Precalculus

9-04 Inverse Matrices

Identity Matrix (*I*)

- $A \cdot I = A$
- $A \cdot A^{-1} = I$
- Both A and A^{-1} must be _____
- $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ OR $I = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ OR $I = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

Inverse of 2×2

If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$**, then**

$$A^{-1} = \frac{1}{ad - bc}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$

Find the inverse of $\begin{bmatrix} 1 & 0 \\ -2 & 4 \end{bmatrix}$

Find other inverses

- _____the matrix with the _____matrix
- Use Gauss-Jordan elimination to turn the _____matrix into the _____matrix
- $[A \vdots I] \rightarrow [I \vdots A^{-1}]$

Find the inverse of $\begin{bmatrix} 1 & 2 & 3 \\ 0 & -1 & -2 \\ -3 & 4 & -4 \end{bmatrix}$

Use an inverse to solve system of equations

- Write system as _____
- $AX = B$ (coefficients · variables = constants)
- $A^{-1}AX = A^{-1}B$
- $IX = A^{-1}B$
- $X = A^{-1}B$
- Solve by multiplying the _____of the coefficients with the _____

Solve $\begin{cases} 2x + 3y = 0 \\ x - 4y = 7 \end{cases}$