ALGEBRA II HONORS

Prerequisite: A grade of B or better in both Algebra I and Geometry (preferably Geometry Honors) is strongly recommended
Meeting time: 5 days a week, full-year, one credit
Placement: Grade 10, Level II

ALGEBRA II

Prerequisite: A grade of C or better in both Algebra I and Geometry is strongly recommended
Meeting time: 5 days a week, full-year, one credit
Placement: Grades 10, 11, 12, Level III

Using advanced topics, Algebra II extends and utilizes the concepts and terminology of elementary algebra while clarifying, simplifying and broadening the basic ideas of mathematics. The course provides a solid foundation for the operations and procedures of algebra.

Algebra and Geometry are coordinated so that a knowledge of algebraic structures, symbolism, and relations can be extended into more complex mathematical problems . Deductive reasoning is woven into the presentation of the course to emphasize the development of communication skills for the interpretation of algebraic application to real-world scenarios. The use of technology (i.e., graphing calculators, computers) will be utilized to develop conceptual understanding.

Algebra II Honors extends the topics presented in Algebra II in greater depth and introduces additional concepts necessary for the study of Advanced Mathematics. Those concepts unique to Algebra II Honors are identified by an asterisk (*****).

COURSE GOALS AND OBJECTIVES

1. To provide the students with an appreciation of mathematics.
2. To expand the student's understanding of number systems.
3. To provide the student with practice and extension of previously learned skills.
4. To develop an understanding of the interdependence of Algebra with other areas of study.
5. To furnish opportunities for the student to realize the many real-world applications of Algebra.
6. To develop the ability to manipulate algebraic concepts with accuracy and insight.

ALGEBRA II HONORS and ALGEBRA II

(Agawam High School Academic Expectations: 1, 2, 3, 4, 5, *6)

Strand 1: Number Sense and Operations

NCTM Standards (State Standards)

- Compare data with and perform operations on matrices.
- Apply technology to discrete mathematics.
- Classify real numbers as natural, whole, integer, rational, or irrational numbers. (AII.N.1)
- Compare and contrast sets of real numbers. (AII.N.1)
- Apply the properties of real numbers. (AII.N.1)
- Identify, order, and perform operations on the set of rational numbers. (AII.N.1)
- Interpret real-world scenarios involving rational numbers. (AI.N.1)
- Identify, order, and perform operations on the set of irrational numbers. (AII.N.1)
- Simplify irrational numbers utilizing such techniques as rationalizing the denominator. (AII.N.1)
- Evaluate expressions using order of operations.
- Perform operations with complex numbers. (AII.N.1)
- Compare and contrast the sets of real and complex numbers. (AII.N.1)
- Apply multiplication and division properties of rational exponents. (AII.N.2)
- Estimate solutions. (AI.N.4)
- Check reasonableness of answer in problem-solving. (AI.N.4)
- Use estimation in analyzing data. (AII.P.1)
- Estimate the result of performing operations on real numbers. (AI.N.4)
- Apply estimation to real-world scenarios. (AI.N.4)
- Compare estimation with technologically generated approximation. (AI.N.4)

Strand 2: Patterns, Relations, and Algebra

NCTM Standard (State Standard)

- Collect and organize data using charts, tables, graphs, and matrices. (AII.D.1)
- Interpret and analyze charts, tables, graphs, and matrices. (AII.D.1)
- Fit exponential and trigonometric curves to data. (AII.P.11)
- Comprehend the concepts of variable, expression, and equation. (AII.P.8)
- Determine the composition of functions. (AII.P.5)
- Interpret and evaluate operations performed with functions. (AII.P.5)
- Simplify irrational expressions. (AII.N.1)
- Identify and perform operations in solving one variable equations and inequalities. (AII.P.8)
- Interpret and solve equations, inequalities, and equations that involve absolute value. (AII.P.8)
- Develop and write equations or inequalities based on word problems. (AII.P.10 and AII.P.12)
- Use equations to solve real-world problems and interpret the results. (AII.P.8)
- Use properties to transform formulas, equations, and inequalities. (AII.P.13)

