

Math 202 - Quiz # 5b

Name: Solution

Ser. # _____

Find the general solution of the following differential equation:

$$y^{(4)} - 2y^{(3)} - 12y'' - 14y' - 5y = 0$$

$$\lambda^4 - 2\lambda^3 - 12\lambda^2 - 14\lambda - 5 = 0$$

possible roots: $\pm 1, \pm 5$

$$(\lambda + 1)^3(\lambda - 5) = 0$$

$$\Rightarrow \lambda = 5, -1, -1, -1$$

The general solution is

$$y = c_1 e^{5x} + c_2 e^{-x} + c_3 x e^{-x} + c_4 x^2 e^{-x}$$

-1	1	-2	-12	-14	-5
		-1	3	9	5
-1	1	-3	-9	-5	0
		-1	4	5	
-1	1	-4	-5	0	
		-1	5		
	1	-5	0		

$\therefore (\lambda + 1)^3(\lambda - 5)$