Higher ords Non homogenous ODE. 8 3.3 Q1: y"-3y"+3y-y= exx-1. 50- As siven that, J-3y+3y-y=exx-1-0 so 8 90 is; J= Jc+Jp -> 0. For yez? Consider J" 3y"+3y'-y=0, -. (3)

Ab linear in J so solution 10; y= ex y'= xen, y'= x2 kn y''= 13 hn 18-312 dx 31x - ela = 0 13 31 - 31 - 1 = 0.  $\lambda^{3}(1)^{3} - 3\lambda^{2} + 3\lambda = 0$  $(\lambda - 1)(\lambda^{2} + \lambda + 1) - 3(\lambda - 1) = 0$  $(\lambda-1)[\lambda^2+\lambda+1-3\lambda]=0$  $(\lambda - 1) \left[ \lambda^2 - 2\lambda + 1 \right] = 0$ (x-1) (x-1)=0 5; ] = 1 , D=1 7 & [] = 1

Basis = < e, ne, n'en> G. Solution 9 ye is; Je= (1 e + (1 e x + (3 n e ) ) Now to Find you to= 29e + ao + ain. Tp=an3ex+aex(3n2) = a, p = an3ex+3n3aex+ae(3x2)+6xaex+0 = an3ex+ 6n2aex + 6naex Tr" = an ex 3 n'aex + 6 n'aex + 13 naex + 6 naex + 6aex TP"- anex + Enacx + 18 nacx + 6acx Put values in & O. 9n3ex+3naex+18naex+6aex-3(9n3ex+6naex+6naex) +3(qn3ex+3n2acx+q1)-n3aex = q0=q1x=ex-1-By company co-efficient que, x & x. +13/x/a

ex ghi + 9ghi + 1820 a + 6a - 30hi - 18ghi - 186 x + 30hi 3
$+96n^2 \times 3a = 0.2$
6a = 1
[a = 1/6]
$\pi: -q_1 = -1.$
Ta1-11
$n^{\circ}$ : $3a_1 - a_0 = -1$ .
-9 = -3 - 1
$\sqrt{a-4}$
So the general solution will be;
オー サイナか
y = (, ex+Q(ex+(3x)ex+1xex+x+4)
Ams

Q2 
$$y'' + 2y'' - y' - 2y = 1 - 4n^{3}$$

Son- As given that;

 $y''' + 2y'' - y' - 2y = 1 - 4x^{3} - 0$ .

The general so  $g \in 0$  is;

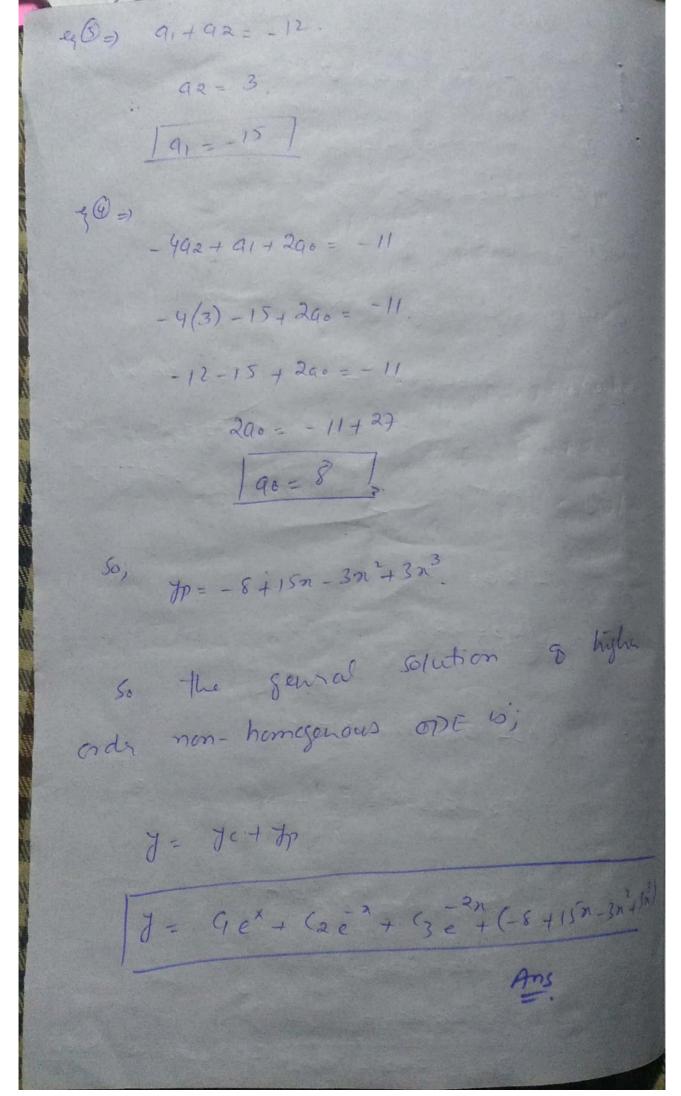
 $y'' + 2y'' - y' - 2y = 0$ .

