

# MATHEMATICS

## Mathematical Practices:

- Make sense of problems and persevere in solving them
- Reason abstractly and quantitatively
- Construct viable arguments and critique the reasoning of others
- Model with mathematics
- Use appropriate tools strategically
- Attend to precision
- Look for and make use of structure
- Look for and express regularity in repeated

## Algebra 1:

- Interpret the structure of expressions
- Write expressions in equivalent forms to solve problems
- Perform arithmetic operations on polynomials
- Understand the relationship between zeros and factors of polynomials
- Use polynomial identities to solve problems
- Rewrite rational expressions
- Create equations that describe numbers or relationships
- Understand solving equations as a process of reasoning and explain the reasoning
- Solve equations and inequalities in one variable
- Solve systems of equations
- Represent and solve equations and inequalities graphically
- Understand the concept of a function and use function notation
- Interpret functions that arise in applications in terms of the context
- Interpret linear models

## Geometry:

- Experiment with transformations in the plane
- Understand congruence in terms of rigid motions
- Prove geometric constructions
- Make geometric constructions
- Understand similarity in terms of similarity transformations
- Prove theorems using similarities
- Define trigonometric ratios and solve problems involving right triangles
- Apply trigonometry to general triangles
- Understand and apply theorems about circles
- Find arc lengths and areas of sectors of circles
- Translate between the geometric description and the equation for a conic section
- Use coordinates to prove simple geometric theorems algebraically
- Explain volume formulas and use them to solve problems
- Visualize relationships between two-dimensional and three-dimensional objects
- Apply geometric concepts in modeling

## Algebra 2:

- Extend the properties of exponents to rational exponents
- Interpret the structure of expressions
- Write expressions in equivalent forms to solve problems
- Understand the relationship between zeros and factors of polynomials
- Understand solving equations as a process of reasoning and explain the reasoning
- Represent and solve equations and inequalities graphically
- Interpret functions that arise as a relationship between two quantities
- Make inferences and justify conclusions from sample surveys, experiments and observational studies

## Precalculus:

- Perform arithmetic operations with complex numbers
- Represent complex numbers and their operations on the complex plane
- Use complex numbers in polynomial identities and equations
- Represent and model with vector quantities
- Perform operations on vectors
- Perform operations on matrices and use matrices in applications
- Arithmetic with Polynomials and Rational Expressions
- Use polynomial identities to solve problems
- Rewrite rational expressions
- Solve systems of equations
- Analyze functions using different representations
- Build a function that models a relationship between two quantities
- Build new functions from existing functions
- Extend the domain of trigonometric functions using the unit circle
- Model periodic phenomena with trigonometric functions
- Prove and apply trigonometric identities
- Apply trigonometry to general triangles
- Understand and apply theorems about circles
- Translate between the geometric description and the equation for a conic section
- Explain volume formulas and use them to solve problems
- Visualize relationships between two-dimensional and three-dimensional objects

**Gardner Public Schools**

**CURRICULUM  
GUIDE  
MATHEMATICS  
GRADES 9-12**

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**The purpose of this guide is to identify the major topics, concepts, and skills that are considered essential for this grade level as identified by the Massachusetts Curriculum Frameworks.**

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