

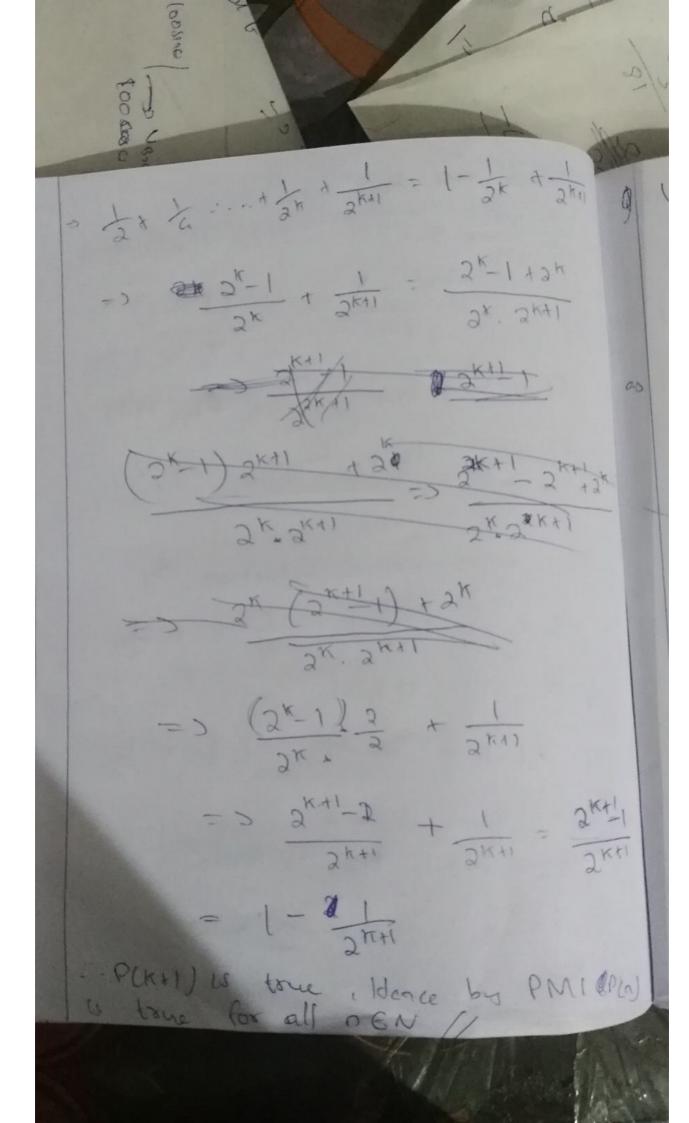
prove by Principle of mathematical industry that 1+3+3,+ ...+30-1 = 30-1 Corall nEN Let P(n) denotes the given statement P(n): 11 3 + 32 + ... +30-1 = 3-1 * Using evaluation p. Thun P(1) = 3'-1 = 3 = 1 P(n) is true los not assume Pan for n= + ie. 1+3+32...3K-1 - 31-1 (adding 3k on both sides 1+3+32+...3K-1+3K = 3K-1+3K =) 3K-1 + 3K => 3K-1+2+3K (200 min => 3×3×-1 => 3×+1-1

i. P(KAI) is bone Idence by mathematical valuetion Pop is bone los all n CN * Using mathe matical induction prove he 1.2 + 2.3 + 3.4 + -.. n(n+1) = n(n+1)(n+2 600 nEN Sd Let Pan denotes the given statement P(n): 1,2 Q1 2,3 + 3.4. +n(n+1) = 0(041)(0+2) P(1) = 1.2 - 2. | P(1) = (1+1) (++2) P(1) 13 love.

that P(K) is true 10, 12 123 136. K(KI) = K(KI)(K12) on adding (k+1)(k+2) on both sides 12 + 2-3+ 36. K(K1) + (K+1) (K+2) = K(K+1)(K+1) (K+1)(K+2) => k(k+1)(k+2)+3(k+1)(k+2) (KXI) (K12) [1/3 + 3/3] [5/1 = K43 => (K+1)(K+2)(K+3) . P(KAI) is true Idence by methorated Induction PCa) is true to all nEN

