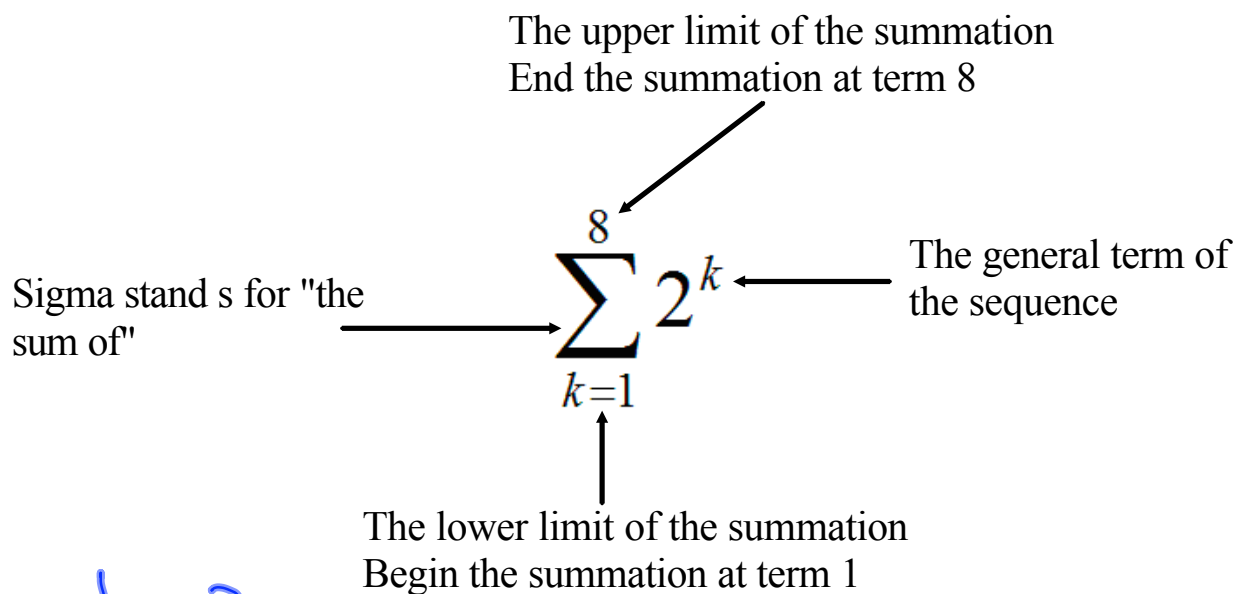


Sigma Notation

In the Greek alphabet the letter Σ (sigma). we use sigma to represent the sum of a series



$$2^1, 2^2, 2^3, \dots, 2^8$$

Write the series represented by $\sum_{k=1}^8 2^k$ in expanded form and determine the sum.

$$2^1, 2^2, 2^3, 2^4, 2^5, 2^6, 2^7, 2^8$$

$$2 + 4 + 8 + 16 + 32 + 64 + 128 + 256$$

$$S_8 = \frac{2(2^8 - 1)}{2 - 1}$$

$$\underline{S_8 = 510}$$

Write the series represented by

$$\sum_{k=5}^8 5(2^{k+1})$$

in expanded form and determine the sum.

$$5(2^{5+1})$$

$$5(2^{6+1})$$

$$320$$

$$640$$

$$1280$$

$$2560$$

$$S_4 = \frac{320(2^4 - 1)}{2 - 1}$$

$$= 4800$$

How many terms are in the series??

Note: number of terms in a series = (upper limit - lower limit) + 1

Write the series $3 + \frac{3}{2} + \frac{3}{4} + \frac{3}{8} + \frac{3}{16} + \frac{3}{32}$ in sigma notation

$$\sum_{n=1}^6 3 \left(\frac{1}{2}\right)^{n-1}$$

$$\begin{aligned} t_n &= a(r)^{n-1} \\ &= 3\left(\frac{1}{2}\right)^{n-1} \end{aligned}$$

$$\begin{aligned} r &= \frac{3}{2} \div 3 \\ r &= \frac{3}{2} \times \frac{1}{3} \\ r &= \frac{3}{6} = \frac{1}{2} \end{aligned}$$

$$1 + 3 + 9 + 27 + 81$$

$$\sum_{n=1}^5 1 (3)^{n-1}$$

A sequence is defined by the recursive formula

$$t^1 = 3$$

$$t^n = \cancel{5 \cdot t^{n-1}}$$

$$5 \cdot t_{n-1}$$

a) List the first four terms in the sequence

$$3, \underline{15}, \underline{75}, \underline{375}$$

$$t_2 = 5 \cdot t_{2-1}$$

$$t_3 = 5 \cdot t_{3-1}$$

b) Find the sum of the first 12 terms in the series

$$S_{12} = 3 \frac{(5^{12} - 1)}{5 - 1} = 183,105,468$$

c) Represent the series from part b using sigma notation.