02: FIRST ORDER DE.

(de sa ti)

=> Direction fields =

The method (alts) field is a graphical method for displaying the general shapes behaviour of solns of De of the form d = fitting), where fig a grow of a valuables xite y

=> seperable dibturel =

The differ eq can be reduced to the form $\frac{dy}{dx} = \frac{g(x)}{h(y)} = \frac{g(x)$

(3-on sol state mont) I has dy = I g as dx + c.

Son sol dets - eq - on second and and some series among a second and second an

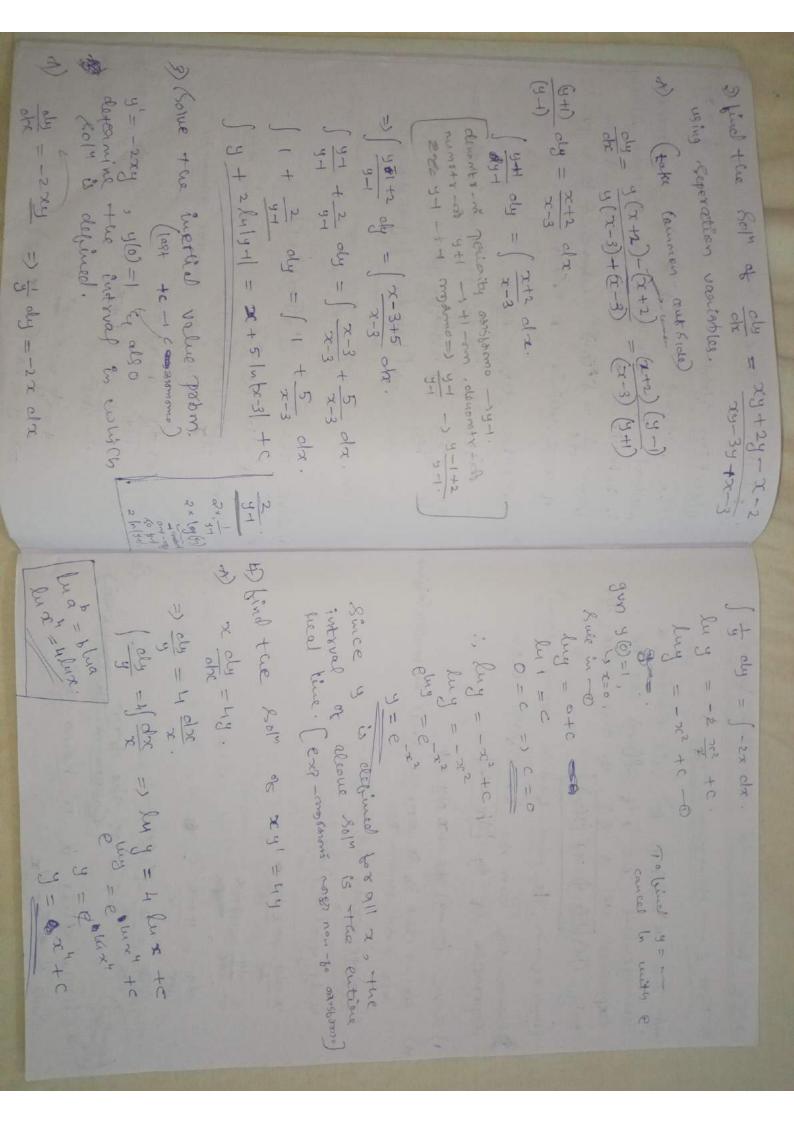
1) Rolve the DE y'=(1+x) (+y2)

