ARITHMETIC SERIES

An arithmetic series is the indicated sum of the terms of an arithmetic sequence.

For example, 4, 9, 14, 19,... is an arithmetic sequence while 4 + 9 + 14 + 19 +... is an arithmetic series.

THE GENERAL FORMULA

$S_n = n\left(\frac{a+t_n}{2}\right)$ if the first and the last term are known OR

$S_n = \frac{n}{2}[2a+(n-1)d]$ if the first term and the common difference are known.

Where a represents _____

n represents _____

d represents _____

t_n represents _____

S_n represents _____

EXAMPLE 1 – For the arithmetic series with $a = 2$ and $d = 4$, determine each of the following :

a) The 10^{th} term

b) the sum of the first 10 terms.

EXAMPLE 2 – Determine the sum of the arithmetic series $3 + 8 + 13 + \ldots + 58$

EXAMPLE 3 – In an arithmetic series, $t_2 = 10$ *and* $t_5 = 31$. Find the sum of the first 16 terms.

EXAMPLE 4 – A marching band has 8 musicians in the first row, 10 musicians in the second row, 12 musicians in the third row, and so on. If there are 12 rows, how many musicians are in the band?

EXAMPLE 5 – A construction company building a new library is required to pay a penalty of $1000 for the first day the completion is late, $1500 for the second day, $2000 for the third day, and so on. If the company payed a penalty of $115 000, how many days late was the completion of the library?