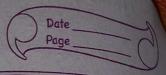
	NAME: Himanshu Dixit  Batch: B10  EnROLL NO.: 21103262  Date  Page
	Mathematics -2 Tutorial sheet -3
Q:1:	(a) $\sum_{(2n-1)^p} \frac{1}{3^p} \frac{1}{5^p} \frac{1}{(2n-1)^p}$
	$U_n = 1$ $(2n-1)^p$
	$1et  \forall n > u_n  \therefore  \forall n = 1$
	$\frac{\lim_{n\to\infty} u_n}{u_n} = \lim_{n\to\infty} n^{\beta} = \lim_{n\to\infty} \left(\frac{1}{2} - \frac{1}{n}\right)^{\beta} = \lim_{n\to\infty} \frac{u_n}{u_n} = \frac{1}{2} \lim_{n\to\infty} \frac{u_n}{u_n} $
	P ≤ 1 → Vn is divergent → Un is also divergent
(b)	$ \begin{bmatrix} 1 + 1 \\ \hline{ \sqrt{n}} \end{bmatrix} - n^{3/2} \qquad U_n^{1/n} = (1 + 1)^{-n/\sqrt{n}/\sqrt{n}} = 1 $ $ (1 + 1)^{-n/\sqrt{n}} = (1 + 1)^{-n/\sqrt{n}/\sqrt{n}} = 1 $
	By Cauchy, soot feet in Chn.
	$\lim_{n\to\infty} (\lambda in)^{n} = \lim_{n\to\infty} \frac{1}{(i+\frac{1}{\sqrt{n}})^{n}} = \lim_{n\to\infty} \frac{1}{e^{n}(x_{i+1})} = \frac{1}{e^{n}} < 1$
	o. Un is convergent.
(C)	Enn By using togonithmic Test
	$\lim_{n\to\infty} \frac{u_{n+1}}{u_n} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{n!}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{(n+1)!} \times \frac{u_n}{n^n \times n!} = \lim_{n\to\infty} \frac{u_n}{(n+1)!} \times u$
	$\lim_{n\to\infty} \frac{u_{n+1}}{u_n} = \lim_{n\to\infty} \frac{(n+1)^n \times n!}{x^n \times n!} = \lim_$
	if $x = \frac{1}{e}$ i. Unit = $(\frac{n}{n+1})^n \frac{1}{2}$
	$=\frac{e}{\left(1+\frac{1}{n}\right)^{n}}$



$$|\log \left( U_{n+1} \right)| = |\lim_{n \to \infty} n - n^2 \log \left( \frac{1+1}{n} \right)$$

$$\lim_{n \to \infty} \left( \frac{1}{n} \left( \frac{1}{n} \right) \right) = \lim_{n \to \infty} n - n^2 \log \left( \frac{1+1}{n} \right)$$

$$\lim_{n \to \infty} \left( \frac{1}{n} - \frac{1}{n^2} \right) = \lim_{n \to \infty} \frac{1}{n^3} = \lim_{n \to \infty} \left( \frac{1}{n} - \frac{1}{n^2} \right) = \lim_{n \to \infty} \left( \frac{1}{n^2} + \frac{1}{n^3} - \frac{1}{n^3} \right)$$

$$\lim_{n \to \infty} \left( \frac{1}{n^2} + \frac{1}{n^2} - \frac{1}{n^3} + \frac{1}{n^3} \right)$$

$$\lim_{n \to \infty} \left( \frac{1}{n^2} + \frac{1}{n^2} - \frac{1}{n^2} + \frac{1}{n^2} \right) = \lim_{n \to \infty} \left( \frac{1}{n^2} + \frac{1}{n^2} \right)$$

$$\lim_{n \to \infty} \left( \frac{1}{n^2} + \frac{1}{n^2} \right) = \lim_{n \to \infty} \left( \frac{1}{n^2} + \frac{1}{n^2} \right)$$

