

**SPRINGFIELD PUBLIC SCHOOLS  
COLLEGE ALGEBRA**

**Course Description**

This course is the standard course in college-level algebra. Topics include basic concepts of algebra; linear, quadratic, rational, radical, logarithmic, exponential, and absolute value equations; equations reducible to quadratic form; linear, polynomial, rational, and absolute value inequalities, and complex number system; graphs of linear, polynomial, exponential, logarithmic, rational, and absolute value functions; conic sections; inverse functions; operations and compositions of functions; systems of equations; sequences and series; and the binomial theorem. Dual enrollment for college credit may be available. Inquire at your high school. Prerequisite: Algebra II, Integrated Algebra II, or Integrated Math III.

**Course Rationale**

This course may allow students to receive college credit along with high school credit. Because the course is actually about four weeks longer than the college semester and students meet in a longer block of time each day, they are able to receive more individual attention than what they would receive in college. These students are required to meet all of the college standards for this course.

**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; MA5; 1.6, 1.10)
  - b. Judge the reasonableness of numerical computations and their results. (MA1; 3.8)
  - c. 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. Use symbolic algebra to represent and solve problems that involve exponential and logarithmic relationships. (MA4; MA6; 1.6, 3.1)
  - e. Describe and use algebraic manipulations, including inverse of functions, composition of functions and rules of exponents. (MA4; 3.1, 4.1)
  - f. Use and solve equivalent forms of equations and inequalities. (MA4; 1.6, 3.4)

- g. Use and solve systems of linear and quadratic equations or inequalities with two variables. (MA4; 1.6)
  - h. Analyze exponential, logarithmic, polynomial, and rational functions, including investigating rates of change, intercepts, and asymptotes. (MA4; 1.6, 4.1)
3. Apply concepts of **Geometric and Spatial Relationships** including:
- a. Perform simple transformations and their compositions on linear, quadratic, logarithmic and exponential functions. (MA4; 3.1)
  - b. Use Cartesian coordinates and other coordinate systems to analyze geometric situations. (MA2; 3.6, 4.1)
  - c. Draw or use visual models to represent and solve problems. (MA2; 3.1)
  - d. Compare and contrast basic conics. (MA2; 1.6)
  - e. Demonstrate and accurately present circles and parabolas 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. (MA3; 1.2, 3.5)
  - b. Given a graph, determine a type of function that models the data. (MA3; 1.6)