

7.2 Day 3 Notes

Thursday, April 9, 2015
11:12 AM

Identity, Inverses, Determinant

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

2x2 Identity Matrix

$$3 \times 3 \text{ Identity Matrix } I_{3 \times 3} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

Inverse of Matrix

Two square matrices are inverses if they "undo" each other: their product is the Identity matrix.

$$A = \begin{bmatrix} 3 & -2 \\ -1 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$$

$$AB = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \quad BA = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

Finding Inverse of a 2x2 matrix

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

Determinant = $ad - bc$

If determinant = 0, no Inverse

Ex. $A = \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix}$ Find inverse of A, if it exists

$$\det A = 3 \cdot 2 - 4 \cdot 1 = 2 \quad \text{yes, inverse exists}$$

$$A^{-1} = \frac{1}{2} \begin{bmatrix} 2 & -1 \\ -4 & 3 \end{bmatrix} = \begin{bmatrix} 1 & -\frac{1}{2} \\ -2 & \frac{3}{2} \end{bmatrix}$$

$$\text{Ex } B = \begin{bmatrix} a & b \\ -1 & -7 \\ c & 3 \\ d & 20 \end{bmatrix}$$

$$\det B = (-1)(20) - (-7)(3) = 1 \checkmark \quad B^{-1} = \frac{1}{1} \begin{bmatrix} 20 & 7 \\ -3 & -1 \end{bmatrix} = \begin{bmatrix} 20 & 7 \\ -3 & -1 \end{bmatrix}$$

Inverse of Larger Square Matrices - All Calculator

$$C = \begin{bmatrix} 1 & 2 & -1 \\ 2 & -1 & 3 \\ -1 & 0 & 1 \end{bmatrix}$$

MATRIX \rightarrow EDIT [A] 3x3
then type in your matrix
(hit ENTER between entries)

EXIT then Go into Matrix again
 \rightarrow NAMES [A]⁻¹ \nwarrow inverse button