

OPEN EVENTS

TOPICS

Algebra	Linear and quadratic equations. Systems of linear equations. Algebraic simplification. Exponents and radicals. Functions and their graphs. Word problems. Absolute value. Inequalities. Rational roots of a polynomial. Remainder theorem. Binomial theorem. Complex numbers.
Geometry	Problems with numerical answers involving similar and congruent figures. Questions based on a sophomore plane geometry course.
Trigonometry	Trigonometric and inverse trigonometric functions. Values of trigonometric functions. Graphs. Solution of triangles. Trigonometric equations. Identities. De Moivre's Theorem.
Mental Arithmetic	Problems employing basic operations of arithmetic will be presented by use of flash cards. The only writing done by students will be to write answers.
Computational Mathematics	Percentage. Addition, multiplication, and division of fractions. Operations involving complex fractions. Square roots and decimal numbers.
Elementary Data Analysis	Measures of central tendency, variability and correlation, data transformations, best-line fit, graphical summaries.
Sets and Logic	Basic operations with sets-unions, intersection, complement. Venn diagrams. Number of elements in a finite set. Truth value of conjunction, disjunction and conditional statement forms. Truth tables for compound sentences. Equivalence.
Number Theory	Number types and number patterns. Prime numbers and the Fundamental Theorem of Arithmetic. Greatest common divisor and least common multiple. Euclidean algorithm.
Probability	Combinations and permutations. Probability of complements, union, and intersection of events. Independent events. Mutually exclusive events. Conditional probability. Expected value.
Hand Calculators	Problems employing basic operations of arithmetic. Consumer arithmetic. Measurement problems.
Non-Routine Problem Solving	
Level I (9th & 10th Grades)	Interesting problems requiring ingenuity rather than high mathematical skills to solve. Arithmetic, basic algebra, knowledge of intuitive geometry, and number sense are used.
Level II (11th & 12th Grades)	Intriguing problems requiring ingenuity, logic, number theory, basic algebra, geometrical relations to solve rather than depending on highly developed technical skill in a branch of mathematics.

CLASS-SPECIFIC EVENTS

Algebra I	Algebraic simplification. Radicals. Factoring. Linear and quadratic equations. Linear inequalities. Word problems.
Algebra II	System of equations. Linear and quadratic equations and inequalities. Functions and their graphs. Rational roots of a polynomial. Binomial theorem.
Geometry	Problems with numerical answers involving similar and congruent figures. Length, area and volume. Angles in circles. Pythagorean Theorem. Questions based on a sophomore plane geometry course.

9th GRADE EVENTS

Word Problems	Problems that can be solved by a linear equation or a linear inequality. Types found in most traditional Algebra I books.
Number Bases	Computations in bases other than 10. Change from one base to another.

11th GRADE EVENTS

Word Problems	Problems that can be solved by a linear equation (inequality), quadratic equation (inequality), or by a system of equations.
Exponential and Log Functions	Logarithmic and exponential functions. Graphs. Using logarithms to solve exponential equations. Logarithms used in computation.

12th GRADE EVENTS

Matrices and Determinants	Properties of matrices and determinants. Computation and applications.
Analytic Geometry	Lines and conic sections. Distances. Curve sketching using intercepts, symmetry, and asymptotes. Graphs. Coordinate geometry.
Calculus	Derivatives and integrals of algebraic functions with applications.

TEAM EVENTS

Algebra I	Same topics as on the Class-Specific Algebra I test.
Algebra II	Same topics as on the Class-Specific Algebra II test plus questions on absolute value, arithmetic and geometric sequences, logarithmic and exponential functions, and word problems.
Geometry	Same topics as on the Class-Specific Geometry test. Questions based on a sophomore plane geometry course.
Trigonometry	Same topics as on the Open Trigonometry test.
Medley	Algebra I. Algebra II. Geometry. Senior level mathematics.

SIGMA AWARD

This award is designed to recognize two schools as the all-around winner in their division. A trophy will be given to both a large school and a small school. To determine the winner, points will be awarded to those individuals and teams earning first, second, and third places for each event. The points will be awarded as follows:

- Each team event will earn 16 points for 1st place, 10 points for 2nd place, and 6 points for 3rd place.
- The individual events will earn 8 points for 1st place, 5 points for 2nd place, and 3 points for 3rd place.