

Show all your work. No credits for answers without work.

Problem 1: Consider the equation $y''' - 5y'' + 8y' - 4y = 0$.

- (a) Find three linearly independent solutions of the equation.
- (b) Use the Wronskian to show that the solutions are linearly independent.
- (c) Find the general solution of the equation.

Problem 2: Consider the equation $(D^2 - 1)y = x + xe^x + \sin 3x$. Using the method of undetermined coefficients, find the most suitable form of the particular solution. **DO NOT FIND THE CONSTANTS.**

Problem 3: Use the method of variation of parameters to solve the equation $(D^2 + 1)y = \csc x$