

#### **4.14 Secondary Mathematics (Grades 7-12)**

To be endorsed in secondary mathematics, an applicant shall hold an earned bachelor's or higher degree from an accepted institution of higher education; have completed an approved teacher preparation program, including prescribed field experience and student teaching requirements; have completed an approved program in mathematics; be knowledgeable about the Colorado Academic Standards in mathematics in grades 7 through 12; and have demonstrated the competencies specified below:

4.14(1) Develop in students an understanding and use of:

- 4.14(1)(a) number sense, properties and operations.
- 4.14(1)(b) patterns, functions and algebraic structures.
- 4.14(1)(c) measurement.
- 4.14(1)(d) data analysis, statistics and probability.
- 4.14(1)(e) functions and use of variables.
- 4.14(1)(f) shape, dimension and geometric relationships.

4.14(2) The mathematics educator is able to effectively demonstrate to students and instruct:

- 4.14(2)(a) approaches to problem-solving that utilize mathematical content in identifying, analyzing, formulating and solving problems that occur in mathematical processes and everyday situations.
- 4.14(2)(b) the utilization of mathematical ideas, both verbally and in writing, using both everyday language and mathematical terminology.
- 4.14(2)(c) the utilization of verbal and written discourse, between teacher and students and among students, to develop and extend students' mathematical understanding.
- 4.14(2)(d) the construction and evaluation of mathematical conjectures and arguments to validate one's own mathematical thinking.
- 4.14(2)(e) independent study in mathematics.
- 4.14(2)(f) the use of mathematics in studying patterns and relationships.
- 4.14(2)(g) the interrelationships within mathematics; how to connect concrete, pictorial and abstract representations; and the connections between mathematics and other disciplines and real-world situations through the selection of appropriate applications from such fields as natural sciences, social sciences, business and engineering, and is able to:
  - 4.14(2)(g)(i) utilize a wide variety of resource materials, including, but not limited to, manipulative materials, graphing calculators, computers and other technologies as tools in learning and for the application(s) of mathematics;
  - 4.14(2)(g)(ii) utilize assessment data to monitor students' acquisition of mathematical skills and abilities and in the process of determining appropriate delivery of instruction based on identified student need and to select appropriate mathematical tasks to reinforce and promote students' development of mathematical concepts and skills;

- 4.14(2)(g)(iii) create an engaging and effective environment in which all students develop mathematically in order to participate more fully in a technologically based society;
  - 4.14(2)(g)(iv) create an environment in which reflection, uncertainty and inquiry are incorporated in the learning of mathematical skills, abilities and concepts; and
  - 4.14(2)(g)(v) apply appropriate knowledge of current research in the teaching and learning of mathematics and incorporate national, state and local guidelines related to mathematics instruction.
- 4.14(3) The mathematics educator shall consistently seek out professional development in the field of mathematics, which can provide enhanced knowledge, skills and abilities in the content area, and participate in professional organizations appropriate and relevant to the field.