For  $y = 2$ :

(onsich  $y''' + 2y'' - y' - 2y = 0$ .

 $y = e^{\lambda n} - 0$ 
 $y = e^{$ 

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Q3:- 
$$(p_{+}^{4} + 5p_{+}^{2} + 41) = 3.5 \sin h 2x$$
.

592. As given Ital;

 $(p_{+}^{4} + 5p_{+}^{2} + 41) = 3.5 \sin h 2x$ .

 $f_{+}^{2} + 5f_{+}^{2} + 4y = 3.5 \sin h 2x$ .

 $f_{+}^{2} + 5f_{+}^{2} + 4y = 3.5 \sin h 2x$ .

As gen solution &  $q_{+}^{2} = 0$ .

 $f_{+}^{2} = 2$ .

Consider  $f_{+}^{14} + 5f_{+}^{2} + 4y = 0$ .

So aloth & put their values in  $q_{+}^{2}$ .

 $f_{+}^{2} = 2$ .

 $f_{+}^{2} = 3.5 \sin h 2x$ .

 $f_{+}^{2} = 3.5 \sin h 2x$ .

 $f_{+}^{2} = 3.5 \sin h 2x$ .

 $f_{+}^{2} = 2$ .

 $f_{+}^$ 

To Find Ip=? letis to a coshan + b sinhax 79' = 2a sinhin + 26 cosh 32 To" = 4a coshax + 4b sinhax Th"= 8a Sinh3x + 85 conh3x 1p = 16a 8 (0) h3x + 16b 8inh 32. By putting Yalues in & O. 16a(ohan+16bsinhaz+5(4a(oshan+4bsinhan)+4(acohan + b sinhan) = allestran x to sinhan By company co-efficient & conhan & sinhan (ohan; 16a+20a+4a = 0 la=07 Sinhan: 16b + 20b+4b = 3.5 b= 7/80 80; D= 7/80 Sinhan =) D= 49 Sin 2K So; genal sor s; 3(E) ) y = Georn + (1 Sinn + 13 Coran + 48in Ax + 49 Sin 2hx) Ans

$$G_{4} = (D^{5} + 3D^{2} \cdot 5D - 391)y = 300 \cos^{3} .$$

$$S_{67} = y'' + 3y' - 5y' - 39y = 0.$$

$$y = e^{\lambda 7}.$$

$$\lambda^{3} + 3\lambda^{2} + 3\lambda^{2} e^{\lambda 7} - 5\lambda e^{\lambda 7} - 39 e^{\lambda 7} = 0.$$

