

Sigma Notation



Preliminaries and Objectives

Preliminaries:

- Sequences of numbers

Objectives:

- Find a sum written using Sigma Notation

Example 1

$$\sum_{k=1}^{10} 2k$$

$$2 + 4 + 6 + 8 + 10 + 12 + 14 + 16 + 18 + 20 = 110$$

$$\sum_{k=0}^9 2(k+1)$$

Example 2

$$\sum_{k=1}^5 k^2$$

$$1 + 4 + 9 + 16 + 25 = 55$$

Example 3

$$\sum_{k=0}^3 k^3 - k^2$$

$$0 + 0 + 4 + 18 = 22$$

Example 4

$$\sum_{k=1}^n 2k - 1 = n^2$$

$$1 + 3 + 5 + 7 + \dots + (2n - 1)$$

If $n = 1$	1	= 1
If $n = 2$	1 + 3	= 4
If $n = 3$	1 + 3 + 5	= 9
If $n = 4$	1 + 3 + 5 + 7	= 16
If $n = 5$	1 + 3 + 5 + 7 + 9	= 25

Sum of the first n odd integers

								17
							15	
						13		
					11			
				9				
			7					
		5						
	3							
1								

Recap

$$\sum_{k=\text{lower}}^{\text{upper}} \text{formula}$$

- Σ means find the sum
- k is a variable that gets plugged into the formula
- k is an integer that starts at the 'lower' summand and goes up one at a time until reaching the 'upper' summand