King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
Math 260
Class Test I, Semester II, 2012-2013

Name:_____

ID:_____ Section:_____

1. If $A = \begin{bmatrix} 1 & x & z \\ 0 & 1 & y \\ 0 & 0 & 1 \end{bmatrix}$ and $A^2 + \begin{bmatrix} 0 & -1 & 0 \\ 0 & 0 & -1 \\ 0 & 0 & 0 \end{bmatrix} = I_3$, then find the sum $x + y + z$.

2. Find $N(x, y)$ that makes the given DE exact $(\cos x \sin x - \frac{(\ln x)y^2}{x^2})dx + N(x, y)dy = 0$.

3. Solve the initial value problem

$$xy' + 5y = 7x^2, \quad y(2) = 5$$

4. Use Gauss-Jordan method to solve the homogeneous linear system

$$\begin{aligned} 4x_1 + x_3 - x_5 - 10x_6 &= 0 \\ 2x_2 - 3x_3 - 2x_4 - 10x_5 + 6x_6 &= 0 \\ x_1 + 2x_2 - 2x_4 - 2x_5 - 2x_6 &= 0 \end{aligned}$$

5. Find a suitable substitution for each of the following differential equations and then identify the resulting equation (DO NOT SOLVE IT).

   (a) $x(x+y)\frac{dy}{dx} + y(3x+y) = 0$.

   (b) $y'' = y'(1+y')$.

   (c) $3\frac{dy}{dx} = 2y + e^{-x}y^{-2}$.

6. (Extra 10pts) A thermometer reading 70^oF is placed in an oven preheated to a constant temperature. If the thermometer reads 100^oF after 1/2 a minute and 145^oF after 1 minute, then how hot is the oven?