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**MONTCLAIR STATE UNIVERSITY**  
**Program for the Preparation of Teachers of Secondary Mathematics**

**Integration of the National Council of Teachers of Mathematics (NCTM) Standards and  
the MSU Standards**

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I. NCTM Standards (Content Knowledge and Pedagogical Knowledge)

1. *Knowledge of Mathematical Problem Solving:* Candidates know, understand, and apply the process of mathematical problem solving.
2. *Knowledge of Reasoning and Proof:* Candidates reason, construct, and evaluate mathematical arguments and develop an appreciation for mathematical rigor and inquiry.
3. *Knowledge of Mathematical Communication:* Candidates communicate their mathematical thinking orally and in writing to peers, faculty, and others.
4. *Knowledge of Mathematical Connections:* Candidates recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding.
5. *Knowledge of Mathematical Representation:* Candidates use varied representations of mathematical ideas to support and deepen student's mathematical understanding.
6. *Knowledge of Technology:* Candidates embrace technology as an essential tool for teaching and learning mathematics.
7. *Dispositions:* Candidates support a positive disposition toward mathematical processes and mathematical learning.
8. *Knowledge of Mathematics Pedagogy:* Candidates possess a deep understanding of how students learn mathematics and of the pedagogical knowledge specific to mathematics teaching and learning.
9. *Knowledge of Number and Operation:* Candidates demonstrate computational proficiency, including a conceptual understanding of numbers, ways of representing number, relationships among number and number systems, and meanings of operations.
10. *Knowledge of Different Perspectives on Algebra:* Candidates emphasize relationships among quantities including functions, ways of representing mathematical relationships, and the analysis of change.
11. *Knowledge of Geometries:* Candidates use spatial visualization and geometric modeling to explore and analyze geometric shapes, structures, and their properties.

12. *Knowledge of Calculus:* Candidates demonstrate a conceptual understanding of limit, continuity, differentiation, and integration and a thorough background in the techniques and application of the calculus.
13. *Knowledge of Discrete Mathematics:* Candidates apply the fundamental ideas of discrete mathematics in the formulation and solution of problems.
14. *Knowledge of Data Analysis, Statistics, and Probability:* Candidates demonstrate and understanding of concepts and practices, related to data analysis, statistics, and probability.
15. *Knowledge of Measurement:* Candidates apply and use measurement concepts and tools.
16. *Field-Based Experiences:* Candidates complete field-based experiences in mathematics classrooms.

## II. MSU Standards for Candidates in Initial Teacher Programs

1. Candidates know the subjects they plan to teach and how to teach those subjects to students. **(See I above)**
2. Candidates understand how children and adolescents learn and develop in a variety of school, family and community contexts, and can provide learning opportunities that support their students' intellectual, social, and personal development.
3. Candidates understand the practice of culturally responsive teaching. They:
  - a. Understand that a person's worldview is profoundly shaped by his or her life experiences, as mediated by factors such as race/ethnicity, social class, gender, and special needs.
  - b. Understand the educability of all children, and that children bring varied talents, strengths, and perspectives to learning.
  - c. Understand the supports for and barriers to culturally responsive teaching in school environments.
  - d. Understand that learners construct knowledge, drawing on prior knowledge and experience.
  - e. Have skills for learning about the diverse students they teach, and the students' families and communities.
  - f. Use knowledge of students and their lives to design and carry out instruction that builds on students' strengths while meeting their needs, taking into account issues of class, gender, race, ethnicity, language, sexual orientation, age, and special needs.

4. Candidates plan instruction (a) based upon knowledge of subject matter, students, families, communities, and curriculum goals and standards; and (b) taking into account issues of class, gender, race, ethnicity, language, sexual orientation, age, and special needs in designing instruction.
5. Candidates understand critical thinking and problem solving, and create learning experiences that promote the development of students' critical thinking and problem solving skills and dispositions.
6. Candidates understand principles of democracy and plan and carry out instruction that promotes democratic values and communication in the classroom as well as critical reflection on the ideals, dispositions, and processes of democracy.
7. Candidates understand and use multiple forms of assessment to promote the intellectual, social, and physical development of learners and to inform instruction.
8. Candidates create a learning community in the classroom. They:
  - a. Have students assume responsibility for themselves and one another, participate in decision making, work independently and collaboratively, and engage in purposeful activities.
  - b. Establish and maintain appropriate standards of behavior.
  - c. Provide an environment that is safe and conducive to learning.
  - d. Use instructional time effectively.
9. Candidates are reflective practitioners who continually (a) inquire into the nature of teaching and learning, (b) evaluate the effects of their choices and actions on others, and (c) seek out opportunities to grow professionally.
10. Candidates build relationships with school colleagues, families, and agencies in the larger community to support students' learning and well-being.
11. Candidates speak and write English fluently and communicate clearly.
12. Candidates develop dispositions expected of professional educators:
  - a. Belief in the educability of all children.
  - b. Respect for individual and cultural differences, and appreciation of the basic worth of each individual and cultural group.
  - c. Belief that all children bring talents and strengths to learning.

- d. Attitude that students' strengths are a basis for growth and their errors are opportunities for learning.
- e. Commitment to using assessment to identify students' strengths and promote students' growth rather than to deny students access to learning opportunities.
- f. Appreciation for multiple ways of knowing.
- g. Commitment to the expression and use of democratic values in the classroom.
- h. Commitment to critical reflection, inquiry, critical thinking, and life-long learning.
- i. Commitment to the ethical and enculturating responsibilities of educators.
- j. Belief in the potential of schools to promote social justice, and commitment to being agents of change and stewards of best practice.
- k. Commitment to teaching.