

**SPRINGFIELD PUBLIC SCHOOLS**  
**ALGEBRA II**

**Course Description**

Students who have successfully completed Algebra I and Geometry or Geometry Honors should plan to take Algebra II. Algebra II starts with a continuation of concepts studied in Algebra I. Students will be challenged by new concepts that require graphing skill, function analysis, solving higher order equations, investigating complex number systems, and working with matrices, conic sections, logarithms, data analysis and probability. This course is a prerequisite for Math Analysis/ Trigonometry and College Algebra. Prerequisite: C or better in Algebra I and Geometry.

**Course Rationale**

Algebra II is for students who wish to prepare for further mathematics such as Math Analysis/ Trigonometry, College Algebra, Discrete Mathematics I and II, AP Statistics, and Calculus. Students who are planning to continue their education after high school should take this course. Students will be involved in communicating information mathematically, solving problems from a real world context and justifying the solutions to problems.

**Major Instructional Goals**

The intent of the Springfield R-12 Secondary Mathematics Program is to explore, investigate and understand the importance of mathematics through real-world experiences. In mathematics, students will acquire the knowledge and skills to problem solve, communicate, reason, create models and make connections. Students will:

1. Apply concepts of **Number and Operations** including:
  - a. Apply properties of logarithms and functions to simplify expressions or solve equations. (MA4; 1.6, 1.10)
  - b. Apply operations to matrices and complex numbers using various methods. (MA1; MA4; MA5; 1.4, 3.4)
  - c. Judge the reasonableness of numerical computations and their results. (MA1; 3.8)
  - d. Solve problems involving proportions. (MA1; MA4; 3.3)
  
2. Apply concepts of **Algebraic Relationships** including:
  - a. Generalize patterns using explicitly or recursively defined functions. (MA4; 1.6, 3.5)
  - b. Compare and contrast various forms of representations of patterns. (MA4; 1.6)
  - c. Understand and compare the properties of linear, absolute value, quadratic, exponential, logarithmic, polynomial, and rational functions. (MA4; 1.6, 3.6)
  - d. Describe the effects of parameter changes on exponential, logarithmic and polynomial functions. (MA4; 1.6, 4.1)

- e. Use symbolic algebra to represent and solve problems that involve exponential and logarithmic relationships. (MA4; MA6; 1.6, 3.1)
  - f. Describe and use algebraic manipulations, including inverse of functions, composition of functions and rules of exponents. (MA4; 3.1, 4.1)
  - g. Use and solve equivalent forms of equations and inequalities. (MA4; 1.6, 3.4)
  - h. Use and solve systems of linear and quadratic equations or inequalities with two variables. (MA4; 1.6)
  - i. Identify quantitative relationships and determine the type(s) of functions that might model the situation to solve the problem. (MA4; 1.6, 3.6)
  - j. Analyze exponential, logarithmic, polynomial, and rational functions by investigating rates of change, intercepts, and asymptotes. (MA 4; 1.6, 4.1)
3. Apply concepts of **Geometric and Spatial Relationships** including:
- a. Use and apply matrices to represent translations, reflections, rotations, and dilations. (MA2; 1.10)
  - b. Perform simple transformations and their compositions on linear, quadratic, logarithmic and exponential functions. (MA4; 3.1)
  - c. Demonstrate and accurately present the conics and their graphs. (MA2; 1.6)
4. Apply concepts of **Measurement** including:
- a. Apply concepts of successive approximation. (MA2; 1.6, 3.4)
  - b. Use unit analysis to solve problems involving rates, such as speed, density or population density. (MA4; 3.1)
5. Apply concepts of **Data Analysis and Probability** including:
- a. Make conjectures about possible relationships between two characteristics of a sample on the basis of scatterplots of the data and approximate lines of fit. (MA3; 1.2, 3.5)
  - b. Given a scatterplot, determine a type of function that models the data. (MA3; 1.6)