

Notes 9.3 – Sigma Notation and Arithmetic Series

DEFINITION: A **Series** is the sum of the terms of a sequence.

Sigma Notation or (Summation Notation) This symbol means “Add” $\rightarrow \sum$ It’s called “Sigma”

$\sum_{n=1}^k a_n$ The variable below sigma (n in this case) is called the “**index**”
 The number below sigma (1 in this case) is which term begins the series, called the “**lower bound**”
 The number above sigma (k in this case) is which term ends the series, called the “**upper bound**”
 The expression to the right of sigma (a_n in this case) is the **explicit formula** used to generate the terms of the series.

Ex 1) Using summation notation to find the sum of a finite sequence

Problem	Work	Answer
(a) $\sum_{n=1}^5 n^2$	$1^2 + 2^2 + 3^2 + 4^2 + 5^2$	55
(b) $\sum_{n=3}^5 \frac{1}{n}$		
(c) $\sum_{n=5}^{10} n$		
(d) $\sum_{n=1}^6 2$		

Ex2) Write the following sums using sigma notation:

- a) $1+4+9+16+25+36+49+64+81$ b) $2+4+6+8+10+12$ c) $625+125+25+\dots$

Now You Try ☺

- a) $6+2-2-6-10-14-18-22$ b) $729+243+81+27+9+3$ c) $8+27+64+125$

FINITE ARITHMETIC SERIES $S_n = \sum_{k=1}^n a_k = \frac{n}{2}(a_1 + a_n)$ Gauss $\rightarrow 1+2+3+4+\dots+100$

- a) $1+3+5+7+\dots+49$ b) $3+7+11+15+19+23+27$

c) A corner section of a stadium has 8 seats along the front row. Each successive row has 2 more seats than the row preceding it. If the top row has 24 seats how many seats are in the entire section?