

Licensure Regulations for School Personnel – 8 VAC 20-21-10 et seq.

8 VAC 20-21-340. Mathematics-Algebra I 9add-on endorsement).

- A. The program in algebra I will ensure that the candidate has demonstrated the following competencies:
1. Understanding of the mathematics relevant to the content identified in the Mathematics Standards of Learning and how the standards provide the foundation for teaching middle level mathematics through Algebra I. The use of technology must be used in enhancing the student's ability to develop concepts, compute, solve problems, and apply mathematics in practical applications with the mathematics content, including:
 - a) The structure of real numbers and subsets, basic operations, and properties;
 - b) Elementary number theory, ratio, proportion, and percent;
 - c) Algebra, trigonometry, and analytic geometry: operations with monomials and polynomials; algebraic fractions; linear, quadratic, and higher degree equations and inequalities; linear systems of equations and inequalities; nonlinear systems of equations; radicals and exponents; complex numbers; arithmetic and geometric sequences and series; algebraic, trigonometric, logarithmic, exponential, absolute value, and step functions; domain and range of functions; composite and inverse functions; one-to-one mapping; transformations between graphical, tabular and symbolic form of functions; direct and inverse variation; line and curve of best fit; conics; and recognition and application of trigonometric identities;
 - d) Calculus: applications of limits and standard integration and differentiation;
 - e) Linear algebra: matrices, vectors, and linear transformations;
 - f) Measurement systems, including U.S. customary and metric;
 - g) Geometry: geometric figures, their properties, relationships, and application of the Pythagorean theorem; using deductive axiomatic methods of proof and inductive reasoning; perimeter, area and surface area of two- and three-dimensional figures; coordinate and transformational geometry; and constructions;
 - h) Probability and statistics: experimental and theoretical probability; prediction; graphical representations, including box-and-whisker plots; and measures of central tendency, range, standard deviation, and simple distributions;
 - i) Discrete mathematics: symbolic logic, sets, permutations and combinations, functions that are defined recursively, and linear programming; and
 - j) Computer science: terminology, simple programming, and software applications.
 2. Understanding of and proficiency in grammar, usage, and mechanics and their integration in writing.

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B. Endorsement requirements. The candidate must have:

1. Completed an approved teacher preparation program in Algebra I; or
2. Completed the following requirements. The candidate must have:
 - a) A baccalaureate degree from an accredited institution and an endorsement in any teaching area; and
 - b) Completed 24 semester hours which include course work in each of the following areas:
 - 1) Elementary functions and introductory college algebra;
 - 2) Trigonometry;
 - 3) Linear algebra;
 - 4) Calculus;
 - 5) Euclidean geometry;
 - 6) Probability or statistics or both;
 - 7) Discrete mathematics; and
 - 8) Computer Science.