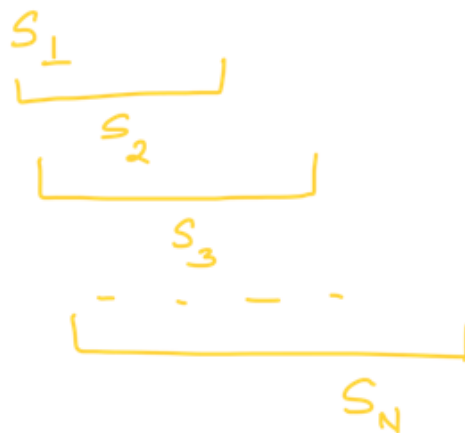


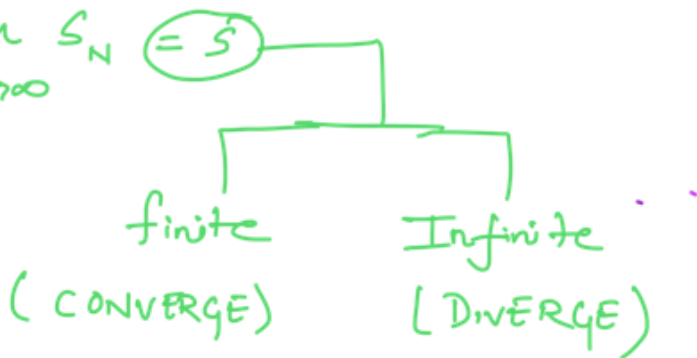
| OCT 20 |

## DICTIONARY

SERIES :  $\sum_{n=1}^{\infty} a_n = \underline{a_1} + a_2 + \dots + a_N + a_{N+1} + \dots$



$\sum_{n=1}^{\infty} a_n = \lim_{N \rightarrow \infty} S_N = S$



	SEQUENCE	SERIES
	$\{a_n\} \rightarrow \lim_{n \rightarrow \infty} a_n = L < \infty$	$\sum a_n \rightarrow \lim_{N \rightarrow \infty} S_N = S < \infty$
$\lim a_n = 0$	Converges to 0	? (No conclusion)
$\lim a_n = c \neq 0 < \infty$	Converges to c	Div (TFD)
1. $\dots$		Converges to $\dots$

$$\lim_{n \rightarrow \infty} a_n = 0$$
$$\lim_{n \rightarrow \infty} S_n = c \neq 0 < \infty$$

Converges to  $c$

## GEOMETRIC SERIES

$$\sum_{n=1}^{\infty} ar^n = \underline{ar} + \underline{ar^2} + \underline{ar^3} + \dots + ar^n$$
$$= \frac{ar}{1-r} \rightarrow \text{1st term if } |r| < 1$$

(Diverges if  $|r| \geq 1$ )

## TELESCOPIC SERIES

- ① Find PFD
- ② Compute  $S_N$
- ③ If  $\lim_{N \rightarrow \infty} S_N = c$  (finite then it converges)

(If not, diverges)

## TEST FOR DIVERGENCE (TFD)

If  $\lim_{n \rightarrow \infty} a_n \neq 0$ , then the series  $\sum_{n=0}^{\infty} a_n$  diverges.

## INTEGRAL TEST

If 'f' is positive, continuous and (eventually) decreasing over  $[1, \infty)$  and

$a_n = f(n)$ , then

$\sum_{n=1}^{\infty} a_n$  and  $\int_1^{\infty} f(x) dx$  either both

converge or diverge.

### P TEST

$\sum_{n=1}^{\infty} \frac{1}{n^p}$  converge for  $p > 1$  and

diverge for  $p \leq 1$

### GENERALISED P TEST

$\sum_{n=2}^{\infty} \frac{1}{n^p (\ln n)^q}$  converge if  $p > 1$   
diverge if  $p < 1$

and,

if  $p = 1$ , it converge if  $q > 1$  and

diverge if  $q \leq 1$

⊛ Only two type of series tells you exact sum, when it converges

i.e (Geometric and Telescopic Series)

