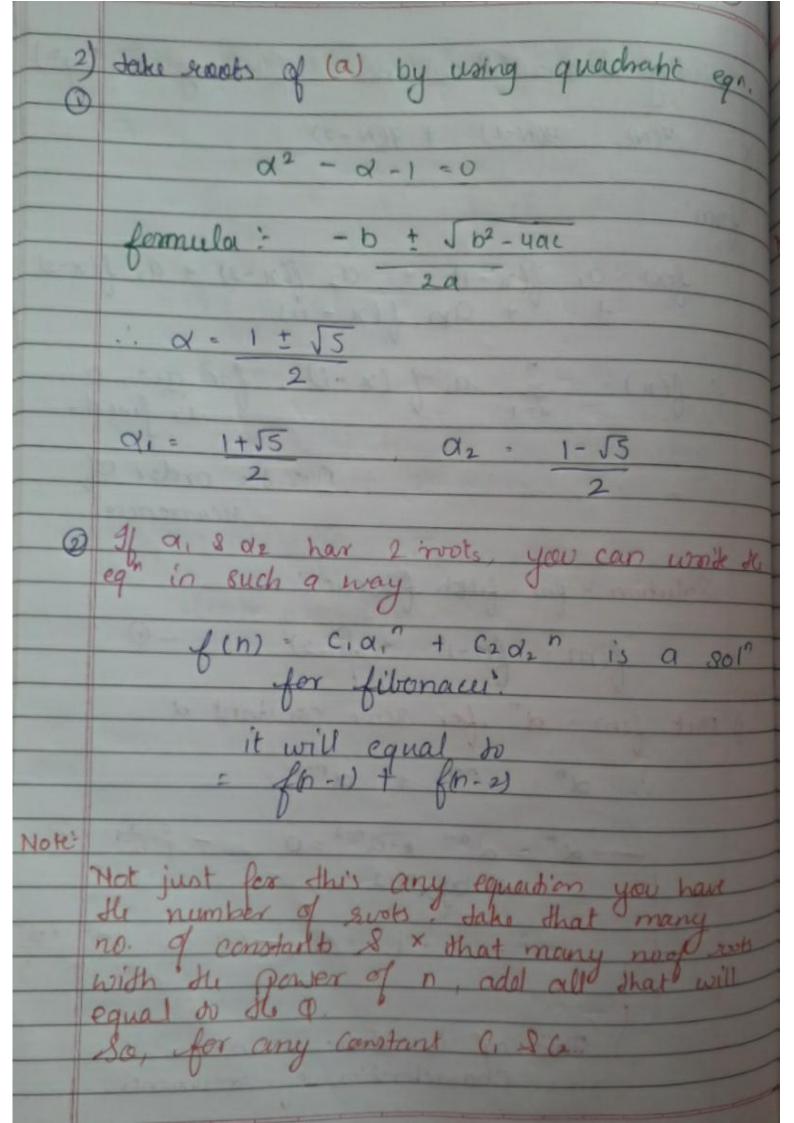
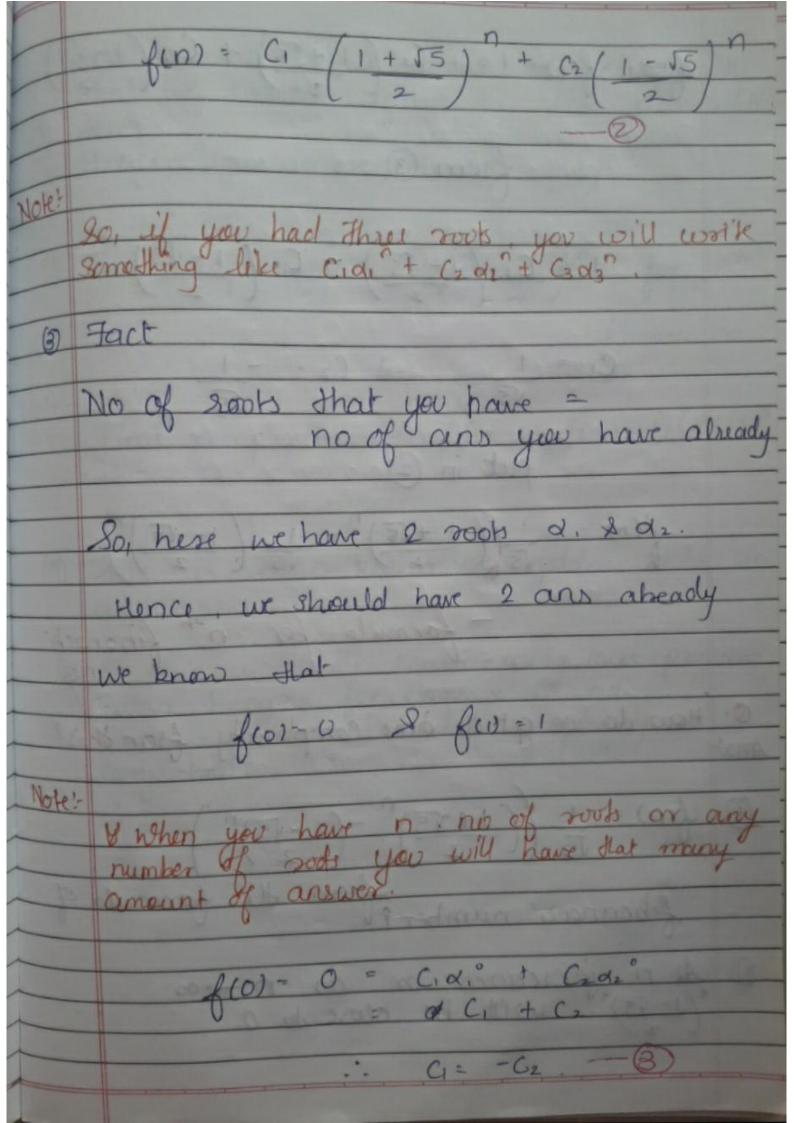
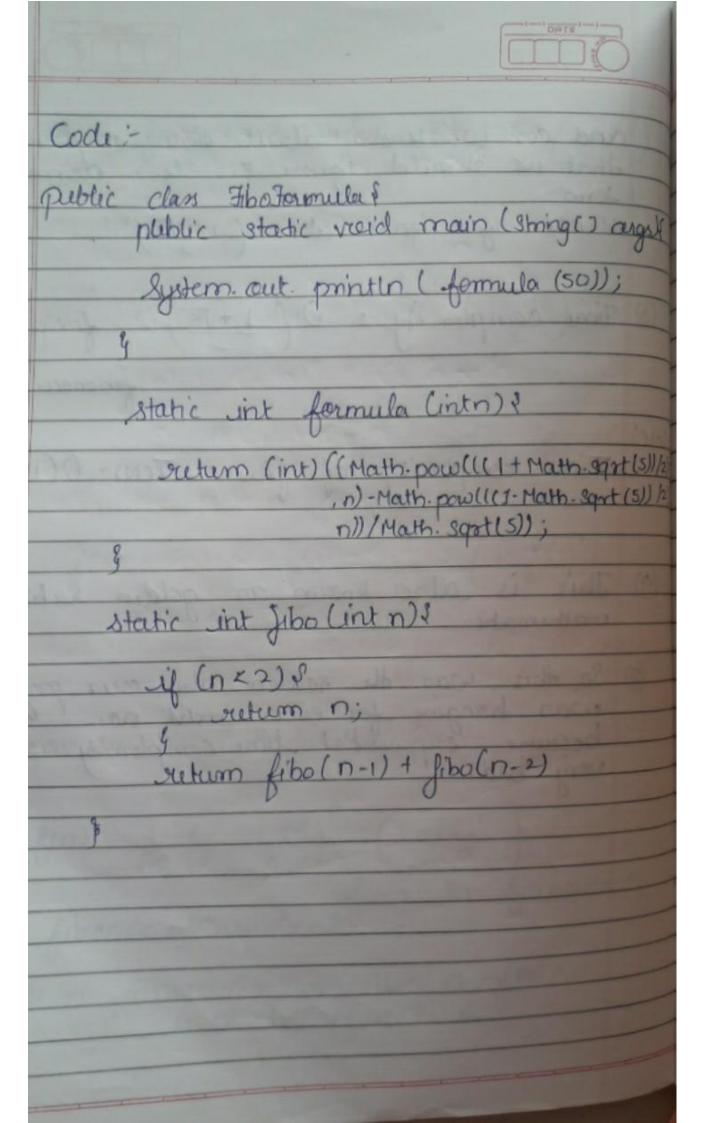
xx Solving Linear Recurrence: (Homogenous *egn) g(N) = f(N-1) + f(N-2)form' $f(x) = a_1 + f(x-1) + a_2 + f(x-2) + a_3 + f(x-3)$ $+ - - + a_{20} + (x-n)$: f(n) - = ai f (x-i) -, for ai -, o is fined. nis the order of Solution: for filter fibroracci no. fen = 86-0 + 80-2) -0) Put fin - a' for some constant a .. a" = a"-1 + a"-2 x2-x-1=0-(a) This eg" is also leneran as characterstics of secumence



