



Curriculum & Instruction

SUMMIT PUBLIC SCHOOLS

Content Area: Special Education
Course: PORR Concepts of Algebra 2
Grade(s): 11

Course Overview

This course provides students with a scaffolded, concept-based pathway through the major strands of Algebra 2, designed to build procedural fluency and conceptual understanding at a pace and depth appropriate for special education learners. The course begins with a review of foundational Algebra 1 skills — solving multi-step and literal equations, function notation, and basic graphing — before progressing through graphing linear functions, writing equations of lines, and solving systems of equations. Students then study properties of exponents, polynomials, and factoring as a foundation for solving quadratic equations by multiple methods (square roots, factoring, and the quadratic formula). The course closes with an exposure-level survey of other function families (exponential, quadratic, absolute value) using graphing technology to build familiarity with key features such as intercepts, vertices, and rates of change.

Instruction is built around consistent, repeated structures — guided notes, spiraled Do-Nows that revisit the prior lesson's skill, worked examples preceding every independent practice set, and a "Homework: Mixed Practice" component that can be assigned independently. The Desmos graphing calculator is introduced explicitly as an accommodation and problem-solving tool throughout the year, used for checking hand-drawn work, evaluating functions, and modeling real-world situations. Flex/reteach days are built into every unit to allow for data-driven adjustment based on formative assessment results and IEP progress monitoring.

Prerequisite Course: Concepts of Algebra 1

New Jersey State Learning Standards

Summit Public Schools curriculum aligns with the [New Jersey Student Learning Standards](#).

Content Area Standards:

- A.CED.A.1 – Create equations and inequalities in one variable and use them to solve problems.
- A.CED.A.2 – Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- A.CED.A.4 – Rearrange formulas to highlight a quantity of interest (literal equations).
- A.REI.B.3 – Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
- A.REI.C.5 – Solve systems of linear equations algebraically, including using the elimination method.
- A.REI.C.6 – Solve systems of linear equations exactly and approximately, focusing on pairs of linear equations in two variables.
- A.REI.B.4 – Solve quadratic equations in one variable (completing the square, quadratic formula, factoring, inspection).
- A.REI.D.10 – Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.
- A.REI.D.11 – Explain why the x-coordinates of intersection points of $y = f(x)$ and $y = g(x)$ are solutions to $f(x) = g(x)$; find solutions using graphs, tables, and technology.
- A.REI.D.12 – Graph the solutions to a linear inequality in two variables as a half-plane, and graph the solution set to a system of linear inequalities as the intersection of half-planes.
- A.SSE.A.2 – Use the structure of an expression to rewrite it (identifying factoring patterns, extending exponent rules).
- A.SSE.B.3a – Factor a quadratic expression to reveal the zeros of the function it defines.
- A.APR.A.1 – Add, subtract, and multiply polynomials.
- N.RN.A.2 – Rewrite expressions involving exponents using the properties of exponents.
- F.IF.A.1/A.2 – Understand the concept of a function; use function notation, evaluate functions for inputs in their domains.
- F.IF.B.4 – Interpret key features of graphs and tables in terms of the quantities they represent.
- F.IF.B.6 – Calculate and interpret the average rate of change of a function.
- F.IF.C.7a – Graph linear and quadratic functions, showing intercepts, maxima, and minima.
- F.BF.A.1 – Write a function that describes a relationship between two quantities.
- F.LE.A.2 – Construct linear and exponential functions given a graph, description, table, or pairs of values.

Interdisciplinary Standards:

- RI.9-10.4 – Determine the meaning of technical and mathematical vocabulary as used in a text.
- W.9-10.2 – Write informative/explanatory texts (e.g., explaining problem-solving steps, justifying a chosen method).
- SL.9-10.1 – Engage effectively in collaborative discussions (e.g., partner/group problem-solving).

Date Revised: September 2026

Career Readiness, Life Literacies and Key Skills Standards:

- **9.1.12.PB.1** – Explain the difference between saving and investing.
- **9.4.12.TL.2** – Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.
- **9.4.12.CT.1** – Identify problem-solving strategies used in the development of an innovation.

