

# WRHS Mathematics Curriculum

## Syllabus

**Course Name: Math Connections II**

**Grade Level: 10**

### **Course Description:**

Math Connections II is the second year of a two-year math program that is designed to provide an introduction to the basic concepts of both algebra and geometry utilizing an integrated approach. This course will extend their knowledge in algebra, geometry, and statistics and probability and prepare students for the algebra two with applications course. In addition, it will provide background information in support of preparation for the MCAS test at the end of sophomore year.

### **Links to Student Expectations:**

- All students will develop skills to utilize technology to gather, to evaluate, to assimilate, and to present information.
- All students will utilize critical thinking skills to identify and to provide resources to solve a problem.
- All students will be able to make decisions and solve problems using logical processes (e.g., scientific method, induction, deduction, syllogism, etc.)
- All students will develop skills to promote a sense of confidence in tackling the rigors of standardized tests such as the required MCAS and optional AP, SAT.

### **Interdisciplinary Connections:**

Math utilizes a variety of skills that have a direct relationship to other math courses and to science. Students must be able to apply numbers and concepts that are used in everyday life. Students must utilize proper English to express mathematical relationships in both written and oral form. Students should also be competent in applying geometric concepts to the real world.

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## **I. Essential Concepts for Course**

- Introduction to Algebra: Develop basic symbolism and terminology students have seen before, but have generally not absorbed. Concepts of variables, expressions and equations are presented in meaningful examples in an intuitive manner. This in turn leads to an introduction to algebraic problem solving that will be the basis for problem solving throughout the course.
- Working with Real Numbers: Focus in on using the four operations and axioms of real numbers to simplify numerical and algebraic expressions. Properties of real numbers and problem solving skills are further developed.
- Solving Equations and Problems: Algebraic methods of solving equations are developed using the properties of equality. Multi-step solutions require the use of many properties from earlier units. The algebraic method of problem solving is considered in its entirety.
- Pythagorean Theorem: Provide an overview of the Pythagorean Theorem and its applications.

- Right Triangle Trigonometry: Introduce students to applications of right triangle geometry and the three basic trigonometric ratios.
- Polynomials: Introduce the concept of an exponent and the rules of exponents.
- Factoring Polynomials: Develop the factorization of composite numbers, monomials, and polynomials.
- Applying Fractions: Present a wide variety of equations and word problems related to algebraic fractions. Introduce ratios and proportions to solve problems involving similar polygons.
- Probability and Statistics: Present the concepts of sample space and events of a random experiment as well as evaluating the probability of specific events. Review the basic statistic concepts of mean, median, and mode to analyze data.
- Introduction to Functions: Introduce the basic concepts for working with more than one variable in linear equations.

## **II. Student Objectives**

- To simplify and evaluate expressions utilizing the correct order of operations.
- To translate numerical relationships from words into mathematical expressions/equations.
- To use the five-step plan in solving word problems.
- To use general rules for solving problems involving addition, subtraction, multiplication, and division of real numbers.
- To translate relationships among integers into equations.
- To use the properties of equality to solve equations and related word problems.
- To solve equations when the variable appears on both sides and related word problems.
- To identify and solve real world problems involving the Pythagorean Theorem.
- To use basic trigonometric ratios to calculate distances that are difficult or impossible to measure directly.
- To use scientific calculators to find values for trigonometric functions.
- To simplify, add, subtract, and multiply polynomials.
- To solve problems related to area.
- To factor polynomials using greatest common factor, difference of two squares, perfect square trinomials, and trial and error methods.
- To solve word problems involving factoring quadratic equations.
- To use ratios and proportions to solve real world problems.
- To discover basic properties of similarity and how useful it is in the fields of chemistry, physics, and medicine.
- To examine situations that are probable and develop methods for expressing their probability of occurring.
- To define mean, median, mode, and range of a frequency distribution.
- To solve equations in two variables by utilizing the graphing, substitution, or elimination methods.
- To comprehend slopes and intercepts and how they relate to linear equations.
- To solve real world problems related to graphing systems of equations. (Linear Programming)

### **III. Suggestions for Instruction**

- Lectures
- Discussions
- Worksheets
- Cooperative Learning
- Hands-on mini labs
- Textbook problems (Algebra I Structure and Method, Discovering Geometry)
- Teacher demonstration
- Technology
- Internet sites
- Interactive software packages (Accelerated Math)

### **IV. Suggestion for Assessment**

- Written assessments with variety of question type including open response
- Classroom presentation of specific questions, problems, or concepts
- Projects on specific concepts
- Out of classroom assignments

### **V. Curriculum**

- Introduction to algebra
- Real numbers
- Solving equations and problems
- Pythagorean Theorem
- Right Triangle Trigonometry
- Polynomials
- Factoring Polynomials
- Ratios and Proportions
- Similar Polygons and Applications
- Basic Probability
- Introductory Statistics
- Linear Equations and Applications

### **VI. Lesson Extensions**

- MCAS preparation problems