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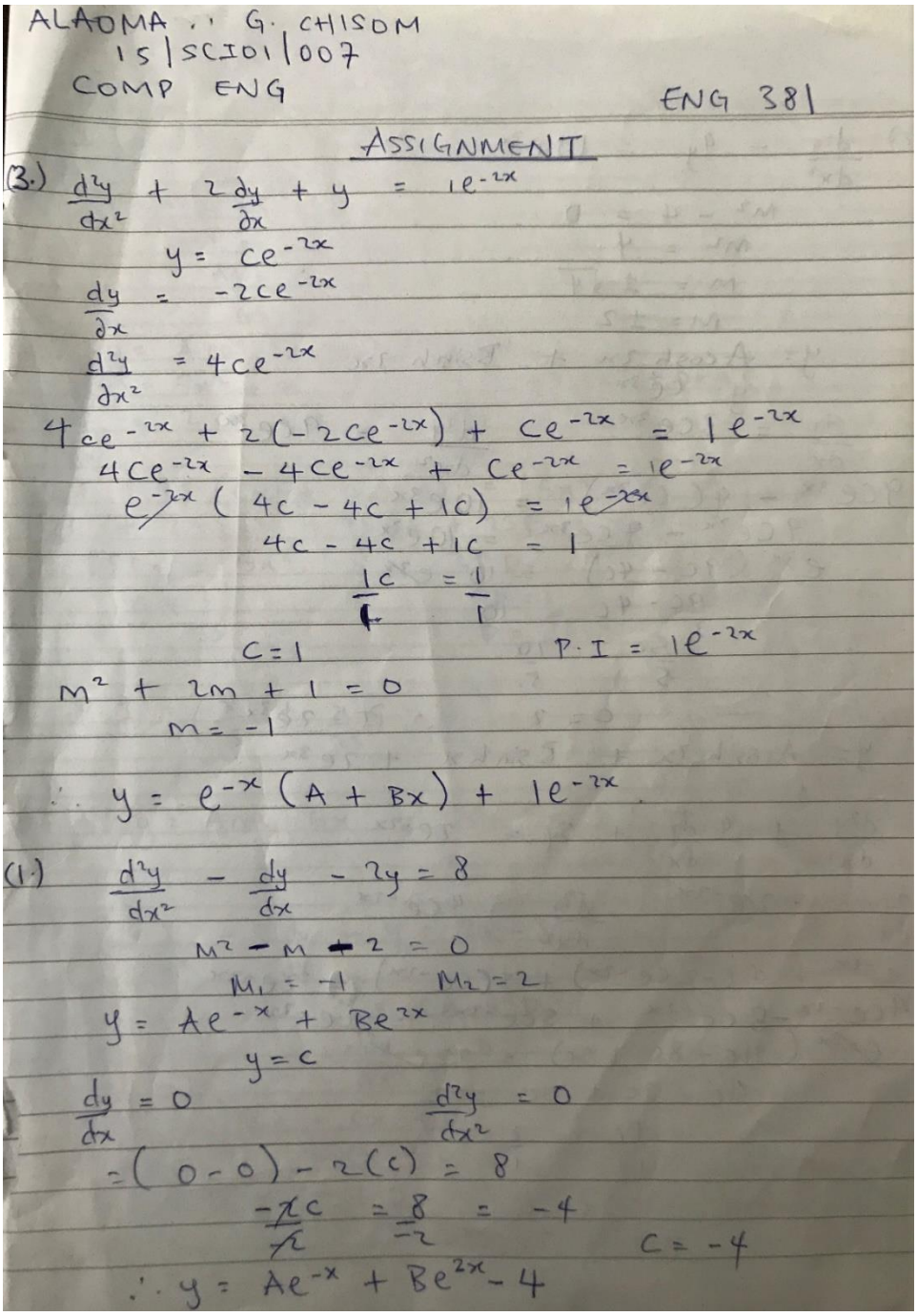
DEPT: COMPUTER ENGINEERING
COURES: EEE 313

