ARITHMETIC PROGRESSION AND SUM TO INFINITY

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CONTRIBUTION: I'll be contributing a c++ code for the calculation of arithmetic progression and sum to infinity. Firstly, Arithmetic progression is a sequence of numbers in which each differs from the preceding one by a constant quantity. While the sum to infinity of a sequence is the sum of the infinite number of terms in a sequence.

Formula for the nth term of an AP:
$T(n) = a + (n - 1)d$
Sample: The first term of an AP is 2 and the common difference is 3. Calculate the 4th term
Solution
$T(n) = a + (n - 1)d$
$T(4) = 2 + (4 - 1)3$
$T(4) = 2 + 3(3) = 2 + 9$
$T(4) = 11$

Formula for sum of the nth term of an AP:
$S(n) = n/2[2a + (n - 1)d]$
Sample: The first term of an AP is 2 and the common difference is 3. Find the sum of the first 4 terms of the AP.
Solution
$S(n) = n/2[2a + (n - 1)d]$
$S(4) = 4/2[2(2) + (4 - 1)3]$
$S(4) = 2[4 + 3(3)] = 2(4 + 9) = 2(13)$
$S(4) = 26$

Formula for Sum to Infinity when r > 1:
$S\sim = a / (r - 1)$
Sample: Find the sum to infinity if the first term is 9 and the common ratio is 4.
Solution
$S\sim = a / (r - 1)$
$S\sim = 9 / (4 - 1)$
$S\sim = 9 / 3$
$S\sim = 3$

Formula for Sum to Infinity when r < 1:
$S\sim = a / (1 - r)$
Sample: Find the sum to infinity if the first term is 8 and the common ratio is 0.5.
Solution
$S\sim = a / (1 - r)$

$S\sim = 8 / (1 - 0.5)$
$S\sim = 8 / 0.5$
$S\sim = 16$