Texas Algebra I, 2025-2026

Scope and sequence with corequisite supports

Texas Essential Knowledge and Skills for Mathematics

In the three years prior to Algebra I, students have already begun their study of algebraic concepts. They have investigated variables and expressions, solved equations, constructed and analyzed tables, used equations and graphs to describe relationships between quantities, and studied linear equations and systems of linear equations.

The Algebra I course outlined in this scope and sequence document begins with connections back to that earlier work, efficiently reviewing algebraic concepts that students have already studied while at the same time moving students forward into the new ideas described in the high school standards. Students contrast exponential and linear functions as they explore exponential models using the familiar tools of tables, graphs, and symbols. Finally, they apply these same tools to a study of quadratic functions. Throughout, the connection between functions and equations is made explicit to give students more ways to model and make sense of problems.

Throughout this Algebra I course, students use mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

(A) apply mathematics to problems arising in everyday life, society, and the workplace;

(B) 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;

(C) 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;

(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E) create and use representations to organize, record, and communicate mathematical ideas;

(F) analyze mathematical relationships to connect and communicate mathematical ideas; and

(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

These processes should become the natural way in which students come to understand and do mathematics. While, depending on the content to be understood or on the problem to be solved, any process might be seen or applied, some processes may prove more useful than others.

These course materials are designed to support 138-143 lessons (1 lesson equals 45 minutes).

Agile Mind Topics	Topic Descriptions	Texas Essential Knowledge and Skills for Mathematics • Standards listed in black are the primary instructional focus of the topic. • Standards in gray support content or indicate foundations for future work.
Representing relationships mathematically (12 lessons)		
1: Constructing graphs 5 lessons	This topic introduces the principles for creating neutral, well-designed graphs. Choosing appropriate values for both axes to present meaningful displays of data is highlighted. Students also review the distinction between independent and dependent variables in a functional relationship, learn conventions related to this distinction, and are formally introduced to the concept of the domain and range of a function. Students also distinguish between discrete and continuous data. Students engage in the process standards by investigating the real-world situation of population growth. They analyze graphs of a situation to communicate how the graph can represent or misrepresent the situation and justify how graphs can be used to support one position over another.	*This topic does not directly align to Algebra I content standards, but it sets the conceptual basis for students' work with function families that will be studied later in this course. This topic is critical in building understanding in the function specific topics. This topic provides the foundation for the following standards:* **(1) Mathematical process standards:** (A), (D), (E), (F), (G) **(2) Linear functions, equations, and inequalities.** The student applies mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to: (A) determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities ***Readiness Standard*** **(12) Number and algebraic methods.** The student applies the mathematical process standards and algebraic methods to write, solve, analyze, and evaluate equations, relations, and functions. The student is expected to**:** (A) decide whether relations represented verbally, tabularly, graphically, and symbolically define a function ***Supporting Standard*** **ELPS:** 1.D, 1.F, 2.E, 3.C, 3.G, 4.C, 4.E
2: Multiple representations in the real world 7 lessons	This topic connects the various representations of a problem—words, concrete elements, numbers, graphs, and algebraic expression--as students explore linear relationships. Students also learn how the same situation can be represented by different but equivalent algebraic expressions. Students use the process standards to represent a real-world situation involving a pool tiling problem. They create multiple representations to communicate how many tiles can be used to tile	*This topic does not directly align to Algebra I content standards, but it sets the conceptual basis for students' work with function families that will be studied later in this course. This topic is critical in building an understanding for multiple representations in the function specific topics. This topic provides the foundation for the following standards:* **(1) Mathematical process standards:** (A), (D), (E), (F), (G) **(2) Linear functions, equations, and inequalities.** The student applies mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to:

	pools of various sizes and analyze various representations to see how they are connected.	(A) determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities ***Readiness Standard*** (C) write linear equations in two variables given a table of values, a graph, and a verbal description ***Readiness Standard*** **(12) Number and algebraic methods.** The student applies the mathematical process standards and algebraic methods to write, solve, analyze, and evaluate equations, relations, and functions. The student is expected to: (A) decide whether relations represented verbally, tabularly, graphically, and symbolically define a function ***Supporting Standard*** **ELPS:** 1.D, 1.E, 2.D, 3.F, 3.H, 4.F, 4.G
Understanding functions (18-20 lessons)		
3: Functions 9 lessons	This topic solidifies students' understanding of the concept of a function and introduces formal function notation. Students connect previous work with sequences to the concept of a function. Students use the process of using a vending machine diagram to communicate and illustrate what a functional relationship is. They also communicate their understanding of functional relationships by creating a functional relationship and justify in writing, with precise language, why it is a functional relationship.	**(1) Mathematical process standards:** (A), (D), (E), (F), (G) **(2) Linear functions, equations, and inequalities.** The student applies mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to: (A) determine the domain and range of a ~~linear~~ function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities ***Readiness Standard*** (C) write linear equations in two variables given a table of values, a graph, and a verbal description ***Readiness Standard*** **(3) Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to: (C) graph linear functions on the coordinate plane and identify key features, including ***x***- intercept, ***y***-intercept, zeros, and slope, in mathematical and real-world problems ***Readiness Standard*** **(5) Linear functions, equations, and inequalities.** The student applies the mathematical process standards to solve, with and without technology, linear equations and evaluate the reasonableness of their solutions. The student is expected to:

