

Section 7.6 The Inverse of a Square Matrix

Objective: In this lesson you learned how to find inverses of matrices and how to 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 541)

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 542–545)

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 inverses of matrices

A _____ matrix cannot have an inverse. 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 545)

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:

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

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 inverses of 2×2 matrices

IV. Systems of Linear Equations (Page 546)

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