



ADMINISTRATIVE RULES OF MONTANA

10.58.518 MATHEMATICS

- (1) The program requires that successful candidates:
 - (a) demonstrate knowledge and understanding of and apply the process of mathematical problem solving;
 - (b) reason mathematically in constructing, evaluating, and communicating mathematical arguments;
 - (c) promote mathematical rigor and inquiry;
 - (d) recognize, formulate, and apply connections between mathematical ideas and representations in a wide variety of contexts;
 - (e) demonstrate understanding of the mathematical modeling process by interpreting, analyzing, and explaining mathematical results and models in terms of their reasonableness and usefulness;
 - (f) recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding including the ability to:
 - (i) attend to precision in mathematical language, notation, approximations, and measurements by consistently and appropriately applying mathematical definitions and procedures; and
 - (ii) choose appropriate symbolic representations and labels such as specifying units of measure, calculating accurately and efficiently, and expressing numerical answers with a degree of precision appropriate for the context and the data used in calculation;
 - (g) appropriately use current and emerging technologies as essential tools for teaching and learning mathematics;
 - (h) look for and recognize repeated reasoning patterns and the mathematical structures behind those patterns to organize and generalize mathematical methods and results in mathematical problem solving and inquiry;
 - (i) demonstrate how students learn mathematics and the pedagogical knowledge specific to mathematics teaching and learning by demonstrating:
 - (i) how learners develop mathematical proficiency through the interdependent processes of integrating conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition;

- (ii) an understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments in mathematics and ensure high standards of mathematical work for all students;
 - (iii) an understanding of learning environments that promote mathematical learning, including individual and collaborative learning, positive social interaction about mathematics, active engagement in mathematics learning, and promote self-motivation among mathematical learners;
 - (iv) an understanding of multiple methods of assessment of mathematical learner growth, progress, and decision making;
 - (v) an understanding of a variety of instructional strategies that encourage learners to develop deep understanding of mathematics; and
 - (vi) an understanding of grades 5-12 mathematics curriculum as specified by the State of Montana Content Standards and of the assessment process as specified by the Montana statewide assessment;
- (j) demonstrate content knowledge in:
- (i) numbers and operations including knowledge and understanding of number systems, arithmetic algorithms, fundamental ideas of number theory, proportion and rate, quantitative reasoning, modeling, and applications;
 - (ii) different perspectives on algebra including knowledge and understanding of algebraic structures, basic function classes, functional representations, algebraic models and applications, formal structures and linear algebra;
 - (iii) geometry and trigonometry including knowledge and understanding of Euclidean and non-Euclidean geometries, geometric transformations, axiomatic reasoning and proof, formulas and calculations related to classical geometric objects, and properties of trigonometric functions;
 - (iv) calculus including knowledge and understanding of limit, continuity, differentiation, integration involving single and multiple-variable functions, sequences and series, and a thorough background in the techniques and application of the calculus;
 - (v) discrete mathematics including knowledge and understanding of basic discrete structures, counting techniques, iteration, recursion, formal logic, and applications in the formulation and solution of problems;
 - (vi) data analysis, statistics, and probability including knowledge and understanding of descriptive statistics using numbers and graphs, survey design, sources of bias and variability, empirical and theoretical probability, simulation, and inferential statistics related to univariate and bivariate data distributions; and
 - (vii) historical development and perspectives of various branches of mathematics including contributions of significant historical figures and diverse cultures, including American Indians and tribes in Montana.

Authorizing statute(s): 20-2-114, MCA

Implementing statute(s): 20-2-121, MCA

History: NEW, 1979 MAR p. 492, Eff. 5/25/79; AMD, 1984 MAR p. 831, Eff. 5/18/84; AMD, 1989 MAR p. 397, Eff. 3/31/89; AMD, 1994 MAR p. 2722, Eff. 10/14/94; AMD, 2000 MAR p. 2406, Eff. 9/8/00; AMD, 2007 MAR p. 190, Eff. 2/9/07; AMD, 2014 MAR p. 2936, Eff. 7/1/15; AMD, 2023 MAR p. 86, Eff. 7/1/23.