University of California, San Diego
Department of Mathematics

Instructions

1. Write your *Name*, *PID*, *Section*, and *Exam Version* on the front of your Blue Book.

2. No calculators or other electronic devices are allowed during this exam.

3. You may use one page of notes, but no books or other assistance during this exam.

4. Write your solutions clearly in your Blue Book

    (a) Carefully indicate the number and letter of each question.

    (b) Present your answers in the same order they appear in the exam.

    (c) Start a new answer on a new page.

5. Show all of your work; no credit will be given for unsupported answers.

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0. (1 point) Carefully read and complete the instructions at the top of this exam sheet and any additional instructions written on the chalkboard during the exam.

1. (8 points) Find the solution to the given initial value problem:

$$2y'' - 5y' + 2y = 0; \qquad y(0) = 1, \quad y'(0) = 0$$

2. (10 points) Find the general solution for the nonhomogeneous differential equation:

$$y'' + 4y = t^2$$

3. (8 points) The given functions y_1 and y_2 are solutions to the corresponding homogeneous differential equation. (You do not need to check). Use the Variation of Parameters formula to find a particular solution Y.

$$t^2 y'' - 2y = 4t^2 + 1, \quad t > 0; \qquad y_1(t) = t^2, \quad y_2(t) = t^{-1}$$

4. (3 points) Write the second order differential equation as a system of first order linear differential equations in standard form:

$$t^2 y'' + 3y' - e^t y = 0$$

(This exam is worth 30 points.)