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Sec c

Dep civil engineering

Subject differential equation

Assignment Mid term

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QNO1 dy = ext see(y)(1+t2) y(0)=0 so t=0 1/20. dy = et et sec(1) (1++2) at. = 1 dy = (1+t2) et dt de cosy) = sec(y) [e'cosydy = ((1+t2) et at.) using integration by pasts.

e<sup>y</sup> [ cosydy - [ ( ] cosy · dy · e<sup>y</sup> ) =

(1+t<sup>2</sup>) [ e<sup>t</sup> - [ ( ] e<sup>t</sup> · dt ( 1+t<sup>2</sup> ) -> eq ( )

L. H.S.

e<sup>-y</sup> [ cosydx - ] ( ] cosy · d/dy e<sup>-y</sup> ).

(2)

ed Siny - S(Siny. ed (-1)) ed Siny + S(Siny. ed) ed Siny + S(ed Siny)

Again very integration by parts.

edsing + ed (-cosy) - s (sing dy ed)

edsing + ed (-cosy) - s (-cosy ed)

edsing - ed (-cosy) - s (cosy ed)

edsing - ed (cosy ed)

Since s (cosy ed) = L. H.s.

Since it is again some to

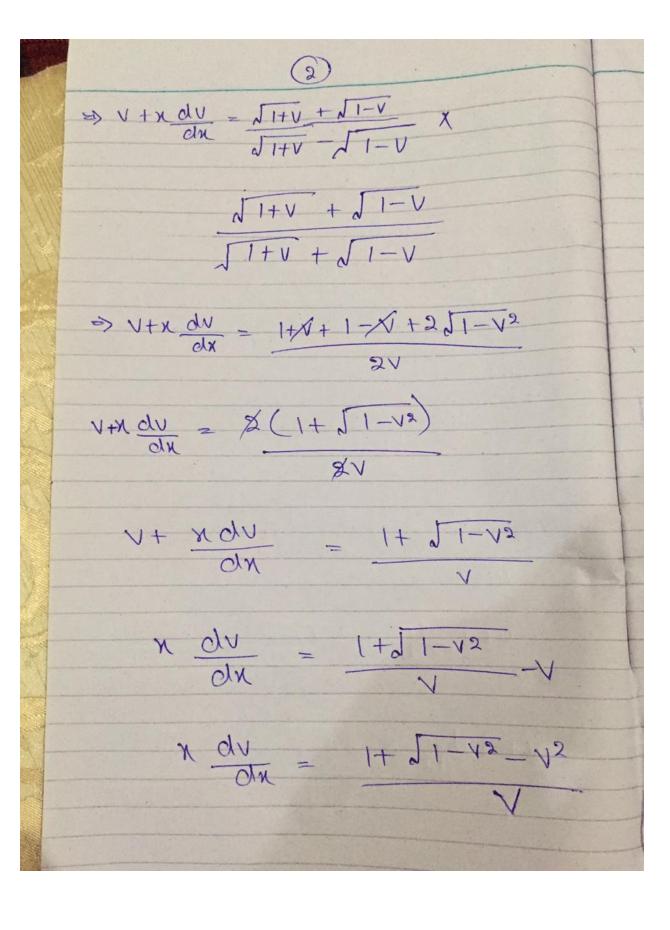
Since it is again same to the first one so L.H.S will become

L.H.S = eJ(Siny-Cosy) - L. H.S.

2 LHS = e-8 (Siny-cosy) LHS = e-8 (Siny-cosy) (3)

Now dating R.H.S. ((1+t2) et dt. (1+t2) Jet- [([et. d/de (1+t2)]) (1+t2) et- ((-e-t(2t)) - (1+t2) et + ((at) et) again usig integration by parts. - (1+t2) e-t + (2+ Je-t - ) ( [e-t d/at 2+)) -(1+t2)e-t+ (-2te-f(-e-t2) - (1+t2) e-+ (-2t e-+ ((2e-+)) - ( 1+t2) et + (-2+ et - 2et)+c. - (1+t2)e-t-2te-2e-t+c - et-et +2-2+et-2 et +c => -(t2+2++3)e-+ + C = R.H.S Now take L. H.S = R. H.S

e-y(siny-cosy) = -(t2+2+3)e-t+c we know that t=0, J=0. Put it above 1 (0-1) = @-3+C e (siny-(osy) = - (+2++3)e+5 Q2 ( In+y + In-y ) dn = (In+y-In-y) dy = 0. Soli dy In+y + In-y  $\frac{1}{\sqrt{x+y}} - \sqrt{x-y} \longrightarrow 0$ this is Homogeneous Differential ex in x and y to solve this put y= VX. -> dy - v+x dv Tus eg 10 become U+X du = JX+VX + JX-VX NX+UX - NX-VX V+ndu = JHV + JI-V V1+V - VI-V



 $x \frac{dv}{dx} = \sqrt{1-v^2(1+\sqrt{1-v^2})}$  $\frac{\sqrt{dV}}{\sqrt{1-\sqrt{2}(1+\sqrt{1-\sqrt{2}})}} = \frac{\sqrt{dx}}{x}$ Takip Integral on b.s Judy = Jux pul 1+11-12 = t 1/2 (1-v2) /2 (-2v) dv = dt 7 1-12 - dt - Int = Unx + Inc - In (1+11-12) = Incx. (n (1+J1-V2) = - (ncx.

