Precalculus

10-02 Series

Series

- _____ of a sequence
- Sequence
  - _____
- Series
  - _____

Summation Notation (Sigma Notation)

$$\sum_{i=1}^{n} a_i = a_1 + a_2 + a_3 + \cdots + a_n$$

Find each sum

$\sum_{i=1}^{4}(4i+1)$

$\sum_{k=2}^{5}(2+k^3)$

$\sum_{n=1}^{\infty}\frac{5}{10^n}$

Shortcut formulas

$$1 + 1 + 1 + 1 + \cdots = \sum_{i=1}^{n} 1 = n$$

$$1 + 2 + 3 + 4 + \cdots = \sum_{i=1}^{n} i = \frac{n(n+1)}{2}$$

$$1 + 4 + 9 + 16 + \cdots = \sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$$

$$1 + 8 + 27 + 64 + \cdots = \sum_{i=1}^{n} i^3 = \frac{n^2(n+1)^2}{4}$$

$$1 + 16 + 81 + 256 + \cdots = \sum_{i=1}^{n} i^4 = \frac{n(n+1)(2n+1)(3n^2+3n-1)}{30}$$

$$1 + 32 + 243 + 1024 + \cdots = \sum_{i=1}^{n} i^5 = \frac{n^2(n+1)^2(2n^2+2n-1)}{12}$$

Evaluate

$$\sum_{i=1}^{5} (3i^2 - 5i)$$