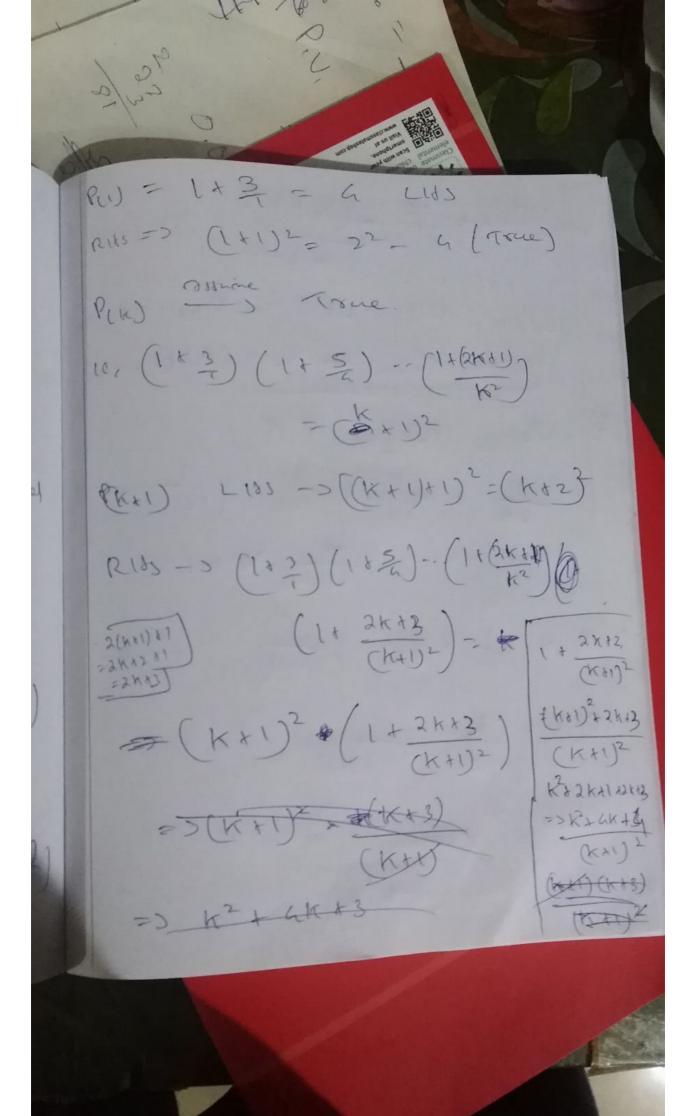
\$ 000\$ & Usins mathematical induction P.T a + as + as2+ ... arn-1 = a(821) for all nEN. sol Let P(n) = ad an das? t... dagnot = a(x0-1) P(1) = 9(8-1) = 9 which is love assume PCK) is tone 10, a 1 as + 982... a 8x-1 = a(8x-1) on adding ast on both sides a + a + a 3' .. a 8 k-1 + a 8 k + a (8 k-1) + a 1 => a(8x-1) + ax(8-1)

0 -> G8K-9 +98KH 9K (8-1) axx11-1 = a(xx11-1) P(K+1) is lone. Hence Pby PMJ Pen) is love for all new * Using Mathematical Induction. P.T los all nEN P(1) = 1- = 1- = - 6 - which is true Ossume that P(H) is bour P(N): なくない、まな~1-ま on adding the on both sides