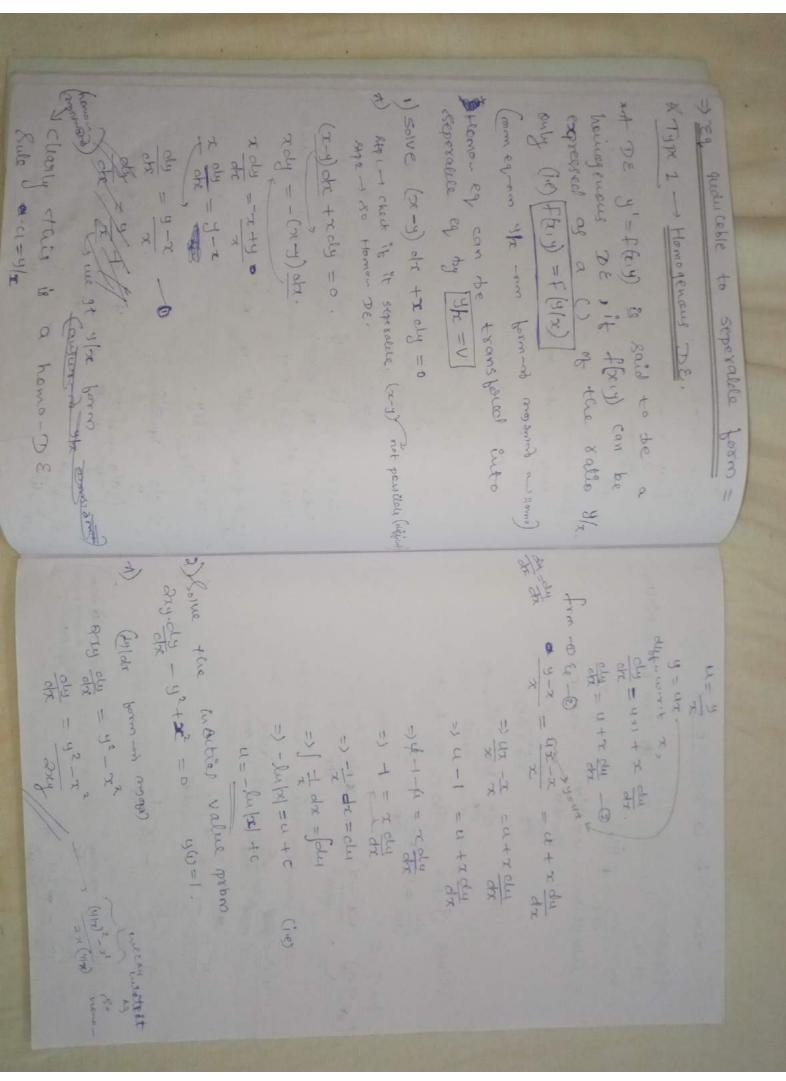
here $\frac{dy}{dy} = (1+x)(1+y^2)$ here $\frac{dy}{dy} = (1+x)(1+y^2)$ (dy Eldx -incurrer remains)

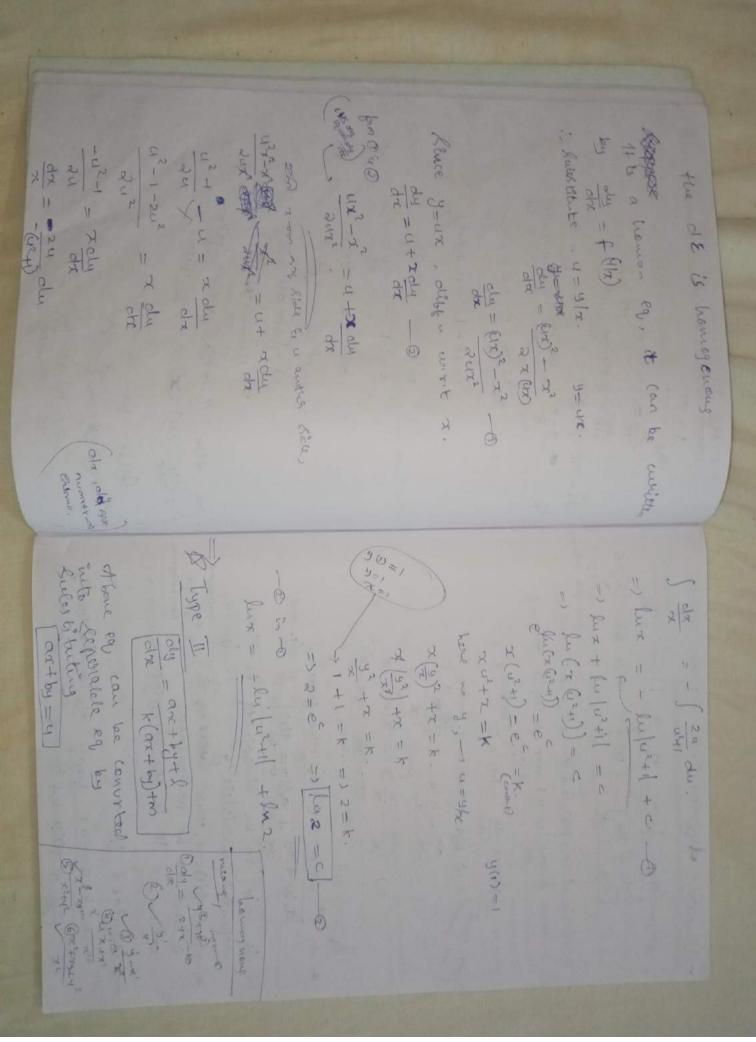
(3) $= \frac{1}{1+y^2} = (1+x) dx$ $= \int (1+x) dx$ $= \int (1+x) dx$