		(A) solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides ***Readiness Standard*** **(12) Number and algebraic methods.** The student applies the mathematical process standards and algebraic methods to write, solve, analyze, and evaluate equations, relations, and functions. The student is expected to: (A) decide whether relations represented verbally, tabularly, graphically, and symbolically define a function ***Supporting Standard*** (B) evaluate functions, expressed in function notation, given one or more elements in their domains ***Supporting Standard*** **ELPS:** 1.A, 1.F, 2.D, 3.B, 3.E, 3.F, 3.G, 4.D, 4.E, 5.B, 5.G
4: Rate of change 9 lessons **Corequisite support** 0-2 lessons **APPENDIX: Exploring rate of change in motion problems**	This topic deepens student understanding of the central ideas of rate of change. Students build on previous work with constant rates as they investigate rates of change in a variety of situations numerically and graphically. Students learn that not all rates of change are constant, motivating future work with nonlinear functions. Students apply the process standards to rates of change in various real-world situations, including analyzing movement in front of a motion detector, elevators, and titling a patio. Students analyze various representations to determine and communicate if rates are constant or nonconstant and justify their reasoning.	**(1) Mathematical process standards:** (A), (B), (D), (E), (F), (G) **(2) Linear functions, equations, and inequalities.** The student applies mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to: (D) write and solve equations involving direct variation ***Supporting Standard*** **(3) Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to: (B) calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems ***Readiness Standard*** **ELPS:** 1.B, 2.D, 2.E, 2.F, 2.I, 3.D, 3.F, 3.G, 3.H, 3.J, 4.E **Corequisite standards:** 8.4.C

Linear functions, equations, and inequalities (26-27 lessons)		
5: Moving beyond slope-intercept 10 lessons	This topic builds on student understanding of slope and ***y***-intercept of a linear function. Students investigate the effect of ***m*** and ***b*** on the graph of a linear function in the form ***y*** = ***mx*** + ***b***. They also learn about the ***x***-intercept and linear equations of the form ***x*** = ***c.*** Students develop and apply the standard and point-slope forms for the equation of a line. Students use the process of analyzing various forms of linear equations to communicate information revealed from the equation. They create various representations to connect linear relationships and justify why some relationships are proportional while others are nonproportional.	**(1) Mathematical process standards:** (A), (B), (D), (E), (F), (G) **(2) Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to: (A) determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities ***Readiness Standard*** (B) write linear equations in two variables in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$, given one point and the slope and given two points ***Supporting Standard*** (C) write linear equations in two variables given a table of values, a graph, and a verbal description ***Readiness Standard*** (E) write the equation of a line that contains a given point and is parallel to a given line ***Supporting Standard*** (F) write the equation of a line that contains a given point and is perpendicular to a given line ***Supporting Standard*** (G) write an equation of a line that is parallel or perpendicular to the X or Y axis and determine whether the slope of the line is zero or undefined ***Supporting Standard*** **(3) Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to: (A) determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$ ***Supporting Standard*** (B) calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems ***Readiness Standard*** (C) graph linear functions on the coordinate plane and identify key features, including ***x***-intercept, ***y***-intercept, zeros, and slope, in mathematical and real-world problems ***Readiness Standard***