- Analyze and evaluate real-world scenarios that utilize equations in rational and radical form. (AII.P.6 and AII.P.8)
- Identify, apply, and analyze steps to solve a system of equations by various methods. (AII.P.9 and AII.P.10)
- Utilize systems of equations to solve real-world scenarios with three unknowns. (AII.P.10)
- Perform operations with monomials, binomials, trinomials, and other polynomials. (AI.P.8)
- Graph coordinate points, linear equations, equations with absolute value and inequalities. (AI.P.4)
- Identify and solve quadratic equations. (AII.P.7)
- Locate and evaluate complex numbers on the complex number plane. (AII.N.1)
- Recognize and extend number patterns involving exponents. (AII.P.1)
- Evaluate binomials to the nth term. (AII.P.3)
- Utilize principles of probability for binomial expansion. (AII.P.3)
- Apply matrices to solve real-world scenarios.(AII.P.9)
- Utilize technology for the purpose of analyzing patterns. (AII.P.1)
- Identify, analyze and interpret families of functions for equations and graphs. (AII.P.13)
- Evaluate functions by various methods including synthetic division.
- Write function rules from tables and real-world situations. (AI.P11)
- Identify and analyze patterns in exponential functions. (AII.P.6)
- Evaluate the inverse relationship between exponential and logarithmic functions. (AII.P.6)
- Analyze exponential and logarithmic equations and their graphs. (AII.P.6)
- Solve exponential equations. (AII.P.8)
- Identify and analyze real-world scenarios involving logarithmic functions. (AII.P.4 and AII.P.8)
- Analyze and interpret the graphs of linear and quadratic functions. (AII.P.8)
- Utilize the discriminant to determine the nature of the roots of quadratic functions.
- Graph systems of functions. (AII.P.10)
- Identify, manipulate, and graph the conic sections. (AII.G.3)
- Identify, interpret, and analyze real-world situations that involve direct and inverse variation.
- Evaluate functions with the Factor and Remainder Theorem's and the Fundamental Theorem of Algebra. (AII.P.8)
- Utilize the change of base to analyze logarithms. (AII.P.10)

* Use trigonometric ratios to explore the parts of a right triangle. (AII.G.1)
* Apply trigonometric ratios and the Pythagorean Theorem to real-world scenarios. (AII.G.1)
* Investigate real-scenarios involving angles of depression and elevation. (G.G.9)
* Identify and utilize trigonometric identities. (AII.G.2)
* Interpret and evaluate circular and trigonometric equations. (AII.P.8)
* Convert between degree and radian measure. (AII.G.1)
* Utilize technology to evaluate trigonometric ratios (AII.G.1)
* Graph basic trigonometric functions and their translations.(AII.G.1)

Strand 3: Geometry and Measurement
NCTM Standards (State Standards)

- Analyze and connect properties of geometric shapes to real-world scenarios. (AII.G.3)
- Investigate geometry, including the graphs of functions, through the application of technology. (AII.G.3)
- Formulate and apply geometric analysis of slope. (G.G.11)
- Use algebraic equations to solve realistic, geometric situations. (AII.G.3)

* Identify, analyze, and justify the use of the Pythagorean Theorem. (AII.G.2)

- Define the sine, cosine, and tangent of an angle. (AII.G.1)

* Use the laws of sines and cosines to determine unknown measures in triangles. (AII.G.2)

- Relate geometric and algebraic representations of lines, simple curves, and conic sections. (AII.G.3)

Strand 4: Data Analysis, Statistics and Probability
NCTM Standards (State Standards)

- Draw inferences, summarize, and communicate from both data collected and data representations. (AII.D.1)
- Analyze data for the prediction of trends. (AII.D.1)
- Determine the probability and odds of an event. (AII.D.2)
- Utilize technology in the evaluation of statistical data and the study of probability. (AII.D.1 and AII.D.2)
- Use and apply theoretical probabilities to determine outcomes with both dependent and independent events. (AII.D.1 and AII.D.2)
- Conduct experimental probabilities. (AII.D.1 and AII.D.2)
- Use combinatorics to solve problems involving probability. (AII.D.2)

RESOURCES

Bellman, Allan et al. Algebra 2. Upper Saddle River, New Jersey; Pearson Prentice-Hall, 2007.

Teacher generated materials such as NCTM journals, note taking outlines, etc.

Technology Resources: Classroom sets of scientific and graphing calculators.

An Introduction to Probability and Statistics. Agawam High School Mathematics Department, March 2004

ASSESSMENT STRATEGIES

- Class participation, written and oral communication
- Class work
- Homework
- Class projects and presentations
- Notebooks/Portfolios
- Quizzes
- Tests
- Departmental Semester Exams
- School Wide and Department Rubrics