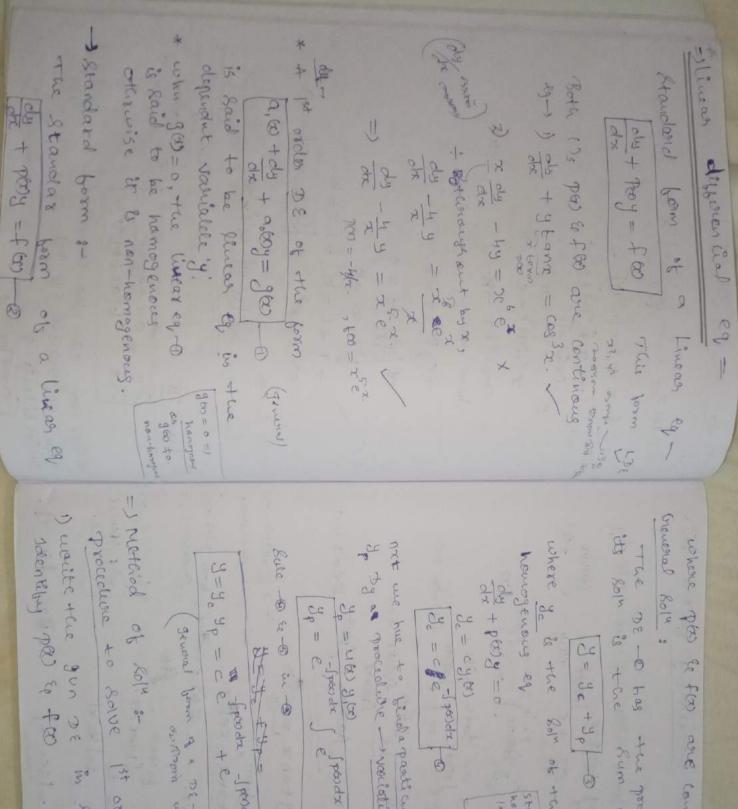
+ any = x + x2 + c => y = tan (x + x2 + c)/ oly =tan y

