

1) The general term of a sequence is given by $a_n = -4n + 15$. Is the sequence an AP?

$$a_n = -4n + 15$$

∴ Sequence = $-4(0) + 15, -4(1) + 15, -4(2) + 15, -4(3) + 15, \dots$
= 15, 11, 7, 3, ...

$$\text{Now, } a_2 - a_1 = 11 - 15 = -4$$

$$a_3 - a_2 = 7 - 11 = -4$$

∴ the difference between the consecutive terms of the sequence is constant.

∴ It is an AP.

2) The n th term of an AP is $6n + 11$. Find the common difference.

∴ The sequence = $6(0) + 11, 6(1) + 11, 6(2) + 11, 6(3) + 11, \dots$
= 11, 17, 23, 29

$$d = a_2 - a_1 = a_3 - a_2 = a_4 - a_3 = 17 - 11 = 23 - 17 = 29 - 23 = 6$$

∴ The common difference is 6.

3) If the n th term of the AP 9, 7, 5, ... is same as the n th term of the AP 15, 12, 9, ... find n .

$$n^{\text{th}} \text{ term of an AP} = a + (n-1)d$$

for 1st AP,

$$n^{\text{th}} \text{ term} = 9 + (n-1) \cdot 2$$

$$= 9 + 2n - 2 =$$

$$7 + 2n$$

for the 2nd AP:

$$n^{\text{th}} \text{ term} = a + (n-1)d$$

$$= 15 + (n-1) \cdot (-3) = 15 - 3n + 3 = 18 - 3n$$

A/O

$$7 + 2n = 18 - 3n$$

$$\Rightarrow -2n + 3m = 18 - 11$$

$$\Rightarrow n = 7$$

So the 7th term of AP 1 and AP 2 is equal.

4) If the 8th term of an A.P. is 31 and the 15th term is 16 more than the 11th term, find the A.P.

$$a_8 = a + 7d = 31$$

$$a_{11} = a + 10d = a_8 + 3d$$

$$a_{15} = a + 14d = a_8 + 2d + 16$$

General term of an A.P. = $a_n = a + (n-1)d$.

$$a_8 = 31 = a + 7d$$

$$a_{15} = a_{11} + 16$$

$$\Rightarrow a + 7d = 31 \text{ and } 4d = 16$$

$$\Rightarrow d = 16/4 = 4$$

Putting the value of d in $a + 7d = 31$,

$$a + 7(4) = 31$$

$$\Rightarrow a + 28 = 31$$

$$\Rightarrow a = 31 - 28 = 3$$

\therefore The A.P. is: 3, 7, 11, 15, ...

(5) Find the 10th term of the arithmetic progression 1, 3.5, 8.5.

$$a = 1, d = 3.5 - 1 = 2.5$$

$$\therefore a_{10} = 1 + (10-1)2.5$$

$$= 1 + 9(2.5)$$

$$= 1 + 22.5 = 23.5$$

6. Find the sum of the first 10 natural numbers.

The AP is 1, 2, 3, ..., 10.

$$S_{10} = \frac{10}{2} [2(1) + (10-1)1]$$

$$= 5 [2 + 9]$$

$$= 5 [11]$$

$$= 55.$$