Assignment 1 OSIGBEMHE E. MUSTIN 16/ENG02/048 COMPUTER ENGINEERING ENG 281 [(22- 4) (Sin (cosx) 1a) lim for the numerator using product rule dy = U. du + v du

dx dx dx For U= 22-11/9 du = 2x dre For V = Sin (cos x) let w = cosx and V = 8min du = - Finx dv = (032) =- 8in X COEW du = dw + dv dx dx dw dv = - fin (cos(cosx)) Tre dy = [x2-IT]. - cos (cosx) sin x + sin (cosx).2 dy = [22-11]. - cos(cos 2) Sm 2 + Sin (cos 2). 22 For the denominator, let b = x- T/2

$$= \frac{311-2}{6} \text{ or } \frac{11}{2} - \frac{1}{3}$$

$$\lim_{x \to 3\frac{1}{2}} \ln \left[ \exp \left( \frac{3x^2 + 2x - 1}{2} \right) \right] = \frac{311-2}{6}$$

$$\lim_{x \to 2 + \sqrt{3}} \cos \left[ \frac{3in^{-1}(x-2)}{(x-\sqrt{3})} \right]$$

$$\lim_{x \to 2 + \sqrt{3}} \cos \left[ \frac{3in^{-1}(x+\sqrt{3})-x}{2+\sqrt{3}} \right]$$

$$= \cos \left[ \frac{3in^{-1}(x+\sqrt{3})-x}{2+\sqrt{3}} \right]$$

$$= \cos \left[ \frac{3in^{-1}(x-2)}{2+\sqrt{3}} \right] = \frac{1}{2}$$

$$\lim_{x \to 2 + \sqrt{3}} \left[ \frac{x^2 - 6x + 16}{x^2 - 5x + 4} \right]$$

$$= \lim_{x \to 7} \left[ \frac{2x - 6}{2x - 5} \right]$$

$$= \lim_{x \to 7} \left[ \frac{2(4) - 8}{2x - 5} \right]$$

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Beries 15 Converge ay 2 + 2 + 2 + 2 + 2 + 2 + 2 + 3x4 4x5 5x6 Solution Hin= 2+2+2+2+2+3P+3P+3P when P=2, we get 2 + 2 + 2 + 2 + 52 + Sin Ce 2 1 2 ; 2 1 2 ; 2 1 2 2 2 2 2 2 2 2 4 3 4 X 5 4 2 Therefore, the given series is convergent.  $\frac{6}{1^2} + \frac{2}{2^2} + \frac{2}{3^2} + \frac{2}{4^2} + \cdots$ 

