



Program Transfer Goals

- Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
- Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
- Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

PACING

First Grading Period			Second Grading Period		Third Grading Period			Fourth Grading Period	
Unit 1: Functions	Unit 2: Linear Functions	Unit 3: Systems	Unit 4: Absolute Value Functions	Unit 5: Quadratic Functions	Unit 6: Polynomial Functions	Unit 7: Root Functions	Unit 8: Rational Functions	Unit 9: Exponential Functions	Unit 10: Logarithmic
			Semester Exams					Final Exams	

Assurances for a Guaranteed and Viable Curriculum

Adherence to this scope and sequence affords every member of the learning community clarity on the knowledge and skills on which each learner should demonstrate proficiency. In order to deliver a guaranteed and viable curriculum, our team commits to and ensures the following understandings:

Shared Accountability: Responding to the Needs of All Learners

- High levels of learning for all students.
- The district and course formative assessments aligned to the standards for this course support educators and learners in monitoring academic achievement and leveraging interventions.

Shared Understanding: Curriculum Design

- The district curriculum design weaves together the elements of content, skills and assessments in order to adhere to curriculum design at the macro and micro level, ensuring vertical alignment.
- The district curriculum incorporates standards, scope and sequence, enduring understandings, essential questions, performance assessments, and recommended resources.

Interdependence: Curriculum Units

Members of the learning community utilize the curriculum units, plan collaboratively, and reflect on results for continuous improvement.

UNIT 1: FUNCTIONS

TIMELINE: 3 WEEKS - 1ST 9 WEEKS

This first unit of Algebra II is the building block for the rest of the course. As an initial exploration of the parent functions, the learners will make connections between the key attributes of each and how these characteristics impact the corresponding function. Learners will compare and contrast various parent functions in equation and graphical forms before exploring each function through in-depth study throughout the rest of the year.

■ Transfer Goal:

- o Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- o Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Students will know...

domain and range represent the x and y values of functions or relations; function notation can applied to prior knowledge; transformations will manipulate parent functions

Students will be skilled at...

stating the domain and range for any function or relation using all three notations; interpreting the information/operation given by function notation; applying transformations to all parent functions

UNIT 2: LINEAR FUNCTIONS

TIMELINE: 3 WEEKS - 1ST 9 WEEKS

Extending from their study of linear functions in Algebra I, learners will identify key features of linear functions including domain and range, written in interval notation, inequalities, and set notation. Learners will determine rate of change in various formats and write equations given different pieces of information. Learners will be able to apply linear functions to word problems and use linear functions to solve scatterplots.

■ Transfer Goal:

- o Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
- o Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
- o Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.

Students will know...

the slope formula is used to find rate of change; linear functions and inequalities can be graphed using different forms; in order to calculate the inverse, equations should be solved for y ; there is a process for solving linear equations and inequalities; different forms of linear functions can be used to write linear equations; some real world data can be represented using linear functions

Students will be skilled at...

determining/calculating rate of change from multiple representations; graphing linear functions and inequalities using different forms; formulating the inverse using a graph or an equation; solving linear equations and inequalities algebraically; writing equations using various pieces of information; creating and analyzing scatter plots; creating linear functions to model a real world situation

UNIT 3: SYSTEMS OF EQUATIONS

TIMELINE: 3 WEEKS - 1ST 9 WEEKS

Extending from their study of linear functions in Algebra I, learners will continue to solve and graph systems of equations. Learners will be able to solve and formulate 3 variable system of equations. They will be able to write and solve linear programming application problems.

■ Transfer Goal:

- o Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
- o Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
- o Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- o Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Students will know...

systems can have two or three variables; systems can have one, none or infinitely many solutions; systems can be used to represent real world situations; the solution to a system of inequalities is the shaded region including or excluding the line; the solution to a system of equations is the point of intersection

Students will be skilled at...

graphing systems of equations and inequalities; solving systems using various methods; writing systems of equations using real world situations

UNIT 4: ABSOLUTE VALUE FUNCTIONS

TIMELINE: 3 WEEKS - 2ND 9 WEEKS

Learners will identify key features of absolute value functions including domain and range, vertex, and all transformations of the parent function. Learners will be able to solve and graph absolute value equations and inequalities. Learners will be able to apply absolute value functions to real world situations.

■ Transfer Goal:

- o Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
- o Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
- o Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- o Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Students will know...

the general shape of an absolute value function; the inverse of an absolute value of a function is not a function; absolute value equations and inequalities have two possible solutions

Students will be skilled at...

graphing absolute value equations and inequalities; solving absolute value equations inequalities; transforming absolute value functions; writing absolute value equations and inequalities; solving systems using absolute value functions; graphing the inverse of absolute value functions; determining the domain and range of absolute value functions; applying absolute value functions to real world situations

UNIT 5: QUADRATIC FUNCTIONS

TIMELINE: 6 WEEKS - 2ND 9 WEEKS

Learners will identify key features of quadratic value functions including domain and range, vertex, and all transformations of the parent function. Learners will be able to write and graph quadratic equations and inequalities. They will master solving quadratics using all methods including factoring, quadratic formula and completing the square. Learners will be able to apply quadratic functions to real world situations.

