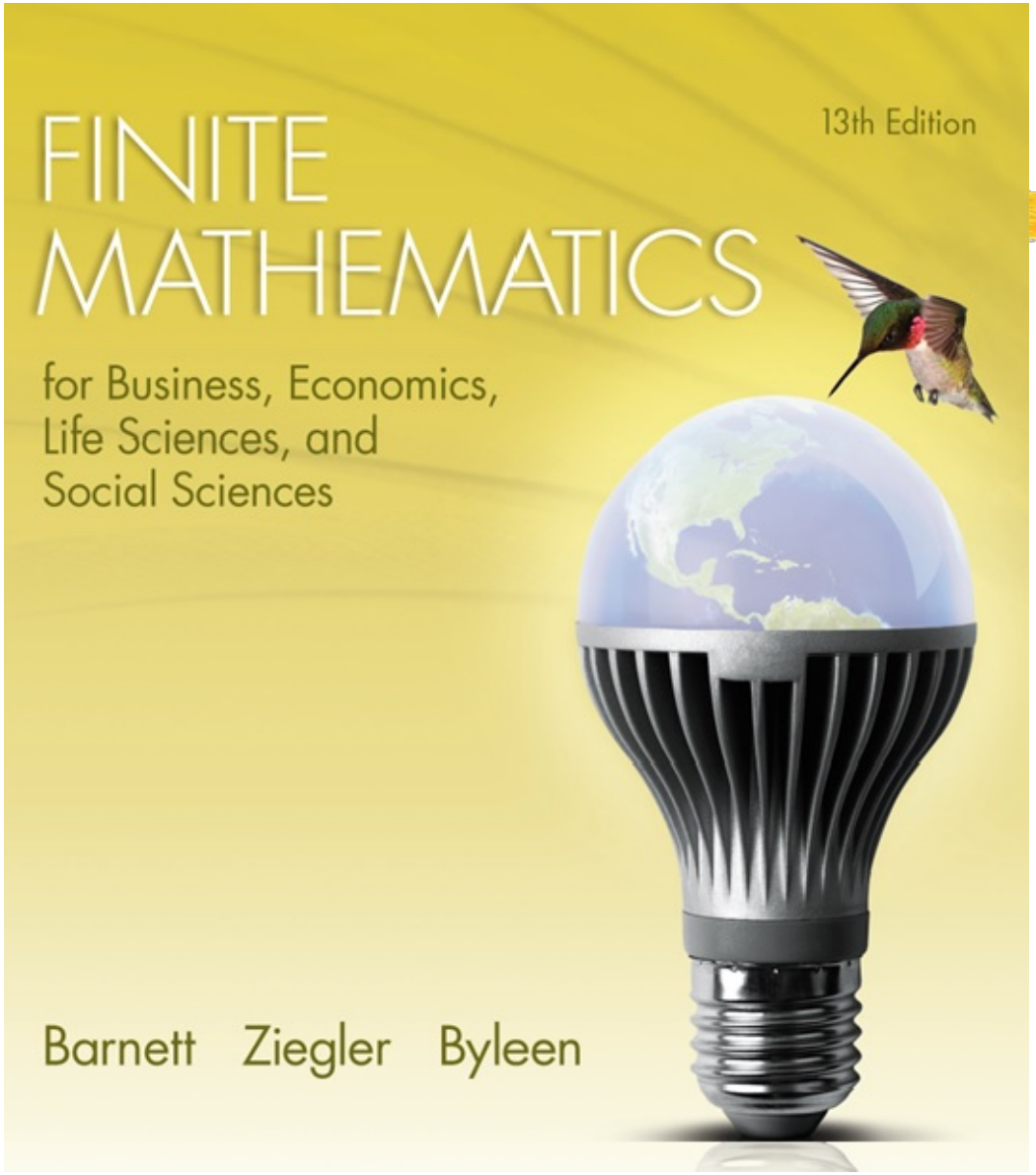

Chapter 4

Systems of Linear Equations; Matrices

Section R

Review

Review for Chapter 4
Important Terms, Symbols, Concepts

- 4.1 Systems of Linear Equations in Two Variables
  - The **solution** of a system is an ordered pair of real numbers that satisfy each equation in the system.
  - Solution by **graphing** is one method that can be used to find a solution.
  - A linear system if **consistent** if it has a unique solution, **dependent** if it has an infinite number of solutions, and **inconsistent** if it has no solutions.

Chapter 4 Review

- 4.1 Systems of Linear Equations in Two Variables (continued)
  - A **graphing calculator** provides accurate solutions to a linear system.
  - The **substitution** method can also be used to solve linear systems.
  - The **method of elimination by addition** is easily extended to larger systems.

Chapter 4 Review

- 4.2. Systems of Linear Equations and Augmented Matrices
  - A **matrix** is a rectangular array of real numbers.
  - Row operations performed on an **augmented coefficient matrix** produce equivalent systems.
  - There are only three possible final forms for the augmented coefficient matrix for a linear system of two equations in two variables.

Chapter 4 Review

- 4.3 Gauss-Jordan Elimination
  - **Reduced row echelon form** is discussed in this section.
  - The **Gauss-Jordan elimination procedure** is described in this section.

Chapter 4 Review

- 4.4 Matrices: Basic Operations
  - Two matrices are **equal** if they are the same size and their corresponding elements are equal.
  - The **sum** of two matrices of the same size is the matrix with elements which are the sum of the corresponding elements of the two given matrices.
  - The **negative** of a matrix is the matrix with elements that are the negatives of the given matrix. If A and B are matrices of the same size, then B can be subtracted from A by adding the negative of B to A.

Chapter 4 Review

- 4.4 Matrices: Basic Operations (continued)
  - Matrix equations involving addition and subtraction are solved much like real number equations.
  - The product of a real number k and a matrix M is the matrix formed by multiplying each element of M by k.
  - The product of a row matrix and a column matrix is defined in this section.
  - The matrix product of an $m \times p$ matrix with a $p \times n$ matrix is also defined in this section.

Chapter 4 Review

- 4.5 Inverse of a Square Matrix
  - The **identity matrix** for multiplication is a square matrix with ones on the main diagonal, zeros elsewhere.
  - The **inverse** of a square matrix is a matrix such that the product of the original matrix and its inverse is the identity matrix.

Chapter 4 Review

- 4.6 Matrix Equations and Systems of Linear Equations
  - Basic properties of matrices are summarized in this section.
  - **Matrix inverse methods** for solving systems of equations are described in this section.
- 4.7 Leontief Input-Output Analysis
  - Leontief's input-output solution is summarized in this section.