$$\lambda^{3} + 3\lambda^{2} - 5\lambda - 39 = 0.$$

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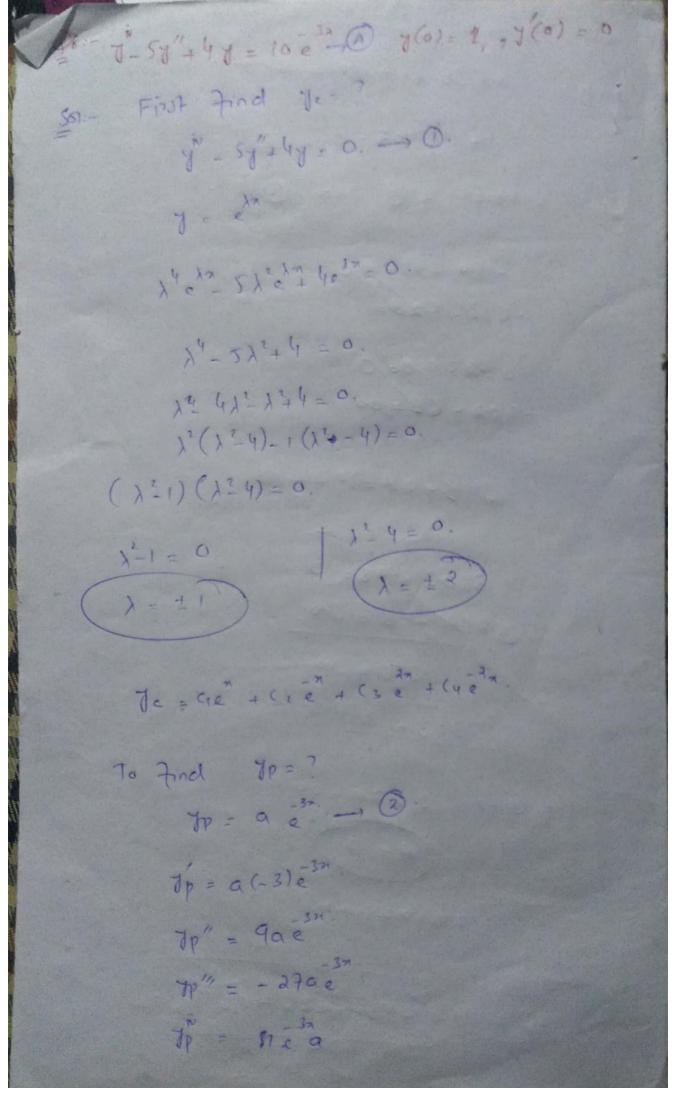
$$\lambda^{3} + 3\lambda^{2} - 3$$

X = -6 = 136-58 2 -6+ 1-16 2 - 6 + 40 1) = - 3+21 1 1/2 = - 3 - 21 Je = C, R + (2 R + (3 R Je = Cie + Cae (coax + (3e 8n ax Now to Find yp=? Jp = @ A (0) x + B 8 in x T'= - Asinn+ Bcom 7" = - Acon - 138172 T"= A SINA - BCOOM Q (D=) Asina- Boom +3(. Acom - Bsina) -5(-Asina + Bcom) - 39 (Acorn+ Bsinn) = = 300 Com Compains co-ests. - B - 3A - 5B - 39 A = 300. -6B-42A =300.

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Some Address Sinn: A- 3B +5A-39B= 0. +4A-42B=0. \_\_\_\_ Subhact & @ From @ -4A -42B +0 4 /A - 428/= 10. -42A-68=300 B+7A=50 - (1) 287-2948=0 3 28A +4B = 300 2981 = 300 18 = 1 9 (B) => 1+7A=50. (A=7) Yp = 7 con 2 + 8002 80; | y = 4 = 4 (2 e cos 2 n + (3 e sindre

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G(A)=) = 879e - 5(9)a = 440 = 3x 10e 819-459+40=10. a = 1946 Ta=44 So the gen. Sol. 7 = (1 e + (2 e + (3 e + (4 e + 2) e) Apply initial (ordition 1 = (1 + (2 + (3 + (4 + 1/4) 3/4 = (1+(2+(3+(4))) y'= (1e- (2e+2(3e-2(4e-3e-10) 7(8) Apply condition. y (0) = 0 · 0 = (1-(2+213-2(4-3/4. 3/4 = 4-62+213-214 - (9) 7"= (12+(20+4(3e+4(4e+2)+9e3) -- B) Apply Initial condition. 7110)=0

