

Math 240 - Assignment 7

October 16, 2025

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary. This assignment is due October 23.

1. Use variation of parameters to solve $y'' - 2y' - 8y = 3e^{-2x}$.

2. Use variation of parameters to solve the following differential equation.

$$x'' - 4x' + 4x = \frac{e^{2t}}{t^2}, \quad t > 0$$

3. Use variation of parameters to solve $y'' + y = \csc^2 x$.

4. Consider the equation $(1 - x)y'' + xy' - y = (1 - x)^2$ for $x > 1$.

- (a) Verify that $y_1(x) = x$ and $y_2(x) = e^x$ are solutions of the corresponding homogeneous equation.
- (b) Use the Wronskian to show that y_1 and y_2 are linearly independent on $(1, \infty)$.
- (c) Use variation of parameters to find a particular solution.
- (d) What is the general solution?
- (e) Find the solution that satisfies $y(2) = 1$ and $y'(2) = -4$.