ity2 =tan x



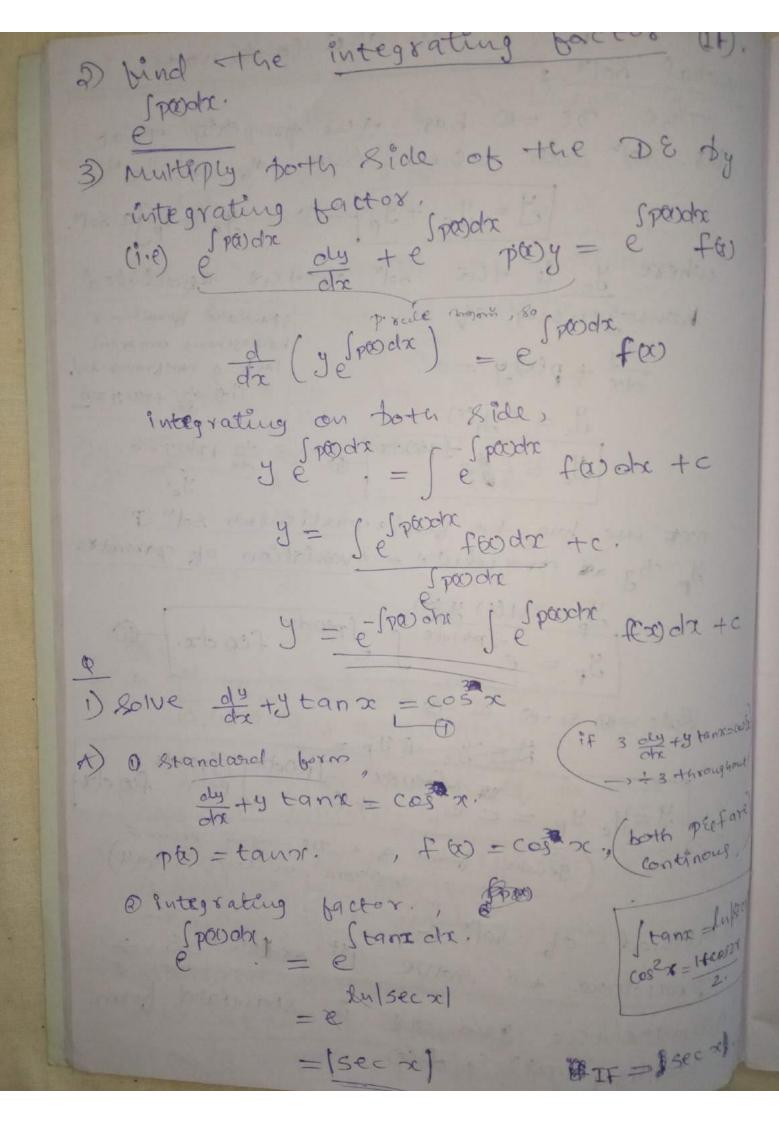




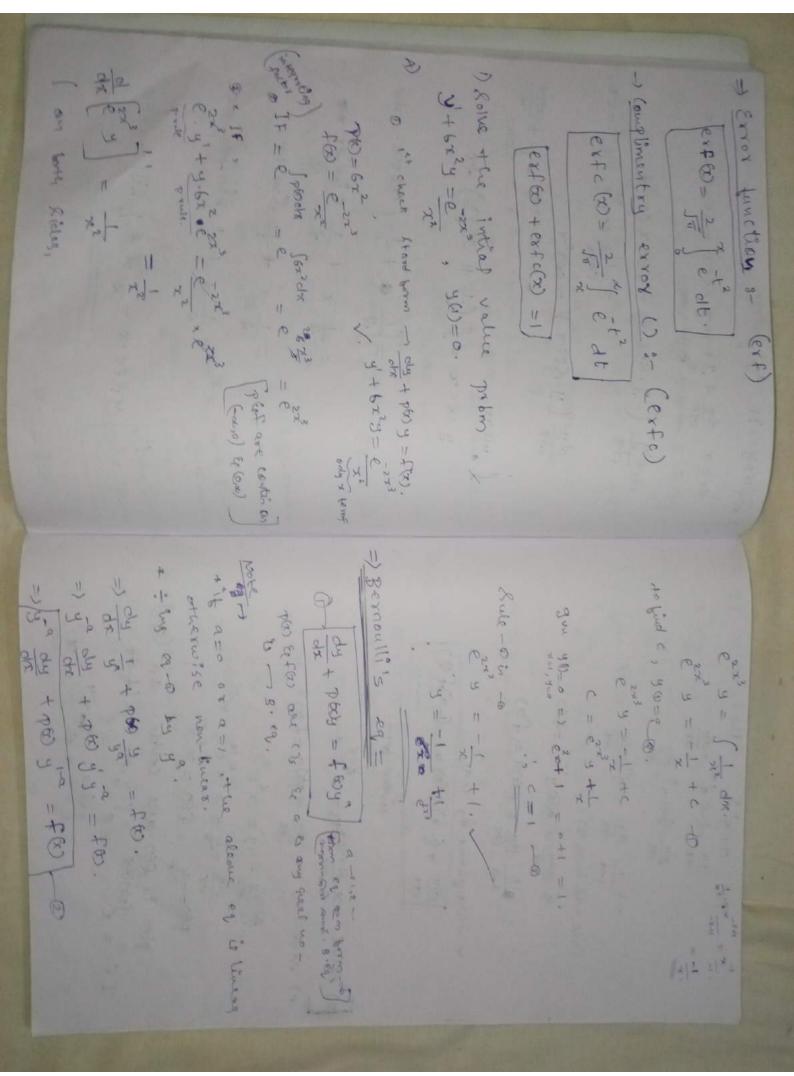


=) Meteriod of solve 1st asdes DE-> Grenesial Bolu : the DE -0 has the beaponed that where ples by for one continous. where you is the sol of the associated of the an proceedable - resultation of parametes not me him to brief a posticular sol" (7) U= yc + yp 3 4 60 4p fo 8011 Sule of the of the of the sules homogenous es U=ye yp = cefround - Jpoodx front · 0= RC0d + 20 yp = e powdx foodx foodx. Che = che - Jacoba - of + phoy - o 