

EXAM 2 - MATH 310

Thursday, February 27

YOUR NAME: _____

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Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Solve the initial value problem

$$y'' + 4y' + 4y = 0, \quad y(0) = 5, \quad y'(0) = -3.$$

2. Find the general solution of

$$y'' + 3y' = t^2.$$

3. Find the general solution of

$$y^{(4)} - 3y'' - 4y = -30e^{-t}.$$

4. Use reduction of order to find a second solution $y_2(t)$ of

$$t^2 y'' - 4ty' + 6y = 0, \quad t > 0,$$

given that $y_1(t) = t^2$ is a solution.

5. Find the general solution of

$$t^2 y'' - 2ty' + 2y = t^{9/2},$$

given that $y_1(t) = t$ and $y_2(t) = t^2$ are solutions of the complementary equation.