Therefore, the given series is convergent $ \begin{array}{lll}                                   $		Since [] Hue Beries Converges
Un = $1+2n^2$ $1+n^2$ Solim $U_n = [\frac{1}{2}n^2]$ $1+n^2$ Solim $U_n = [\frac{1}{2}n^2 + \frac{2n^2}{n^2}]$ $1+n^2$		Therefore, the given Beries is Convergent
Vertically the series is divergent.  Vertically the series is divergent.		
It n <sup>2</sup> Solution: $ U_n = \underbrace{1 + 2n^2}_{1 + n^2} $ So $\lim_{n \to \infty} U_n = \underbrace{\begin{bmatrix} U_n^2 + \frac{2n^2}{n^2} \end{bmatrix}}_{n \to \infty} $ $ = \underbrace{\begin{bmatrix} U_n^2 + \frac{2}{n^2} \end{bmatrix}}_{\begin{bmatrix} U_n^2 + \frac{1}{n^2} \end{bmatrix}} $ $ = \underbrace{\begin{bmatrix} U_n^2 + \frac{2}{n^2} \end{bmatrix}}_{\begin{bmatrix} U_n^2 + \frac{1}{n^2} \end{bmatrix}} $ $ = \underbrace{0 + 2}_{0 + 1} $ $ = 2 $ Lim $U_n = 2$		
It n <sup>2</sup> Solution: $U_n = \underbrace{1 + 2n^2}_{1 + n^2}$ So $\lim_{n \to \infty} U_n = \underbrace{1 + 2n^2}_{n \to \infty} \underbrace{1 + n^2}_{n \to \infty}$ $\lim_{n \to \infty} \frac{1}{1 + n^2}$ $= \underbrace{1 + 2n^2}_{n \to \infty}$ $= 1 + 2n$		
It no solution:  Un = $\frac{1+2n^2}{1+n^2}$ So Lim Un = $\frac{1}{1+n^2}$ $\frac{1+n^2}{1+n^2}$		
Solution: $ U_{n} = \underbrace{1 + 2n^{2}}_{1 + n^{2}} $ So $\lim_{n \to \infty} U_{n} = \underbrace{\begin{bmatrix} U_{n}^{2} + 2n^{2} \\ -n^{2} \end{bmatrix}}_{n \to \infty} $ $ = \underbrace{\begin{bmatrix} U_{n}^{2} + 2 \\ -1 \end{bmatrix}}_{1 \to \infty} $ $ = \underbrace{\begin{bmatrix} U_{n}^{2} + 2 \\ -1 \end{bmatrix}}_{1 \to \infty} $ $ = \underbrace{\begin{bmatrix} U_{n}^{2} + 2 \\ -1 \end{bmatrix}}_{2 \to \infty} $ $ = \underbrace{\begin{bmatrix} U_{n}^{2} + 2 \\ -1 \end{bmatrix}}_{2 \to \infty} $ $ = \underbrace{\begin{bmatrix} U_{n}^{2} + 2 \\ -1 \end{bmatrix}}_{2 \to \infty} $ $ = \underbrace{\begin{bmatrix} U_{n}^{2} + 2 \\ -1 \end{bmatrix}}_{2 \to \infty} $ $ = \underbrace{\begin{bmatrix} U_{n}^{2} + 2 \\ -1 \end{bmatrix}}_{2 \to \infty} $ $ = \underbrace{\begin{bmatrix} U_{n}^{2} + 2 \\ -1 \end{bmatrix}}_{2 \to \infty} $ $ = \underbrace{\begin{bmatrix} U_{n}^{2} + 2 \\ -1 \end{bmatrix}}_{2 \to \infty} $ $ = \underbrace{\begin{bmatrix} U_{n}^{2} + 2 \\ -1 \end{bmatrix}}_{2 \to \infty} $ $ = \underbrace{\begin{bmatrix} U_{n}^{2} + 2 \\ -1 \end{bmatrix}}_{2 \to \infty} $ Since $\lim_{n \to \infty} U_{n} \neq 0$ $\underbrace{1 + 2n^{2}}_{n \to \infty} $ Since $\lim_{n \to \infty} U_{n} \neq 0$ $\underbrace{1 + 2n^{2}}_{n \to \infty} $ Since $\lim_{n \to \infty} U_{n} \neq 0$ $\underbrace{1 + 2n^{2}}_{n \to \infty} $ Therefore, the beries is divergent.	>	$U_n = 1 + 2n^2$
So lim $U_n = \frac{1+2n^2}{1+n^2}$ So lim $U_n = \frac{1}{2} \frac{1}{n^2} + \frac{2n^2}{n^2}$ $n \to \alpha$ $\frac{1}{n^2} + \frac{2}{n^2}$ $= \frac{1}{n^2} + \frac{1}{n^2} + \frac{1}{n^2}$ $= \frac{1}{n^2} + \frac{1}{n^2} + \frac{1}{n^2}$ $= \frac{1}{n^2} + \frac{1}{n^2} + \frac{1}{n^2}$ $= \frac{1}{n^2} + \frac{1}{n^2} + \frac{1}{n^2} + \frac{1}{n^2}$ $= \frac{1}{n^2} + \frac{1}{n^2} $	1	1+n2
So lim $U_n = [V_n^2 + \frac{2n^2}{n^2}]$ $n \to \alpha$ $1/n^2 + \frac{2n^2}{n^2}$ $= [V_n^2 + \frac{2n^2}{n^2}]$ $= [V$		
So lim $U_n = [V_n^2 + \frac{2n^2}{n^2}]$ $n \to \alpha$ $1 = [V_n^2 + \frac{2n^2}{n^2}]$ $1 \to \alpha$ $1$		Un - 1+202
$ \begin{array}{ll}                                    $		$1+0^2$
$ \begin{array}{ll}                                    $		- 1/2 + 0.5
$ \begin{array}{ll}                                    $		901 ln = 1/2+2021
$ \begin{array}{ll}                                    $		2 Zim Lin n
$= \frac{\left[\frac{\ln^2 + 2}{\ln^2 + 1}\right]}{\left[\frac{\ln^2 + 2}{\ln^2 + 1}\right]}$ $= \frac{0 + 2}{0 + 1}$ $= 2$ Lim Un = 2 $n \to \alpha$ Since Lim Un \neq 0 $n \to \alpha$ Therefore, the series is divergent.		n->0 1/2+ n/2
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Therefore, the beries is divergent.		170
		The face of a simple of
		merejore, me veries 10 divergent.
		2 + 36 + 54 = 1 + 3 + 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1

