

# **University of Alaska College of Education Initial Endorsement Content Preparation Review Secondary Mathematics Grades 7-12**

**Note: The following content area preparation review is for application to a UAA teacher education program leading to an Alaska Type A Certificate with an initial endorsement in Mathematics Grades 7-12. These requirements are based on the *National Council for Teachers of Mathematics (NCTM)* and the Alaska Content and Performance Standards, which define what students in grades 7-12 should know about mathematics. Once the applicant has been admitted to the UAA teacher education program, evaluation of her/his progress toward certification will be guided by the Alaska Teacher Standards for Professional Practice, the Alaska Content, Cultural, and Performance Standards for Students, the NCTM standards for preparation of mathematics teachers, and the NCATE *Program for Initial Preparation of 7-12 Mathematics Teachers*.**

Applicants should have the equivalent of an undergraduate degree in mathematics. If a potential applicant does not hold a degree in mathematics, at minimum, the applicant must have the equivalent transcript credits of a teaching major in mathematics-based coursework (36 hours).

\*Note: Applicants who complete a BA/BS in Mathematics from UAA must include the following coursework as electives:

- MATH A305 Geometry
- MATH A306 Discrete Methods
- MATH A420 History of Mathematics

The following matrix is intended to guide the applicant in demonstrating her/his content knowledge through transcripts, PRAXIS II scores, and/or relevant work experiences. The applicant should list courses in the appropriate matrix cell and attach transcripts for documentation, test score reports, and narratives for work/life experience documentation. For coursework, applicants may be required to submit course syllabi, course products, or other documentation regarding the content of the course. When the documentation is work/life experience, the applicant must provide an annotated resume (supported by items such as letters of reference or employee evaluations) and a brief reference to this material in the appropriate cell. All of the evidence will be evaluated by a College of Education Faculty Advisor. Applicants will be notified if further evidence and/or coursework is needed.

## Initial Endorsement Content Preparation Review Secondary Mathematics Grades 7-12

Student \_\_\_\_\_

Social Security/Student ID# \_\_\_\_\_

Advisor Signature \_\_\_\_\_

Date \_\_\_\_\_

PRAXIS II Score \_\_\_\_\_

Math GPA \_\_\_\_\_ Total Math Credits \_\_\_\_\_

<i>NCTM Standards</i>	<i>Applicant's Coursework</i>				<i>Praxis Subsection Score/Other Evidence</i>	<i>Meets Standard/ Evidence Needed</i>	<i>Actions Required by Applicant</i>
Examples of UAA courses appropriate to the standard.	Course	Credits	Date	Grade		(Advisor Initials)	
1. Apply concepts of number, number theory, and number systems.  MATH A420 History of Mathematics or MATH A303 Introduction to Modern Algebra	_____	_____	_____	_____		MS      EN  Advisor _____	
2. Apply numerical computation and estimation techniques and extend them to algebraic expressions.  MATH A200 Calculus I MATH A201 Calculus II MATH A202 Calculus III	_____	_____	_____	_____		MS      EN  Advisor _____	



<p><i>NCTM Standards</i></p> <p>Examples of UAA courses appropriate to the standard.</p>	<p><i>Applicant's Coursework</i></p> <p>Course                  Credits          Date                  Grade</p>				<p><i>Praxis Subsection Score/Other Evidence</i></p>	<p><i>Meets Standard/ Evidence Needed</i></p> <p>(Advisor Initials)</p>	<p><i>Actions Required by Applicant</i></p>
<p>7. Understand the concepts of random variable, distribution functions, and theoretical versus simulated probability and apply them to real-world situations.</p> <p>MATH A371 Probability Models or AS A307 Probability &amp; Statistics</p>	<p>_____          _____          _____          _____</p>					<p>MS          EN</p> <p>Advisor _____</p>	
<p>8. Use algebra to describe patterns, relations, and functions, and to model and solve problems.</p> <p>Pre-requisite for MATH A200 Calculus I</p>	<p>_____          _____          _____          _____</p>					<p>MS          EN</p> <p>Advisor _____</p>	
<p>9. Understand the role of axiomatic systems and proofs in different branches of mathematics, such as algebra and geometry.</p> <p>MATH A305 Geometry or MATH A303 Modern Algebra or MATH A215 Introduction to Proof</p>	<p>_____          _____          _____          _____</p>					<p>MS          EN</p> <p>Advisor _____</p>	

