ALGEBRA I PART II/INTRODUCTION TO GEOMETRY

Prerequisite: A grade of C or better in the last previous math course is recommended
Meeting time: 5 days a week, full-year, one credit
Placement: Grades 10, 11, 12, Level III

This is the second half the two-year sequence in elementary algebra and includes rational expressions and equations, graphs, systems of equations, proportions, factoring, quadratic equations, and irrational numbers. This course also includes a geometry unit to assist students in successfully completing the MCAS examination required for graduation.

COURSE GOALS AND OBJECTIVES

1. To strengthen the student's fundamental skills and concepts previously learned.
2. To have the student acquire facility in applying algebraic concepts and skills.
3. To have the student learn the meaning of the types of open sentences and be able to determine the solution sets for first degree and some special forms of second-degree open sentences.
4. To develop for the student a procedure for understanding and solving application problems related to real-world scenarios.
5. To develop the student's appreciation for estimation and awareness of when precision is needed in mathematical language and symbolism.
6. To give the student a basic understanding of the connection and interrelations between Algebra and Geometry.
7. To bring the student an understanding of the logical evolution of the real number system, and to have the student realize that this system developed as a result of a need for numbers with particular properties.

ALGEBRA I, PART II/INTRODUCTION TO GEOMETRY

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

Strand 1: Number Sense and Operations

NCTM Standard (State Standard)

- Collect and organize data using charts, tables, and graphs. (AI.D.1)
- Interpret, analyze charts, tables, and graphs. (AI.D.1)
- Find mean, median, and mode of sets of data. (AI.D.1)
- Classify real numbers as natural, whole, integer, rational, or irrational numbers. (AI.N.1)
- Compare and contrast sets of real numbers. (AI.N.1)
- Apply the properties of real numbers. (AI.N.1)
- Identify rational numbers. (AI.N.1)
- Compare and order rational numbers on the number line. (AI.N.1)

- Perform the four arithmetic operations with rational numbers. (AI.N.1)
- Interpret real-world scenarios involving rational numbers. (AI.N.4 and AI.P.11)
- Identify irrational numbers. (AI.N.1)
- Order irrational numbers. (AI.N.1)
- Perform four arithmetic operations with irrational numbers. (AI.N.1)
- Evaluate expressions using order of operations.(AI.N.2)
- Apply multiplication and division properties of integer exponents. (AI.N.2)
- Apply technology to discrete mathematics and mathematical structure. (AI.P.11)
- Estimate solutions. (AI.N.4)
- Check reasonableness of answer in problem solving. (AI.N.4)
- Use estimation in analyzing data. (AI.N.4 and AI.D.1 and AI.D.2)
- Compare estimation with and without technologically generated approximation. (AI.N.3 and AI.N.4)

Strand 2: Patterns, Relations, and Algebra

NCTM Standard (State Standard)

- Comprehend the concepts of variable, expression, and equation. (AI.P.1)
- Identify and perform operations in solving one variable equations and inequalities. (AI.P.2)
- Interpret and solve equations, inequalities, and equations that involve absolute value. (AI.P.2 and AI.P.10)
- Develop and write equations or inequalities based on word problems. (AI.P.11)
- Use equations to solve real-world problems and interpret the results. (AI.P.11 and AI.P.12)
- Use properties to transform formulas, equations, and inequalities. (AI.P.8)
- Perform operations with monomials, binomials, trinomials, and other polynomials. (AI.P.7)
- Graph coordinate points, linear equations, equations with absolute value and inequalities. (AI.P.5 and AI.P.10)
- Identify and solve quadratic equations. (AI.P.9)
- Define relations, functions, domain, and range. (AI.P.3)
- Identify families of functions for equations and graphs. (AI.P.4)
- Evaluate functions. (AI.P.3)
- Write rules for functions from tables and real-world situations. (AI.P.4 and AI.P.11)
- Identify and analyze patterns in exponential functions. (AI.P.1)
- Analyze and interpret the graphs of linear and quadratic functions. (AI.P.1)
- Graph systems of functions. (AI.P.12)
- Utilize technology to aid in the analysis of functions, and to situations involving algebra. (AI.P.11 and AI.P.12)

Strand 3: Geometry

NCTM Standard (State Standard)

- Solve problem situations with geometric properties. (G.G.5)
- Analyze and connect properties of geometric shapes to real-world scenarios. (G.M.1)
- Formulate and apply geometric analysis of slope. (G.G.11 and G.G.12)
- Use algebraic equations to solve realistic, geometric situations. (AI.P.2)
- Identify, analyze, and justify the use of the Pythagorean Theorem. (G.G.7)
- Apply technology to geometry from an algebraic, geometric, and spatial perspective. (G.G.14)
- Identify figures using sides, angles, and diagonals. (G.G.1)
- Apply congruency and similarity correspondences. (G.G.5)
- Solve simple triangle problems. (G.G.7)
- Use the properties of special right triangles. (G.G.8)
- Calculate midpoints of segments and distance between two points. (G.G.12)
- Draw the results and interpret transformations on figures on a coordinate plane. (G.G.15)
- Demonstrate the ability to visualize solid objects. (G.G.16)

Strand 4: Measurement

NCTM Standard (State Standard)

- Calculate perimeter, circumference, and area of common geometric figures. (G.M.1)
- Given the formula, find the lateral area, surface area, and volume of common geometric figures. (G.M.2)
- Relate changes in measurement of one attribute of an abject to changes in other attributes. (G.M.3)

Strand 5: Data Analysis, Statistics and Probability

NCTM Standard (State Standard)

- Draw inferences, summarize, and communicate from both data collected and data representations. (AI.D.1)
- Use sampling from real-world situations in statistical experiments. (AI.D.3)
- Determine ratios and percents of outcomes. (AI.D.3)
- Conduct experimental probabilities. (AI.D.3)
- Use proportions and percents to solve real-world problems. (AI.P.4)
- Apply technology to the study of probability and in the evaluation of statistical data. (AI.D.2)

RESOURCES

Primary Textbook:

Bellman, Allan et al. Algebra I, Upper Saddle River, New Jersey; Prentice-Hall, Inc., 2004.

Supplementary Units:

An Introduction to Geometry. The Agawam High School Mathematics Department, March 2003.

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

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

Technology Resources:

Classroom sets of scientific and graphing calculators.

ASSESSMENT STRATEGIES

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