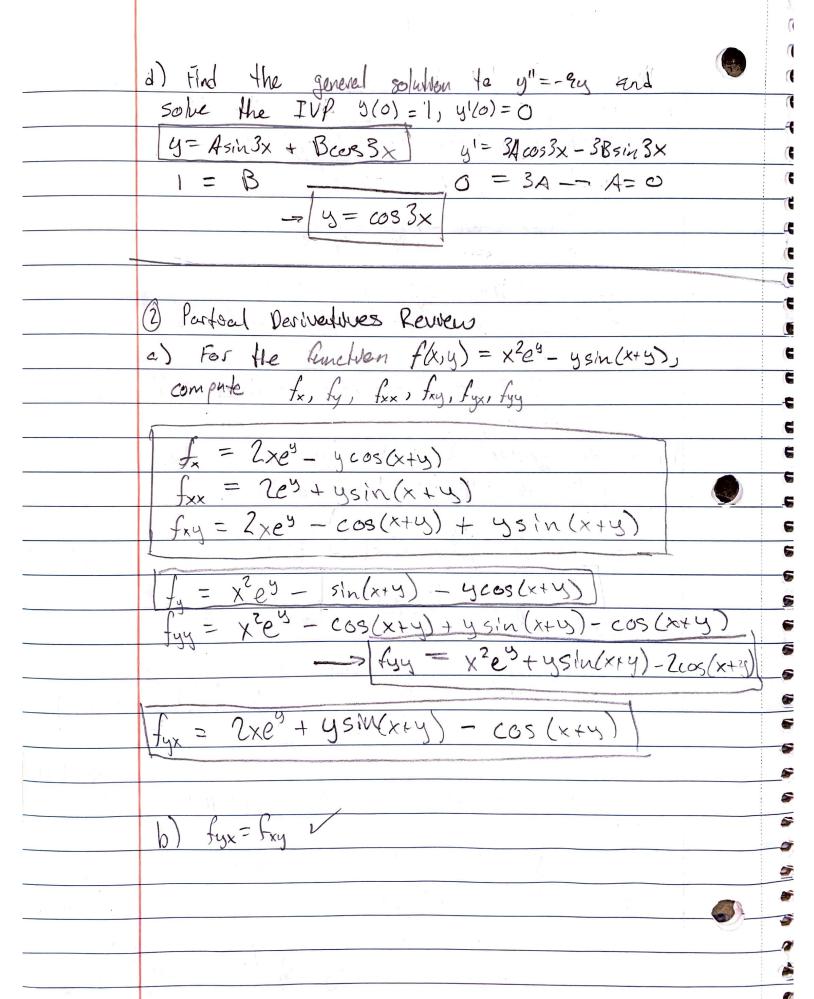
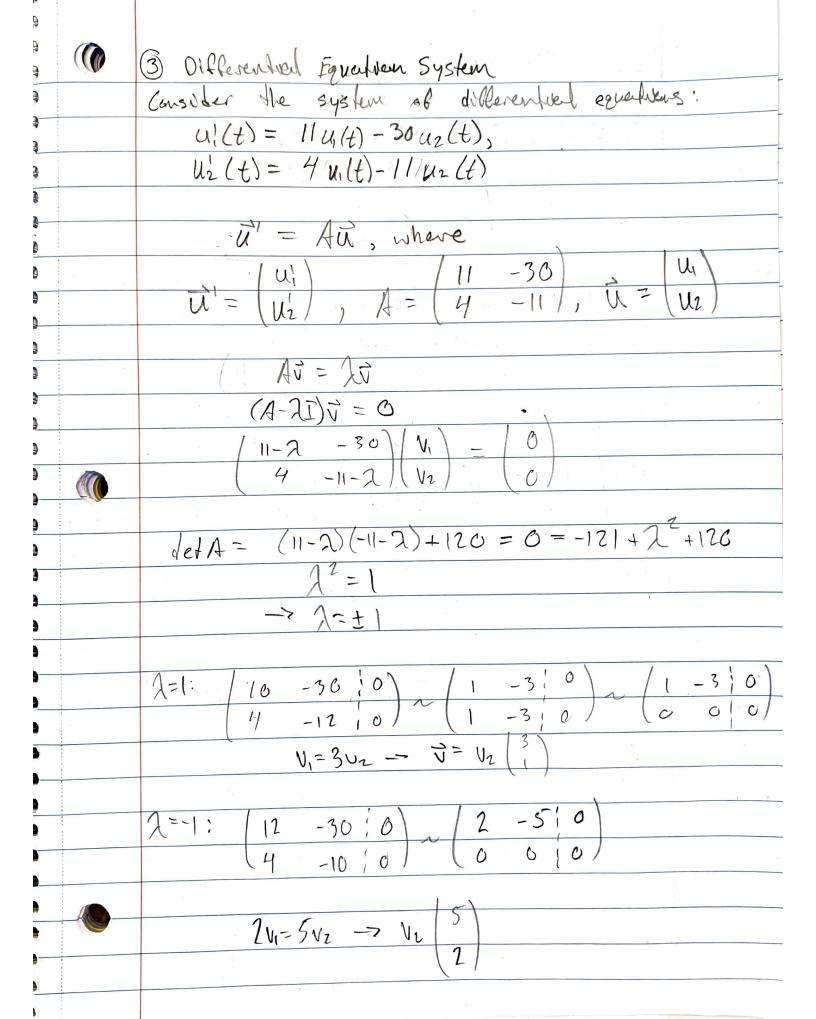
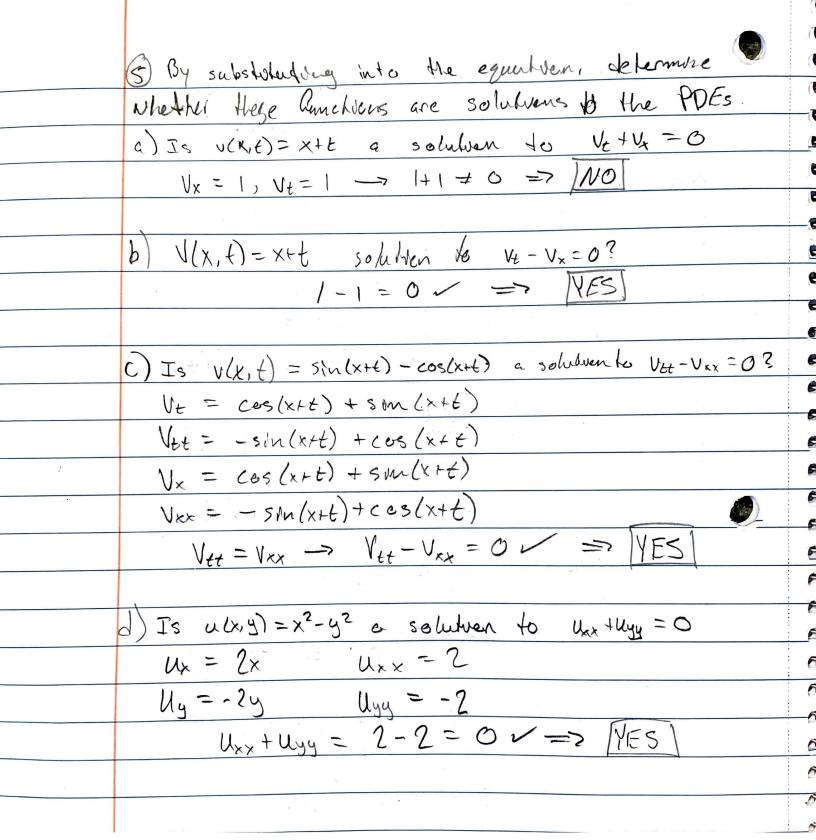
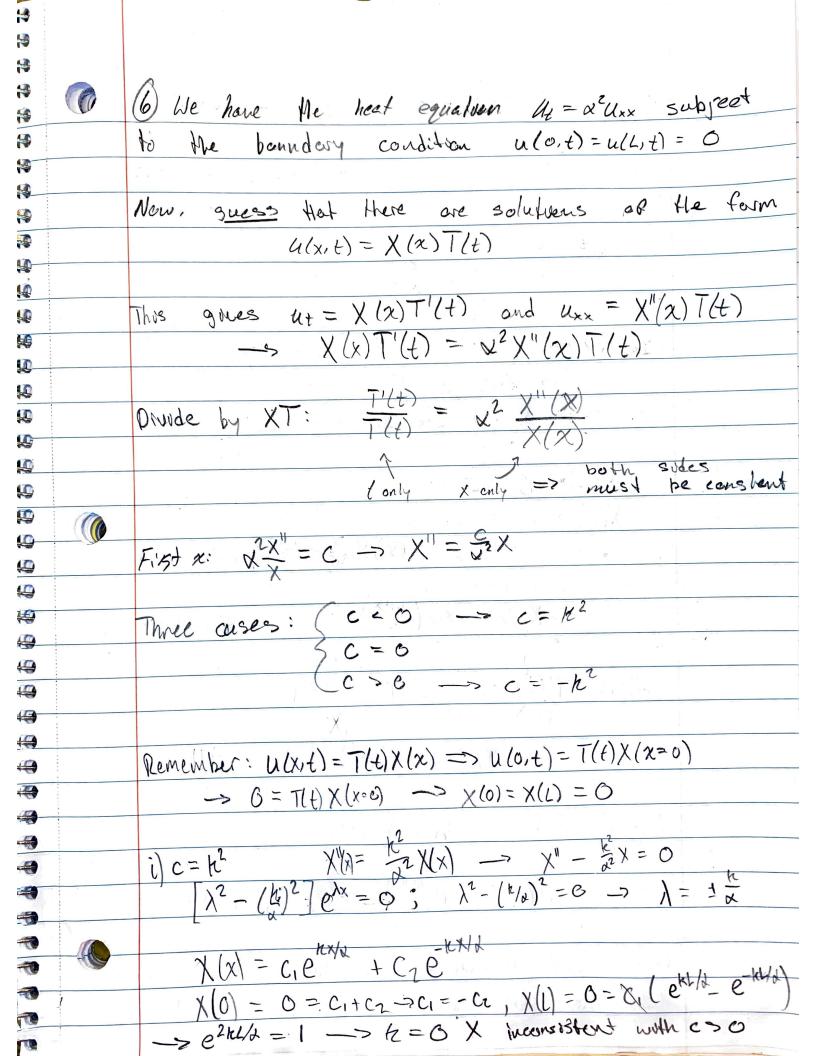
Trever McCathrey Math 323 HW 1 1/13/2021 Q Q (1) ODE Raview a) Find the general solution to y'=- 9y and then solve D D Inidial value problem with y(0) = 2 D dy - 44 - 5 dy = (-40x D /ny = -4x+C y = e xe -> y = Ae 4 D D 2 = Ae-4(0) -> A = 2 - 1 y = 2e-9x b) Find the general solution to y'= 44+1 then solve 1 the intial value problem with y(0)=2. 4 0 du = -4y+1 = \(\frac{du}{4y-1} = \int -dx = \frac{1}{4y-1} = -x + C = \(\frac{1}{4y-1} = 0 1 4y-1 = Ae-1x -> y= Ae4x +) -> y= Ae4x + q 1 + c) Find the gen. soln to y= 94 them solve the IVP y'(0)=0 1 | y = Ae3x + Be3x - y' = 9Ae3x - 9Be3x 1 = A+B = A=1-B, 0 = 9(1-B) - 9B = 9-18B = B== $A = 1 - \frac{1}{2} = \frac{1}{2}$ \Rightarrow $y = \frac{1}{2} \left(e^{3x} + e^{-3x} \right)$





