Course Number

Instructor

Date

Section 6.3 The Inverse of a Square Matrix

Objective: In this lesson you learned how to verify that two matrices are inverses of each other and find inverses of matrices and how to use inverse matrices to solve systems of linear equations.

Important Vocabulary Define each term or concept.

Inverse of a matrix

I. The Inverse of a Matrix (Pages 460–461)

What you should learn
How to verify that two matrices are inverses of each other

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

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

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 _____.

II. Finding Inverse Matrices (Pages 462–463)

What you should learn
How to use Gauss-Jordan elimination to find the inverses of matrices

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 464)

What you should learn
How to use a formula to find the inverses of 2×2 matrices

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:

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

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

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

IV. Systems of Linear Equations (Page 465)

What you should learn
How to use inverse matrices to solve systems of linear equations

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:

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

Homework Assignment

Page(s)

Exercises