

December 10th, 2008

7.4 Arithmetic Series

- is the sum of the terms of an arithmetic sequence.

sequence 2, 4, 6, 8

series 2+4+6+8

$$t_1 = 2$$

$$t_4 = 8$$

$$S_1 = 2$$

$$S_4 = 20$$

$$S_3 = 12$$

S_n denotes the sum of the first "n" terms

For an arithmetic series :

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

OR

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

$$\rightarrow = \frac{n}{2} [a + t_n]$$

- use when given t_1 and t_n

$$\begin{aligned} t_1 &= 1 & t_{1000} &= 1000 & \text{Find } S_{1000} \\ S_{1000} &= \frac{1000}{2} [1 + 1000] \\ &= 500 \cdot 1000 \end{aligned}$$

Ex 1: Find the sum of the first 50 terms of the series $4 + 7 + 10 + 13 + \dots$

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

$$\begin{aligned} S_{50} &= \frac{50}{2} [2(4) + (49)(3)] \\ &= 3875 \end{aligned}$$

Ex 2: Evaluate $200 + 195 + 190 + \dots + 20$

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

$$20 = 200 + (n-1)(-5)$$

$$20 = 200 - 5n + 5$$

$$5n = 185$$

$$n = 37$$

position
is # terms
n

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

$$= \frac{37}{2} [200 + 20]$$

$$= 37(110)$$

$$= 4070$$