Computer Science and Design Thinking Standards:

- **8.1.12.DA.1** – Create interactive data visualizations using software tools to help others better understand real-world phenomena.
- **8.1.12.DA.5** – Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.
- **8.1.12.DA.6** – Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.

Career Ready Practices

CRP 1. Act as a responsible and contributing citizen and employee.

CRP 2. Apply appropriate academic and technical skills.

CRP 3. Attend to personal health and financial well-being.

CRP 4. Communicate clearly and effectively and with reason.

CRP 5. Consider the environmental, social and economic impacts of decisions.

CRP 6. Demonstrate creativity and innovation.

CRP 7. Employ valid and reliable research strategies.

CRP 8. Utilize critical thinking to make sense of problems and persevere in solving them.

CRP 9. Model integrity, ethical leadership and effective management.

CRP 10. Plan education and career paths aligned to personal goals.

CRP 11. Use technology to enhance productivity.

CRP 12. Work productively in teams while using cultural global competence.

New Jersey Curriculum Mandates:

This curriculum integrates lessons that address the following interdisciplinary New Jersey Curriculum Mandates:

- [Diversity and Inclusion](#) (Grades K - 12)
- [Climate Change Education](#) (Grades K - 12)

Learning Objectives

Units of study are organized collections of lessons and learning experiences focused on a specific topic and set of skills within a course. Each unit is guided by a set of essential questions.

By the end of this course, students will be able to:

- Solve multi-step linear equations, including those with variables on both sides, using the distributive property and combining like terms.
- Solve literal equations for a specified variable.
- Identify and evaluate functions using function notation.

Date Revised: September 2026

- Graph linear functions from a table of values, from slope-intercept form, and from standard form.
- Graph horizontal and vertical lines and identify their slopes.
- Use a graphing calculator (Desmos) to graph functions, evaluate outputs, and model real-world word problems.
- Write the equation of a line given a graph, a slope and y-intercept, or two points.
- Identify and write equations for parallel and perpendicular lines.
- Solve systems of linear equations by graphing, substitution, and elimination.
- Graph linear inequalities and systems of linear inequalities, identifying the solution region by hand and with technology.
- Apply the properties of exponents (product, quotient, zero power, negative exponents, power-to-power) to simplify expressions.
- Classify, add, subtract, and multiply polynomials.
- Factor polynomials using GCF, the X-game (trinomials, $a = 1$), and other methods (DOTS, four-term polynomials, $a \neq 1$).
- Solve quadratic equations by square roots, factoring (Zero Product Property), the quadratic formula, and graphing.
- Use a graphing calculator to explore and describe key features (domain, range, intercepts, vertex, increasing/decreasing behavior) of exponential, quadratic, and absolute value functions.
- Apply function graphing skills to real-world applications such as projectile motion, compound interest, and break-even analysis.

Units of Study

Units of study are organized collections of lessons and learning experiences focused on a specific topic and set of skills within a course. Each unit is guided by a set of essential questions.

Unit 1: Review from Concepts of Algebra 1 (14 days)

- How do we solve multi-step equations, and how do we check our answers?
- What strategies help us isolate a variable in a longer or more complex equation?
- What is a literal equation, and how is solving one similar to solving a regular equation?
- What is a function, and how does function notation work?
- How do we plot and interpret points on the coordinate plane?

Unit 2: Graphing Linear Functions (17 days)

- What does a graph of an equation actually represent?
- How does knowing the slope and y-intercept let us graph a line more efficiently than plotting points from a table?
- Why do horizontal and vertical lines need their own rules?
- How can the same line be graphed in more than one way, and how do I choose the most efficient method for a given form?
- How does a graphing calculator help us graph and interpret functions and real-world situations more efficiently?
- What does the shaded region of a graphed inequality tell us about the solutions to that inequality?

Unit 3: Writing Equations of Lines (15 days)

- How can we write the equation of a line if we know its slope and y-intercept, or can see them on a graph?
- How do we find the slope of a line given two points?
- How do we write a full equation when the y-intercept isn't given to us directly?
- What makes two lines parallel or perpendicular, and how does that show up in their equations?
- How can we use an equation to model and make predictions about a real-world relationship?