ASSIGNMENT 1

NUMBER 3 AND 1



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COMP ENG
ENG 381

ASSIGNMENT

(3.) $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + y = 1e^{-2x}$

$y = ce^{-2x}$

$\frac{dy}{dx} = -2ce^{-2x}$

$\frac{d^2y}{dx^2} = 4ce^{-2x}$

$4ce^{-2x} + 2(-2ce^{-2x}) + ce^{-2x} = 1e^{-2x}$

$4ce^{-2x} - 4ce^{-2x} + ce^{-2x} = 1e^{-2x}$

$e^{-2x}(4c - 4c + 1c) = 1e^{-2x}$

$4c - 4c + 1c = 1$

$\frac{1c}{1} = \frac{1}{1}$

$c = 1$ P.I $= 1e^{-2x}$

$m^2 + 2m + 1 = 0$

$m = -1$

$\therefore y = e^{-x}(A + Bx) + 1e^{-2x}$

(1.) $\frac{d^2y}{dx^2} - \frac{dy}{dx} - 2y = 8$

$m^2 - m + 2 = 0$

$m_1 = -1 \quad m_2 = 2$

$y = Ae^{-x} + Be^{2x}$

$y = c$

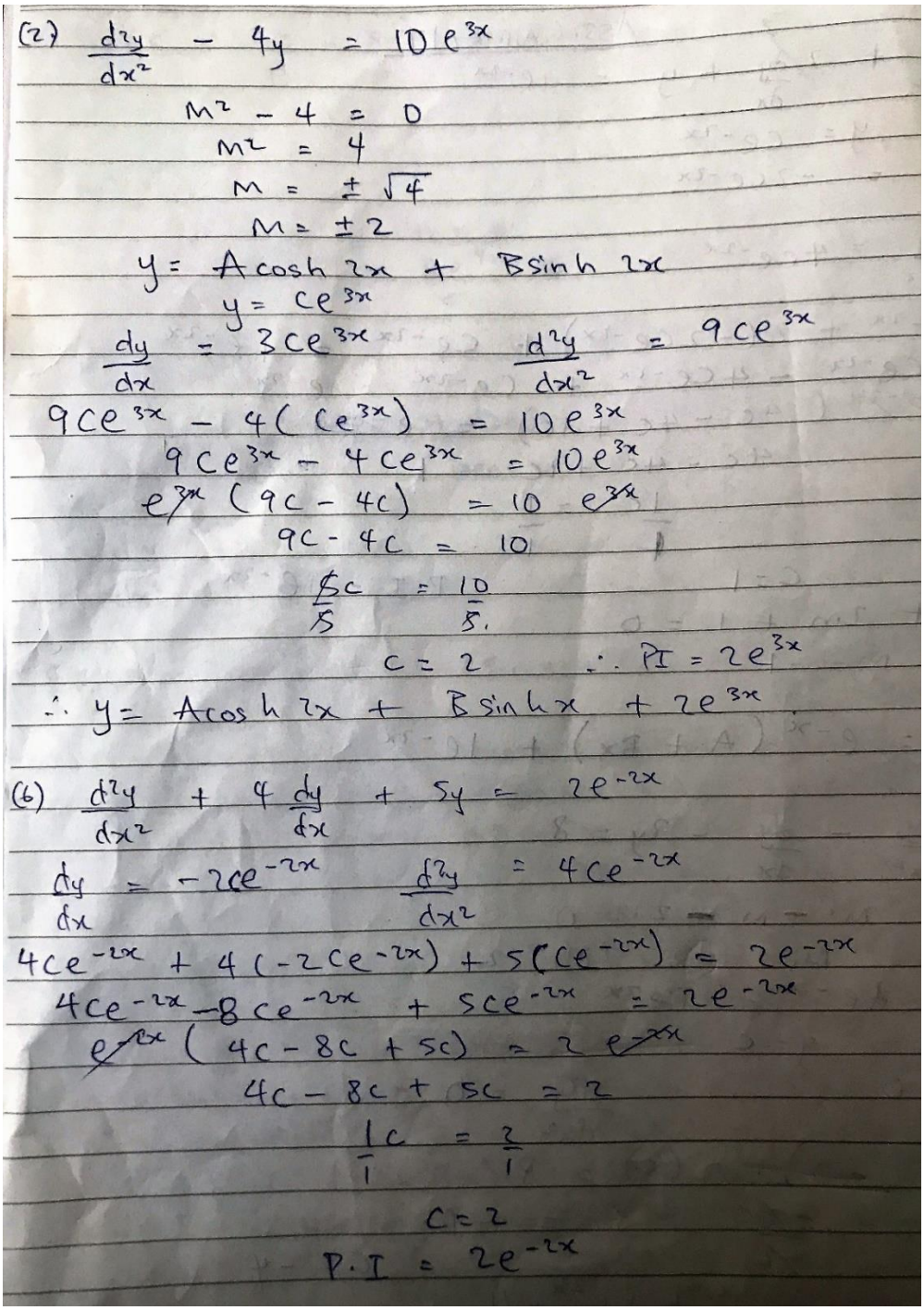
$\frac{dy}{dx} = 0 \qquad \frac{d^2y}{dx^2} = 0$

