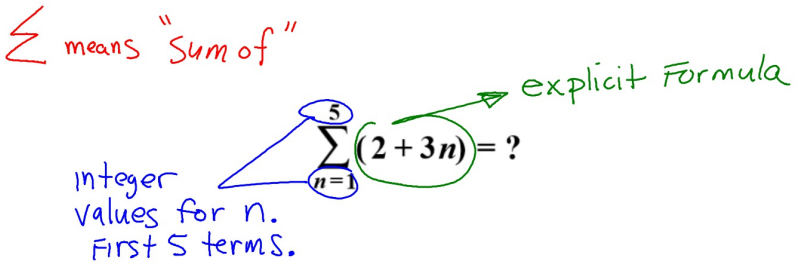
If a series contains many terms, writing every term can be tedious. For this reason, mathematicians have developed a shorthand notation to indicate a series. This notation makes use of the Greek capital letter sigma, Σ, to stand for sum, as well as the formula for the nth term of the series. This notation is often referred to as **sigma** or **summation** notation. Play the animation to understand how to use sigma notation.

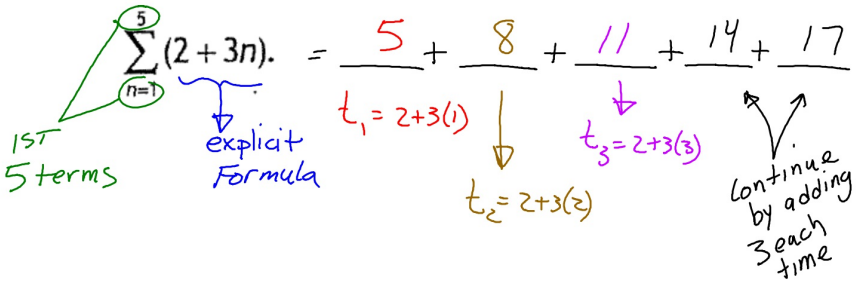
Consider this series, represented using sigma notation. The numbers below and above the sigma define the interval of integer values to substitute for n in the nth-term formula to generate each term in the series. The variable n is called the ***index*** of summation.



12 on SAS2

Agile Mind -Topic 1 - Exploring - Arith Seq & Series - page 14 - Panels 1&2

12. Write the series represented by the sigma notation $\sum_{n=1}^{5}(2+3n)$.



Problem 13 on SAS2

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13. Represent the series 20 + 23 + 26 + 29 + 32 + 35 + 38 + 41 + 44 + 47 + 50 + 53 using sigma notation.

Arithmetic series with $d = 3$
Explicit Formula: $t_n = 20+3(n-1)$
12 TERMS

$$\sum_{n=1}^{12} 20+3(n-1)$$

Problem 14 on SAS2

14. Represent the series 15 + 20 + 25 + 30 + 35 + 40 + 45 + 50 + 55 + 60 + 65 + 70 + 75 + 80 using summation notation.

Explicit Formula for an Arithmetic series with $d = 5$: $t_n = 15+5(n-1)$

Terms = 14

$$\sum_{n=1}^{14} 15+5(n-1)$$

Write this series in Sigma Notation:

$7 + 13 + 19 + 25 + 31 + 37 + 43 + 49 + 55 + 61$

Arithmetic $d = 6$ 10 Terms

$t_n = 7 + 6(n-1)$

$$\sum_{n=1}^{10} 7 + 6(n-1)$$

Find the sum of this series.

$$S_{10} = \frac{10}{2}(7 + 61) = 340$$

$n = 10$, $t_1 = 7$, $t_{10} = 61$

Write this series in Sigma Notation:

$-6 + -10 + -14 + -18 + -22 + -26 + -30 + -34 + -38$

Arithmetic $d = -4$ 9 Terms

$t_n = -6 + -4(n-1)$

$$\sum_{n=1}^{9} -6 + -4(n-1)$$

Find the sum of this series.

$n = 9$, $t_1 = -6$, $t_9 = -38$

$$S_9 = \frac{9}{2}(-6 + -38) = -198$$

Write the first 5 terms of this series:

$$\sum_{n=1}^{7} 19 - 6(n-1)$$

$\underset{t_1}{19} + 13 + 7 + 1 + -5$

$= 19 - 6(1-1)$, $t_2 = 19 - 6(2-1)$, $t_3 = 19 - 6(3-1)$ ... Now you can use the pattern of subtracting 6.

Find the sum of this series:

Linear eq means this is an Arithmetic Series.

$$\sum_{n=1}^{9} 11 + 2n \quad (1^{ST}\ 9\ \text{Terms})$$

$t_1 = 11 + 2(1) = 13$

$t_9 = 11 + 2(9) = 29$

$\underset{t_1}{13} + \_\_ + \_\_ + \cdots + \underset{t_9}{29}$

Sum of 1ST 9 terms:

$S_9 = \frac{9}{2}(13 + 29) = 189$

Write this series in Sigma Notation:

$25 + 29 + 33 + 37 + 41 + \ldots + 65$

Arithmetic $d = 4$

Explicit Formula: $t_n = 25 + 4(n-1)$

terms: $65 = 25 + 4(n-1)$

$40 = 4(n-1)$

$10 = n-1$

$n = 11$

Sigma NOTATION

$$\sum_{n=1}^{11} 25 + 4(n-1)$$

Hwk #5: Pick up the sheet I've printed off for you.

Part 1. SAS2 problem #15.

Part 2. More Practice pages 1-5 on Agile Mind website:
Topic 1: Arithmetic & Geometric Sequences and Series

Window closes 11:59pm Thursday, September 12