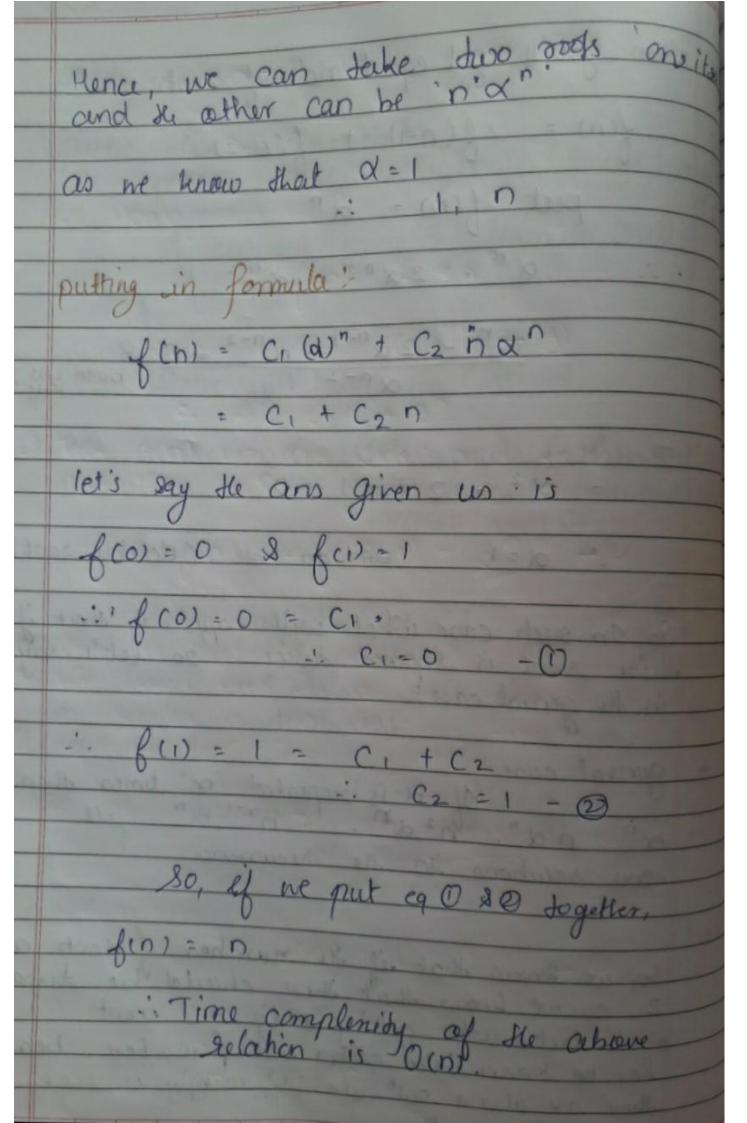


for f(1)= 1= C1 (1+J3) + C2(from 3 $1 - C_1 \left(\frac{1 + \sqrt{5}}{2} \right) - C_1 \left(\frac{1 - \sqrt{5}}{2} \right)$ put in 2 (1+15)n-1 - formula for non fiborac O. How do we get the time complexity from this $f(n) = \frac{1}{\sqrt{5}} \left(\frac{1+\sqrt{5}}{2} \right)^n - \left(1 - \sqrt{5} \right)^n$ fibonnaci number i from the formula of As in increases or as n->00

and as we know about time complexity
that we should ignore the less dominating Hence, igore ignore, de "(1-V3)". Jime complexity = 0 (1+55)". for not fibonacii no. Time complexity of fibo = T(N) - O(1.6180) 9 This is also known as golden saho in mathematics. 5 So, this was the scason why cour program was hanging for even small no. because enponential time complexity is very bad.



a when you'll get equal no of roots fin) = 2 f(n-v) + f(n-2) put fon - a" an = 2 d " + d n-2 xn-2 xn-2 both LH3 & $= x^2 - 2x + 1 = 0$ i a=1 and on both (double root) So, In such case what will happen is short if there root is repeated twice. so, let's say in the general case * general cone: a', na', ha a' nor all rive solutions to the recurrence Note : So, we know that if the number of souts are 2, 30 we know that there should be two So, we kean take entry noot from here because there are also a sol whe just multiply of whe know

