**Portable Assisted Study Sequence**

# Math A

## SCOPE OF COURSE

Math A is a combination of topics from traditional beginning algebra and elementary geometry courses along with topics from probability, statistics, and logic.

Topics from algebra include the real number system and its properties, sets, exponents, radicals, absolute value, order of operations, algebraic expressions and operations with algebraic expressions. Students also learn to write and solve equations. Application problem types include the common standards of distance, rate and time, work, percentage, and mixture problems. Linear functions, radical equations, inequalities, quadratic functions, and systems of equations are analyzed and examined using a concept based approach.

Basic geometry concepts beginning with points, lines, planes, angles, polygons, and parallel and perpendicular line properties are examined. Locus problems, measurement, perimeter, area, and volume are addressed. Circles and triangles are examined. Students use compass and straight edge constructions to help them make sense of geometric concepts.

Right triangle trigonometric ratios are discussed. Other topics include transformations, probability, statistics, and an entire chapter is devoted to logic.

## SEQUENCE OF SKILLS

### UNIT 1 – Numbers and Numeration

1. Real Numbers
2. Sets
3. Prime Factorization
4. Variables and Axioms
5. Real Number Properties – the Commutative, Associative, and Distributive Properties
6. Other Properties of Real Numbers
7. Addition of Signed (+/-) Numbers (Integers)
8. Subtraction of Signed (+/-) Numbers (Integers)
9. Multiplication and Division of Signed Numbers
10. Fractions and Number Sense
11. Operations with Fractions
12. Decimals
13. Scientific Notation and Percent
14. Properties of Real Numbers, Order, and the Number Line

### UNIT 2 – Operations and Algebraic Expressions

1. Exponents
2. Operations with Exponents
3. Radicals
4. Like Radicals
5. Absolute Value
6. Order of Operations
7. Writing Algebraic Expressions
8. Evaluating Algebraic Expressions with One Variable
9. Evaluating Algebraic Expressions with More than One Variable
10. Polynomials
11. Combining Like Terms
12. Adding and Subtracting Polynomials
13. Simplifying Algebraic Expressions with Exponents

## SEQUENCE OF SKILLS

### UNIT 3 – Operations with Polynomials: Multiplying, Dividing, and Factoring

1. Multiplying Polynomials
2. Multiplying a Binomial by a Binomial
3. Special Binomial Products
4. Dividing a Polynomial by a Monomial
5. Factoring – Common Factors
6. The Difference of Two Squares
7. Factoring Trinomials
8. Factoring Completely
9. Reducing Algebraic Fractions – Using Factoring
10. Addition and Subtraction of Algebraic Fractions with Common Denominators
11. Addition and Subtraction of Algebraic Fractions without Common Denominators
12. Multiplying and Dividing Algebraic Fractions

### UNIT 4 – Equations

1. Equations
2. One Step Equations – Addition and Subtraction
3. One Step Equations – Multiplication and Division
4. Two Step Equations
5. Multiple-Step Equations
6. Writing Equations
7. Word Problems with One Variable (Number Relations, Consecutive Integer, and Average Problems)
8. Word Problems with One Variable (Coin Problems and Interest Problems)
9. Word Problems with One Variable (Perimeter and Area)
10. Rational Algebraic Expressions
11. Distance – Rate – Time Problems
12. Work Problems and Percent Problems
13. Mixture Problems
14. Literal Equations

### UNIT 5 – Linear Functions

1. Functions and Relations
2. Functional Notation
3. Graphing
4. Linear Functions
5. Slope of a Line
6. Intercepts
7. Applications of Slope and Intercepts
8. Effects of Change of Slope and Intercepts
9. Parallel and Perpendicular Lines
10. Writing Linear Equations
11. Horizontal and Vertical Lines
12. Linear Equations and Inverses
13. Applications

## SEQUENCE OF SKILLS

### UNIT 6 – Radicals and Inequalities

1. Simplifying Radicals with Variables
2. Multiplying and Dividing Radical Expressions with Variables
3. Addition and Subtraction of Radicals with Variables
4. Radicals Review
5. Radical Equations
6. Advanced Radical Equations
7. Graphing and Writing
8. The Algebra of Inequalities
9. Linear Inequalities in Two Variables
10. Writing Linear Inequalities in Two Variables
11. Introduction to Linear Programming
12. Linear Programming
13. Gears, Pulleys, and the Wheel and Axle

### UNIT 7 – Quadratic Functions and Systems of Equations and Inequalities

1. Quadratic Functions: The Basics
2. Solving Quadratic Equations – Using Square Roots
3. Solving Quadratic Equations – By Factoring
4. Solving Advanced Quadratic Equations and Application Problems
5. Graphing Quadratic Functions
6. Writing the Equations of Quadratic Functions
7. Systems of Two Linear Equations – Graphing
8. Systems of Two Linear Equations – Substitution
9. Systems of Two Linear Equations – Addition or Elimination Method
10. Systems of Equations Review
11. Writing Systems of Equations
12. Simultaneous Solutions – A Linear and Quadratic
13. Systems of Linear Inequalities
14. Systems of Linear Inequalities – Applications

### UNIT 8 – Circles and Transformations

1. The Distance Formula and Circles
2. The Midpoint Formula and the Circle
3. Graphing Circles
4. Transformations
5. Translations
6. Reflections
7. Rotations
8. Size Transformations
9. Symmetry
10. Transforming Circles
11. Systems of Equations Involving Circles

## SEQUENCE OF SKILLS

### UNIT 9 – Probability and Statistics

1. Theoretical Probability
2. Mutually Exclusive and Complementary Events
3. Tree Diagrams and Multi-Stage Experiments
4. Geometric Probability and Expected Value
5. Experimental Probability and Simulations
6. Permutations
7. Combinations
8. Statistics – Organizing Data
9. Bar Graphs and Histograms
10. Line Graphs and Pictographs
11. Circle Graphs
12. Mean, Median, and Mode
13. Frequency Distributions
14. Box and Whisker Plots

### UNIT 10 – Geometry

1. Points, Lines, and Planes
2. Line Segments, Rays, and Angles
3. Plane Geometry
4. Polygons
5. Isosceles Triangles
6. Analytic Geometry
7. Introduction to Constructions
8. Triangle Constructions
9. The Locus Problem
10. Congruent and Similar Triangles
11. Transversals and Parallel Lines
12. More Angle Properties Involving Parallel Lines
13. More on Triangles

### UNIT 11 – Measurement and Trigonometry

1. Perimeter
2. Area
3. Connection Between Perimeter and Area
4. Area of a Parallelogram
5. Area of a Triangle
6. Area of a Trapezoid
7. Area of Regular Polygons
8. Classification of Solids
9. Volume of Solids
10. Effects of Changing Dimensions
11. Measurement – Conversions
12. Measurement – Estimation and Accuracy
13. Trigonometric Ratios
14. Right Triangle Applications and Properties of Special Right Triangles

## SEQUENCE OF SKILLS

**UNIT 12 – Logic**

1. Statements and Their Negations
2. Conjunctions
3. Disjunctions
4. Conditional Statements
5. More on Logic Statements
6. The Converse of a Statement
7. The Inverse of a Statement
8. Contrapositives and Logically Equivalent Statements
9. Review of Conditionals
10. Biconditional Statements
11. Deduction
12. Induction
13. Logic Puzzles
14. Advanced Logic Puzzles