9° = CA(00) general boun of a DE- normal examina 大学生 Mull fint stans moster thing bull Standand your - my Wennestween From Jesus of last o outstand out 0.0 8 + 30 0.0

in standard from.



3 multiply IF by Specialing. Secx dy + y tanx secx = secx cos3x. dy (y secx) = secx (053x $= \frac{1}{\cos x} \cos x = \cos x.$ aby (y Record) = cos2x. $=1+\cos 2\pi c = \frac{1}{2}+\cos 2\pi c$ (megt, y sec $x = \int \left(\frac{1}{2} + \frac{\cos 2x}{2}\right) dx$. $=\int_{\mathcal{Q}} + \frac{1}{2} \int \cos 2\pi \cdot \operatorname{ohr}.$ $= \frac{1}{2} \times + \frac{1}{2} \operatorname{sin} \operatorname{an}$ = 1 n + 1 Sun ar. = 1 x + 1 8 cm 2x + c. y sec x = 1 x + 1 km 2x + c



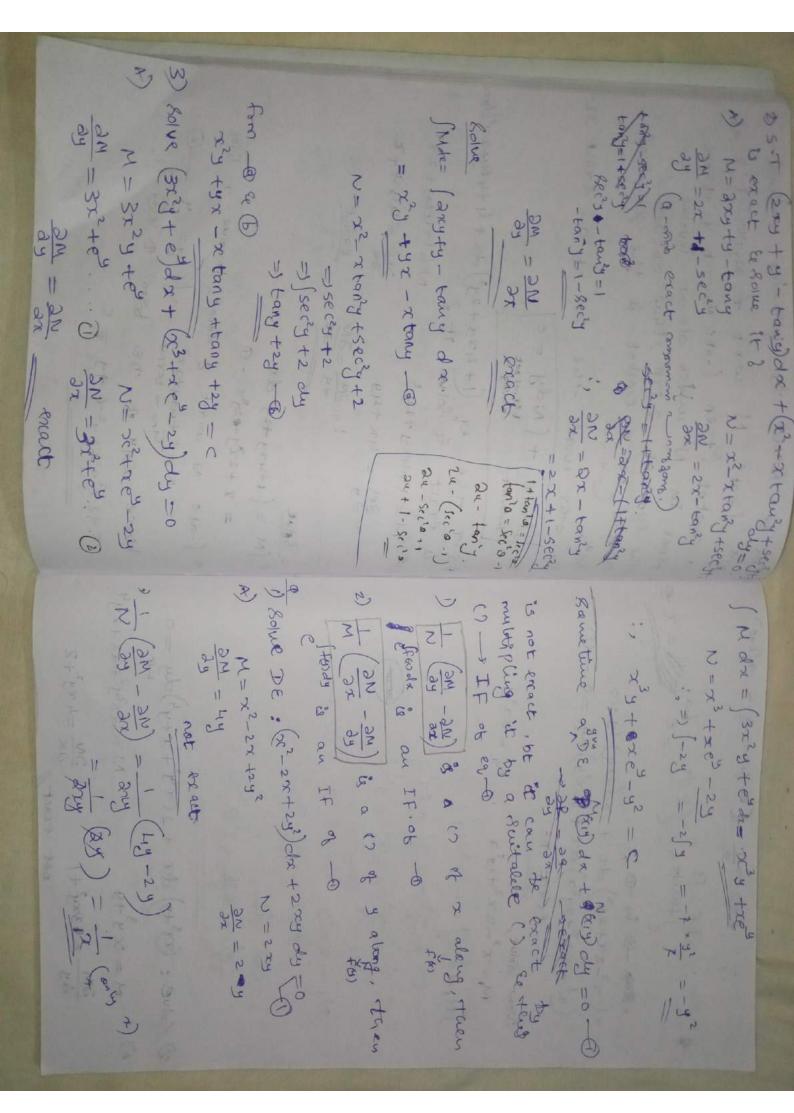
x) Rolle x chy - Hy = x 6 x. A) Stard of the type of - fto. TF = Eposodre = e5-4 dre -417 dre (00) x + woughout by 1-a, Rule - 1 in - 0 po=-4, to = x5ex. DOLY -43 = x60x dx -4 4 - 262 dx + (1-9) 7 (8) 4 - (1-9) + (8) 9 oly + payy 1-x = + 100. = 1 - de = 10 de - 0 put al = 4 - + then 1-9 day + pool = for) 2/2 = (1-0) grad x dy 是一个一个 = 6 = 6 = 4 = 4 = 4 = 4 Stadeout Jum.

