

MATH 361 EXAM 3, Spring 2002

	Name: _____
1.	<p>Determine the radius of convergence of the power series <math>\sum_{n=0}^{\infty} \frac{(n-4)(x-3)^n}{5^n}</math></p> <p style="text-align: right;">Ans: _____.</p>
2.	<p>Find the first three terms of a Taylor series solution of <math>y'' + xy = 0</math>, about <math>x=0</math></p> <p style="text-align: right;">Ans: _____.</p>
3.	<p>Determine a lower bound for the radius of convergence of the solutions of the differential equation <math>(4+x^2)y'' - 6xy' + 8(x+1)y = 0</math>, about a) <math>x = 0</math>; b) <math>x = -1</math>.</p> <p style="text-align: right;">Ans: a) _____ b) _____.</p>
4.	<p>Solve the equation: <math>x^2y'' + xy' + 2y = 0</math></p> <p style="text-align: right;">Ans: _____.</p>

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5. Determine and classify the singular points of the equation  $x^3(1+x)y'' + (x-1)y' + 3xy = 0$ .

Ans:\_\_\_\_\_.

6. Let  $x^2y'' + xy' + (x^2 - 1/4)y = 0$ . Find the roots of the indicial equation. Using the largest root, find three terms of a Frobenius series solution.

Ans:\_\_\_\_\_.

Extra Credit. Express the solution of problem 6 in terms of elementary functions.