GACE Mathematics Standards Assessment Chart

The GACE Mathematics Standards Assessment Chart indicates the NCTM Secondary Mathematics Standards and Indicators (2003) that are addressed, in whole or in part, by the content of the GACE Mathematics assessment objectives.

Standard 1: Knowledge of Mathematical Problem Solving

Candidates know, understand, and apply the process of mathematical problem solving.

Indicators

1.1	Apply and adapt a variety of appropriate strategies to solve problems.	✓
1.2	Solve problems that arise in mathematics and those involving mathematics in other contexts.	✓

Standard 2: Knowledge of Reasoning and Proof

Candidates reason, construct, and evaluate mathematical arguments and develop an appreciation for mathematical rigor and inquiry.

Indicators

2.2	Make and investigate mathematical conjectures.	✓
2.3	Develop and evaluate mathematical arguments and proofs.	✓
2.4	Select and use various types of reasoning and methods of proof.	✓

Standard 3: Knowledge of Mathematical Communication

Candidates communicate their mathematical thinking orally and in writing to peers, faculty, and others.

Indicators

3.2	Use the language of mathematics to express ideas precisely.	✓
3.3	Organize mathematical thinking through communication.	✓

Standard 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.

Indicators

4.1	Recognize and use connections among mathematical ideas.	✓
4.2	Recognize and apply mathematics in contexts outside of mathematics.	✓

Standard 5: Knowledge of Mathematical Representation

Candidates use varied representations of mathematical ideas to support and deepen students' mathematical understanding.

Indicators

5.2	Create and use representations to organize, record, and communicate mathematical ideas.	✓

Standard 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.

Indicators

9.1	Analyze and explain the mathematics that underlies the procedures used for operations involving integers, rational, real, and complex numbers.	✓
9.3	Provide equivalent representations of fractions, decimals, and percents.	✓
9.4	Create, solve, and apply proportions.	✓
9.5	Apply the fundamental ideas of number theory.	✓
9.6	Make sense of large and small numbers and use scientific notation.	✓
9.8	Represent, use, and apply complex numbers.	✓
9.9	Recognize matrices and vectors as systems that have some of the properties of the real number system.	✓

GACE Mathematics Standards Assessment Chart (continued)

Standard 10: Knowledge of Different Perspectives on Algebra

Candidates emphasize relationships among quantities including functions, ways of representing mathematical relationships, and the analysis of change.

Indicators

10.1	Analyze patterns, relations, and functions of one and two variables.	✓
10.2	Apply fundamental ideas of linear algebra.	✓
10.4	Use mathematical models to represent and understand quantitative relationships.	✓

Standard 11: Knowledge of Geometries

Candidates use spatial visualization and geometric modeling to explore and analyze geometric shapes, structures, and their properties.

Indicators

11.2	Exhibit knowledge of the role of axiomatic systems and proofs in geometry.	✓
11.3	Analyze characteristics and relationships of geometric shapes and structures.	✓
11.5	Specify locations and describe spatial relationships using coordinate geometry, vectors, and other representational systems.	✓
11.6	Apply transformations and use symmetry, similarity, and congruence to analyze mathematical situations.	✓

Standard 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.

Indicators

12.1	Demonstrate a conceptual understanding of and procedural facility with basic calculus concepts.	✓
12.3	Use the concepts of calculus and mathematical modeling to represent and solve problems taken from real-world contexts.	✓

Standard 13: Knowledge of Discrete Mathematics

Candidates apply the fundamental ideas of discrete mathematics in the formulation and solution of problems.

Indicators

13.1	Demonstrate knowledge of basic elements of discrete mathematics such as graph theory, recurrence relations, finite difference approaches, linear programming, and combinatorics.	✓

Standard 14: Knowledge of Data Analysis, Statistics, and Probability

Candidates demonstrate an understanding of concepts and practices related to data analysis, statistics, and probability.

Indicators

14.1	Design investigations, collect data, and use a variety of ways to display data and interpret data representations that may include bivariate data, conditional probability and geometric probability.	✓
14.2	Use appropriate methods such as random sampling or random assignment of treatments to estimate population characteristics, test conjectured relationships among variables, and analyze data.	✓
14.3	Use appropriate statistical methods and technological tools to describe shape and analyze spread and center.	✓
14.4	Use statistical inference to draw conclusions from data.	✓
14.7	Determine and interpret confidence intervals.	✓

Standard 15: Knowledge of Measurement

Candidates apply and use measurement concepts and tools.

Indicators

15.1	Recognize the common representations and uses of measurement and choose tools and units for measuring.	✓
15.2	Apply appropriate techniques, tools, and formulas to determine measurements and their application in a variety of contexts.	✓