

**SPRINGFIELD PUBLIC SCHOOLS
MATH ANALYSIS/TRIGONOMETRY**

Course Description

Math Analysis/Trigonometry is a course designed for students who are planning to take Calculus and are interested in a math-or science-related career. Students in this course will study functions, graphing, limits, trigonometric relations, analytic geometry, and other advanced topics. Prerequisite: C or better in Algebra II or Mathematical Functions.

Course Rationale

Math Analysis/Trigonometry is a prerequisite for Calculus and provides a better understanding of the mathematics used in physics and other sciences. Math Analysis/Trigonometry introduces concepts that are studied in preparation for many mathematics-and science-related careers and satisfies most colleges' mathematics entrance requirements. Students will learn to communicate mathematically, solve problems, and justify the results.

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 **Numbers and Operations** including:
 - a. Use vectors as systems and compare their properties to the real number system. (MA5)
 - b. Apply properties of logarithms and functions to simplify expressions or solve equations. (MA4; MA5; 1.6, 1.10)
 - c. Apply operations to complex numbers and vectors. (MA1; MA4; MA5; 1.4, 3.4)
 - d. Judge the reasonableness of numerical computations and their results. (MA1; MA4; 3.8)

2. Apply concepts of **Algebraic Relationships** including:
 - a. Generalize patterns using explicitly and recursively defined functions. (MA4; 1.6, 3.5)
 - b. Understand and compare the properties of linear, polynomial, quadratic, exponential, logarithmic, rational, and periodic functions. (MA4; 1.6, 3.6)
 - c. Describe the effects of parameter changes on logarithmic, exponential, polynomial, and periodic functions. (MA4; 1.6, 4.1)
 - d. Describe and use algebraic manipulations, including inverse and composition of functions, and rules of exponents. (MA4; 3.1, 4.1)

- e. Use, solve, and analyze equivalent forms of equalities and inequalities (exponential, logarithmic, rational, polynomial, and trigonometric). (MA4; 1.6, 3.4, 4.1)
 - f. Analyze trigonometric identities and use them to simplify trigonometric expressions and solve trigonometric equations. (MA4; 3.1)
 - g. Examine the limiting process and calculate limits of functions. (MA4; 1.6)
3. Apply concepts of **Geometric and Spatial Relationships** including:
- a. Use trigonometric relationships to determine lengths and angle measures in all types of triangles. (MA2; 1.6, 1.10)
 - b. Use vectors to represent and analyze problems involving velocity and directions. (MA2; 3.6, 4.1)
 - c. Use Cartesian coordinates and other coordinate systems to analyze geometric situations, such as navigational, polar, or spherical systems. (MA2; 3.6, 4.1)
 - d. Perform simple transformations and their compositions on linear, quadratic, logarithmic, exponential, rational, and periodic functions. (MA4; 3.1)
 - e. Draw or use visual models, including three-dimensional objects, to represent and solve problems. (MA2; 1.4, 3.1, 3.6)
 - f. Examine and apply trigonometric functions through definitions and problem-solving. (MA2; 1.6, 3.2)
4. Apply concepts of **Measurement** including:
- a. Compare and contrast angle and radian measure. (MA2; 3.1)
 - b. Apply concepts of upper and lower bounds and limits in measurement situations. (MA2; 1.6, 3.4)
5. Apply concepts of **Data and Probability** including:
- a. Create a scatterplot, describe its shape, determine and analyze regression equations using technological tools. (MA3; 1.4, 1.6)