

**CURRICULUM**

**GUIDE**

Algebra 2

Providence  
Schools

## QUARTER I

### Content students have to learn

### Processes students will learn and use

#### Unit 1.1 – Transformations (5 days)

- Recognize the properties and characteristics of families of functions.

- » Select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.
- » Select or develop appropriate problem-solving strategies from a variety of different types.

#### Unit 1.2 – Probability and Statistics (6 days)

- Develop and use a variety of representations of data to make decisions and predictions.
- Understand and use different models of regression within data sets.
- Explore rules of probability and odds through sets from problem situations.

- » Select or develop appropriate problem-solving strategies from a variety of different types.
- » Select and use tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.

#### Unit 1.3 – Numbers and Operations (4 days)

- Understand and use rational and irrational numbers and their properties to solve problems.

- » Select or develop an appropriate problemsolving strategy from a variety of different types.
- » Select tools such as real objects, manipulatives, paper/pencil, and technology, or techniques such as mental math, estimation, and number sense to solve problems.
- » Reflect on solutions and the problem-solving process for a given situation and refine strategies as needed.

#### Unit 1.4 – Linear Relationships (13 days)

- Explore and understand patterns to generalize and make predictions in problem situations.
- Develop procedures for evaluating expressions and analyzing data to make decisions.
- Understand and use a variety of representations of linear functions to solve problems.
- Extend understanding of equality to include inequality and apply the concept in problem situations.

- » Select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.
- » Reflect on solutions and the problem-solving process for a given situation and refine strategies as needed.
- » Explain and justify thinking and develop a problem-solving model that incorporates understanding the problem.

## QUARTER I

### Content students have to learn

### Processes students will learn and use

#### **Unit 1.5 – Systems of Equations and Inequalities (9 days)**

- Relate systems of linear equations algebraically and graphically in problem situations.
- Interpret solutions in real-world applications using systems of equations and inequalities.
- Investigate systems of equations and systems of inequalities through a variety of representations.

- » Evaluate the effectiveness of different representations to communicate ideas: formulate questions, conjectures, definitions, and generalizations about data, information, and problem situations.
- » Identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics.

- » Select or develop an appropriate problemsolving strategy from a variety of different types.
- » Select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.
- » Reflect on solutions and the problem-solving process for a given situation and refine strategies as needed.

## QUARTER 2

### Content students have to learn

### Processes students will learn and use

#### Unit 2.1 – Quadratic Functions: Graphing and Factoring (13 days)

- Understand and distinguish the characteristics of the graph of a quadratic function.
  - Conceptually understand the process to factor polynomials.
- » Select or develop an appropriate problemsolving strategy from a variety of different types.
  - » Explain and justify thinking and develop a problem-solving model that incorporates understanding the problem.
  - » Determine and use the appropriate mathematical representation to model situations.

#### Unit 2.2 – Quadratic Functions: Solving Equations (17 days)

- Apply quadratic functions and equations to solve problems using a variety of methods.
- » Select or develop an appropriate problemsolving strategy from a variety of different types.
  - » Explain and justify thinking and develop a problem-solving model that incorporates understanding the problem.
  - » Determine and use the appropriate mathematical representation to model situations.

#### Unit 2.3 – Quadratic Functions: Complex Numbers (11 days)

- Describe and understand the set of complex numbers.
  - Apply properties of arithmetic operations to the complex number set.
  - Investigate closure and its application to complex numbers.
  - Create and examine a geometric model for imaginary and complex numbers.
- » Use informal and formal reasoning and proof to explain and justify conclusions.
  - » Use and create representations to solve problems and organize thoughts and ideas.
  - » Determine and use the appropriate mathematical representation to model situations.

## QUARTER 3

### Content students have to learn

### Processes students will learn and use

#### Unit 3.1 – Polynomial Expressions and Functions (21 days)

- Understand and perform operations on polynomial expressions.
- Determine the characteristics of polynomial functions.
- Use polynomial functions to solve problems.

- » Select or develop an appropriate problemsolving strategy from a variety of different types.
- » Select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.
- » Explain and justify thinking and develop a problem-solving model that incorporates understanding the problem.
- » Determine and use the appropriate mathematical representation to model situations.
- » Identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics.
- » Use different strategies to solve problems.

#### Unit 3.2 – Rational Expressions and Functions (20 days)

- Apply proportional reasoning and rational equations to solve problems.
- Learn and understand characteristics of rational functions, their graphs, and transformations of the graphs.
- Perform operations using rational expressions in problem situations.

- » Select or develop an appropriate problemsolving strategy from a variety of different types.
- » Select tools such as real objects, manipulatives, paper/pencil, and technology, or techniques such as mental math, estimation, and number sense to solve problems.
- » Explain and justify thinking and develop a problem-solving model that incorporates understanding the problem.
- » Identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics.
- » Use different strategies to solve problems.

## QUARTER 4

### Content students have to learn

### Processes students will learn and use

#### Unit 4.1 – Radical Expressions and Functions (11 days)

- Understand and use radical and exponential expressions and functions to solve problems.
- Describe the relationship between the quadratic function and its inverse and the square root function, using a variety of representations.
- Use properties of equality and inequality in problem situations involving radical expressions.

- » Select or develop an appropriate problem-solving strategy from a variety of different types.
- » Select tools such as real objects, manipulatives, paper/pencil, and technology, or techniques such as mental math, estimation, and number sense to solve problems.
- » Reflect on solutions and the problem-solving process for a given situation and refine strategies as needed.
- » Use informal and formal reasoning and proof to explain and justify conclusions.
- » Draw logical conclusions and make generalizations using deductive reasoning.
- » Explain and justify thinking and develop a problem-solving model that incorporates understanding the problem.
- » Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.
- » Use and create representations to solve problems and organize thoughts and ideas.
- » Use different strategies to solve problems.

#### Unit 4.2 – Exponential and Logarithmic Expressions and Functions (14 days)

- Understand and use the relationship between exponential functions and logarithmic functions to solve problems.
- Explore the properties of logarithms and apply them in problem situations.
- Describe the patterns in exponential and logarithmic functions and connect them to applications in solving problems.

- » Select or develop an appropriate problemsolving strategy from a variety of different types.
- » Select tools such as real objects, manipulatives, paper/pencil, and technology, or techniques such as mental math, estimation, and number sense to solve problems.
- » Use informal and formal reasoning and proof to explain and justify conclusions.
- » Explain and justify thinking and develop a problem-solving model that incorporates understanding the problem.
- » Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.

## QUARTER 4

### Content students have to learn

### Processes students will learn and use

#### Unit 4.3 – Matrices (9 days)

- Understand and use matrices as tools for organizing and solving problems.

- » Determine and use the appropriate mathematical representation to model situations.
- » Identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics.
- » Use different strategies to solve problems.

#### Unit 4.4 – Circles (6 days)

- Describe and use the characteristics of a circle to create equations.
- Apply the equation of a circle to solve problems.
- Connect angle measure within a circle to both degrees and radians in problem situations.

- » Select or develop an appropriate problemsolving strategy from a variety of different types.
  - » Select tools such as real objects, manipulatives, paper/pencil, and technology, or techniques such as mental math, estimation, and number sense to solve problems.
  - » Reflect on solutions and the problem-solving process for a given situation and refine strategies as needed.
  - » Use informal reasoning and proof to explain and justify conclusions.
  - » Explain and justify thinking and develop a problem-solving model that incorporates understanding the problem.
  - » Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.
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- » Select or develop an appropriate problemsolving strategy from a variety of different types.
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