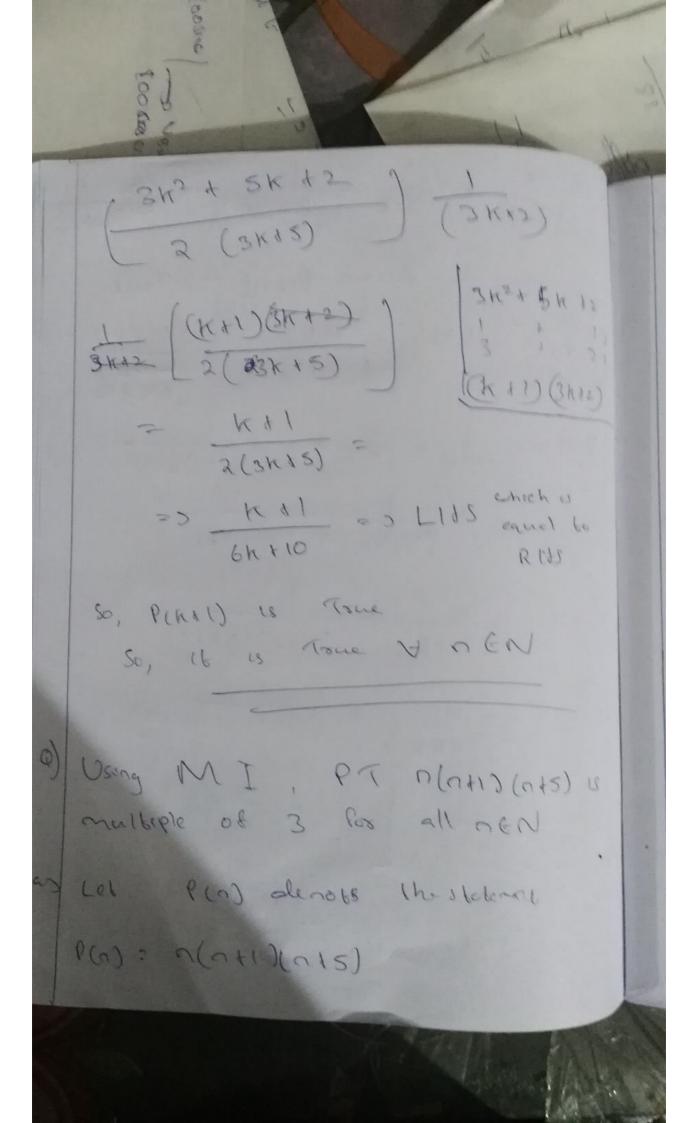
Using PMI, P.T (1-十) (1+古) (1+古)…(1十六) = NH HOEN Lot Pan = (1.+ +) (1++3)... ... (1+4)=011 P(1) => (1++)= 1/1=2 - Pour Ossume P(H) - True. 10, (1++) (1++) (1++) ...= (K+) (11/kg) we have to Prox P(kd1) to also Tous P(K+1) = (K+1)+1= K+2 (R185) (1++) (1+2) ... (1++) (1++1) Att A t the KII (K+1)(1+ K+1) => +++

