The College of New Jersey
ENG272 Advanced Engineering Math I, Fall 2015
Chapter 3 Practice Problems

Name_____ Date_____

Please solve the following problems from Chapter 3. Show all work for full credit.

1. $y_1(x) = 1$ is a solution to $x^2 y'' + xy' = 0$. Find a second linearly independent solution $y_2(x)$. You may use the integrating factor method.

2. $y_1(x) = e^{3x}$ is a solution to $y'' - 6y' + 9y = 0$. (a) Use reduction of order to find a second linearly independent solution $y_2(x)$. (Use the substitution $y_2(x) = u(x)y_1(x)$). *(b)* Verify that the two solutions are linearly independent.

3. Use the method of roots to find the general solution of the differential equation $y''-y'-12=0$.

4. Use the method of roots to solve the initial value problem $y''-2y'+5y=0,\ \ y(0)=-5,\ y'(0)=1.$