Review of Inverses

A matrix has an inverse if:

- It is Square
- The det(A)≠0

If the det(A)=0 then the matrix is SINGULAR

The determinant of a 2x2 matrix is ad-bc

Inverse of a 2x2 Matrix

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

$$\begin{pmatrix} 3 & 1 \\ 4 & 2 \end{pmatrix}$$

Inverse of a 3x3 Matrix

Plug into your calculator

$$\begin{pmatrix} 3 & -3 & 6 \\ 1 & -3 & 10 \\ -1 & 3 & -5 \end{pmatrix}$$

Matrices with Inverses

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Solving with inverses:

$$x - 3y + z = 4$$

$$-y - 4z = 7$$

$$5x - 13y + 13z = 8$$

coefficient matrix

$$\begin{pmatrix} 1 & -3 & 1 \\ 0 & -1 & -4 \\ 5 & -13 & 13 \end{pmatrix}$$

variable matrix

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix}$$

answer matrix

$$\begin{pmatrix} 4 \\ 7 \\ 8 \end{pmatrix}$$

coefficient matrix

answer matrix

$$\begin{pmatrix} 1 & -3 & 1 \\ 0 & -1 & -4 \\ 5 & -13 & 13 \end{pmatrix} \bullet \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 4 \\ 7 \\ 8 \end{pmatrix}$$

variable matrix

$$C \cdot V = A$$

to solve:

you have to have the same number of variables as equations to use this method

possible answers:

you obtain solutions

singular matrix - no solutions
(because there was no inverse for C)

2x2 Matricies: BY HAND

$$3x - 2y = 0$$

$$-x + y = 5$$

Solve using inverse matrices:

$$2x - y + z = -6$$

$$x + 2y - 3z = 9$$

$$3x - 2y + z = -3$$