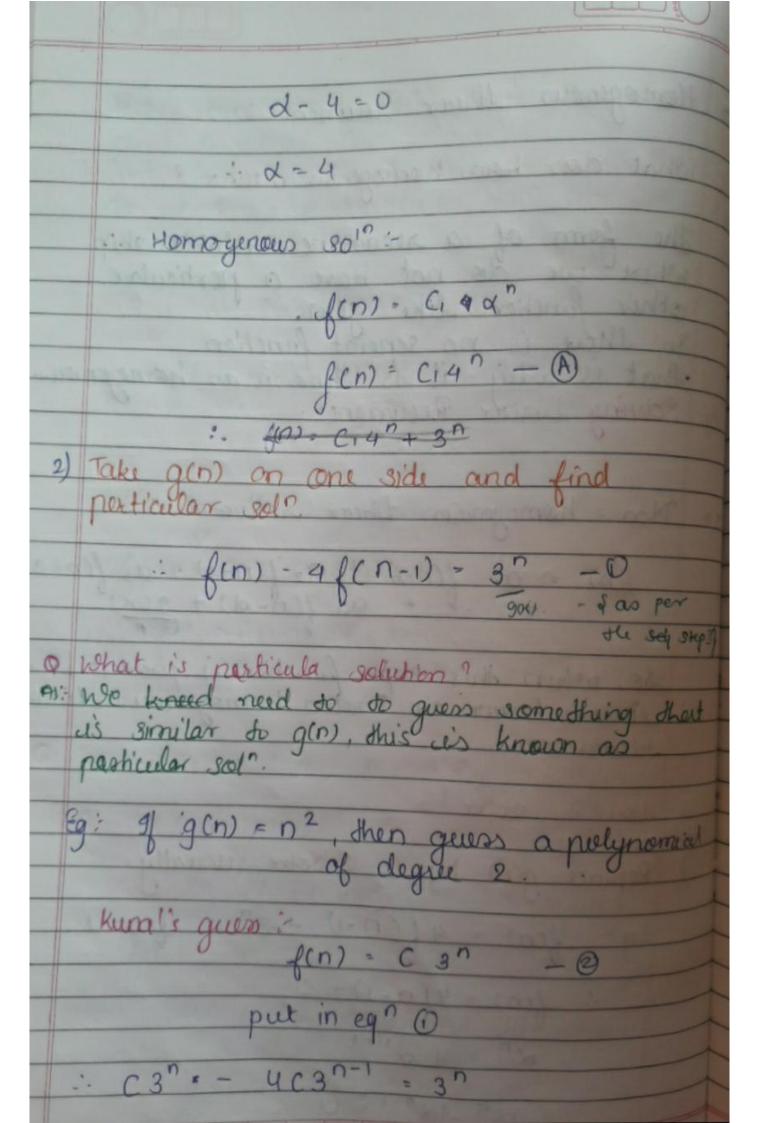


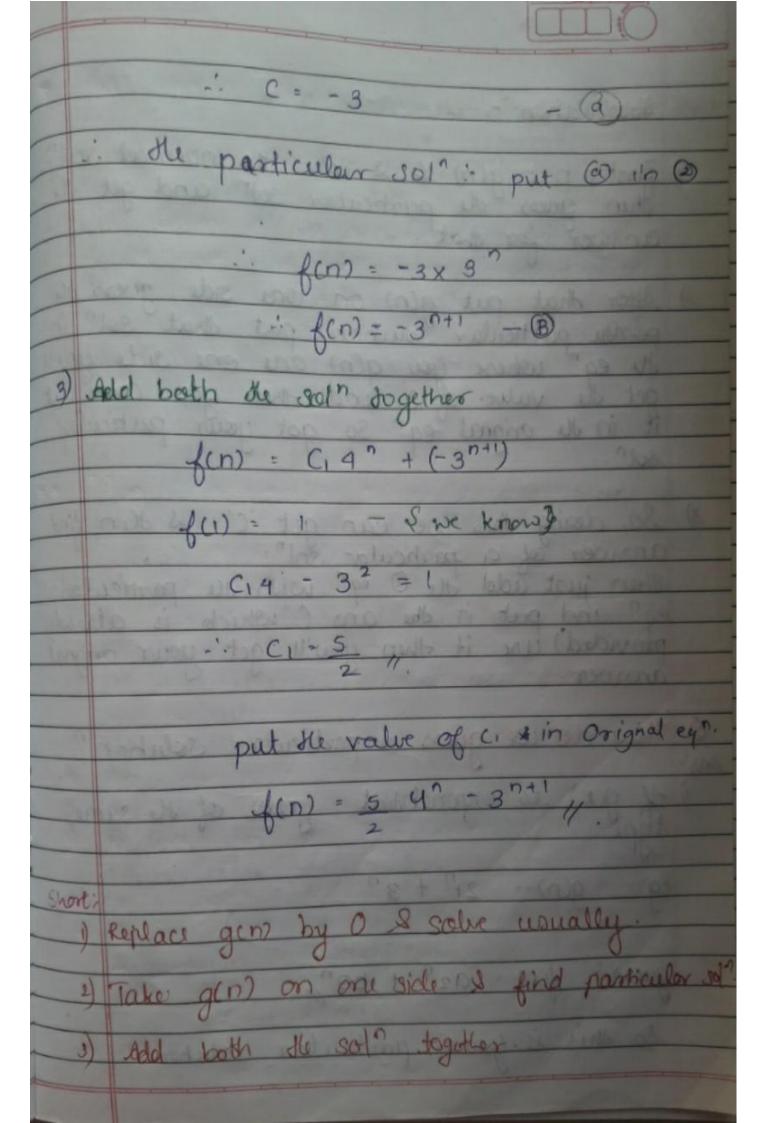
* Homogenous linear recursence: e what does how homogenous means ? the form of a recurrence relationship where we do not have a perticular other function like gov.

80 shore is no seperat function

That is why it is known as homogenous.

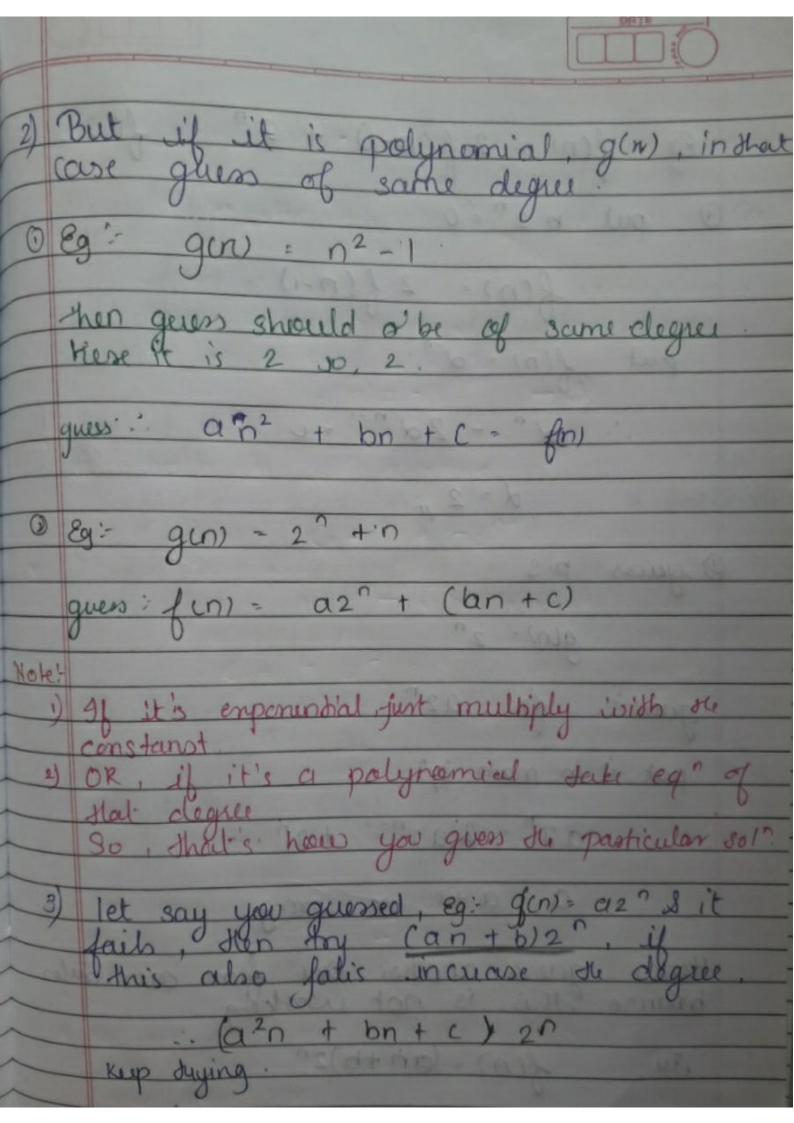
80 Solving Linear Recurrence. Non- Homogeneus Linear recumences: Jen) = au f(n-1) + az f(n-2) + az f(n-3) + + ad f(n-d) + g(x) So, when this entra function is present then it is known as Enolon homogenous linear 1 How to solve? I Replace g(n) by 0 & some usually. exg: f(n) = 4 f(n-v) +3", f(n-1 · fin) = 4 (n-1)+0 d" = 4 d"-1 : d4 -101-1= U

