Betle: Beginneg of "Real analysis" Feoren: le ratual line sont anydété Coupleteres: 98 AER has an apper band, ren it has a "lub", in IR mullis. > Dos hold for TR rubes. Let A= 2 rEQ | 170 N 12 2 } I here we are talking about rahmal creats

A & bounded above. eg. 25 an apper bond, (hearly need to gladone)
(4) I will show that A his no best upper bound) 1.e host will mean that A is a set graharal, which has an upperbond, but no lub, and hence " the rational line is not complete" How will I show there is no lub? Let xEQ be away apper band of A, and show here is a smaller one (n'Q) ande: when do we we de Q for rathaulis Q = quotents! @ @ Quertout feutges Let x = Rq, whee P, q E NI)

Suppose x2<2 [000 100 or x 712, his lobe are] then 20127 p2 As nights larger, nonty increases what borned Do we can pick on n EAN' so large that 2/11/ > 29/2-p2 1.e 2n2g2 > (n+1)2p2 Hence $\left(\frac{n+1}{n}\right)^2 \frac{p^2}{q/2} < 2$ $\text{Let } y = \left(\frac{n+1}{n}\right)\frac{p}{q}.$ This y EQ and y2<2 00 g EA But 47X (Centradiction) appeland of A DO 22/12

Now well show for sa smaller upper Lord, and no chance of sony & benga lub. A = [r + Q r = 0 1 12 < 2], X s an upperband of A, (inform) X = //9/ goal: flow that A he apper hand smaller han X: we just shared that 22 7/2, Lonce Once V2 is irrapael, x7/2 Thes (aree x = /9). p2 >29,2 Picker no loge that: $\frac{n^2}{2n+1}$ 7292 $p^2n^2 > 2q^2 (n+1)^2$ (recrease) I.e

1.e p2 (n/1)2>2 Let y=(n) p n+1)q, hen y ∈ Q and y2>2. Ance (n/N/) But, for ony a & A, a2< 2<y2, so xy. Hence y is an upper bound of A, smalls This A does not have a lus. Thus prove he treasem.

Real Newson Segreences > hoyae long deal in analysis, but also in Calculus! Most ci a sequence? List: 91,9293.... Lang 2] infinite Segren eg $1,2,3,\ldots= \xi n_{n=1}^{\infty}$ (confinite sequence) $a = 7, 7, 7, \dots = 27 \sum_{n=1}^{\infty}$ 3, 1, 4, 1, 5, 9:= The degenood degts of TI $\sqrt{2}\left(-1\right)^{n+1} = +1, -1, +1, -1, -1$ (alternative Square) hostat $d_{n=1}^{2} = 1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}$ numbers get (a) (arbitrary) 2 1+2n] = 15, 14, 18, 1/6. get abutant, dese to 1 3,3.1,3.14,3.141,3.145 get close to TT

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