2022 Differential Equation Quiz 9 (Written quiz)

1. Show that $W(5, cos^2 t, cos 2t) = 0$ for all t. Can you establish this result without direct evaluation of the Wronskian? If so explain how.

2. Find general solution of given equation!

$$y''' - 3y'' + y' + y = 0$$

3. Find the general solution of the given system of equations and describe the behavior of the solution as $t \to \infty$

$$x' = \begin{pmatrix} 1 & -2 \\ 3 & -4 \end{pmatrix} x$$

4. Solve the given initial value problem. Describe the behavior of the solution as $t \to \infty$.

$$x' = \begin{pmatrix} 5 & -1 \\ 3 & 1 \end{pmatrix} x, \quad x(0) = \begin{pmatrix} 2 \\ -1 \end{pmatrix}$$

5. Find the general solution of the given system of equations.

$$x' = \begin{pmatrix} 1 & i \\ -i & 1 \end{pmatrix} x$$