NAME:_____ Date_____ MATH 104 Spring 2009 **Test 4** Tigran Mkrtchyan

YOU MUST SHOW ALL OF YOUR WORK to receive full credit for the problem. The more work you show on your paper leading to your solution will give me more opportunity to award partial credit. **Clearly indicate your solution** to the problem.

1) *(4 points)* The half-life of radium-226 is 1620 years. How much of a 2-g sample remains after 100 years?

2) *(4 points)* Solve the following system using matrices.

$$\begin{cases} 3x+4y-z=5 \\ x-3y+2z=2 \\ 5x-6z=-7 \end{cases}$$

3) *(4 points)* Given $\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}\begin{pmatrix} 5 & x \\ 7 & 8 \end{pmatrix}=\begin{pmatrix} 19 & 22 \\ 43 & 50 \end{pmatrix}$, find x.

4) Given the system $\begin{cases} x+4y=7 \\ 2x+7y=12 \end{cases}$

(a) *(4 points)* Find the inverse of the coefficient matrix A^{-1}

(b) *(4 points)* Use A^{-1} to solve the given system.

5) *(4 points)* For a given system, use Cramer's rule to find only x in the solution of the system. (You may use problem #2 to check your answer.)

$$\begin{cases} 3x+4y-z=5 \\ x-3y+2z=2 \\ 5x-6z=-7 \end{cases}$$

6) Find all solutions of the system where x and y are real numbers.

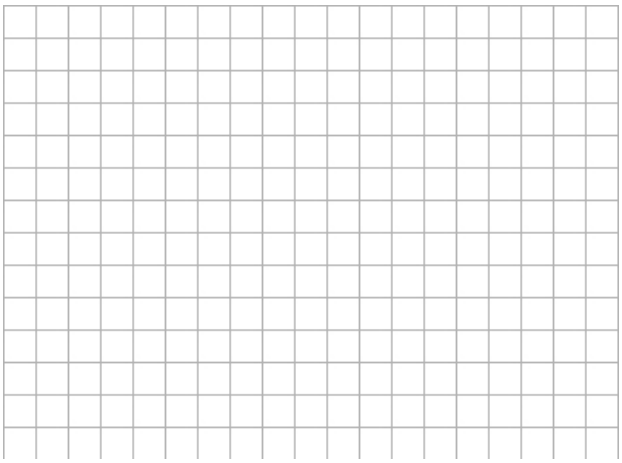
(a) *(4 points)* $\begin{cases} x^2 + y^2 = 25 \\ 24y = x^2 \end{cases}$

(b) *(4 points)* $\begin{cases} y = 2^x \\ y = 2^{2x} - 12 \end{cases}$

7) *(5 points)* Find the focus and directrix of the parabola and sketch the graph. $(y-2)^2 = -8x$

Directrix:

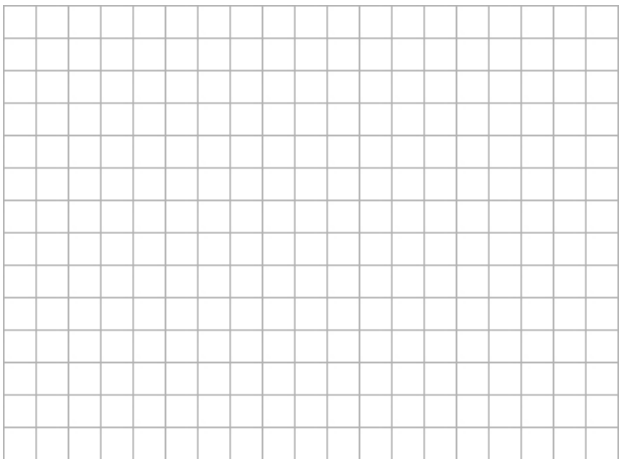
Focus:



8) *(5 points)* Determine the foci and eccentricity of the ellipse and graph it. $4x^2 + 9y^2 - 8x - 54y + 49 = 0$

Foci:

Eccentricity:



9) *(8 points)* Determine vertices, foci, eccentricity, equations of the asymptotes of the given hyperbola and graph it. $x^2 - y^2 + 2y - 5 = 0$

Vertices:

Foci:

Eccentricity:

Asymptotes: