

YOUR NAME: _____

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Read each problem **very carefully** before starting to solve it and do only what is asked. Each problem is worth around 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. [5 points] Find the particular solution of the initial value problem

$$4y'' - 4y' + 65y = 0, \quad y(0) = 5, \quad y'(0) = \frac{7}{2}.$$

2. [5 points] Find the particular solution of the initial value problem

$$4y'' + 12y' + 9y = 0, \quad y(0) = -3, \quad y'(0) = \frac{13}{2}.$$

3. [2 Bonus Points] Suppose that you know that the homogeneous second order linear differential equation

$$y'' + 6y' + 9y = 0$$

has the solution $y_1(t) = e^{-3t}$. Show all steps in trying to identify a function $v(t)$ so that $y_2(t) = v(t)y_1(t)$ is also a solution.