$$0 = 9 + 10 = 14(3 + 14(4 + 194))$$

$$-94 = 1 + 10 = 14(3 + 14(4 + 194))$$

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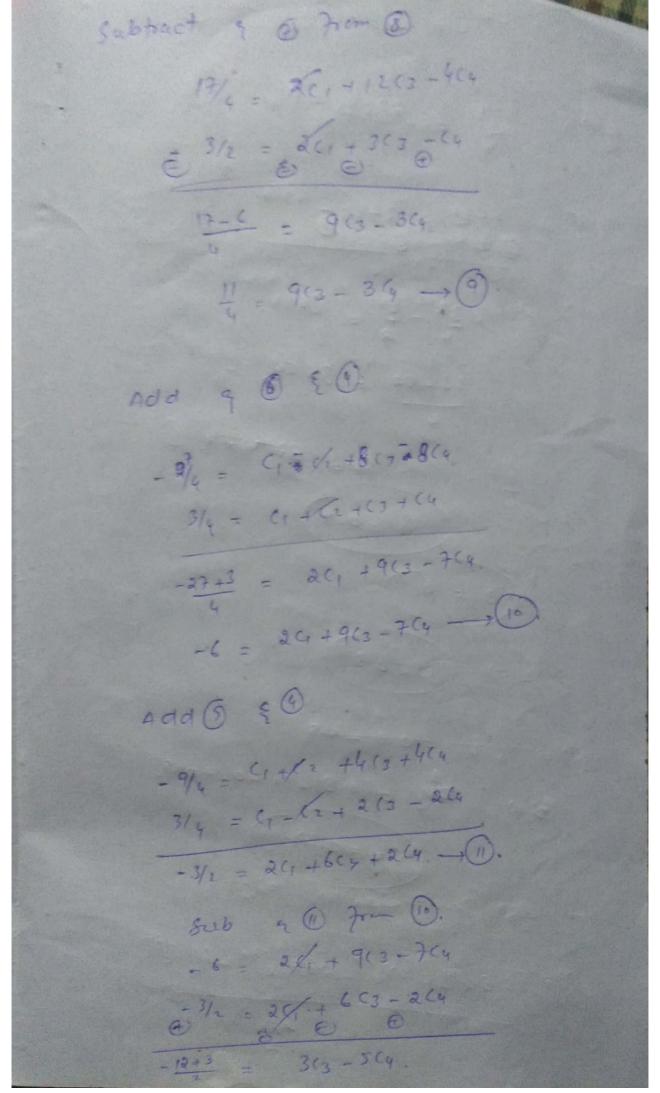
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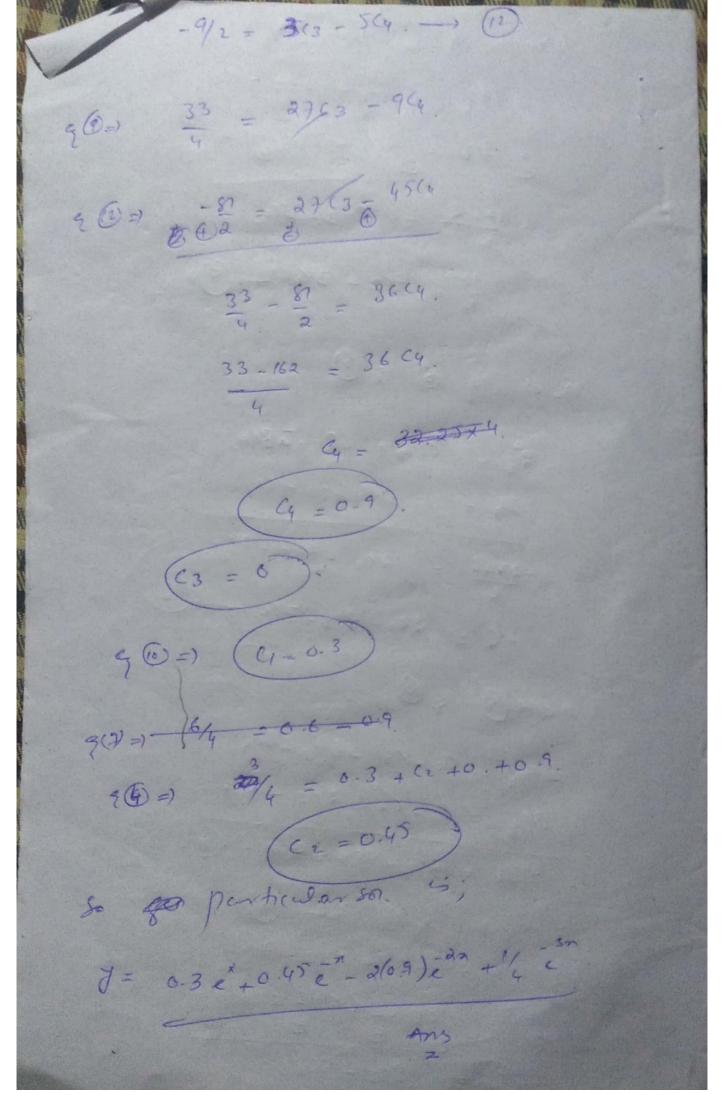
$$4 = 10 = 10$$

