MATH 361 Final Exam Spring 2012

	Name:
1.	Solve the differential equation:
	$x^2y' + x(x+2)y = e^x,$
	Ans:
2.	Solve the differential equation
	$(\sin x \cos x - xy^2)dx + y(1 - x^2)dy = 0, y(0) = 2,$
	<u>,</u>
3.	Ans: An apple pie is removed from the oven at 300°F. Three minutes later the temperature is 200°F
J.	If the room temperature is 70°F, how long does it take for the pie to cool to 100°F?
	if the room temperature is to 1, now long does to take for the pie to cool to 100 1.
	Ans:
	(Extra Space)

	Name:
4.	Let $\frac{dx}{dt} = 8x - 2x^3$, Graph qualitative solutions for $x(0) = 4, 1/2, -1$. Classify the equilibrium solutions
	and determine the inflection points.
5.	a) Solve the equation: $2y'' - 5y' + 4y = 8e^x$
	Ans:
	b) Solve the equation: $y^{iv} + y'' = 0$
6.	Find the general solution of $y'' + y = \sec x \tan x$.
	Ans: (Extra Space)
	(Extra Space)

	Name:
7.	Let $t^2y'' - t(t+2)y' + (t+2)y = 0$. Find the general solution, given that $y_1 = t$ is a solution.
	Ans:
8.	a) Solve the equation: $x^2y'' + 3xy' + 3y = 0$
	A
	Ans: b) Find the radius of convergence of the series solution of $(x^3 + 8)y'' + 4xy' + 2y = 0$, about $x = 1$.
	b) Find the radius of convergence of the series solution of $(x + 5)y + 74xy + 2y = 0$, about $x = 1$.
	Ans:
9.	Solve by Laplace Transforms
	a) $y'' - 6y' + 9y = t^2 e^{3t}$, $y(0) = 2$, $y'(0) = 6$
	Ans:
	b) $y'' + 2y' + 17y = \delta(t - 3), \ y(0) = 0, \ y'(0) = 0$
	Ans:
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	Name:
10.	Find the first four non zero terms of a series solution of the equation: $9x^2y'' + 9x^2y' + 2y = 0$.
	(Use the largest root of the indicial equation!)
	Ans:
	Extra space