

Activity 7: Homogeneous Linear Differential Equations with Constant Coefficients

Names: _____ Date: November 5, 2009 Score: _____

Show your work for each of the following. You should submit one copy for your group. Feel free to ask your instructor for advice if you need it.

1. (5 pts) Find the general solution to the homogeneous, linear, constant coefficient differential equation with the characteristic equation $(r + \pi)^5(r - 1)(r^2 + 2r + 5)(r^2 + 100)^2 = 0$

2. (5 pts) Solve the differential equation $y'' + 3y' - 10y = 0$ with initial conditions $y(1) = 0$ and $y'(1) = 3$.

3. (5 pts) Find a differential equation for which a basis of the solution space is e^{3t} , e^{5t} , te^{5t} , $e^{-2t} \cos(t)$, and $e^{-2t} \sin(t)$.

4. (5 pts) A 2kg mass moves along a frictionless table. The mass is attached to a spring which is in turn attached to a wall. A force of 7N is required to move the mass 5 meters from the equilibrium position of the spring. Find a function $y(t)$ that describes the location of the mass at time t if $y(0) = -2$ meters and $y'(0) = 0$.