

(Lecture 15, 16) Sequence of Submissions

Sequence is

in a discrete list in orders

e.g.:-
 $1, 2, 3, 5, 7, \dots$
 $1, 4, 9, 16, \dots$
 $2, 7, 12, 17, \dots$

e.g.:-
 $a_n = \left[\frac{n}{2} \right] + \left[\frac{n}{2} \right]$

$$a_1 = \left[\frac{1}{2} \right] + \left[\frac{1}{2} \right]$$

$$= 0.5 + 0.5 = 1$$

$$a_2 = \left[\frac{2}{2} \right] + \left[\frac{2}{2} \right]$$

$$= 1 + 1 = 2$$

Formulas-

$$\sum_{k=1}^n k = \frac{n(n+1)}{2}$$

$$\sum_{k=1}^n k^2 = \frac{n(n+1)(2n+1)}{6}$$

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

Examples:-
 i) $\sum_{k=1}^5 k = 1 + 2 + 3 + 4 + 5 = 15$

ii) $\sum_{i=1}^3 (2i+1) = (2(1)+1) + (2(2)+1) + (2(3)+1)$
 $= 3 + 5 + 7 = 15$

iii) $\sum_{i=1}^5 7(i) = 7(1)^0 + 7(2)^0 + 7(3)^0 + 7(4)^0 + 7(5)^0$
 $= 7 + 7 + 7 + 7 + 7 = 35$

Question:- $\prod_{i=1}^5 i = 1 \times 2 \times 3 \times 4 \times 5$
 $= 120$

Question:- $\prod_{i=1}^{100} i = 0 \times 1 \times 2 \times 3 \times \dots \times 100$

Question:- $\sum_{i=0}^2 \sum_{j=1}^3 ij$

$= \sum_{i=0}^2 (i(1) + i(2) + i(3))$

$= \sum_{i=0}^2 6i = 6(0) + 6(1) + 6(2)$
 $= 18$

Question:- $\sum_{k=100}^{200} k$

$\sum_{k=1}^{200}$