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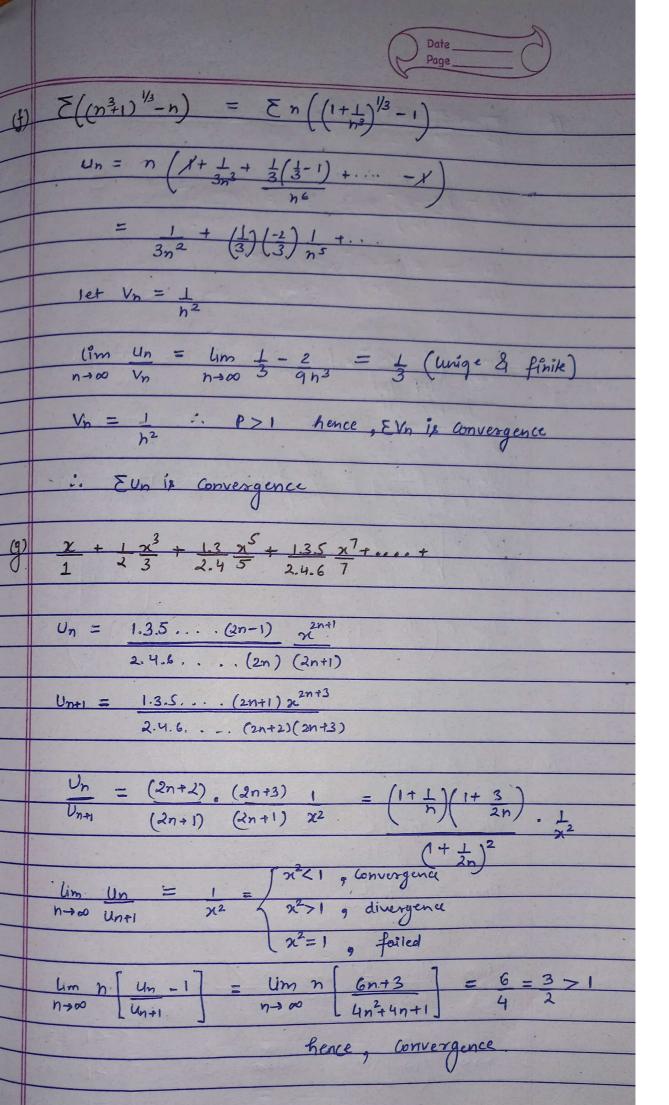
$$\lim_{n \to \infty} \left( \frac{1}{n^2} + \frac{1}{n^2} + \frac{1}{n^2} \right)$$

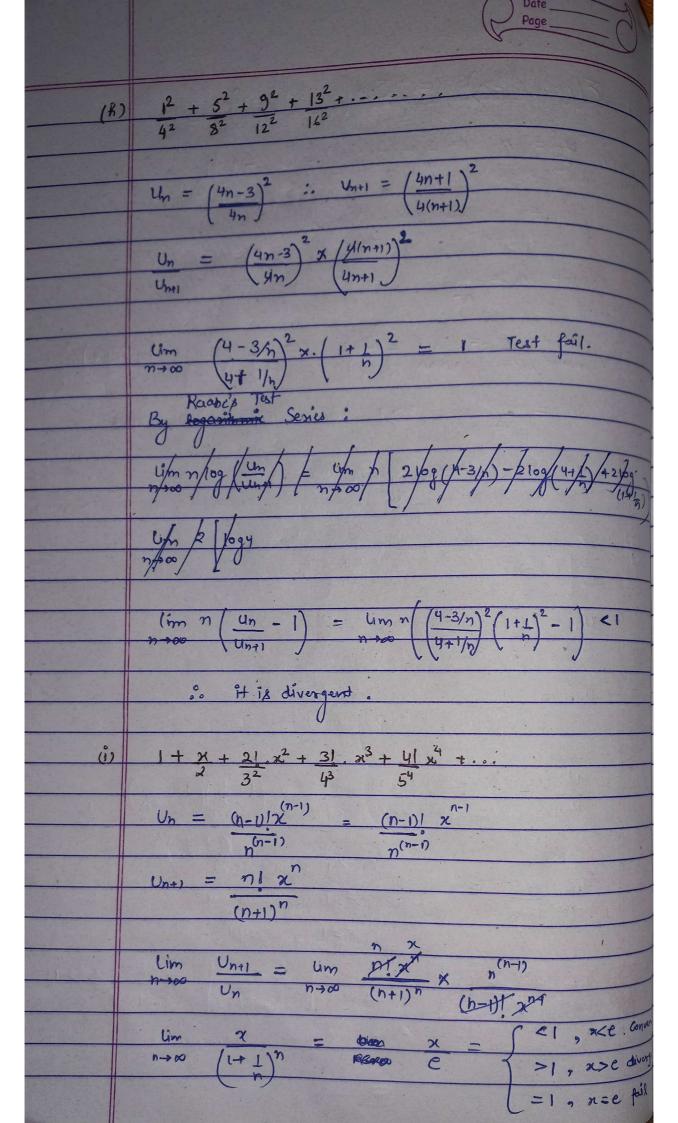
$$\lim_{n \to \infty} \left( \frac{1}{n^2} + \frac{1}{n^2} + \frac{1}{n^2} \right)$$

