

SPRINGFIELD PUBLIC SCHOOLS

INTEGRATED MATH 3

Course Description

Integrated Math 3 continues to build on the development of concepts introduced in the integrated series. This course will emphasize skills necessary for problem-solving and continued growth in mathematics. Students will apply concepts of number and operations, algebraic relationships, geometric and spatial relationships, measurement, and data analysis and probability. This course is a prerequisite to Integrated Math 4. Prerequisite: Integrated Math 2.

Course Rationale

The Integrated Math program is an alternate approach to achieve mathematical understanding. The content provides the foundation for future work in mathematics and science. An understanding of integrated mathematics is essential in preparation for careers that utilize or depend upon mathematics. It provides students with tools to represent and solve problems in a variety of ways. Students will better understand the language and abstract symbols of mathematics and how to use that language in real-life applications.

Major Instructional Goals

The intent of Springfield R-12 High School 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 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 function. (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, quadratic, exponential, logarithmic and rational functions (include asymptotes). (MA4; 1.6, 3.6)
 - d. Describe the effects of parameter changes on logarithmic and exponential functions. (MA4; 1.6, 4.1)
 - e. Use symbolic algebra to represent and solve problems that involve exponential and logarithmic relationships, including recursive and parametric 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 (exponential, logarithmic and rational). (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 (including recursive forms). (MA4; 1.6, 3.6)
 - j. Analyze exponential and logarithmic functions by investigating rates of change, intercepts and asymptotes. (MA4; 1.6, 4.1)
3. Apply concepts of **Geometric and Spatial Relationships** including:
- a. Use trigonometric relationships with right triangles to determine lengths and angle measures. (MA2; 1.6, 1.10)
 - b. Determine the effect on surface area or volume of changing one measurement. (MA2; 3.5)
 - c. Use vectors to represent and analyze problems involving velocity and direction. (MA2; 3.6, 4.1)
 - d. Use and apply matrices to represent translations, reflections, rotations, and dilations. (MA 2; 1.10)
 - e. Perform simple transformations and their compositions on linear, quadratic, logarithmic and exponential functions. (MA4; 3.1)
 - f. Draw representations of three-dimensional geometric objects from different perspectives using a variety of tools. (MA2; 1.4)
 - g. Draw or use visual models to represent and solve problems. (MA2; 3.1)
4. Apply concepts of **Measurement** including:
- a. Compare and contrast intensity levels within a system of measure. (decibels, pH) (MA1; 3.1)
 - b. Apply concepts of successive approximation. (MA2; 1.6, 3.4)
 - c. 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. Formulate questions, design studies and collect data about a characteristic. (MA3; 1.2)
 - b. Describe the characteristics of well-designed studies, including the role of randomization in survey and experimental research. (MA3; 1.2, 3.1)
 - c. Apply statistical concepts to solve problems and distinguish between a statistic and a parameter. (MA3; 1.10, 3.4)
 - d. Given one-variable quantitative data, display the distribution, describe its shape and calculate summary statistics. (MA3; 1.8, 1.10)
 - e. Given a scatterplot, determine a type of function that models the data. (MA3; 1.6)
 - f. Use simulations to describe the variability of sample statistics from a known population and to construct sampling distributions. (MA3; 1.2)
 - g. Compute and interpret the expected value of random variables. (MA3; 3.1)
 - h. Use and describe how to compute the probability of a compound event. (MA2; 3.1)