1.2 Arithmetic Series

An arithmetic series is a sum of terms that form an arithmetic sequence.

$S_n$ represents the sum of the first $n$ terms of a series.

Example 1:

2, 5, 8, 11 is an arithmetic sequence

2+5+8+11 is an arithmetic series

$S_4 = 20$ is the sum of the first four terms of the series

The general sum of an arithmetic series can be determined by:

$$S_n = \frac{n}{2} [2t_1 + (n - 1)d]$$

Where $t_1$ is the first term

$n$ is the number of terms

$d$ is the common difference

$S_n$ is the sum of the first $n$ terms

We can determine another form of the equation using:

$$t_n = t_1 + (n - 1)d$$

$$S_n = \frac{n}{2} (t_1 + t_n)$$

In this equation, $t_n$ represents the $n$th term in the series (usually the last term in the series)

Example 2:

Determine the following:

a.) $S_9$ of the series 20+ 23+ 25...

b.) $S_{14}$ of the series −32 + (−26) + (−20) + …
Example 3:

Determine the sum of the following series:

\[ 11 + 14 + \cdots + 122 \]

Example 4:

The sum of the first two terms of an arithmetic series is 19 and the sum of the first four terms is 50. Determine \( t_1 \), \( d \) and \( S_n \).