

7: Matrices

Learning Objectives

In this chapter, you will learn to:

1. Do matrix operations.
2. Solve linear systems using the Gauss-Jordan method.
3. Solve linear systems using the matrix inverse method.
4. Do application problems.

• **7.1: Introduction to Matrices**

A matrix is a 2-dimensional array of numbers arranged in rows and columns. Matrices provide a method of organizing, storing, and working with mathematical information. Matrices have an abundance of applications and use in the real world. Matrices provide a useful tool for working with models based on systems of linear equations. We'll use matrices in sections 7.2, 7.3, and 7.4 to solve systems of linear equations with several variables in this chapter.

[7.1.1: Introduction to Matrices \(Exercises\)](#)

• **7.2: Systems of Linear Equations and the Gauss-Jordan Method**

In this section, we learn to solve systems of linear equations using a process called the Gauss-Jordan method by first expressing the system as a matrix, and then reducing it to an equivalent system by simple row operations. The process is continued until the solution is obvious from the matrix. The matrix that represents the system is called the augmented matrix, and the arithmetic manipulation that is used to move from a system to a reduced equivalent system is called a row operation.

[7.2.1: Systems of Linear Equations and the Gauss-Jordan Method \(Exercises\)](#)

• **7.3: Systems of Linear Equations – Special Cases**

[7.3.1: Systems of Linear Equations – Special Cases \(Exercises\)](#)

• **7.4: Inverse Matrices**

In this section, we will learn to find the inverse of a matrix, if it exists. Later, we will use matrix inverses to solve linear systems.

[7.4.1: Inverse Matrices \(Exercises\)](#)

• **7.5: Application of Matrices in Cryptography**

In this section, we will learn to find the inverse of a matrix, if it exists. Later, we will use matrix inverses to solve linear systems.

[7.5.1: Application of Matrices in Cryptography \(Exercises\)](#)

• **7.6: Applications – Leontief Models**

In this section we will examine an application of matrices to model economic systems.

[7.6.1: Applications – Leontief Models \(Exercises\)](#)

•

7.7: Chapter Review

Thumbnail: (via Wikipedia)

This page titled [7: Matrices](#) is shared under a [CC BY 4.0](#) license and was authored, remixed, and/or curated by [Rupinder Sekhon and Roberta Bloom](#) via [source content](#) that was edited to the style and standards of the LibreTexts platform; a detailed edit history is available upon request.

This page titled [7: Matrices](#) is shared under a [CC BY 4.0](#) license and was authored, remixed, and/or curated by [Rupinder Sekhon and Roberta Bloom](#) via [source content](#) that was edited to the style and standards of the LibreTexts platform.

- **2: Matrices** by [Rupinder Sekhon and Roberta Bloom](#) is licensed [CC BY 4.0](#). Original source: <https://www.deanza.edu/faculty/bloomroberta/math11/afm3files.html.html>.