Name:_____
M555: Differential Equations I (Spring 2018)
Instructor: Justin Ryan
Good Problems 4: Sections 3.1 and 3.2

WICHITA STATE UNIVERSITY

Instructions *Complete all problems, showing enough work. A selection of problems will be graded based on the organization and clarity of the work shown in addition to the final solution (provided one exists).*

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1. Solve the initial value problem

$$\begin{cases} y'' + 5y' + 3y = 0, \\ y(0) = 1, \\ y'(0) = 0. \end{cases}$$

2. Solve the initial value problem

$$\begin{cases} 2y'' - 3y' + y = 0, \\ y(0) = 0, \\ y'(0) = 2. \end{cases}$$

3. Find a second order linear homogeneous differential equation with constant coefficients for which the general solution is

$$y(t) = C_1 e^{-t/2} + C_2 e^{-2t}.$$

4. Show that the functions $y_1 = e^{rt}$ and $y_2 = te^{rt}$ are linearly independent.