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Math 202 **Mid- EXAMINATION** Nahlus & Yamani

Time: 75 minutes

Date: April 6, 2005

Name .....

I.D .....

Sec. 9 (12:30 Th, Yamani) Sec. 10 (2:00 Th, Yamani)

Sec. 11 (9:30 Th, Nahlus), Sec.12 (2:00 Th, Nahlus)

Circle Your Section Number

Problems	Grade	Maximum
1	.....	14
2	.....	14
3	.....	14
4	.....	14
5	.....	12
6	.....	12
7a,b	.....	10
8a,b	.....	10
Total		100

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1) Solve the IVP problem $(x^2+1)yy' = e^{-y^2}$ where $y(1)=0$

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2) Solve the Bernoulli DE $x^2y' - xy + y^2 = 0$

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3) Find an integrating factor to make the following DE exact. Then solve it.

$$2xy\,dx + (4x^2 + 6y^2 + 4)\,dy = 0.$$

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4) Find the general solution of the DE $y''-4y = 20x + e^{2x}$

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5) Use the formula for Reduction of order to find the general solution of the DE

$(1+x^2)y'' - 2xy' + 2y = 0$ given that $y_1 = x$ is a solution

6) Find the general solution of the DE

$$y'' + 3y' + 2y = \sin e^x$$

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7a) (7 pts) Find the general solution of the DE (by any method)

$$x^2 y'' + xy' + y = 0$$

7b) (JUST 3 pts) Use the substitution $x = e^t$ (SHOW ALL DETAILS) to change your DE to a DE with constant coefficients. **THEN STOP ! STOP**

$$x^2 y'' - xy' + y = x \ln x$$

THEN STOP ! STOP

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8a) (7pts) Find all solutions of $y'' = (\sin y')\, e^{y' \tan x}$ where $y'(\pi/5)=0$

Hint: Let y'=Y. Then try Y=k (for some k).

8b) (JUST 3 pts) Change the following ***Ricatti*** DE to a ***Bernoulli*** DE.

THEN STOP $y' = \frac{y}{x} + x^3 y^2 - x^5$ (Hint: y=x is a solution)

THEN STOP