Transfer Goal:

- o Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
- o Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
- o Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- o Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Students will know...

the general shape of a quadratic function; the inverse of a quadratic of a function is not a function; quadratic equations and inequalities have two possible solutions; factoring a key skill to solve quadratic functions and future functions

Students will be skilled at...

graphing quadratic equations and inequalities; solving quadratic equations using various methods and inequalities; transforming quadratic functions; writing quadratic equations and inequalities; solving systems using quadratic functions; graphing the inverse of quadratic functions; determining the domain and range of quadratic functions; applying quadratic functions to real world situations; factoring quadratic functions

UNIT 6: POLYNOMIAL FUNCTIONS

TIMELINE: 3 WEEKS - 3RD 9 WEEKS

Learners will identify key features of polynomial functions including domain and range, and end behavior. Learners will be able to perform all operations (add, subtract, multiply, divide) and sketch the graphs of polynomial functions. Learners will be able to factor polynomial functions and determine the number of solutions based on the degree.

■ Transfer Goal:

- o Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
- o Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
- o Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- o Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Students will know...

the degree of a polynomial function determines the number of solutions and end behavior; the factors of the polynomial function relate to the solutions of the polynomial graph

Students will be skilled at...

determining the domain, range, and end behavior of polynomial functions; sketching the graph of polynomial functions; factoring to solve polynomial functions; performing operations with polynomial expressions

UNIT 7: ROOT FUNCTIONS

TIMELINE: 2 WEEKS - 3RD 9 WEEKS

Learners will identify key features of root functions including domain and range and all transformations of the parent function. Learners will be able to solve and graph root functions as well the inverse. Learners will be able to apply root functions to real world situations.

■ Transfer Goal:

- o Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
- o Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
- o Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- o Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Students will know...

the root function's graph is one direction; the inverse of a square root function is a restricted quadratic function; there are extraneous solutions; the domain must be restricted for its inverse

Students will be skilled at...

graphing root equations and inequalities; solving root equations and inequalities; transforming root functions; writing root equations and inequalities; graphing the inverse of root functions with a restricted domain; determining the domain and range of root functions; applying root functions to real world situations

UNIT 8: RATIONAL FUNCTION

TIMELINE: 5 WEEKS - 3RD 9 WEEKS, 4TH 9 WEEKS

Learners will identify key features of rational functions including domain and range, asymptotes, holes and all transformations of the parent function. Learners will be able to perform operations (add, subtract, multiply, divide). Learners will be able to solve and graph rational equations.

■ Transfer Goal:

- o Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
- o Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
- o Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- o Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Students will know...

rational functions are made up of two or more branches; vertical discontinuities are a result of value that make the denominator undefined; horizontal discontinuities are a result of the comparison the degree of the numerator and denominator; holes in the graph are a result of a reduced factor rational function

Students will be skilled at...

graphing rational functions; transforming rational functions; determining the domain and range of rational functions; factoring rational functions; determining asymptotes

UNIT 9: EXPONENTIAL FUNCTIONS

Learners will identify key features of exponential functions including domain and range, asymptote, and all transformations of the parent function. Learners will be able to solve and graph exponential equations. They will determine that inverse of a exponential function is a logarithmic function. Learners will be able to apply exponential functions to real world situations.

TIMELINE: 2 WEEKS - 4TH 9 WEEKS

■ Transfer Goal:

- o Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
- o Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
- o Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- o Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Students will know...

exponential function graphs have the same general form; exponential functions have a horizontal asymptotes

Students will be skilled at...

graphing exponential functions; solving exponential equations; transforming exponential functions; graphing the inverse of exponential functions; determining the domain and range of exponential functions; applying exponential functions to real world situations

UNIT 10: LOGARITHMIC FUNCTIONS

TIMELINE: 3 WEEKS - 4TH 9 WEEKS

Learners will identify key features of logarithmic functions including domain and range, asymptote, and all transformations of the parent function. Learners will be able to solve and graph logarithmic equations. They will determine that inverse of a logarithmic function is an exponential function. Learners will be able to apply logarithmic functions to real world situations.

■ Transfer Goal:

- o Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
- o Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
- o Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- o Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Students will know...

logarithmic function graphs have the same general form; logarithmic functions have a vertical asymptotes

Students will be skilled at...

graphing logarithmic functions; solving logarithmic equations; transforming logarithmic functions; graphing the inverse of logarithmic functions; determining the domain and range of logarithmic functions; applying logarithmic functions to real world situations