

MATH 2850: TAKE HOME 08 (50 points.)

NAME: _____

DUE: Wednesday, March 20th at the beginning of class.

DIRECTIONS: Show all work.

1. Use the Method of Undetermined Coefficients to solve: $y'' + 4y = 12 \cos(2x) - 4$, $y(0) = 1$, $y'(0) = -2$.

SOLUTION:

2. Use Reduction of Order to solve $x^2y'' + 2xy' - 2y = 5\sqrt{x}$ given $y_1 = x$ is part of y_c .

GENERAL SOLUTION:

3. Consider the IVP: $x^2y'' + 3xy' - 3y = 5x^2$ on $(0, \infty)$. Suppose $y_c = c_1x + c_2x^{-3}$.

(a) Use Variation of Parameters to find the general solution.

GENERAL SOLUTION:

(b) Find the solution which satisfies the IC's: $y(1) = 3$, $y'(1) = -2$.

4. Suppose $y_1 = e^{mx}$ is a solution to the constant coefficient equation: $a_2 y'' + a_1 y' + a_0 y = 0$.

(a) Find A so that $y = A x y_1$ is a solution to $a_2 y'' + a_1 y' + a_0 y = y_1$.

(b) What assumptions must you make about m in order to guarantee a solution?

(c) What can be said a_0 , a_1 , and a_2 if there is no solution for A ?

What is the general solution to $a_2 y'' + a_1 y' + a_0 y = 0$ in this case?