Test 3

Homogeneous and nonhomogeneous differential equations with nice coefficients.

You have 50 minutes to complete this test. You may use a calculator, a book or notes. Please show any work that is to be graded on this question sheet. You must hand in any scrap paper you use, but it will not be graded. Good luck! I will see you all on Tuesday. – Dr. Swaine

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Questions:

1. (2 points) Find the general solution to $y^{''}-5y^{'}+3y=0$.
2. (2 points) Find the solution to $y^{''}-3y^{'}+5y=0 $where $y\left(0\right)=1 \& y^{'}\left(0\right)=2$.

1. (2 points) Solve $y^{''}-6y^{'}+9y=0 $where $y\left(0\right)=2 \& y^{'}\left(0\right)=1$.
2. (2 points) Find the general solution of $t^{2}y^{''}-3ty^{'}-10y=0$. For 1 point of extra credit, name the type of equation this is.
3. (2 points) Find the general solution of $ty^{''}+\left(t+1\right)y^{'}+y=0$, given that $e^{t}$ is a solution.
4. (2 points) Of what form would you suppose a solution of the following equation to be?

$y^{''}-y^{'}-3y=1+t+t^{2}$

1. (2 points) Find a solution to the equation below of this form if one exists. If one doesn’t show why not. Form: $bte^{3t}+ae^{3t}$ Equation: $y^{''}-2y^{'}+y=2te^{3t}$
2. (2 points) Given that $y\_{0}=\sin(t)$ solves $y^{''}+y^{'}+y=\cos(t)$ and that $y\_{1}=e^{t}$ solves $y^{''}+y^{'}+y=3e^{t}$ and that $y\_{2}=e^{-t/2}(c\_{1}\cos(\frac{\sqrt{3} }{2})+c\_{2}\sin(\frac{\sqrt{3}}{2})) $ is the general solution of $y^{''}+y^{'}+y=0$, find the general solution of $y^{''}+y^{'}+y=2\cos(t)+e^{t}$.