

# **Review Questions for Exam I**

## **Math 260**

**Introduction to Differential Equations and Linear Algebra**

**Prepared by**

**Mohammad Samman**

**Department of Mathematics and Statistics**  
**KFUPM**

**October 2009**

1. Use **Gauss-Jordan Elimination Method**, to solve the system

$$x_1 - x_2 + x_3 + x_4 = 0$$

$$2x_1 + 2x_3 = 0$$

$$x_1 + x_2 + x_3 - x_4 = 0$$

$$-x_1 - 3x_2 - x_3 + 3x_4 = 0$$

2. The Population of a Community is known to increase at a rate Proportional to the number of People present at any time. The Population of the community is doubled after 5 years and it is 10,000 after 3 years. What was the initial population? What will be the Population after 10 years?

3. If we know a solution for a given DE, is it necessarily to be unique?

4. Solve  $x^2 \frac{dy}{dx} = y - xy$ .

5. Solve  $x \frac{dy}{dx} - y = x^2 \sin x$ .

6. Solve the initial value problem  $(e^x + y)dx + (2 + x + ye^y)dy = 0$ ,  $y(0) = 1$ .

7. Solve the initial value problem  $\frac{dy}{dx} = \cos(x + y)$ ,  $y(0) = \pi/4$ .

8. Solve  $xy'' - y' = 100$

9. Solve  $x \frac{dy}{dx} - (1 + x)y = xy^2$ .

10. Solve  $(y^2 - xy)dx + x^2 dy = 0$ .