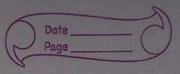
$$\lim_{n \to \infty} \left( \frac{1}{n^2} + \frac{1}{n^2} + \frac{1}{n^2} + \frac{1}{n^2} \right)$$

$$\lim_{n \to \infty} \left( \frac{1}{n^2} + \frac{1}{n^2} + \frac{1}{n^2} + \frac{1}{n^2} + \frac{1}{n^2} + \frac{1}{n^2} \right)$$

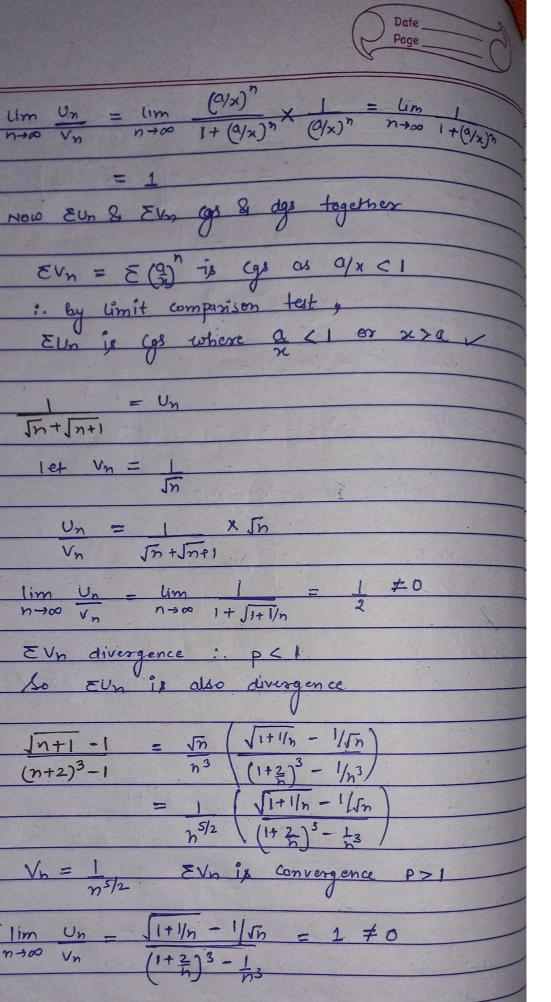
$$\lim_{n \to \infty} \left( \frac{1}{n^2} + \frac{1}$$





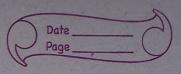


	for n=e using logarithmic Tept Series:
	$\frac{\lim_{n\to\infty} n\left(\log U_n\right)}{\lim_{n\to\infty} \left(\frac{1+1}{U_{n+1}}\right)^n = \lim_{n\to\infty} \left(\frac{1+1}{u_n}\right)^n = 1$
	$\frac{\lim_{n\to\infty} n \left[ n \log \left( 1+1 \right) - \log e \right]}{n\to\infty}$
	$\lim_{n\to\infty} n \left[ n \log(1+1) - 1 \right]$
	$\lim_{n\to\infty} n^2 \left[ \log \left( 1 + \frac{1}{n} \right) \right] - n$
	$\lim_{n\to\infty} n^2 \left[ \frac{1}{n} - \frac{1}{2n^2} + \frac{1}{3n^3} - \cdots \right] - n$
	= -1 < 1 , divergent
	x <e -=""> conv. 7 Au</e>
	n>,e -> div.
- 1	
9.2	(a) on case 1: If $x = a$
	$x^{n}+a^{n} \qquad U_{n}=1 < 1 \qquad \lim u_{n}\neq 0$
	hence, divergence
	Case 2: if $2/a < 1$ $u_n = \frac{1}{\left(\frac{2i}{a}\right)^n + 1}$
	$\lim_{n\to\infty} U_n = \lim_{n\to\infty} 1 = 1 \neq 0$
	hence, divergence.
-	(b) case 3: if $n/a > 1 = 0/x < 1$
+	
	$\lim_{n\to\infty} U_n = \lim_{n\to\infty} \frac{(a/n)^n}{1+(\frac{a}{n})^n} = 0$
	let $v_n = \sqrt{a} \gamma^n$
7	