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4=-(3 let (3=7, when YER. · [ 1 = v ] if (3=v). 17 = 2(,+(+)e + re + con-2sinx. where YER.

To Find yp=?	
$dp = ae^{2n}$ .	
$f' = 2ae^{2n}, f'' = 4ae^{2n}, f'' = 8ae^{2n}.$	
800) 8ae - 24ae ) - 9(2ae ) + 18 ae = e.	
6-e.	-
(a-0)	THE RESIDENCE AND ADDRESS.
	THE PARTY OF THE P
	The state of the s
	THE PERSON NAMED IN
	-

$$\frac{Q_{12}}{(0)} = \frac{2D^{2} - 9D + 18I}{(0)} = \frac{2}{2} , \quad \frac{1}{3}(0) = \frac{1}{4}. \quad \frac{1}{4}.$$

$$\frac{1}{3}(0) = \frac{1}{4}. \quad \frac{1}{4}. \quad \frac{1}{4}.$$

$$\frac{1}{3}(0) = \frac{1}{4}. \quad \frac{1}{4}.$$
The general solution is;
$$\frac{1}{1} = \frac{1}{4}. \quad \frac{1}{4}.$$

$$\frac{1}{4} = \frac{1}{4}.$$

$$\frac{1}{4} =$$

$$\frac{9(0) = 0.4, \quad 9'(0) = -0.4, \quad 9''(0) = -0.4.}{9(0) = -0.4, \quad 9''(0) = -0.4.}$$

$$\frac{9(0) = 0.4, \quad 9'(0) = -0.4, \quad 9''(0) = -0.4.}{9(0) = -0.4}$$

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$$\frac{9(0) = 0.4, \quad 9''(0) = -0.4, \quad 9''(0) = -0.4.}{9(0) = -0.4}$$