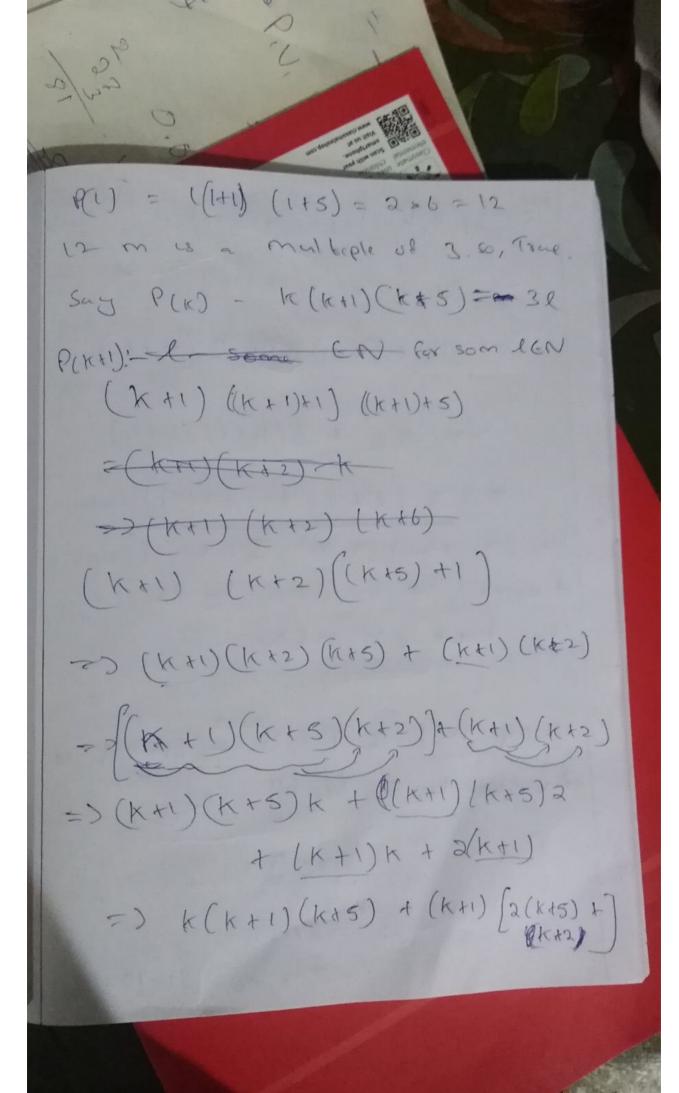
1000 B (KAY) 1 = 3 Pu 01 (K +1) (- 1+ / K+1) => (K81) (K+1)+1 10 => (K+1)(K+2) = K+2 => LIB which is equal to Pelds idence provide cesing PMI, Nove @ GnEN P. J. IMG PRIZU (P. T (1+3)(1+5)(1+2)...(1+(20+1)) =(U+1) A U EN Pa) = + (1+3) (1+5)...(1+(2n+1)) = (U+1)