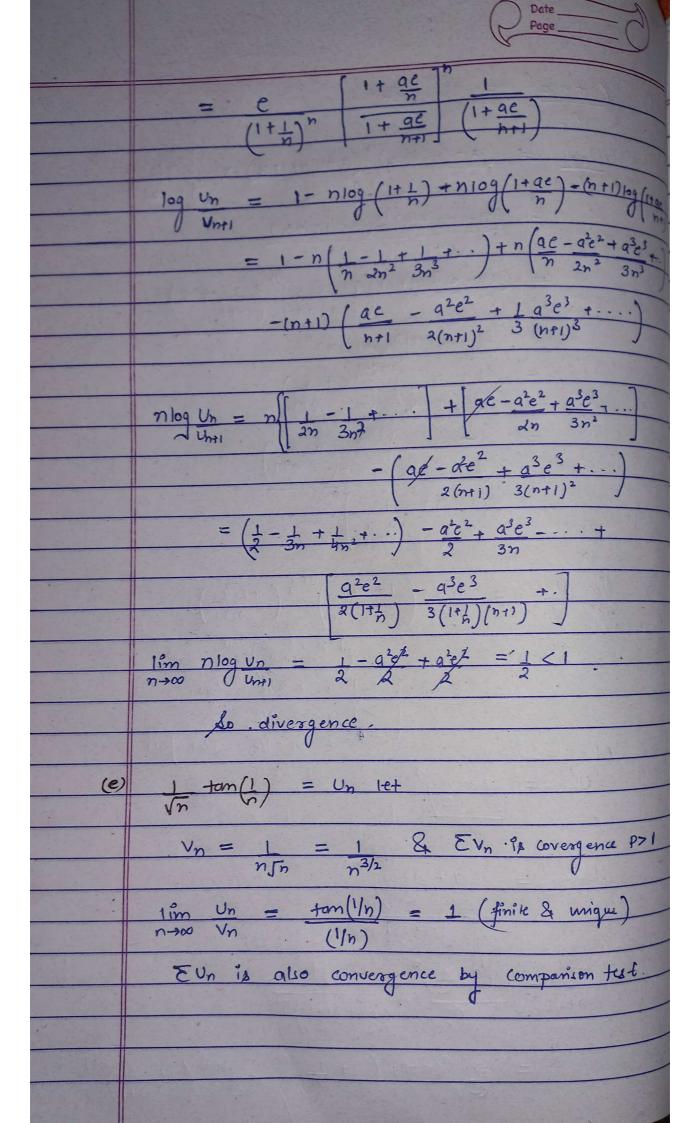


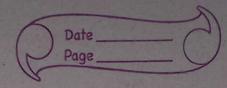
(b)

EUn is convergence by limit companison test.



(d) 
$$(a + n \times)^n = U_n$$
 (et  $n!$ 
 $U_{n+1} = (a + (n+1) \times)^n (a + (n+1) \times) \times n!$ 
 $U_n = (a + n \times + \times)^n (a + n \times + \times)$ 
 $(n+1)(a + n \times)^n$ 
 $= (a + n \times + \times)^n (n+1)(a + n \times)^n$ 
 $= (a + n \times + \times)^n (n+1)(a + n \times)^n$ 
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(f)  $3^{-n-(-1)^n} \rightarrow Un$  let  $EU_n = 1 + \frac{1}{3^3} + \frac{1}{3^2} + \frac{1}{3^5} + \frac{1}{3^5}$   $= 1 + \frac{1}{3^2} + \frac{1}{3^3} + \frac{1}{3^5} + \frac{1}{3^5}$   $^{?+} ?s \quad Convergence$  88 88 88 88  $8 = \frac{1}{3} : 8 < 1 \quad \text{if is Convergence}$