 = 32 \times 3$$

Since 96 is a multiple of common difference 3, 100 is a term of this sequence.

**Note:**

When  $4 \div 3$ , remainder = 1

When  $7 \div 3$ , remainder = 1

When  $10 \div 3$ , remainder = 1

⋮

When  $100 \div 3$ , remainder = 1

Here we can see that **when the terms are divided by common difference remainder is the same .**

So we can say, 100 is a term of this sequence.

Considering an arithmetic sequence with terms and common difference as natural numbers , the terms of this sequence **leave same remainder when they are divided by its common difference**

**Assignment****T.B Page 21**

- (1) In each of the arithmetic sequences below, some terms are missing and their positions are marked with  $\bigcirc$ . Find them.
- i) 24, 42,  $\bigcirc$ ,  $\bigcirc$ , ...      ii)  $\bigcirc$ , 24, 42,  $\bigcirc$ , ...
- iii)  $\bigcirc$ ,  $\bigcirc$ , 24, 42, ...      iv) 24,  $\bigcirc$ , 42,  $\bigcirc$ , ...
- v)  $\bigcirc$ , 24,  $\bigcirc$ , 42, ...      vi) 24,  $\bigcirc$ ,  $\bigcirc$ , 42, ...
- (2) The terms in two positions of some arithmetic sequences are given below. Write the first five terms of each:
- i) 3<sup>rd</sup> term 34      ii) 3<sup>rd</sup> term 43      iii) 3<sup>rd</sup> term 2  
6<sup>th</sup> term 67      6<sup>th</sup> term 76      5<sup>th</sup> term 3
- iv) 4<sup>th</sup> term 2      v) 2<sup>nd</sup> term 5  
7<sup>th</sup> term 3      5<sup>th</sup> term 2
- (3) The 5<sup>th</sup> term of an arithmetic sequence is 38 and the 9<sup>th</sup> term is 66. What is its 25<sup>th</sup> 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?