pholoe 74 +4 = 243 x -2 + h, out. ->-> du + u = x put aux = t + throughout by y3 74 304 + 4 = 2 24 304 + 4 = 2 - 24 + 4 = 2 XX = oft x of a roughout by a, on bath sides, 200 States of former * 9 = 1 first clos. = + (-e-t) - (1x &e-t) + c. 1 6 t of t. Bullet The - to = J Lux olx. ーーナーでナーでナ =-1 (1+ lux)+c. = -e-t (1+t) + C. percheck bernall put u=y2 5 49 poort 10 - 2 du = 19 Old 2-24 de Carrier on the Color 1 1 min 21 x If = (produ = (-2 dux = (ux2 = x) 3 = 2 x + cx 2 x + cx 2 en @ is in Stancious born. ag- his 's with a particular gen- he to =) x2 du - 2 ax = -2x-2 7, xcl = \(-2 \\ dx. 72 4 = -2 \ \frac{1}{x^2} \ \text{clx.} = -2 \ \frac{1}{241} + 0 - 24 = -2 - 24 = -2 - 24 = -2 - 24 = -2 72 ch -24 -2 -2 on - 24 =-2 -0 5 = 2x + Cx 2 Pulled party 2-2 21 +0 1 02 + mc

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=) of [exu] =-27.
                                                                                                                                                                                                                                                                                                                                                  A) y (2xy +ex) Ax = ex oly
                                                                                                                                                                                                                                                                                                                                                                      2 some y (exy tex) dx -ex
                                                                                         x It ou -B
                                                               endy + eny = -2x xet
                                                                                                         IF = e Trody [ lotz = e
                                        ex du +4ex = -2x
                                                                                                                                                                                    + + throat by - ex,
                                                                                                                                                                                                                                                                                                                           \Rightarrow 2xy^2 + e^xy = e^x \frac{dy}{dx}
                                                                                                                                                                                                    -ex -e u = 27: ~
                                                                                                                                                                                                                                                                         to thisect by y?
                                                                                                                                                                                                                           ex y 2 oly - ex y = 2x
                               Proule - 1 Exxu.
                                                                                                                                                            du + u = 08-25
                                                                                                                                :, p(x) = 1 , f(x) = -2x
                                                                                                                                                                                                                                                                                        - Besnoully of
                                                                                                                                                -> Standarm born
                                                                                                                                                                                                                                                                                                                                                                               10 = 0.
                                                                                                                                                                                                                                                                                                                                          (2) Several form
                                                                                                                                                                                                                                                                                                                                                               Off oras
                                                                                                                                                                                                                              Jut 11=47
                                                                                                                                                                                                                                                                                                                        Sty + play + the
                                                                                                                                                                                                                                                          J Exact DE :-
                                                                                                                                                    Determine whether the gun es is
                                 b) (5 x+4,4) or + (4x-843) dy =0
                                                                                                                          9) (2x-1) dr + (3y+1) dy = 0
             そう ペークスナルは して 一七次一名りる
                                                                                                           +) M=2x-1 , N=3y+7
                                                                                                                                                                    BC exact is that, form on, whether in the
                                                                                                                                                                                                                                                                                                                                                        ex u = 1 -2 m.
The fire the Ne Ne H = Ne
                                                          chard on the spect
                                                                                                                                                                                                                                                                                                                      :, e y = -x2+c.
                                                                                                                                                                                                                                           A necessary condition that a DE,
                                                                                    =-2/x =-2 x2 =-x2 +c
                                                                                                                                                                                                                                                                                    y^{-1} = \frac{-2c^2}{e^2x} + \frac{c}{e^2x}
y^{-1} = \frac{1}{e^2x} \left(-x^2 + c\right)
                                                                                                                                                                                                                             M(2) dx + N (21) dy
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= medical of Solm of exact DE :-& find the value of k, 80 that omo 1 m value of 6, 50 strat 3xy2+20xy 0 exact & solve 1t 8 N=1+4xy+2x2 dx+(1+4xy+2x2/ds=c exact A) convert this to Moby + Noty =0. 3) xy ty +4 =0 1,3/2+4Kxy3 = 3/2+40xy3 T = 20 TAB = 20 DM = 34 + HKIY3 M= y3+ Kry 1-2x N=3xy2+20x3y3 It Mox+Noy =0 is exact, ir x cly + y+h = 0. x cly = -9 =4 THE ON - KINGH K=40=10 exact ~ 3N = 34x + 20x2x 43 = 342+4024 Solve

OThe sum of 2 exp, tay obtained @ J-ate N witt & donot involve 7. (i.e) solu. (-+ =5) a constat às the grequissed In other words the solve of an exact DEcan be howed by following method -01" J-ate H wist x, sugarching 'y' as terms in N which do not involve x. IM = (1+474 try dx. hence fold of DE from De A log & アナンヤッサンタイナナリー (いより) [Mor + I now = c 少しついますま = x+2xy+2xx -0 BM = HUCHHY NOTE TO C! exact



Solve: (25+y) $dz + 2(x^3y^2 + x + y^4) dy = 0$. $N = xy^2 + y$ $\frac{\partial x}{\partial y} = 0.3xy^2 + 1$ $\frac{\partial x}{\partial y} = 0.3xy^2 + 1$ $\int M_1 dx = \int n^3 - 2x^2 + 2y^2 x \cdot chx.$ $= \frac{2x^4}{4} - \frac{2x^3}{3} + \frac{2x^2}{4} + \frac{2x^3}{4}$ $N_1 = \frac{2x^2y}{4} + \frac{2x^3}{3} + \frac{2x^2}{4} + \frac{2x^2}{4}$ of foods = e = e = x Now 80/14,

N_= x^3-2x2+13'x

N_1 = 2x341 x (x2-2x+2y2) dx + x (any) dy =0, (x3-2x2+2y2x) dx + (2x3y) dy =0 -0 to == 1 (or beam of or alone) not exact

 $\frac{1}{\sqrt{\frac{3N}{3}} - \frac{3N}{3}} = \frac{1}{\sqrt{\frac{3}{3}}} \left(\frac{3N^{2} + 1}{\sqrt{\frac{3}{3}}} - \frac{1}{\sqrt{\frac{3}{3}}} + \frac{1}{\sqrt{\frac{3}{3}}} + \frac{1}{\sqrt{\frac{3}{3}}} \right) = \frac{1}{\sqrt{\frac{3}{3}}} \left(\frac{3N^{2} + 1}{\sqrt{\frac{3}{3}}} - \frac{1}{\sqrt{\frac{3}{3}}} + \frac{1}{\sqrt{\frac{3}{3}$

