Quiz 4: Yusuf Ismaíl Start 2:45 1) by excluding the zeros in between, the series becomes 1+1+1 which is \$\frac{3}{n-1} \frac{1}{n-0} Sill could be represented be  $F(x) = \frac{1}{x}$  and series is bounded by Lim 1 dx =7 lim [Inw] = lim In(n) = ln(2)

with lim In(n) approaching as, the series converses.

we choose 1 = dx because it's menotonic and bounds 2) I Ln(n) is bounded by I Ln(x) dx by integrating by Parts, u=Lnix) dv=xiz => [2Vx Lnix] - 5 3Vx

du= 1 v= 2Vx Lima 2/x ln(x) = Lim2/ri ln(n) - 2/2 ln(2) 3 2 Vn In(n) tends to as, thus diverges and makes the series dives you as well

 $\frac{\text{Lim an}}{n \Rightarrow \infty} = \frac{\text{Lim Ln(n)}}{n \Rightarrow \infty} = \frac{2}{\sqrt{n}} = \frac{2}{n \sqrt{n^3}} = 0$ so, the series diverges although an goes to zero 3)  $\sum_{n=1}^{\infty} \frac{1}{1+n^2} = \sum_{n=1}^{\infty} \frac{1}{1+\frac{1}{n^2}} = \alpha_n = \frac{1}{1+\frac{1}{n^2}}$ the series doesn't Pass the divergence test and is therefore divergent. End time 3:00 Pm