Limits and S Sequences and Series 25th. March A sequence is a list of numberas { a, a 2 - . . an . . } - List. Examples. · an = 1/2  $\frac{3}{4} \quad \text{old} \quad \frac{1}{11} \quad \frac$ 9 9 92 93 Reconsion.

Reconstance: ait = Some expression in lower ais. Example: ai+1 = 2 aijaj=2 => 9,=2, az=2a, az=2az== 2.4= = 2.4=8 •  $a_{i+1} = (i+1) a_{i} a_{i} = 1 \Rightarrow a_{i} = 1, a_{2} = 2.a_{i}, a_{3} = 3.2.1$ · ait = ai 12:9=4 = 4 Three ways a sequence is given  $-\frac{1}{2}$   $\frac{2}{2}$   $\frac{2}{2}$   $\frac{2}{2}$   $\frac{1}{2}$   $\frac{2}{2}$   $\frac{1}{2}$   $\frac{2}{2}$   $\frac{1}{2}$   $\frac{$ 3> Formulae 3> Recursion



A sequence (an) converges to a limit L, if it
gets "closes" to L as n gnows large If limiting exists a then (an) is convergent. If limit does not exist then (an) is divergent.

Examples:

Find. the limit of the sequence \(\frac{2}{2}\), \(\frac{1}{2}\), \(\frac{ Solution: First write general term: an.

az = 1 ... guen an = 1,

Lim an = Lim fi = 0

Find the limit of the sequency  $\{\frac{1}{2}, \frac{3}{5}, \frac{3}{10}, \frac{4}{17}, \dots \}$ Solution:  $q_1 = \frac{1}{2} - \frac{1}{12+1}$   $q_2 = \frac{2}{5} = \frac{2}{2^2+1}$ 