<p><i>NCTM Standards</i></p> <p>Examples of UAA courses appropriate to the standard.</p>	<p><i>Applicant's Coursework</i></p> <p>Course                  Credits          Date                  Grade</p>				<p><i>Praxis Subsection Score/Other Evidence</i></p>	<p><i>Meets Standard/ Evidence Needed</i></p> <p>(Advisor Initials)</p>	<p><i>Actions Required by Applicant</i></p>
<p>10. Have a firm conceptual grasp of limit, continuity, differentiation and integration, and a thorough background in the techniques and application of calculus.</p> <p>MATH A200 Calculus I MATH A201 Calculus II MATH A202 Calculus III</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>_____</p> <p>_____</p> <p>_____</p>		<p>MS          EN</p> <p>Advisor _____</p>	
<p>11. Have a knowledge of the concepts and applications of graph theory, recurrence relations, linear programming, difference equations, matrices, and combinatorics.</p> <p>MATH A306 Discrete Methods</p>	<p>_____</p>	<p>_____</p>	<p>_____</p>	<p>_____</p>		<p>MS          EN</p> <p>Advisor _____</p>	
<p>12. Use mathematical modeling to solve problems from fields such as natural sciences, social sciences, business, and engineering.</p> <p>MATH A200 Calculus I MATH A201 Calculus II MATH A202 Calculus III</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>_____</p> <p>_____</p> <p>_____</p>		<p>MS          EN</p> <p>Advisor _____</p>	

<i>NCTM Standards</i>  Examples of UAA courses appropriate to the standard.	<i>Applicant's Coursework</i>  Course                  Credits          Date                  Grade	<i>Praxis Subsection Score/Other Evidence</i>	<i>Meets Standard/ Evidence Needed</i>  (Advisor Initials)	<i>Actions Required by Applicant</i>
13. Understand and apply the concepts of linear algebra.  MATH A314 Linear Algebra	_____          _____          _____          _____		MS                  EN  Advisor _____	
14. Understand and apply the major concepts of abstract algebra.  MATH A303 Introduction to Modern Algebra	_____          _____          _____          _____		MS                  EN  Advisor _____	
15. Knowledge of historical development in mathematics that includes the contributions of underrepresented groups and diverse cultures.  MATH A420 History of Mathematics	_____          _____          _____          _____		MS                  EN  Advisor _____	

The following four overriding themes, Problem Solving, Reasoning, Communication, and Connections, are present throughout the undergraduate math curriculum. An applicant meets these four standards either through completion of a Bachelor's degree in Mathematics or by having the equivalent transcript credits of a teaching major in mathematics-based coursework (36 hours).

<i>NCTM Overriding Themes (Process Standards)</i>	<i>Applicant's Degree or Equivalent Math Coursework</i>		<i>Praxis Subsection Score/Other Evidence</i>	<i>Meets Standard/Evidence Needed</i>	<i>Action Required by Applicant</i>
	Degree/Equivalent	Date		<i>Advisor's Initial</i>	
<p><b>16. Problem Solving</b> Build new mathematical knowledge through problem solving; solve problems that arise in mathematics and in other contexts; apply and adapt a variety of appropriate strategies to solve problems; monitor and reflect on the process of mathematical problem solving.</p> <p>(Embedded throughout undergraduate math courses)</p>	_____	_____		<p>MS      EN</p> <p>Advisor _____</p>	
<p><b>17. Reasoning</b> Recognize reasoning and proof as fundamental aspects of mathematics; make and investigate mathematical conjectures; develop and evaluate mathematical arguments and proofs; select and use various types of reasoning and methods of proof.</p> <p>(Embedded throughout undergraduate math courses)</p>	_____	_____		<p>MS      EN</p> <p>Advisor _____</p>	

<i>NCTM Overriding Themes (Process Standards)</i>	<i>Applicant's Degree or Equivalent Math Coursework</i>  Degree/Equivalent _____ Date _____	<i>Praxis Subsection Score/Other Evidence</i>	<i>Meets Standard/Evidence Needed</i>  <i>Advisor's Initial</i>	<i>Action Required by Applicant</i>
<p><b>18. Communication (oral &amp; written)</b> Organize and consolidate mathematical thinking through communication; communicate mathematical thinking coherently and clearly to peers, teachers, and others; analyze and evaluate the mathematical thinking and strategies of others; use the language of mathematics to express mathematical ideas precisely.</p> <p>(Embedded throughout undergraduate math courses)</p>	<p>_____</p> <p>_____</p>		<p>MS      EN</p> <p>Advisor _____</p>	
<p><b>19. Connections</b> Recognize and use connections among mathematical ideas; understand how mathematical ideas interconnect and build on one another to produce a coherent whole; recognize and apply mathematics in contexts outside of mathematics.</p> <p>(Embedded throughout undergraduate math courses)</p>	<p>_____</p> <p>_____</p>		<p>MS      EN</p> <p>Advisor _____</p>	

COMMENTS: