EXAM 2 - MATH 310 Friday, October 13

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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

$$3y'' + 7y' + 2y = 0, \quad y(0) = \frac{19}{2}, \quad y'(0) = -2.$$

2. Solve the initial value problem

$$y'' + y' + \frac{37}{4}y = 0, \quad y(0) = 10, \quad y'(0) = -20.$$

3. Find the general solution of

$$y'' - 4y' - 5y = 3e^{-t}.$$

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

$$t^2y'' + 2ty' - 2y = 0$$

if it is known that $y_1(t) = t$ is one of its solutions.

5. Solve the differential equation

$$y'' + 2y' + 5y = \cos t.$$