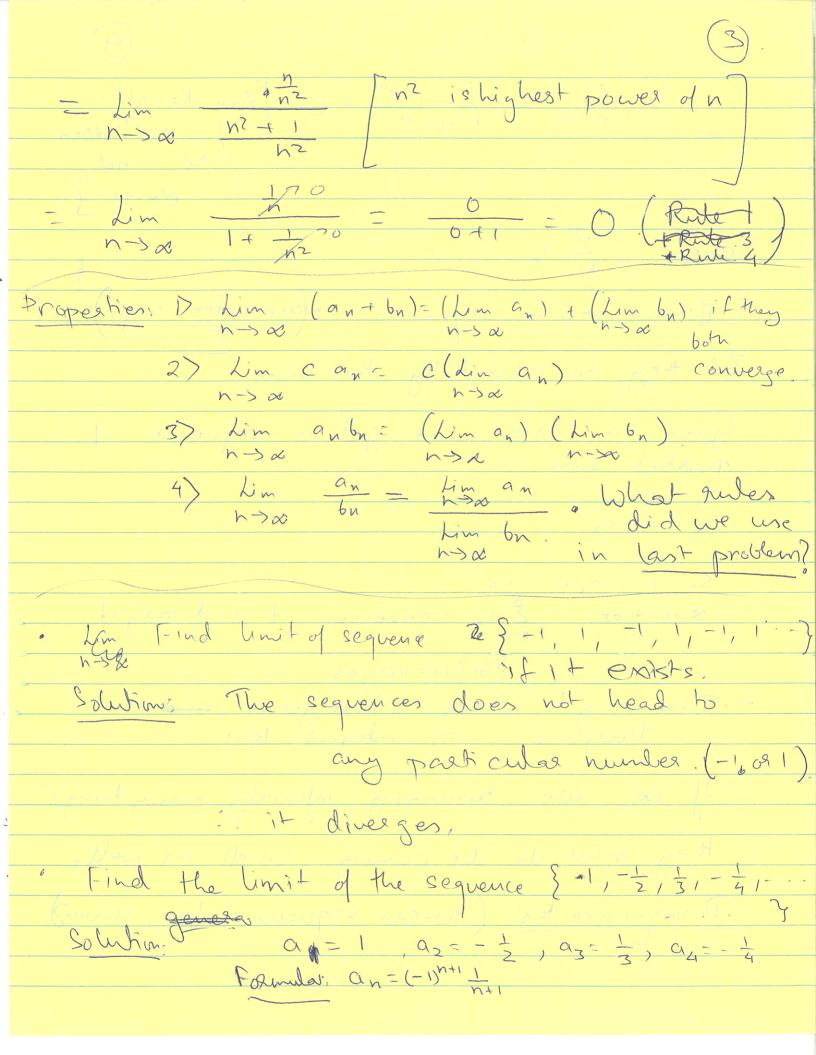
 $a_3 = \frac{3}{3} + 1$ 

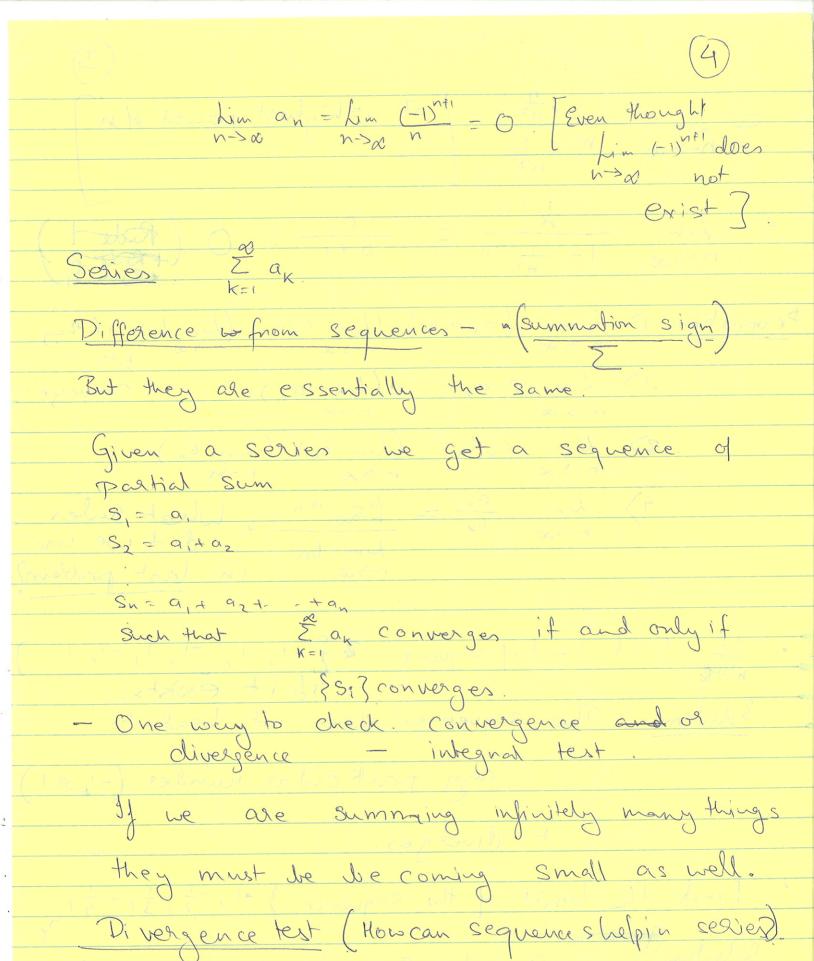
94 = 4 = 43+1

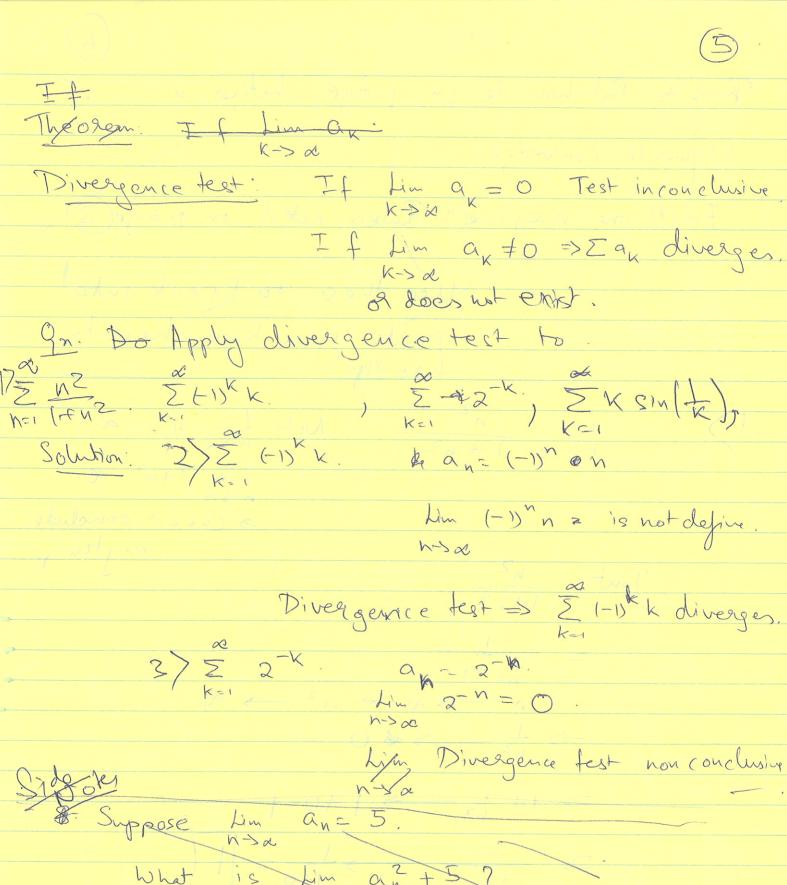
Gren: an = N

Lim and Lim M = Lim 1 Pivide.

No of No of Not No Not In Privide.







What is him an +5? 52+5=30

Barkto But how do we judge whether a
Sequence converges.
Facts one may use: Rules noted on page 3
Use these to break into  parts you know how to  handlage
parts you know how to
Note Lim n? = d'
him 1+n2=0.  N-> R  Cannot conclude
But 12
- t- +1 ·
$\frac{1}{n^2} \rightarrow \infty \rightarrow n.^2 \rightarrow \infty$
$\Rightarrow 1+\frac{N_2}{1+0=1}$
$\Rightarrow \frac{1}{1+1} \Rightarrow \frac{1}{1+0} = $
Z N2 divelges,

Lim nsin (th) N-30 Syn (h)  $N \rightarrow \infty \rightarrow \lambda \rightarrow 0$ Thus 2 nsm(tn) divelges.