Big omega Notation: prove that g(n) = n3 72 2 +4n 1's 2 (n3) ton 10 (sn) 8 31 (18 + 2014 Soi) $g(n) \geq (n)^3$ 9(n) = n3+ 26° +4 mind bound may For Finding constants cordinated and $n^{3}+2n^{2}+4n\geq c.n^{3}$ (((n)0) brown 19490 Divide both sides with n3 + of 1000 $1+\frac{2n}{n^3}+\frac{4n}{n^3}\geq 0$ 1+ 2+ 4 > C1 bis also shows Here a and 4 approaches o pured paral Example C== astaks tond 1+ = + = = = = MAD S LANK 1+=+ + = > (122 1721) 1+2+2 = == (N31/18=1) Thus 19(n) = n3+2n2 +4n is indeaded 12 (n3) (m) (m) (m)

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Big Theta Notation : Determine whether h(n)
=4n2 +3n is O(n2) or not(20) = 21
 Cin < h(n) < con
In upper bound h(n) is o(n2)
In Lower bound han) is named
upper Bound (0 (n2));
                     CHO SIND + OCH ON
   h(n) = 4n2 +3n
   h:(n) < (, n2
                     COLL GO
   4n2 +3n < c2n2) 4n2 +3n <5n
let's Co=5
    Divide both sides by no
    4+ 3 5 5 Sharmon Market
h(n) = 4n^2 + 2n iso(n)(c_2 = 5 ino = 1)
Lower bound!
 h(n) = 4n +3n
 h(n) ≥ cin2
   4n2 +3n 2 CID2
1et's CIEY = 4n2+3n =4n
  Divide both sides by n2
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 $h(n) = 4n^2 + 3n$ (c(=4 | no=1) $h(n) = 4n^2 + 3n$ is $O(n^2)$

(3

Let f(n) = n3 - 2n2+n and g(n) -n2 Show wheter ten) = 1 (9(1)) is true or palse and Justin your > (0/1190012) f(n) ≥ cig(n) substituting (n) and g(n) into this inequality ove get n3 -2n2+n ≥ (-(-n2) and cond no holds n3-2n2+n2-cn2 Ut apolation n3 -2n2 +n +cn220 n3+ (C-2)n2+n20 n3+ (c-2) n3+n20 (n320) n3+(1-2)n7+n=n3-n2+n20 (c=2) f(n) = n3-2n2+n is 22(g(n))=22(-n2) Therfore the statement f(n)=12 (g(n)) is True Determine whether han) = n logn + n is O(n logn) prove a vigorous proof For your conclusion cinlogn & hand & conlogn upper Bound! Bound! and acol au land han) sice planting policies and silver han) = nognith o more to sold on nlogn to S Canlogn 11 + (N) THE (M)

pivide both sides by nlogn

1+ Togn & C2 (simplify) (c2=2) 1200 = (m) (ne bio (ro) oraleta Then han) is O(n 10gn) (2=2,10=2) Lower Bound! hon) 2 anlogn h(n) =n logn +n nlogn +n 2 Gn logn Dri'de both sides bi n logn 1+ n 2 CD = 1 17 2 C1 (2implie) +1 alt 109 m 3 /2 (m) C1=10) 12 add rolph Sor For all no I h(n) is -2 (n logn) - (5121 +1621) h(n) =n logn +n is O (n logn) solve the Following recurrence reptions and Find the order of growth of solutions

T(n) = 47 (n/2) + n217(1) =1

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T(n) = 4T (N2) +n2 (Ta)=1
  T(n) = 9T (n/b) + 6(n)
  9=4 16=2 (m)=n2
Applying master thereom
 T(n) = QT (n/b) + + (n)
    f(n) = O(n^{\log_0 n - \epsilon}) (\epsilon > 0)
  f(n) = 0 (n 109 69) , then T(n) = 0 (n 109 6 109 n)
 f(n) = 12 (n 109, 9+6) 1 than T(n) = 6 (1698) 1095)
Calculating log a:
   109,01 = 109, 4=2
    +(n) =n2 = O(n2) (comparing + (n) coith nogo
f(n) =0 (n<sup>2</sup>) =0 (n<sup>109</sup>69), (case 2)
 T(n) = 47 (n/2) +n2
T(n) = 0 (n 109 b 109 n)
                          =0 (n210gn)
order of growth
T(n) = 4T (n/2) + n with T(1)=1
   is O Cno logn).
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