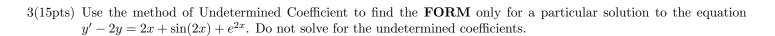
Mat	h 221 Test 2				Fall 2013
Name:			Score:		
Insti	ructions: You must show supporting red.	work to receive f	full and partial cr	redits. No text book,	notes, formula sheets
(15pts)	Find the general solution of the equat $y(x)$ .	ion $2y^{(4)}(x) - y''$	''(x) - y''(x) = 0,	where $y^{(4)}(x)$ denote	s the 4th derivative o
(15pts)	Use the method of reduction of ord- $x^2y'' - xy' + y = 0$ if one solution is g		n of parameter)	to find a second solu	ition to the equation



4(20pts) Use the method of Variation of Parameters to find a particular solution to the equation

$$(x^{2} + 2x)y'' - 2(x+1)y' + 2y = 2(x^{2} + 2x)^{2}$$

for which two linearly independent solutions to the homogeneous equation are given:  $y_1(x) = x + 1, y_2(x) = x^2$ .

5(15pts) Verify that  $\vec{v} = \begin{bmatrix} 3-i \\ 2 \end{bmatrix}$  is an eigenvector of  $A = \begin{bmatrix} -5 & 10 \\ -4 & 7 \end{bmatrix}$  and the corresponding eigenvalue is  $\lambda = 1 + 2i$ .

6(20pts) Consider 
$$A = \begin{bmatrix} 0 & 2 \\ -1 & 3 \end{bmatrix}$$
.

(a) Find all eigenvalues of A.

(b) Find all eigenvectors of A.

(c) Find a general solution to the system of equations  $\vec{x}'(t) = A\vec{x}(t)$ .