

Section 8.3 The Inverse of a Square Matrix

Objective: In this lesson you learned how to find the inverses of matrices and use inverse matrices to solve systems of linear equations.

Course Number

Instructor

Date

Important Vocabulary

Define each term or concept.

Inverse of a matrix

I. The Inverse of a Matrix (Page 649)

To verify that a matrix B is the inverse of the matrix A , . . .

What you should learn

How to verify that two matrices are inverses of each other

II. Finding Inverse Matrices (Pages 650–652)

If a matrix A has an inverse, A is called _____ or nonsingular. Otherwise, A is called _____.

What you should learn

How to use Gauss-Jordan elimination to find the inverses of matrices

To have an inverse, a matrix must be _____. Not all square matrices have inverses. However, if a matrix does have an inverse, that inverse is _____.

To find the inverse of a square matrix A of order n , . . .

Example 1: Find the inverse of the matrix $A = \begin{bmatrix} 1 & 2 & 4 \\ 1 & 0 & 2 \\ 2 & 3 & 6 \end{bmatrix}$.

III. The Inverse of a 2×2 Matrix (Page 653)

If A is a 2×2 matrix given by $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, then A is invertible if and only if _____. Moreover, if this condition is true, the inverse of A is given by:

$$A^{-1} = \frac{\quad}{\quad} \begin{bmatrix} \quad & \quad \\ \quad & \quad \end{bmatrix}$$

The denominator is called the _____ of the 2×2 matrix A .

Example 2: Find the inverse of the matrix $B = \begin{bmatrix} 3 & 9 \\ -2 & -7 \end{bmatrix}$.

What you should learn

How to use a formula to find the inverses of 2×2 matrices

IV. Systems of Linear Equations (Page 654)

If A is an invertible matrix, the system of linear equations represented by $AX = B$ has a unique solution given by _____.

Example 3: Use an inverse matrix to solve (if possible) the system of linear equations:

$$\begin{cases} 12x + 8y = 416 \\ 3x + 5y = 152 \end{cases}$$

What you should learn

How to use inverse matrices to solve systems of linear equations

Homework Assignment

Page(s)

Exercises