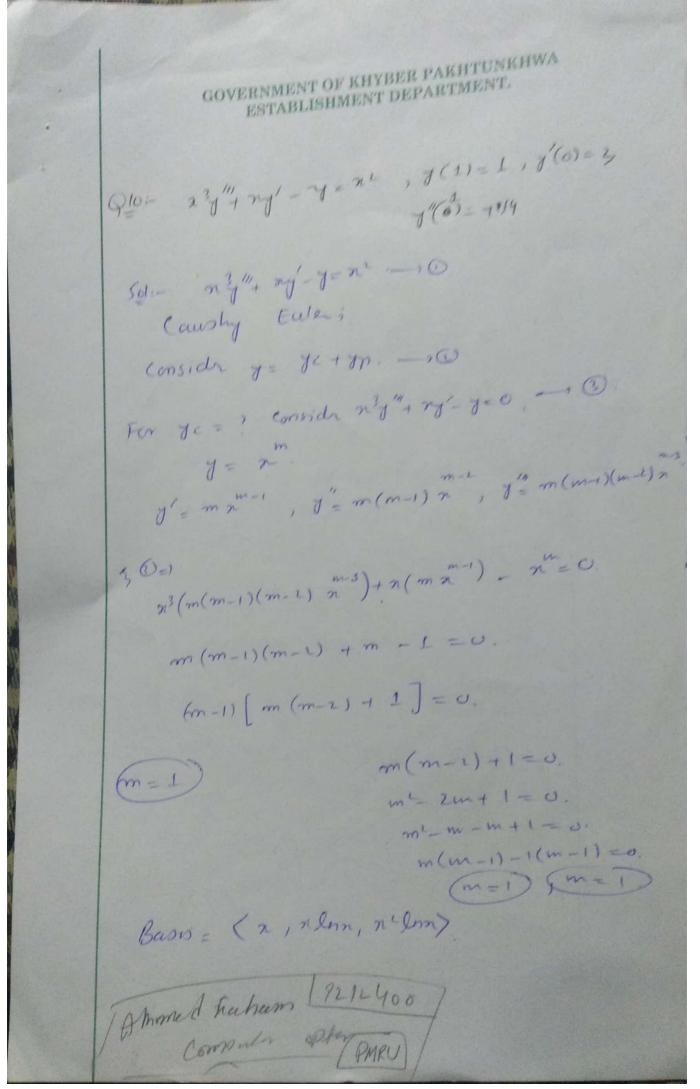
$$\frac{9(0) = 0.4, \quad 9''(0) = -0.4, \quad 9''(0) = -0.4, \quad 9''(0) = -0.4.}{9(0) = -0.4}$$

$$\frac{9(0) = 0.4, \quad 9''(0) = -0.4, \quad 9''$$

Apply Conditions y(1)=1 [4=0] リニ リナス(物)にナ(コルカナス(な)) ラナマル、 y'= 4 + (2 + (2n lon+n) (3+ an 1'(0)=3, 3= 0+ (2+0+0 162 = 3 / y"= (3x(1/m)+2lnn)(3+2 7"(1)=14 14= (2+0)(3+2. (3=13/ =) (3=6) So, the required solution will be y = 3 x lnx + 6 x lnn | Ans - Jor wolf thought (0)

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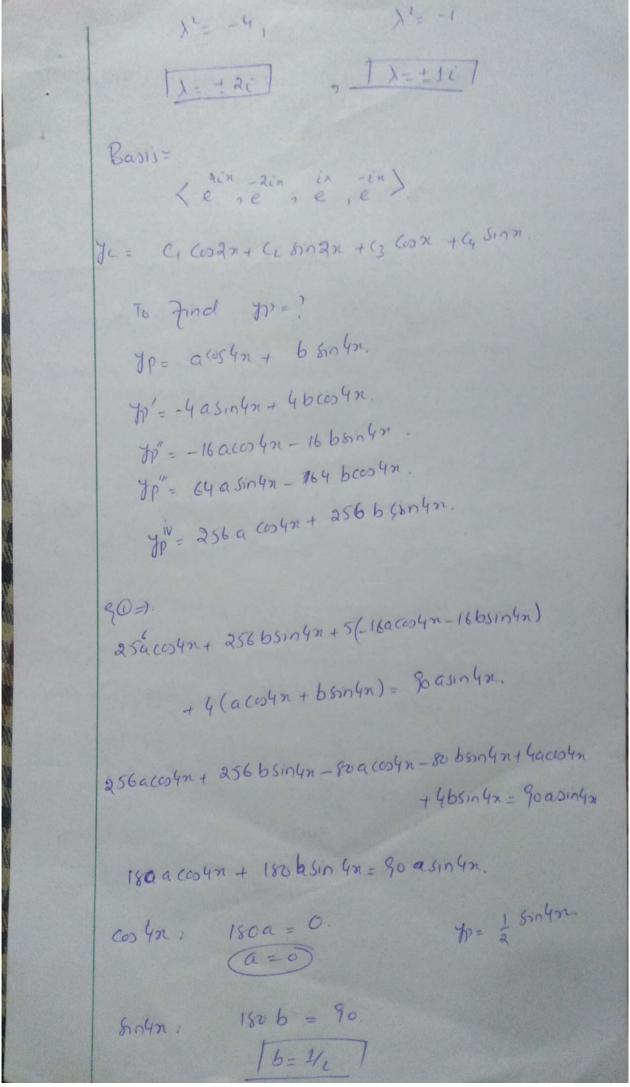
· ye = Con+ Conlan + Contan. To And Tre? To = 90 +9, 2 + 9222 To = 9, 12922. h"= 202. Put in 50. n3(292)+n(9,+292n)-a0-a,n-92n=n2. 2022 + a/n + 202 n- a0-a/n-an= n2. By compains co-efficient gin, n & n. 230. 292 xt- agot = 1 (92=1) x: 9,-0, =0 (a,=0) nº: [a0=0] プロ= 1x1=) 「カンコン 500) j= 9x+ x lnx (1 + nelnx 3. + ne.