$$y_{h} \left(1 + \sqrt{1 - \sqrt{2}} = \sqrt{h} \left(cx\right)^{T}\right)$$

$$1 + \sqrt{1 - \sqrt{2}} = \frac{1}{Cx}$$

$$1 + \sqrt{1 - \frac{y^{2}}{x^{2}}} = \frac{1}{Cx}$$

$$1 + \sqrt{x^{2} - y^{2}} = \frac{1}{Cx}$$

$$2 + \sqrt{x^{2} - y^{2}} = \frac{1}{Cx}$$

$$3 + \sqrt{x^{2} - y^{2}} = \frac{1}{Cx}$$

$$4 + \sqrt{x^{2} - y^{2}} = \frac{1}{Cx}$$

$$5 + \sqrt{x^{2} - y^{2}} = \frac{1}{Cx}$$

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$$4 + \sqrt{x^{2} - y^{2}} = \frac{1}{Cx}$$

$$5 + \sqrt{x^{2} - y^{2}} = \frac{1}{Cx}$$

$$6 + \sqrt{x^{2} - y^{2}} = \frac{1}{Cx}$$

$$7 + \sqrt{x^{2} - y^{2}} = \frac{1}{Cx}$$

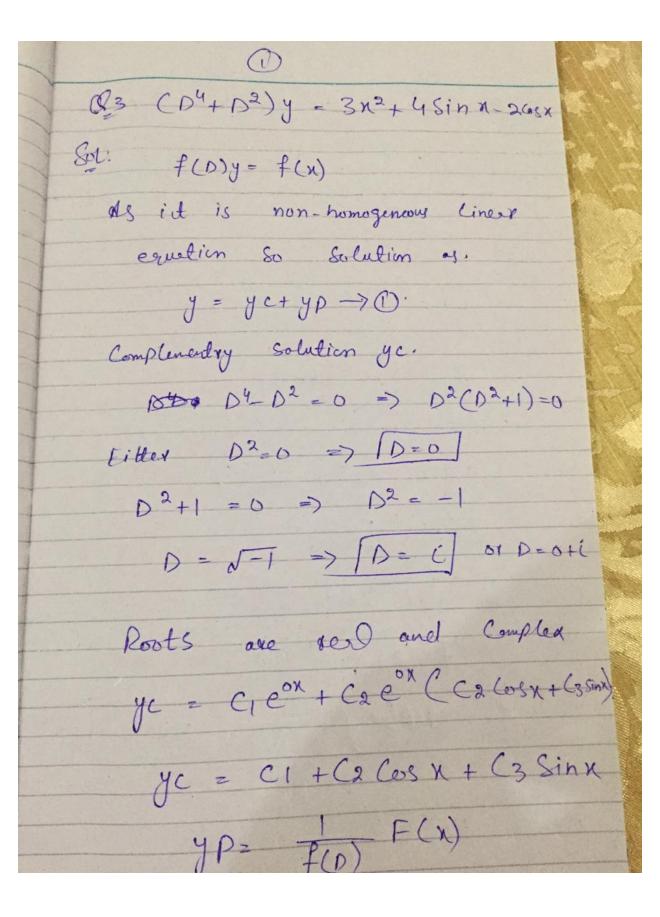
$$2 + \sqrt{x^{2} - y^{2}} = \frac{1}{Cx}$$

$$3 + \sqrt{x^{2} - y^{2}} = \frac{1}{Cx}$$

$$4 + \sqrt{x^{2} - y^{2}} = \frac{1}{Cx}$$

$$5 + \sqrt{x^{2} - y^{2}} = \frac{1}{Cx}$$

$$7 + \sqrt{x^{2} - y^{2}} = \frac{$$



yp = 1 (3x2+ 4 Sin n - 2 (05x)

 $= \frac{3x^2}{D^4 + D^2} + \frac{4\sin x}{D^4 + D^2} - \frac{2\cos x}{D^4 + D^2}$ 

f(0) = D4+D2.

at D=0 => f(0) =0

 $f'(D) = 4D^3 + 2D$ 

NOW also for D=0 => f(0)=0

again dittexentiatif

f"(0) = 12D+2

So for D=0.

f"(0) = 12(0) +2 = 2.

So replacy f(D) with x2

=> YP= x23x2 + x2 .48in x - x2 265x putting D=0 in all  $yP = \frac{\pi^2 3\pi^2}{12(0) + 2} + \frac{\chi^2 4 \sin \chi}{12(0) + 2} = \frac{2\pi^2 \cos \chi}{12(0) + 2}$ yp= 3x4+ 4x2 Sinn - 2x2Cosx = 3/2 x4+ 2x2 Sinx - x2 Cosx putij in eg O. y= CI+ C2 Cosx + C3 Cosx + 3/2 x4 2x2 sinx - n2 Cos x. 4= C1 + (C2-x2) Cosx+(C3 + 2x2) Sinx + 3/2 x4