Arithmetic Series

1.2

Sequence: 1, 2, 3, 4, 5, ...

Series: 1 + 2 + 3 + 4 + 5 + ...

- A series is a Sum of a Sequence
- t_n still works for finding an individual term in a series.

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

S_n means the sum of the first 'n' terms

OR

$$S_n = \frac{n}{2}[t_1 + t_n]$$

Find 'n'

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

Ex 1 $5 + 8 + 11 + \ldots + 53$ (t_1, t_n)

Find the sum of this Series

$$S_n = \frac{n}{2}[t_1 + t_n]$$

We need 'n' first:

use: $t_n = t_1 + (n-1)d$ to find n

$$53 = 5 + (n-1)\cdot 3$$

$$53 = 5 + 3n - 3$$

$$53 = 3n + 2$$

$$-2 \quad -2$$

$$\frac{51}{3} = \frac{3n}{3}$$

$$n = 17$$

So: $t_1 = 5$ $d = 3$ $t_n = 53$ $n = 17$

$$S_{17} = \frac{17}{2}[5 + 53]$$

$$= 493$$

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

$$S_{17} = \frac{17}{2}[2(5) + (17-1)\cdot 3]$$

$$= \frac{17}{2}[10 + 48]$$

$$= 493$$

Find t_1 if $d=6$, $S_{14}=574$ $n=14$

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

$$574 = \frac{14}{2}[2t_1 + (14-1)\cdot 6]$$

$$574 = 7[2t_1 + 78]$$

13
6

$$574 = 14t_1 + 546$$

-546 -546

$$\frac{28}{14} = \frac{14t_1}{14}$$

$$t_1 = 2$$