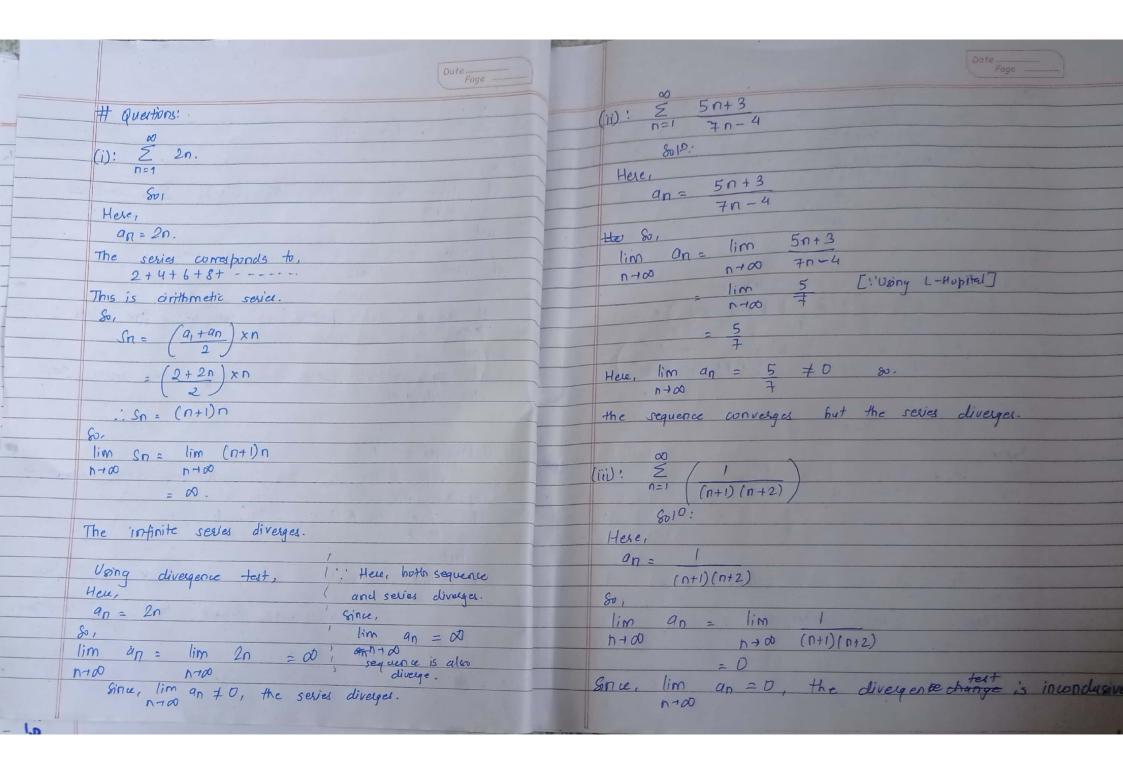
INFINITE STRIES: # Intinite spries: If dan3 is a sequence of numbers, then the sum a, + a2+ ... + an + is an infinite series. Here, an is there not term of the society It is denoted as: # Partial Sums: A partial sum of an infinite series is the sum of the finite number of consecutive terms beginning with the first term. If fan 3 is a sequence and Zan is a corresponding series, then the sequence fin } is defined as, S1 = a, Sn = 9,+02+....+9n Sn = the sequence of partial sum of the series Ean We know,

Zan = lim Sn lim Sn = L (any finite value), Zan conveyes lim Sn = ±00 or , Ean diverger. if n +00 It sequence of partial sum converges, the series Zan also converges. and. if sequence of partial sum diverges, the series Ean also diverges. # Divergence test: let £90 is the corresponding infinite series of sequence an. If lim an \$0, Ean diverges but if lim an = 0, Ean may converse or diverge n+00 ie, divergence test is not conclusive.



86; $\frac{1}{1}$ $\frac{1}{1}$

80, $Sn = q_1 + q_2 + q_3 + \cdots + q_n$ $= \begin{pmatrix} 1 - 1 \\ 2 \end{pmatrix} + \begin{pmatrix} 1 + 1 \\ 3 \end{pmatrix} + \begin{pmatrix} 1 - 1 \\ 4 \end{pmatrix} + \cdots$ $= \begin{pmatrix} 1 - 1 \\ 2 \end{pmatrix} + \begin{pmatrix} 1 + 1 \\ 3 \end{pmatrix} + \begin{pmatrix} 1 - 1 \\ 4 \end{pmatrix} + \cdots$ $= \begin{pmatrix} 1 + q_2 + q_3 + \cdots + q_n \\ 2 + q_3 + \cdots + q_n \\ 3 + q_1 \end{pmatrix} + \begin{pmatrix} 1 - 1 \\ 4 + q_2 + q_3 + \cdots + q_n \\ 2 + q_3 + \cdots + q_n \\ 3 + q_1 \end{pmatrix} + \begin{pmatrix} 1 - 1 \\ 4 + q_2 + q_3 + \cdots + q_n \\ 2 + q_3 + \cdots + q_n \\ 3 + q_1 \end{pmatrix} + \begin{pmatrix} 1 - 1 \\ 4 + q_2 + q_3 + \cdots + q_n \\ 4 + q_2 + q_3 + \cdots + q_n \\ 2 + q_3 + q_3 + \cdots + q_n \\ 3 + q_1 + q_2 + q_3 + \cdots + q_n \\ 4 + q_1 + q_2 + q_3 + \cdots + q_n \\ 4 + q_2 + q_3 + \cdots + q_n \\ 4 + q_1 + q_2 + q_3 + q_3 + \cdots + q_n \\ 4 + q_1 +$

! Sn = 1 - 1 2 n-2

Hence, $\lim_{n\to\infty} Sn = \lim_{n\to\infty} 1 - 1$ $\lim_{n\to\infty} Sn = \lim_{n\to\infty} 1 - 1$

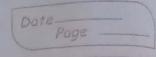
Since, lim Sn = 1 is finite value. N+0 2

Thus, Zan converges.

Infinite Geometric Sevice: Let a = first term 1 = common ratio n = no. of terms then, the cever $0 + ar + ar^2 + \cdots + qr^{n-1} + \cdots$ is an infinite geometric seviel.

It is denoted as E arm-1 We know, for geometric series, $S_1 = a(1-r^n)$ for all $r \neq 1$ *) Case 1: If |r|=1, The corresponding sevier becomes, Sn = a+a+ + a .! Sn = na 80, lim sn = 11m na = 00 00 + 10 00 + 11 The series diverges. *) Case 2: if 11/71 1/m r = 00 $\lim_{n\to\infty} S_n = \lim_{r\to\infty} q(r^n-1) = \infty$ The series diverges.

x) (ase 3: $\lim_{n \to \infty} S_n = \lim_{n \to \infty} a = 0$ The series converges. En if for a infinite segue rever if $|r| \ge 1$, series diverges $|r| \le 1$, series converges. # Duestions (i): $\frac{8}{5}$ (-1) $\frac{n+1}{5}$ $\frac{5}{4^{n-1}}$ The consipording server is. $5-5+5-5+\cdots$ $=\frac{5}{9}\left(\frac{1-1}{9}+\frac{1}{9}-\frac{1}{9}+\cdots\right)$ Here, |r| = |-1| = 1 < 1give 1141, the series converges.



GID: ## & 1 0=1 2n=1

The corresponding resies is. $1+1+1+1+1+\cdots$ $2 2^{2} 2^{3}$

Here

|r|= |1| = 1 <1

Since |1 | < 1, the series converges.