	90-1 1- 6,000
	Cq = 1+1/3
	1 C4 = 4/3
	Consider of 6 & 6
	x= 201+18+1.
	6 = -862 - 68 - 16
	-6, Cz = 16.
	L2 8/3
	q (3)=1 2(1+(3=0.
	2(-8/3)+(3=0
	[c3 = 16/3]
	So the general solution can be
1	So the general worther as.
	y=-1/3 con 3n+4/3 sin 3n-8/3 cosn+1/6 sinn+1/2 sin4n
	Ans

オープイナタア J= 4000 9 n+ 62 Singn + 63 Sinn + 64 Coon + 1/2 Sin 4n. Find 9,61,67 & G apply Initial condition; 7(0)=1 1 = 44, -, 0 1'= - 24 Sin 2n +2(2 cos 2n + Gcosn - Cy cosn + 25/14/2n. 7(0) = 2. 2 = 2(2 + (3 -) (2). 7"= -4 4 60522 - 4(25in22 - 38in2 - 4com 44 cos 4n. 7"(0)=0. 0=-44-Cy -1 3. 7"= 8 Cysinan - 8 Ca cosan - Ca cosn + Cysinn-16 cos4n. y"(0)=0. 0 = -8(2-(3-16-16). 0=-461-84 90 € 3=1 10= 4+64 -361=1=1 (1=-1/3

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So Je= 4/5 (osn + 2/5 sinn. the general solution is; y= (10 + (20 + (30)) Ams

So, Te= Gen (2 8 73 n + 63 e. To Find yp=? Ty = acon + bsina yp'= -asinn+ bcosn, Th"= - acon - 6802. Ty" = asinn-boon. By putting values in & O. asinn-bcon-3 (tasin -accon-bsinn)+3 (-asinn+bcon)+acon+bsinn asinn-been +3acon +3boinn - 3asinn +3bcon+ acon+ bonn = 4con - 208112 - 26 com + 40 com. + 468172 - 4 con. Comparing co- efficient & com & sinn, 26 +49 = 4 Con: 6+29=2-Sinn: -2a+4b=6. a = 2b. 56=2=) (6=2/5) 6+46=2= a = 4/5

$$y' = \lambda e^{\lambda x}.$$

$$y'' = \lambda^{2} e^{\lambda x}.$$

$$y'' = \lambda^{3} e^{\lambda x}.$$

$$\lambda^{2} e^{\lambda x} = \lambda^{3} e^{\lambda x}.$$

$$\lambda^{3} - 3\lambda^{2} \lambda^{3} + 3\lambda e^{\lambda x} + e^{\lambda x} = 0.$$

