



**SNS College of Technology(Autonomous)
Coimbatore-35
Academic Year 2023 – 2024 (Even)**



UNIT 1 QUANTITATIVE ABILITY III

T5: Progressions

Introduction

A sequence of numbers is called a geometric progression if the ratio of any two consecutive terms is always the same. In simple terms, it means that the next number in the series is calculated by multiplying a fixed number by the previous number in the series. This fixed number is called the common ratio. For example, 2,4,8,16 is a GP because the ratio of any two consecutive terms in the series (common difference) is the same ($4 / 2 = 8 / 4 = 16 / 8 = 2$).

n th term of a GP = $a r^{n-1}$

Geometric Mean = n th root of product of n terms in the GP

Sum of ' n ' terms of a GP ($r < 1$) = $[a (1 - r^n)] / [1 - r]$

Sum of ' n ' terms of a GP ($r > 1$) = $[a (r^n - 1)] / [r - 1]$

Sum of infinite terms of a GP ($r < 1$) = $(a) / (1 - r)$

Harmonic Progression (HP)

A sequence of numbers is called a harmonic progression if the reciprocal of the terms are in AP. In simple terms, a,b,c,d,e,f are in HP if $1/a, 1/b, 1/c, 1/d, 1/e, 1/f$ are in AP.

Harmonic Mean = $(2 a b) / (a + b)$

For two numbers, if A, G, and H are respectively the arithmetic, geometric and harmonic means, then

$$A \geq G \geq H$$

$A H = G^2$, i.e., A, G, H are in GP

Find the nth term for the AP: 11, 17, 23, 29, ...

Solution:

Here, $a = 11$, $d = 17 - 11 = 23 - 17 = 29 - 23 = 6$ We know that nth term of an AP is $a + (n - 1) d \Rightarrow$ nth term for the given AP $= 11 + (n - 1) 6 \Rightarrow$ nth term for the given AP $= 5 + 6 n$ We can verify the answer by putting values of 'n'. $\Rightarrow n = 1 \rightarrow$ First term $= 5 + 6 = 11 \Rightarrow n = 2 \rightarrow$ Second term $= 5 + 12 = 17 \Rightarrow n = 3 \rightarrow$ Third term $= 5 + 18 = 23$ and so on ...

Q2: Find the sum of the AP in the above question till the first 10 terms.

Solution :

From the above question, \Rightarrow nth term for the given AP $= 5 + 6 n \Rightarrow$ First term $= 5 + 6 = 11 \Rightarrow$ Tenth term $= 5 + 60 = 65 \Rightarrow$ Sum of 10 terms of the AP $= 0.5 n$ (first term + last term) $= 0.5 \times 10 (11 + 65) \Rightarrow$ Sum of 10 terms of the AP $= 5 \times 76 = 380$

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