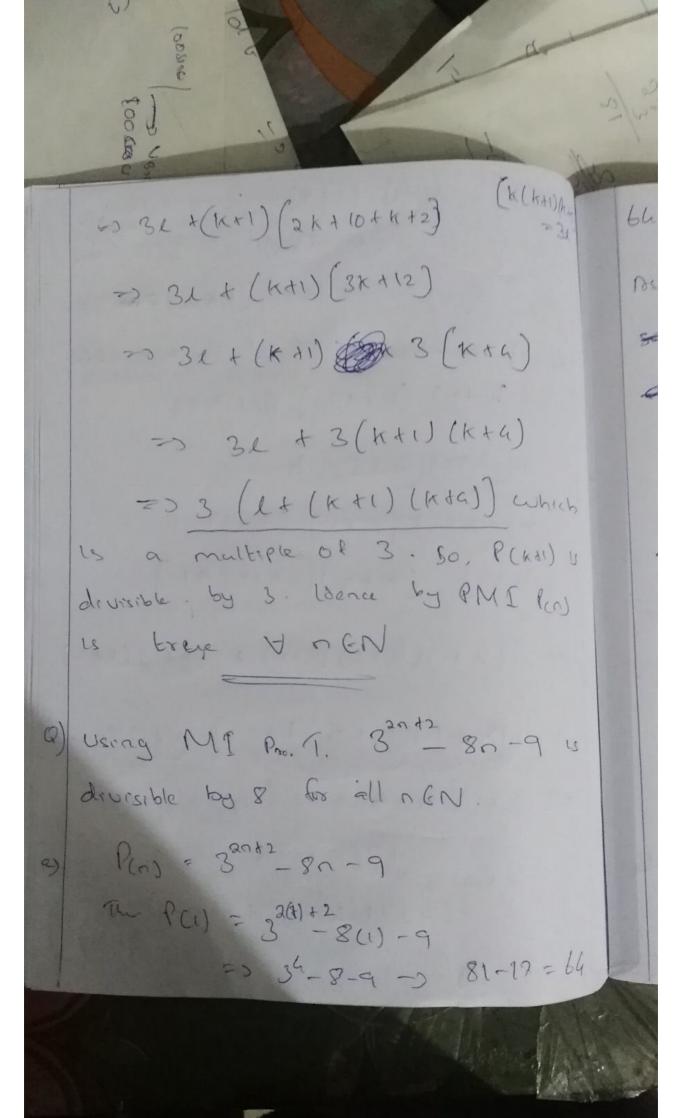


>2(K+1)2 ~ (K+2)2 = (K+2)2) Ry Here RIBS = LESS SO, P(KAI) holds For Monce Trace for Un EN (Proval) 9) Using MI P.T. 1 2.5 + 5.8 + 8.11 (3n-1)(3nt2) - D A WEN as P(a) = \frac{1}{2.8} \, \frac{5.8}{30-1(30.82)} = \frac{7}{60.44} P(1) = 1 = 1 L13 RUS - > 1 = to -> Tome. P(K) Ossumed to be

1.6, 1 5.8 (3K1) (3K-2) = 6K14 me have 60 prove PCKIN - J France PCKTO LIBS - KTI (KTI)
6(KTI) ta (KTI) R165-3 1 + \$.8 + ... + (3K-1)(3K+2) + - (3(k+1)-1) (3(k+1)+2 => K (6K+4) + (3K+2)(3K+5) => K + (3KAZ)(3KAS) => 1 (3K+5) 3K82 (3K8f5) +27







6h 18 divisible by 8 so it is true Assuming P(K) is true sor Than, 3 - 8x-9 ce divisible by 8. 7(ha) - 3 - 8(k+1)-9 = 3 3 - 8K -8-9. => (9)(3 =) - 8 x x 9 + 8 Kx 9 - 9 x 9 + 9a9 - 8k-17 $= 9 \left(\frac{3^{k+2}}{3^{k+2}} - \frac{8k \cdot 9 - 9 \cdot 6}{9 \cdot 9} \right) + \frac{4 \cdot 9k + 9 \cdot 9}{4 \cdot 2k - 9k + 81 - 17}$ $= 9 \left(\frac{3^{k+2}}{3^{k+2}} - \frac{8k \cdot -9}{9 \cdot 9} \right) + \frac{72k - 9k + 81 - 17}{6ak}$ $= 9 \left(\frac{3^{2k+2}}{3^{2k+2}} - \frac{8k - 9}{9 \cdot 9} \right) + \frac{6ak}{6ak} \left(\frac{6ak}{6k} \right)$ which is divisible by 8. t. P(kol) U toue.

a) Using MI P.T 41 - 16" is a multiple of 27 you a) P(0) - (1) - 14) P(1) = 41' = 14' = 27 which is a multiple of 27 so, PCI) is true Assuming PLW is true 10, 41k - 14k is a multiplod 20 Say "41" - 14" = 27 & for some LEN W) Then GINST 14KH >> 41 × 41 - 14 × 14 => G1 = 41 - 41 * 16 + 4 4 + 14 + 14 - 14 / 14 GI (41 - 14") + GIA 14" - 14" = 14"

0 => al (al = 19k) + 16k (41-14) by 27 (P(K) Assumed) divisible by 29 so, P(K+1) is True broved, Pas True VacN a) Using MI Pr 10 +1 is divisible by Il for all nEN a) Let P(0) = 1020- 1 DC12 = 10 +1 = 10+1=11 Il is divisible by Il so, Pen is True Assuming P(K) 15 Erue 10, 10 + 1 cs devisible by 11 10 de = 11 1 for some : LEN

N OF Den 10-(KHI) \$1 = 10 - 2102K+1+1 -> 102×10+1 -> 10=10 × 10+1 => 10= 10 = 1024 41 = 100 * 102 x 10 31 => (00 × (13 K1 + 1) => (00 x 10 x 100 - 100 41 100 (10 +1) - 100119 => 100x 11e - 99 =0 11 (1001-99) which re divisible 50 11. PIKHIJ is treve. Heavy by PMI Pens is true for all all