

Table of Contents

Introduction	6
Chapter 1. Matrices	7
1.1. Definition of a Matrix.....	7
1.2. Special Matrices.....	8
1.3. Transpose of a Matrix.....	9
1.4. Basic Matrix Operation.....	10
Chapter 2. Determinant of a Matrix	17
2.1. Definition of a Determinant.....	17
2.2. Cofactors.....	20
2.3. Properties of Determinants.....	21
Chapter 3. Inverse of a Matrix	25
3.1. Inverse of a Matrix.....	25
3.2. Matrix Equations.....	28
Chapter 4. Systems of Linear Equations	32
4.1. Elementary Row Operations.....	33
4.2. Echelon and Reduced Echelon Forms.....	35
4.3. The Gauss-Jordan Method.....	38
4.4. Rank of a Matrix.....	41
4.5. Cramer's Rule.....	44
4.6. Inverse Matrix Method.....	46
Chapter 5. Vectors in a Plane and Space	49
5.1. Vectors.....	49
5.2. Directional Cosines.....	55
5.3. Linearly Dependent and Independent Vectors.....	57
5.4. Scalar (Dot) Product.....	62
5.5. Vector Product.....	68
5.6. Mixed Product.....	73
Chapter 6. Lines and Planes in Space	78
6.1. Equations of Lines in a Plane.....	78
6.2. Equation of a Plane.....	85
6.3. Equation of a Line in Space.....	91
Chapter 7. Conic Sections	100
7.1. Circle.....	100
7.2. Ellipse.....	101
7.3. Hyperbola.....	104
7.4. Parabola.....	107