SIGMA NOTATION

Note Title 10/12/2011

RECALL: WE KNOW A SERIES IS THE SUM OF THE TERMS OF A SEQUENCE

IE IF t_n IS A SEQUENCE THEN S_n IS

$$S_1 = t_1$$

$$S_2 = t_1 + t_2$$

$$S_3 = t_1 + t_2 + t_3$$

$$S_n = t_1 + t_2 + t_3 + \ldots + t_n$$

- WE USE Σ (SIGMA NOTATION) TO ABREVIATE

THE SERIES

IE $$\sum_{k=1}^{5} 2k = 2(1) + 2(2) + 2(3) + 2(4) + 2(5)$$

K IS CALLED THE INDEX OF SUMMATION. THE LOWER NUMBER IS CALLED THE LOWER LIMIT OF SUMMATION, THE UPPER NUMBER IS THE UPPER LIMIT OF SUMMATION.

IE $$\sum_{k=1}^{5} (2)^k = 2^1 + 2^2 + 2^3 + 2^4 + 2^5$$

USE S_n FORMULA

$$S_n = \frac{a(r^n - 1)}{r - 1}$$

* n = TOP NUMBER − BOTTOM NUMBER + 1 *

$a = 2$

$r = 2$

$n = 5 - 1 + 1 = 5$

$$S_5 = \frac{2(2^5 - 1)}{2 - 1} \qquad S_5 = 62$$

<u>FE</u> CHANGE TO SIGMA $t_n = 3^n$ FOR $n = 1$ TO $n = 4$

$$\sum_{k=1}^{4} 3^k$$

IE WRITE WITH SIGMA NOTATION AND FIND THE SUM.

$$8 + 4 + 2 + \ldots \frac{1}{64}$$

SOLN $r = 1/2$ $\quad 8\left(1 + \frac{1}{2} + \frac{1}{4} + \ldots \frac{1}{512}\right)$

$$8\left(\tfrac{1}{2}\right)^0 + 8\left(\tfrac{1}{2}\right)^1 + 8\left(\tfrac{1}{2}\right)^2 + \ldots 8\left(\tfrac{1}{2}\right)^9$$

$$\begin{matrix} \parallel & \parallel & \parallel \\ 8 & 4 & 2 \end{matrix}$$

$$\sum_{k=1}^{10} 8\left(1/2\right)^{k-1} \quad \underline{\text{OR}} \quad \sum_{k=0}^{9} 8\left(1/2\right)^k$$

Sum is $S_n = \dfrac{a(r^n - 1)}{r - 1}$

$a = 8 \quad r = \frac{1}{2} \quad n = 10$