

1.2 – Arithmetic Series and Sigma Notation By Hand

Introduction to (General) Series

– **series** → the indicated _____

- distinguish the difference – sequence $\rightarrow 6, 12, 18, \dots, 300$ where it contains _____
series $\rightarrow 6 + 12 + 18 + \dots + 300$ where it contains _____

- series notation – $S_n = \underbrace{a_1 + a_2 + a_3 + \dots + a_n}$

Example 1: Find the sum for each given sequence.

a.) Given: $a_n = 2n + 6$

Find: S_4

b.) Given: $a_n = 4(3n - 2)$

Find: S_3

Specific Series # 1 – Arithmetic Series

– **arithmetic series** → the indicated _____

where it's represented by the following formula:

$$S_n = \frac{n}{2} (a_1 + a_n)$$

The diagram shows three arrows pointing downwards from the formula above. The first arrow points from the variable S_n to the text 'Sum of n terms'. The second arrow points from the variable a_1 to the text 'first term'. The third arrow points from the variable a_n to the text 'last term'.

Example 2: Find the sum of each arithmetic series.

a.) $a_1 = 8$, $a_n = 146$, $n = 24$

b.) $a_1 = 21$, $d = -3$, $n = 17$

c.) $9 + 22 + 35 + \dots + 776$

Example 3: Use the arithmetic series formula to complete each problem.

a.) How many terms were added to get a sum of 5,958 when the first term is 8 and the last term in the series is 323?

b.) What is the second term of an arithmetic series if the first term is 9, the n th term is 105, and the sum is 741?

Sigma Notation (By Hand Method)

– **sigma notation** → a _____ and more concise way to _____

• The following is a simple representation of Sigma Notation:

$$\sum_{n=1}^4 3n = 3(1) + 3(2) + 3(3) + 3(4) = 3 + 6 + 9 + 12 \Rightarrow S_4 = 30$$

Example 4: Find the sum.

a.) $\sum_{n=3}^5 4n + 3$

b.) $\sum_{n=1}^5 2n - 4$

c.) $\sum_{n=5}^{26} 5 - 3n$