Spring 2020 Math 337 - Lecture 7 Name _____

Note: For full credit you must show intermediate steps in your calculations. Your work must be your own. Copying or sharing solutions with others may subject you to disciplinary action based on the appropriate sections of the San Diego State University Policies.

1. (6pts) Consider the linear nonhomogeneous ODE given by:

$$y'' + y' - 2y = 8t^2.$$

Show how to solve this problem using both the *Method of Undetermined Coefficients* and the *Variation of Parameters*. Which technique do you consider easier to perform and why? (Slide 24 from both lecture notes of *Second Order Differential Equations*)

2. (5pts) a. Consider the linear homogeneous ODE given by:

$$ty'' - y' + 4t^3 y = 0.$$

Show that $y_1(t) = \cos(t^2)$ and $y_2(t) = \sin(t^2)$ are solutions to this ODE. Find the *Wronskian* of these solutions, $W[y_1, y_2](t)$ and use this to prove that these solutions form a *fundamental set of solutions* to this ODE.

b. Consider the linear nonhomogeneous ODE given by:

$$ty'' - y' + 4t^3 y = 8t^3.$$

Use the *Variation of Parameters* method to solve this problem. (Slide 24)

3. (5pts) Consider the following ODE:

$$y'' + 16\, y = 32 \csc^2(4t).$$

Find the solution to this problem. (Slide 24)