1 Differentied Equation System 2 $u'_{1}(t) = -7u_{1}(t) - 24u_{2}(t)$ $u_{1}(0) = 17$ $u'_{2}(t) = -24u_{1}(t) + 7u_{2}(t)$ $u_{2}(0) = -6$ $\vec{u}' = A\vec{u}$ with $A = \begin{pmatrix} -7 & -24 \\ -24 & 7 \end{pmatrix}$ det (A-DI) = (-7-2)(7-2) - 242 = -49+22-576 = 0 2=6125 -> 2=±1250. 7=+25: -32 -24 $\rightarrow \dot{u}(t) = c_1 e^{2st/-3} + c_2 e^{-2st/4}$ $-3c_{1} + 4c_{2} = 17 - 2c_{1} = \frac{3}{4}c_{1} + \frac{17}{4}$ $4c_{1} + 3(\frac{3}{4}c_{1} + \frac{17}{4}) = -6 = 4c_{1} + \frac{9}{4}c_{1} + \frac{51}{4}$ -24=16c, +9c, +51 -> 25c, =-75 -> C, =-3 -> (1= 3(-3)+1= -9+1= -2 $- \frac{1}{2} u_2(t) = -3e^{25t} \left(\frac{-3}{4} \right) + 2e^{-25t} \left(\frac{4}{3} \right)$