$= (0 - 0) - 2(c) = 8$

$\frac{-2c}{2} = \frac{8}{-2} = -4$ $c = -4$

$\therefore y = Ae^{-x} + Be^{2x} - 4$

NUMBER 2 AND 6



(2) $\frac{d^2y}{dx^2} - 4y = 10e^{3x}$

$m^2 - 4 = 0$

$m^2 = 4$

$m = \pm\sqrt{4}$

$m = \pm 2$

$y = A\cosh 2x + B\sinh 2x$

$y = ce^{3x}$

$\frac{dy}{dx} = 3ce^{3x}$ $\quad \frac{d^2y}{dx^2} = 9ce^{3x}$

$9ce^{3x} - 4(ce^{3x}) = 10e^{3x}$

$9ce^{3x} - 4ce^{3x} = 10e^{3x}$

$e^{3x}(9c - 4c) = 10e^{3x}$

$9c - 4c = 10$

$\frac{5c}{5} = \frac{10}{5}$

$c = 2$ $\quad \therefore PI = 2e^{3x}$

$\therefore y = A\cosh 2x + B\sinh x + 2e^{3x}$

(6) $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 5y = 2e^{-2x}$

$\frac{dy}{dx} = -2ce^{-2x}$ $\quad \frac{d^2y}{dx^2} = 4ce^{-2x}$

$4ce^{-2x} + 4(-2ce^{-2x}) + 5(ce^{-2x}) = 2e^{-2x}$

$4ce^{-2x} - 8ce^{-2x} + 5ce^{-2x} = 2e^{-2x}$

$e^{-2x}(4c - 8c + 5c) = 2e^{-2x}$

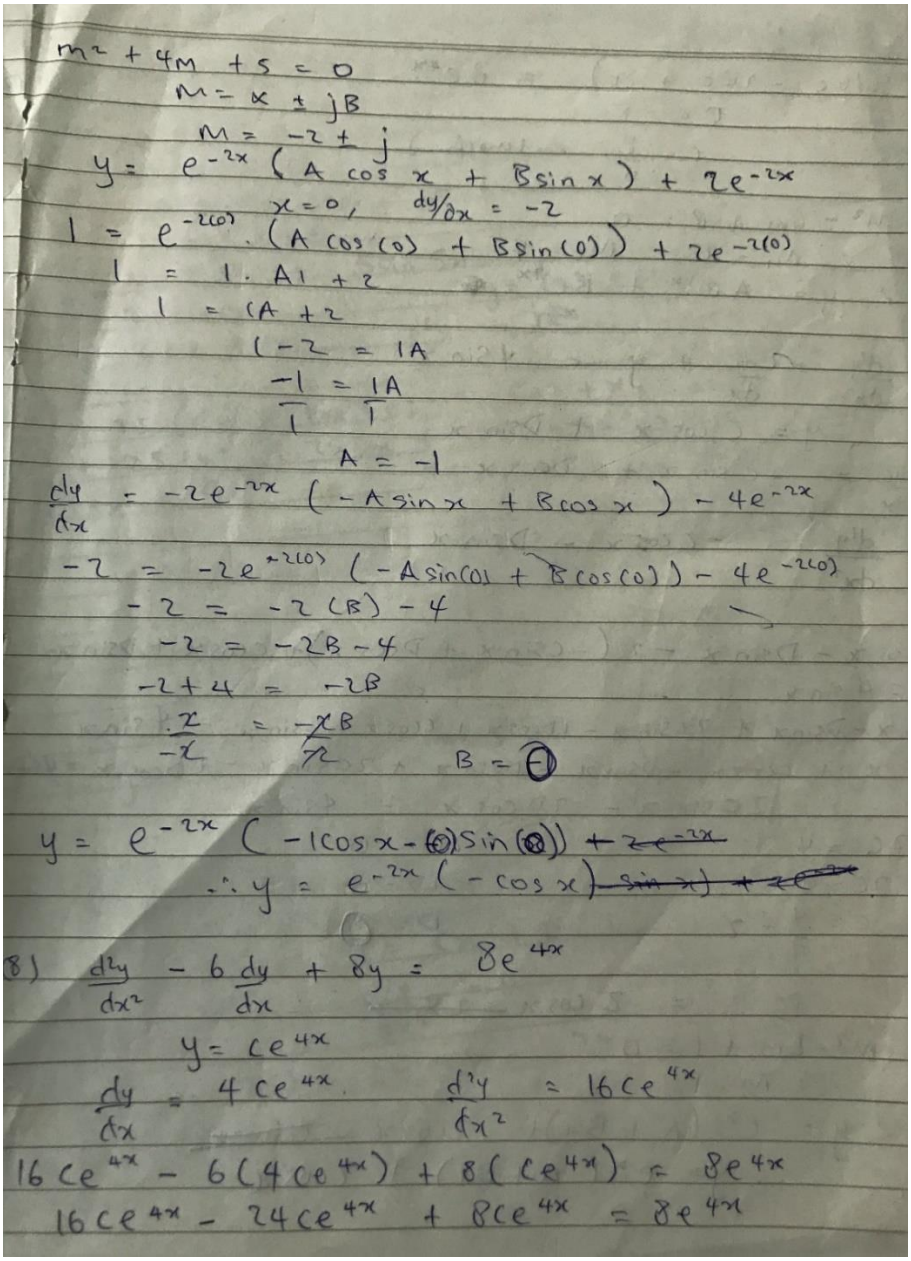
$4c - 8c + 5c = 2$

$\frac{1c}{1} = \frac{2}{1}$

$c = 2$

$P.I = 2e^{-2x}$

NUMBER 6 AND 8



$m^2 + 4m + 5 = 0$

$m = x \pm jB$

$m = -2 \pm j$

$y = e^{-2x}(A\cos x + B\sin x) + 2e^{-2x}$

$x = 0, \quad dy/dx = -2$

$1 = e^{-2(0)} \cdot (A\cos(0) + B\sin(0)) + 2e^{-2(0)}$

$1 = 1 \cdot A1 + 2$

$1 = 1A + 2$

$1 - 2 = 1A$

