MATH 290C   **EXAM 3**   **Spring 2008**

Name: _____

Student ID number: _____

Instructions:
1. Please fill in the above information. There are 7 problems.
2. You must show sufficient work to justify all answers. Correct answers with insufficient work will not receive full credit. Partial credit may be obtained provided sufficient work is shown.
3. No books, notes or papers may be used.
4. Only non-programmable, non-graphing calculator may be used.
5. The exam is self-explanatory. Please do not ask the instructor to interpret any of the exam questions.
6. Write your final answer in the box provided.
7. Good luck!

Problem #	Max possible	Your score
1	14	
2	18	
3	12	
4	12	
5	12	
6	18	
7	14	
Total	100	

1. [14pts] Solve the initial-value problem by using integrating factor:

$$\begin{cases} y'-y = e^x \\ y(0) = 1 \end{cases}$$

$y =$

2.[18 pts]Consider the autonomous differential equation:

$$y' = y^2 - 4y + 3$$

(a) Find the equilibrium values:

(b) Assess the stability of each equilibrium value:

```



```

3. [12pts]Solve the initial-value problem by separation of variables:

$$\begin{cases} \dfrac{dy}{dx} = \dfrac{x+1}{y} \\ y(0) = 4 \end{cases}$$

```



```

4. [12pts] Use Euler's method to get y_5 for

$$y' = y + 2, \quad y(0) = 3, \quad \Delta x = 0.2$$

$$y_5 =$$

5. [12pts]Let $A = \begin{bmatrix} 10 & -4 \\ 2 & -5 \\ 7 & 2 \end{bmatrix}, B = \begin{bmatrix} -5 & 6 & 0 \\ -2 & 1 & 9 \end{bmatrix}$,compute AB
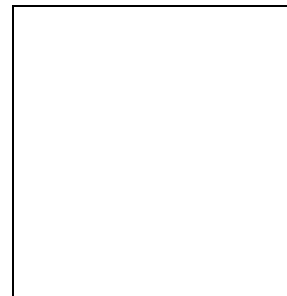
$$AB = \begin{bmatrix} & \\ & \end{bmatrix}$$

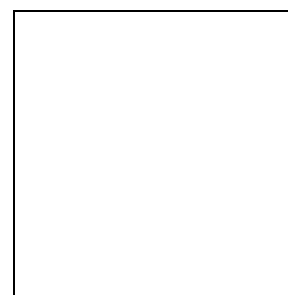6[18pts]. The Leslie matrix for a population of birds is

$$G = \begin{bmatrix} 0.6 & 3 \\ 0.4 & 0.2 \end{bmatrix}.$$

The population vector for year 1 is $p = \begin{bmatrix} hatchlings \\ adults \end{bmatrix} = \begin{bmatrix} 200 \\ 180 \end{bmatrix}$

(a)Estimate the population vector for year 2.

(b)Estimate the population vector for year 3.

7. [14pts]Solve the system of linear equations by using Gaussian elimination.

$$\begin{cases} x + y + z = 4 \\ 2x - y - 3z = -5 \\ 3x - 3y - 3z = -6 \end{cases}$$

$$\begin{cases} x = \\ y = \\ z = \end{cases}$$