Sequence and Series (A.P.)

Concept: If a sequence is in A.P., then its nth term will be a linear expression in n and thus the common difference (d) will be equal to the coefficient of n.

Problem 1: Let the nth term of an A.P. is $t_n = 4n - 3$, find the common difference d ?

Solution: as per theorem we know that if t_n is in linear expression then d will be the coefficient of n, so answer is 4.

Problem 2: Let the nth term of an A.P. is $t_n = 9n + 6$, find the common difference d ?

Solution: as per theorem we know that if t_n is in linear expression then d will be the coefficient of n, so answer is 9.

Concept: A sequence will be in A.P. if its sum of first n terms is in the form of An^2+Bn, (expressed as quadratic expression), where A and B are constants (pure number) and independent of n.In this case common difference will be equal to,

2 x coefficient of n^2 = 2.A = double of coefficient of n^2.

Problem 3: The sum of the first n terms of a particular sequence is in the form of $3n^2+2n$, find its common difference (d).

Solution: As per above discussion the sum of first n terms are expressed in quadratic form, so it will give us an A.P. whose common difference will be 6.(2 x coefficient of n^2)

Problem 4: The sum of the first n terms of a particular sequence is in the form of $6n^2 - 9n$, find its common difference (d) ?

Solution: As per above discussion the sum of first n terms are expressed in quadratic form, so it will give us an A.P. whose common difference will be 12.(2 x coefficient of n^2)

Problem 5: If $s_n = n^2 + 9n$ (sum of first n terms of a particular sequence) find its common difference (d) ?

Solution: As per above discussion the sum of first n terms are expressed in quadratic form, so it will give us an A.P. whose common difference will be 2.(2 x coefficient of n^2)

Problem 6: If $s_n = \sqrt{3}n^2 + n$ (sum of first n terms of a particular sequence) find its common difference (d) ?

Solution: As per above discussion the sum of first n terms are expressed in quadratic form, so it will give us an A.P. whose common difference will be $2\sqrt{3}$.(2 x coefficient of n^2)