$\frac{-1}{1} = \frac{1A}{1}$

$A = -1$

$\frac{dy}{dx} = -2e^{-2x}(-A\sin x + B\cos x) - 4e^{-2x}$

$-2 = -2e^{-2(0)}(-A\sin(0) + B\cos(0)) - 4e^{-2(0)}$

$-2 = -2(B) - 4$

$-2 = -2B - 4$

$-2 + 4 = -2B$

$\frac{2}{-2} = \frac{-2B}{2}$

$B = 1$

$y = e^{-2x}(-1\cos x - 1\sin(0)) + 2e^{-2x}$

$\therefore y = e^{-2x}(-\cos x) - \sin x) + 2e^{-2x}$

8) $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 8y = 8e^{4x}$

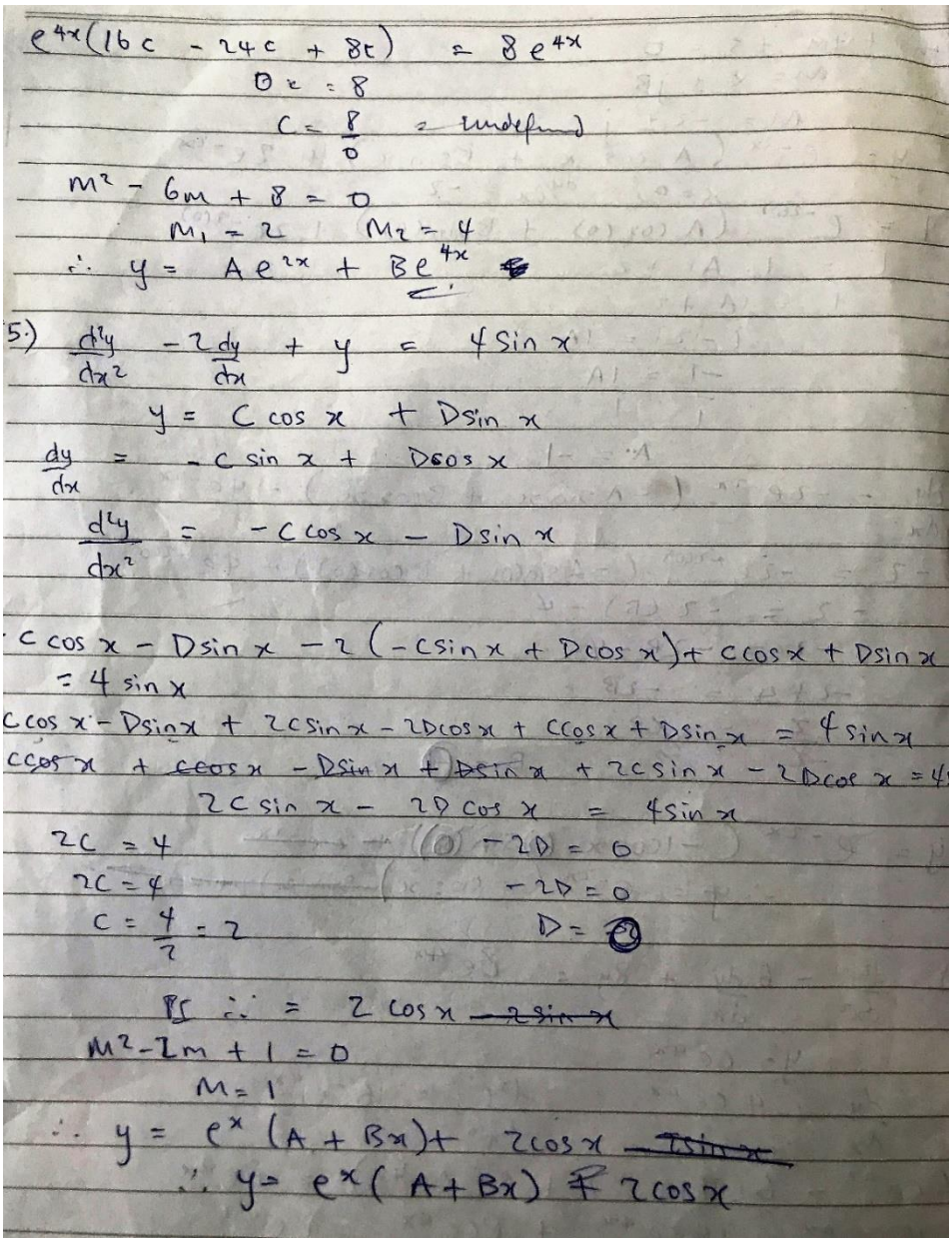
$y = ce^{4x}$

$\frac{dy}{dx} = 4ce^{4x} \qquad \frac{d^2y}{dx^2} = 16ce^{4x}$

$16ce^{4x} - 6(4ce^{4x}) + 8(ce^{4x}) = 8e^{4x}$

$16ce^{4x} - 24ce^{4x} + 8ce^{4x} = 8e^{4x}$