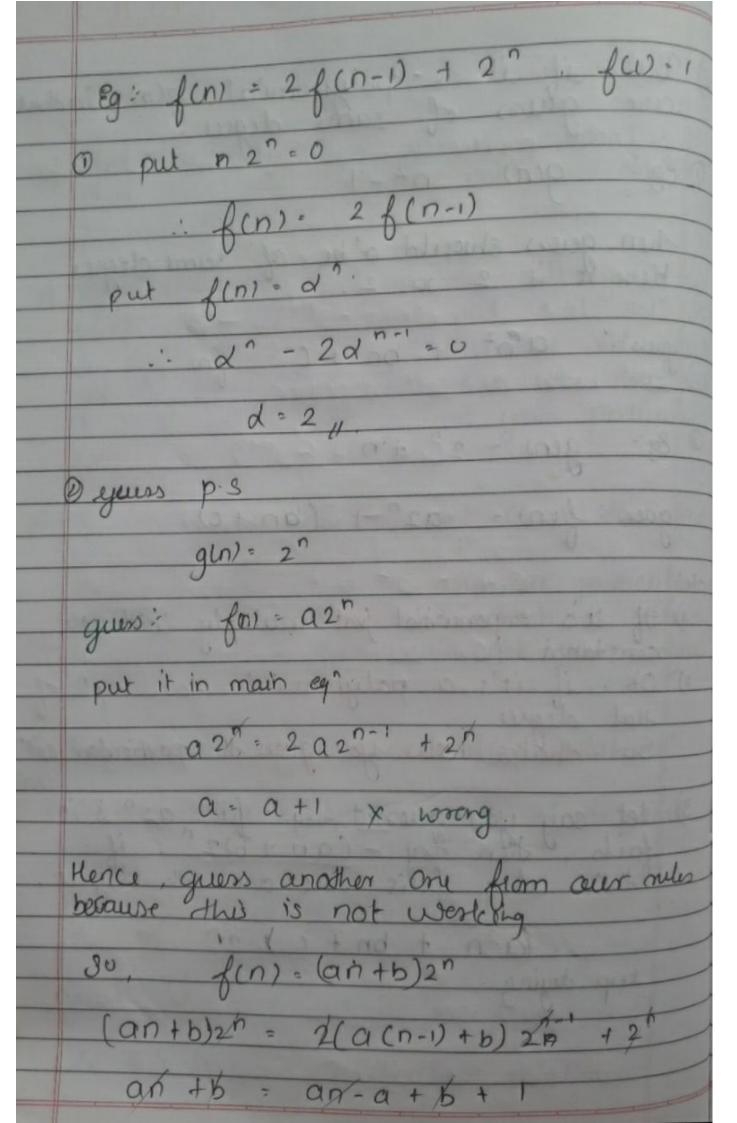




Abbrevation > i) First, put g(n) = 0 x take de normal solo Then guess de particular solo and get de answer for that. e) After that put g(n) on one side, guess the particular solution, put that soli in the equi where you g(n) one one side your get the value of c' and then you can autit in the original equi so, got your particular soli. soln. 3) So, doing this we can get it & then find answer of a particular sol".

Then just add the O eg with the particular eg and put it the ans ("which is already provided) use it then you'll get your original 9 How do we guess a posticular solution? I se ger is emponetiate, greess of the same Eg: g(n) = 21" + 3" quess: fin? - a2" + b3" So, this is your particular solution





· · · Q=+ discard b. f(n) - n2" our particuler sol genral answer :f(n) = C, 2" + n2" - Some of both the f(0) = 1 = c, +0 C1 = 1 -: fin: 2" + n2" Complexity = O(n2")