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7.5 Arithmetic Series

Goals:
- Define series and describe how it is different than a sequence
- Investigate the development of the arithmetic series formula
- Calculate the sum of the terms of an arithmetic sequence

A _____ is an expression in which the terms of a sequence are added together; it is created from the corresponding sequence by replacing the commas separating the terms of the sequence with plus signs

An _____ *series* is a series whose corresponding sequence is an arithmetic sequence. Below is a general example:

$S_n = a + (a+d) + (a+2d) + (a+3d) + ... + (a+(n-1)d)$

The _____ of a series is the result obtained by evaluating the expression defining the series. A formula can be determined using Gauss' Method.

$$\begin{array}{lcccccc} S_n & = & a & +(a+d) & +(a+2d)+... & +(a+(n-1)d) \\ +S_n & = & (a+(n-1)d) & +(a+(n-2)d) & +(a+(n-3)d)+... & +a \end{array}$$

Therefore the formula for an arithmetic series is:

$S_n =$ or $S_n =$

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Examples: Determine the sum of each series:

a) S_{10} of a series where a = -4, d= -3

b) S_{20} for - 11m - 2m + 7m + …

c) 3 + 8 + 13 + … + 58