Unit 4: Solving Systems of Equations (19 days, + 2 optional project days)

- What does it mean for a point to be a "solution" to a system of equations?
- How can we solve a system by graphing, and what are the limitations of that method?
- When is substitution the most efficient method for solving a system?
- When is elimination the most efficient method for solving a system?
- How do we represent and solve real-world situations that involve two changing quantities?
- What does the solution region of a system of inequalities represent?

Unit 5: Properties of Exponents (9 days)

- What happens when we multiply or divide expressions with the same base?
- Why does any nonzero number raised to the zero power equal 1?
- What does a negative exponent really mean?
- What happens when a power is raised to another power?

Unit 6: Polynomials (12 days)

- How do we describe a polynomial by its degree and number of terms?
- What does it mean to write a polynomial in standard form?
- How do we add and subtract polynomials by combining like terms?
- How do we multiply polynomials using the distributive property, FOIL, or the box method?

Unit 7: Factoring (16 days)

- What does it mean to factor an expression, and how is it the "reverse" of multiplying?
- How do we find and factor out the greatest common factor (GCF)?
- How does the X-game help us factor trinomials when $a = 1$?
- What other factoring patterns exist (difference of two squares, four-term polynomials, trinomials when $a \neq 1$), and how do we recognize which one to use?

Unit 8: Solving Quadratics (14 days)

- How do we solve a quadratic equation using square roots?
- How does the Zero Product Property let us solve a quadratic equation by factoring?
- How does the quadratic formula work, and when is it the most useful method?
- How can we use a graph to find the roots (x-intercepts) of a quadratic function?

Unit 9: Graphing Other Functions Using Graphing Calculator (11 days)

Note: the focus of this unit is exposure to important function families using technology, not manual calculation.

- What makes an exponential function's graph different from a linear function's graph, and how quickly do exponential functions change?

- What is the vertex of a quadratic function, and what does it tell us about the graph?
- How is the graph of an absolute value function similar to and different from a quadratic function's graph?
- How can we compare two functions using their graphs?
- How can we use graphs to solve equations and systems involving different function types?
- How do these function types show up in real-world situations like projectile motion, compound interest, and break-even analysis?

Instructional Resources and Materials

Instructional resources are the information sources teachers utilize to guide their teaching and assessing. Instructional materials are the texts students read or review. The instructional resources and materials may vary in order to meet the learning needs of students.

Required:

- Desmos graphing calculator
- Summit unit guided notes and practice packets (all units)
- Graph paper / pre-printed coordinate grids

Recommended:

- *Big Ideas Math Algebra 1* (reference for pacing/examples)

Assessment Strategies

Assessment measures a student's mastery of a course standard and learning objective. Assessment can be used for both instructional purposes and for evaluative purposes. Teachers may choose one or more of the following ideas to assess learners. They may also modify these ideas to make the assessment more responsive to students' interests and needs.

Formative:

- Do Now / warm-ups spiraling the previous lesson
- Guided notes checks for understanding
- Exit tickets
- Whiteboard checks during independent practice
- Graphing calculator screen checks

Summative:

- Mid-unit quizzes (per unit, as specified in each unit plan)
- End-of-unit tests

Benchmark:

- Mid-unit check-ins / progress monitoring on IEP graphing and algebra goals

Alternative:

- Graphing calculator word-problem tasks (student graphs a given real-world scenario and answers questions from the graph/table)

- Open-notes review activities

Suggested Strategies for Modification & Differentiation

[Modifications Chart](#)

- Pre-filled/partially-filled coordinate grids so students focus on plotting, not ruling the grid
- Color-coded steps for multi-step procedures (e.g., slope rise/run, cover-up method, X-game factoring)
- Reference sheets with worked examples kept visible during independent practice
- Extended time and reduced problem sets on practice pages
- Graphing calculator as a built-in accommodation for checking hand-drawn work
- Flex/reteach days built into every unit for data-driven reteaching