$$\lambda^{3} - 3\lambda^{2} + 3\lambda + 1 = 0.$$

$$\lambda^{4} - 4\lambda + 1$$

$$\lambda^{3} - 3\lambda^{2} - 3\lambda^{2} + 1 = 0.$$

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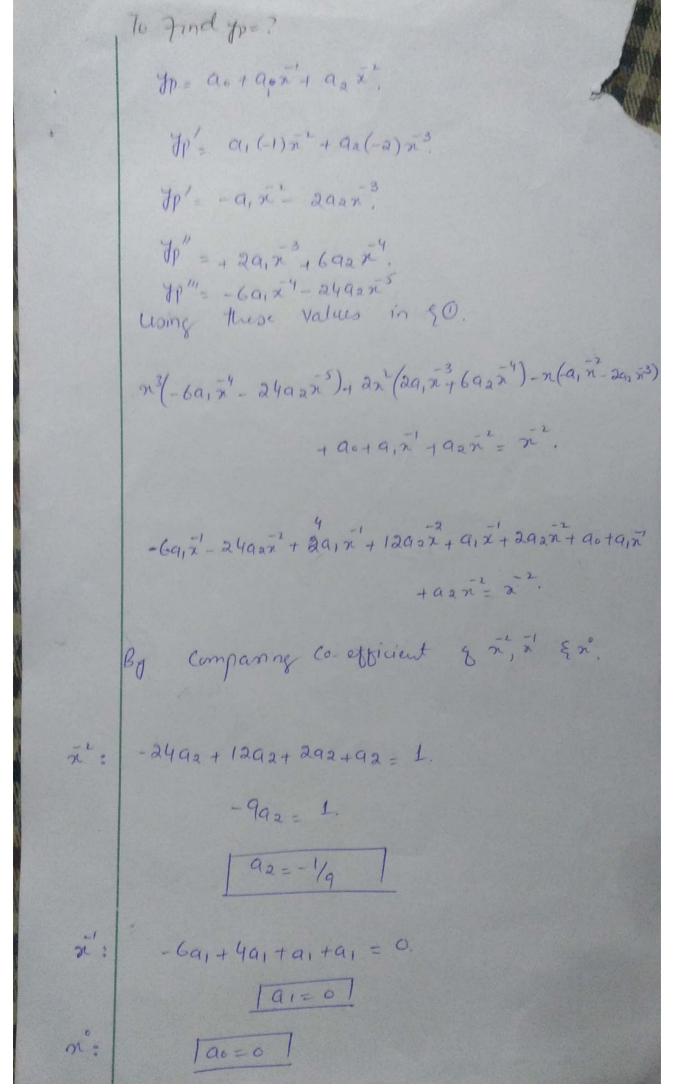
By company co-etticals &. Son & cox. Sinn + - 3a = 1 [a=-1/3] Con 3b = 0 [b=0] To= - 1/2 (052. So the general solution is; 1 1p = 4+62 (002n + (36)n2n - 1/3 (com.) 97:- (D=3D+3D+I)7= 4cox. 501:- 7"-37"+37+7= 4cox -10. As general solution & qo is; For ye=? J"-3y"+3y'+y=0.\_\_\_\_\_. As linear in y so. y= e' 5 solution & 3

$$43=) \quad 7'' + 4y' = 0.$$

$$\lambda^{3} + 4\lambda = 0.$$

$$\lambda(\lambda^{2} + 4) = 0.$$

$$\lambda($$



So; 
$$y_p = 0 + 0 - \frac{1}{9}x^2$$
.

 $y_p = -\frac{1}{9}x^2$ 

So the general of g non one with  $y = y_c + y_p$ 
 $y = y_c + y_p$ 
 $y = y_c + y_p$ 
 $y = C_1x + (2x^2 + C_3x) C_{nn} - 1x^2$ 
 $y = y_c$ 
 $y = y$ 

45:- 
$$(n^3b^3 + 2n^3p^2 - nD + 1)y = n^2$$
.

Soli-

 $3y''_+ 2n^3y''_+ ny'_+ y = n^2 \longrightarrow 0$ .

To Enter (ausky equation.

As general solution of 90 is;

 $y = y + yp \longrightarrow 0$ .

To Find  $y = ?$ 

(onside  $n^3y''_+ 2n^2y'_+ ny'_+ y = 0$ 

By trail;  $y = n^m$ .

 $n^3m(m-1)(m-2)n^{m-3} + 3n^2m(m-1)n + nmn + n$