

MATH 320, Spring 2013, Assignment 5

Due date: Friday, March 8

Name (printed): _____

UW Student ID Number: _____

Discussion Section: (circle)

Robin Prakash: **301 302 303**

Sowmya Acharya: **304 306 307 308**

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Instructions

1. Fill out this cover page **completely** and affix it to the front of your submitted assignment.
2. **Staple** your assignment together and answer the questions in the order they appear on the assignment sheet.
3. Show all the work required to obtain your answers.
4. You are encouraged to collaborate on assignment problems but you must write up your assignment independently. **Copying is strictly forbidden!**

S#	Q#	Mark
3.1	21	/2
3.2	12	/3
3.2	15	/2
3.2	20	/3
3.2	27	/3
3.3	17	/3
3.3	35	/4
—	1	/5
—	2	/5
Total:		/30

Linear Systems, Gaussian Elimination, Applications

Suggested problems:

Section 3.1: 1-31, 33

Section 3.2: 1-28

Section 3.3: 1-30, 35-39

Problems for submission:

Section 3.1: 21

Section 3.2: 12, 15, 20, 27

Section 3.3: 17, 35

(Justify your answers for full marks!)

1. Solve the first-order differential equation

$$3y \frac{dy}{dx} = (y^2 + 1)(y^2 + 4).$$

[**Hint:** You will have to perform partial fraction decomposition keeping the $(y^2 + 1)$ and $(y^2 + 4)$ terms in tact—make sure you set this up correctly!]

2. Consider the third-order differential equation

$$\frac{d^3y}{dx^3} - 3\frac{d^2y}{dx^2} + 4\frac{dy}{dx} - 2y = 0. \quad (1)$$

- (a) Verify that $y(x) = C_1e^x + C_2e^x \sin(x) + C_3e^x \cos(x)$ is a solution of (1) for all values of $C_1, C_2, C_3 \in \mathbb{R}$.
- (b) Find the particular solution (i.e. solve for C_1, C_2 , and C_3) for the initial conditions $y(0) = 1$, $y'(0) = 0$ and $y''(0) = 0$.