

Apr. 5, 2017

Sect. 11-2

Arithmetic Sequences ; Series

Defn.

Finding pattern

Finding n^{th} term

Finding sum

Using Sigma Notation

$$3, 5, 7, 9, 11, \underline{13}, \underline{15}, \underline{17}$$

+2 +2 +2 . . .

This is an arithmetic sequence because the same # is used to get the next term.

Common difference: $d = 2$

Find the 90TH term

$$a_n = a_1 + d(n-1)$$

$$a_{90} = 3 + 2(90-1)$$

$$= 3 + 178$$

$$a_{90} = 181$$

Find a_{21} for 5, 9, 13, ... -

$$a_{21} = 5 + 4(21 - 1)$$

$$= 5 + 80$$

$$a_{21} = 85$$

Arithmetic Mean (Average)

31, 37, 43

3, 5, 7, 9,

3 + 5 + 7 + 9 + + ^{Stop} a_n

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

Find the sum of the first
31 terms of $3 + 5 + 7 + \dots$

$$\begin{aligned}a_{31} &= 3 + 2(31-1) \\ &= 3 + 60 = 63\end{aligned}$$

$$S_{31} = \frac{31(3+63)}{2} = \frac{31(66)}{2}$$

$$S_{31} = 1023$$

Find S_{15} for 7, 10, 13,

$$\begin{aligned} a_{15} &= 7 + 3(15 - 1) \\ &= 7 + 42 = 49 \end{aligned}$$

$$S_{15} = \frac{15(7 + 49)}{2} = \frac{15(56)}{2}$$

$$S_{15} = 420$$

Sigma Notation

$$\sum_{i=\#}^{\#} (\text{Argument})$$

Diagram illustrating the components of Sigma Notation:

- The top $\#$ is labeled "Stop counter #".
- The bottom $i = \#$ is labeled "Start counter #".
- The expression inside the summation is labeled "(Argument)".

$$\sum_{i=1}^6 (2i)$$

Expand

$$\begin{aligned} & 2 + 4 + 6 + 8 + 10 + 12 \\ & = 42 \end{aligned}$$

$$\sum_{i=3}^7 (3i+1)$$

$$10 + 13 + 16 + 19 + 22$$
$$= 80$$

$$\sum_{i=1}^{105} (2i-1)$$

$$a_1 = 2(1) - 1 = 1$$

$$a_n = 2(105) - 1 = 209$$

$$n = 105 - 1 + 1 = 105$$

$$S_{105} = \frac{105(1+209)}{2}$$

$$S_{105} = 11,025$$