NUMBER 8 AND 5



$e^{4x}(16c - 24c + 8c) = 8e^{4x}$

$0c = 8$

$c = \frac{8}{0}$ = undefined

$m^2 - 6m + 8 = 0$

$m_1 = 2 \quad m_2 = 4$

$\therefore y = Ae^{2x} + Be^{4x}$

5.) $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = 4\sin x$

$y = C\cos x + D\sin x$

$\frac{dy}{dx} = -C\sin x + D\cos x$

$\frac{d^2y}{dx^2} = -C\cos x - D\sin x$

$C\cos x - D\sin x - 2(-C\sin x + D\cos x) + C\cos x + D\sin x = 4\sin x$

$C\cos x - D\sin x + 2C\sin x - 2D\cos x + C\cos x + D\sin x = 4\sin x$

$C\cos x + C\cos x - D\sin x + D\sin x + 2C\sin x - 2D\cos x = 4$

$2C\sin x - 2D\cos x = 4\sin x$

$2C = 4 \qquad 0 - 2D = 0$

$2C = 4 \qquad -2D = 0$

$C = \frac{4}{2} = 2 \qquad D = 0$

$\therefore = 2\cos x - 2\sin x$

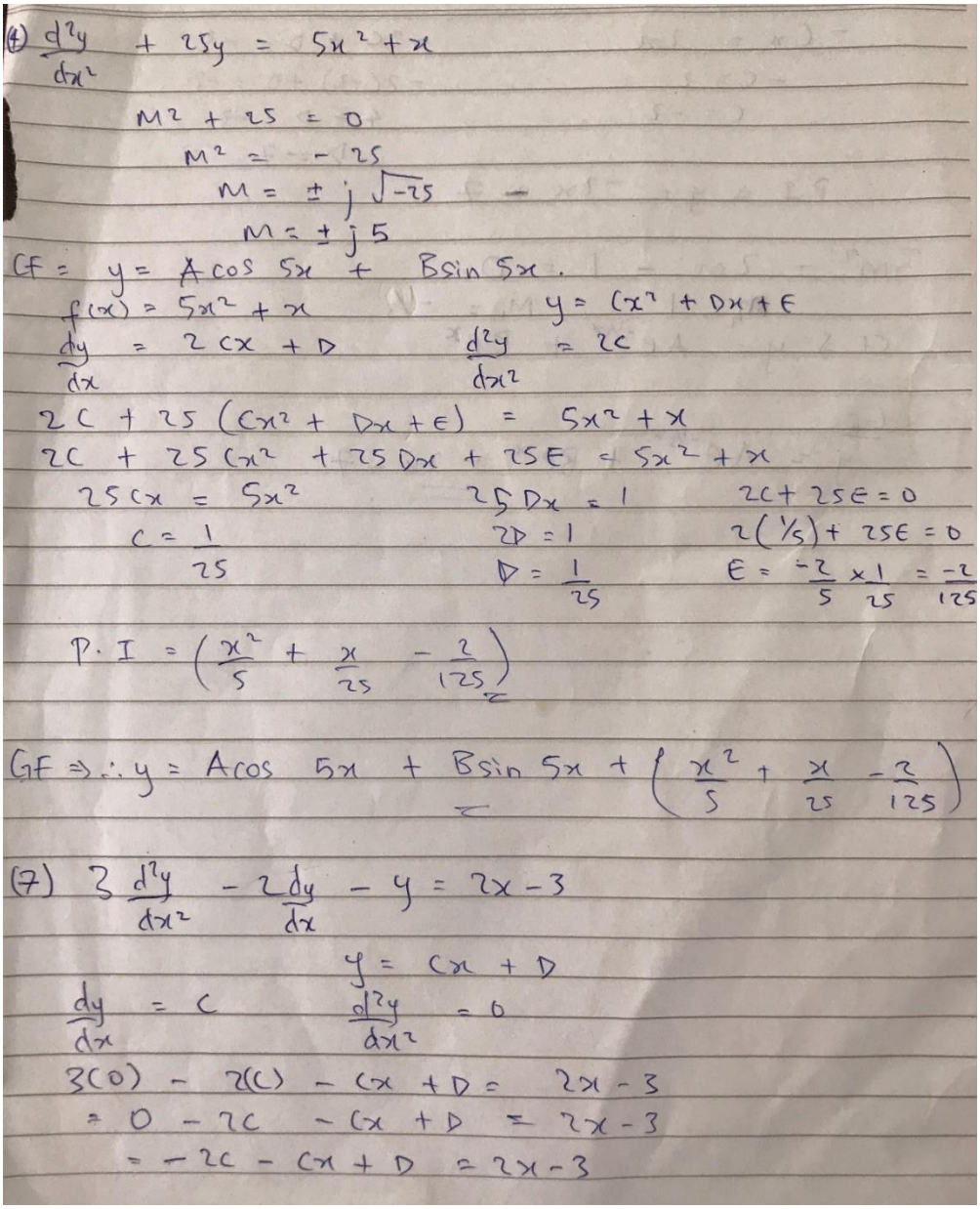
$m^2 - 2m + 1 = 0$

$m = 1$

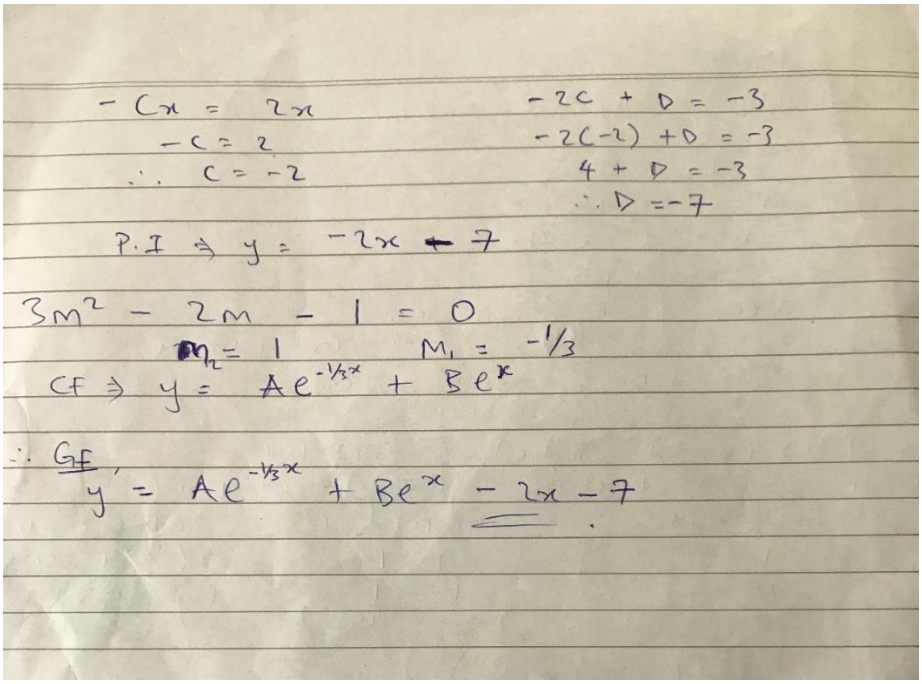
$\therefore y = e^x(A + Bx) + 2\cos x - 2\sin x$

$\therefore y = e^x(A + Bx) + 2\cos x$

NUMBER 4 AND 7



NUMBER 7


$-Cx = 2x$
$-C = 2$
$\therefore C = -2$
$-2C + D = -3$
$-2(-2) + D = -3$
$4 + D = -3$
$\therefore D = -7$
P.I $\Rightarrow y = -2x - 7$
$3m^2 - 2m - 1 = 0$
$m_2 = 1$ $M_1 = -1/3$
CF $\Rightarrow y = Ae^{-1/3x} + Be^{x}$
$\therefore$ GF,
$y = Ae^{-1/3x} + Be^{x} - 2x - 7$