

SPRINGFIELD PUBLIC SCHOOLS

INTEGRATED ALGEBRA II

Course Description

Students who have successfully completed Algebra I and Geometry may consider taking this course. Integrated Algebra II includes a review of topics from Algebra I and new topics may include matrices, complex numbers, conic sections, polynomial functions, logarithms, data analysis and probability. This course cannot be used as a prerequisite for Math Analysis/Trigonometry and is non-weighted. Possible follow-up courses include: Discrete Mathematics I and II, AP Statistics, Computer Programming, and College Algebra. Prerequisite: Algebra I and Geometry.

Course Rationale

This course serves as a prerequisite to Discrete Mathematics I and II, AP Statistics, Computer Programming, College Algebra, and Mathematical Functions. These courses are excellent choices for students planning careers involving social decision making, such as psychology, sociology, health related careers, environmental related careers, journalism, law, or business. This course, along with geometry, covers the mathematics tested on the ACT. Students will be involved in communicating information mathematically, solving problems from a real world context and justifying the solutions.

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 involving the rules of exponents and functions. (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. Define exponential, logarithmic, polynomial and rational functions by 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. Compare and contrast basic conics. (MA2; 1.6)
 - c. 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 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)