

1.2: Arithmetic Series

Arithmetic Series \Rightarrow a sum of terms that form an arithmetic sequence.

ex $\{2, 4, 6, 8\}$ finite arithmetic sequences

$2 + 4 + 6 + 8 =$ arithmetic series

$$S_4 = 20$$

Formula used to find the sum for Arithmetic Series

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

example: Find the sum of the arithmetic sequence

$$\{ \underbrace{-7}_{t_1}, \underbrace{-5}_{t_2}, \underbrace{-3}_{t_3}, \underbrace{-1}_{t_4}, \dots, \underbrace{83}_{t_{46}} \}$$

* need the number of terms

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

$$= -7 + 2(n-1)$$

$$= -7 + 2n - 2$$

$$t_n = 2n - 9$$

$$83 = 2n - 9$$

$$83 + 9 = 2n$$

$$92 = 2n$$

$$46 = n$$

$$S_{46} = \frac{46(t_1 + t_{46})}{2}$$

$$= \frac{46(-7 + 83)}{2}$$

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

$$S_{46} = 1748$$

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#1. Determine the sum of each arithmetic series

a) $5 + 8 + 11 + \dots + 53$

a) 493

b) $7 + 14 + 21 + \dots + 98$

b) 735

c) $8 + 3 + (-2) + \dots + (-102)$

c) -1081

d) $\frac{2}{3} + \frac{5}{3} + \frac{8}{3} + \dots + \frac{41}{3}$

d) $\frac{301}{3}$