 $\frac{x''(x) = 0}{X(0) = 0} = \frac{x''(x) = 0}{A(0) = 0} = \frac{A(x) = 0}{A(0) = 0}$ $\frac{X''(x) = 0}{A(0) = 0} = \frac{A(x) = 0}{A(0) = 0}$ Not true. iii) c=- 2 $X'' = -\frac{k^2}{\sqrt{2}}X$ $\frac{\chi''' + \frac{k^2}{\alpha^2} \chi = 0}{(4\pi)^2 + (4\pi)^2 = 0} \longrightarrow \chi^2 = -\frac{k^2}{\alpha^2} \longrightarrow \chi = \pm \frac{i\hbar}{\alpha}$ -> X(x)= aeikx/2 + cz e-i/xx/2 => X(x) = c, cos = + c2 sinlex $X(0) = 0 = c_1$ X(1) = 0 = c2 sink C2 + 0 -> SM/L = 0 -> KL = NIT (n=1, 2, 3, ...) $\Rightarrow X_n(x) = \sin\left(\frac{\lambda \pi n x}{L}\right)$ C2 exhibiting Also: T'(t) = c -> T' = - k2T -> Ta(t) = e-4mT/L)2t U(x,t)=Un(x,t) = Tn(t) Xn(x) $- > u(x)t) = e^{-(\frac{n\pi}{L})^2 t} \sin(\frac{\pi nx}{L}) \qquad n = 1,2,3,...$ Mut = Uxx of Ut-Uxx =0 is linear; if v(xit), whith are solus, so are CIV(xit) + C2 W (x,t)