3) Find the range of Value 5 Of. 
$$x$$
 for which the 300 ieo below is absolutely convergent

$$\frac{x}{27} + \frac{x^2}{125} + - - + \frac{x^n}{(2n+1)^3}$$

$$\frac{90 \ln | U_{n+1}| = \frac{x^{n+1}}{(2n+3)^3}$$

$$\frac{|U_{n+1}| = \frac{x^{n+1}}{(2n+3)^3} \times \frac{(2n+1)^3}{x^n}$$

$$= \frac{x^n}{(2n+3)^3} \times \frac{(2n+1)^3}{x^n}$$

$$= \frac{x}{(2n+3)^3} \times \frac{(2n+3)^3}{x^n}$$

$$= \frac{\chi \left[8 + 0 + 0 + 0\right]}{8 + 0 + 0 + 0}$$

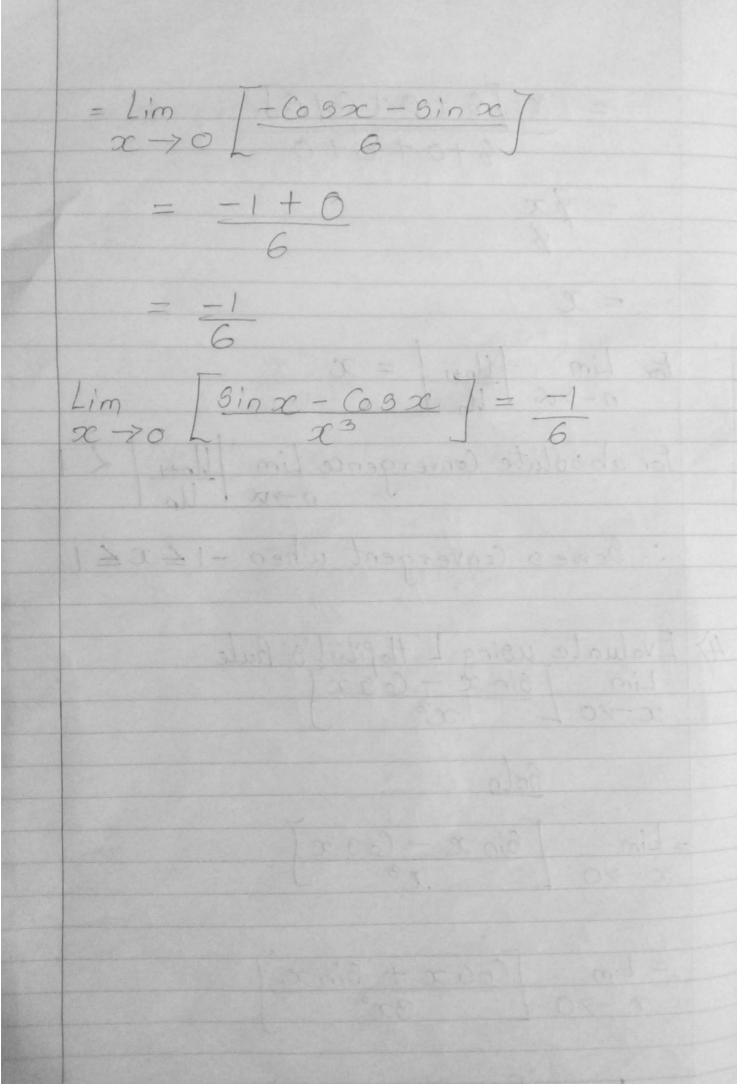
$$= \frac{g_{\chi}}{g_{\chi}}$$

$$= \chi$$

$$= \chi$$

$$= \frac{\chi}{g_{\chi}}$$

$$= \chi$$



$$\lim_{x \to \frac{\pi}{2}} \left( \frac{\pi^2 - \pi}{4} \right) \left( -\cos \left( \cos \frac{\pi}{2} \right) \sin \frac{\pi}{2} \right) + \sin \left( \cos \frac{\pi}{2} \right) + \frac{\pi}{2}$$

$$= \left( \frac{\pi^2 - \pi}{4} \right) \left( -1 \right) + 0$$

$$= \left( \frac{\pi^2 - \pi}{4} \right) - 1 = -\frac{\pi^2 + \pi}{4}$$

$$= \frac{\pi}{4} \left( -\frac{\pi}{4} \right) - 1 = -\frac{\pi^2 + \pi}{4}$$

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