Algebra 2A Notes Name: _____

2-4 Inverse Matrices Date: _____ Hr: _____

Objective: To solve systems of equations using matrix inverses and multiplication.

Common Core Content Standard:

N.VM.8 Add, subtract, and multiply matrices of appropriate dimensions

You can solve some matrix equations $AX = B$ for X by multiplying each side of the equation by A^{-1}, the inverse of matrix A.

***Example 1:* Solving a Matrix Equation Using an Inverse Matrix**

What is the solution of this matrix equation?

$$\begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} X = \begin{bmatrix} 6 \\ 3 \end{bmatrix}$$

You can write a system of equations as a matix equation $AX = B$, using a _____ matrix, a _____ matrix, and a _____ matrix.

***Example 2:* Writing a System as a Matrix Equation**

What is a matrix equation that corresponds to each system?

a.) $\begin{cases} 2x - y = -1 \\ x + 3y = 17 \end{cases}$

b.) $\begin{cases} 3a + 2b = 5 \\ 4a = 3c + 7 \\ 6b - 6c = -5 \end{cases}$

If the coefficient matrix has an inverse, you can use it to find a _____ solution to a system of equations.

Example 3: **Solving a System of Two Equations**

What is the solution of the system $\begin{cases} 4x + 5y = -8 \\ x + \frac{3}{4}y = 2 \end{cases}$? Solve using matrices.

If a system has det = 0, then there is no inverse matrix and the system has no unique solution. This means the system either has _____ solutions or _____ many solutions.

Example 4: **Solving a System of Three Equations**

A baseball field has 6200 seats in the lower three tiers. Seats sell for $120 in section A, $100 in section B, and $75 in section C. If tickets are sold for all of the seats, the total in sales is $604,000. The number of seats in section C is $500 fewer than those in section B. How many seats are in each section of the field?