		(E) determine the effects on the graph of the parent function $f(x) = x$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, ~~$f(x - c)$~~, ~~$f(bx)$~~ for specific values of a, ~~bc, and d~~ ***Supporting Standard*** **ELPS:** 1.A, 1.B, 1.D, 1.E, 2.C, 3.B, 3.C, 3.F, 4.C, 5.B, 5.F
6: Creating linear models for data 9 lessons	This topic revisits analyzing rate of change to determine whether using a linear model to represent data is appropriate. It also introduces the use of residuals to informally assess the fit of a linear function. Students learn that correlation does not imply causation. They also explore transformations of functions by transforming the parent function ***y* = *x*** to create linear models for data. Students use the process standards to analyze real world salary data, in order to communicate about trends in salaries between groups of people. They select tools, including pencil and paper, manipulatives, and technology, to analyze transformations and communicate about their reasonings and implications.	**(1) Mathematical process standards:** (A), (B), (C), (D), (E), (F), (G) **(2) Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to: (B) write linear equations in two variables in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$, given one point and the slope and given two points ***Supporting Standard*** (C) write linear equations in two variables given a table of values, a graph, and a verbal description ***Readiness Standard*** **(3) Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to: (A) determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$ ***Supporting Standard*** (B) calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems ***Readiness Standard*** (C) graph linear functions on the coordinate plane and identify key features, including x-intercept, y-intercept, zeros, and slope, in mathematical and real-world problems ***Readiness Standard*** (E) determine the effects on the graph of the parent function $f(x) = x$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d ***Supporting Standard*** **(4) Linear functions, equations, and inequalities.** The student applies the mathematical process standards to formulate statistical relationships and evaluate their reasonableness based on real- world data. The student is expected to: (A) calculate, using technology, the correlation coefficient between two quantitative variables and interpret this quantity as a measure of the strength of the linear association ***Supporting Standard***

		(B) compare and contrast association and causation in real-world problems ***Supporting Standard*** (C) write, with and without technology, linear functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems ***Supporting Standard*** **ELPS:** 2.C, 3.E, 3.J, 4.C, 4.G
7: Solving linear equations and inequalities 7 lessons **Corequisite support** 0-1 lesson **APPENDIX: Linear equations and inequalities**	In this topic, students leverage the connections among linear functions, linear equations, and linear inequalities as they create and solve equations and inequalities. They solidify and extend their understanding of solution techniques for single-variable equations and inequalities, and they learn how to graphically represent solutions to linear inequalities in two variables. In this topic, students engage in the process standards by analyzing the relationship between linear functions and equations. They use tables and graphs to solve linear equations and connect these methods to the algebraic solution. They use symbolic notation to represent situations that can be represented by an inequality and explain why a point is or is not a solution to the inequality.	**(1) Mathematical process standards:** (A), (C), (D), (E), (F), (G) **(2) Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to: (C) write linear equations in two variables given a table of values, a graph, and a verbal description ***Readiness Standard*** (H) write linear inequalities in two variables given a table of values, a graph, and a verbal description ***Supporting Standard*** **(3) Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to: (D) graph the solution set of linear inequalities in two variables on the coordinate plane ***Readiness Standard*** **(5) Linear functions, equations, and inequalities.** The student applies the mathematical process standards to solve, with and without technology, linear equations and evaluate the reasonableness of their solutions. The student is expected to: (A) solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides ***Readiness Standard*** (B) solve linear inequalities in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides ***Supporting Standard*** **(12) Number and algebraic methods.** The student applies the mathematical process standards and algebraic methods to write, solve, analyze, and evaluate equations, relations, and functions. The student is expected to: (E) solve mathematic and scientific formulas, and other literal equations, for a specified variable ***Supporting Standard***

		ELPS: 1.E, 2.C, 3.E, 4.D, 5.F **Corequisite standards:** 8.8.A, 8.8.C
Systems of linear equations and inequalities (14-15 lessons)		
8: Systems of linear equations and inequalities 6 lessons **Corequisite support** 0-1 lesson **APPENDIX: Formulating and solving systems**	This topic builds on students' previous experiences with systems of linear equations and inequalities, in which two conditions apply to a situation. Students review how to set up a system of linear equations, solve it using graphs and tables, and check the solution for reasonableness. Students also learn how to set up a system of linear inequalities and solve it by graphing. Students engage in the process standards as they solve systems of equations that represent a lawn mowing business. They use a problem-solving model to evaluate and make sense of the problem, define the variables, write and solve the system, then interpret the solutions. Students analyze the graphical and tabular methods for solving and make connections between the two representations. As they solve systems of inequalities, they make connections to systems of equations and consider what it means for a point to be a solution.	**(1) Mathematical process standards:** (A), (B), (C), (D), (E), (F), (G) **(2) Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to: (C) write linear equations in two variables given a table of values, a graph, and a verbal description ***Readiness Standard*** (I) write systems of two linear equations given a table of values, a graph, and a verbal description ***Readiness Standard*** **(3) Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to: (F) graph systems of two linear equations in two variables on the coordinate plane and determine the solutions if they exist ***Supporting Standard*** (G) estimate graphically the solutions to systems of two linear equations with two variables in real-world problems ***Supporting Standard*** (H) graph the solution set of systems of two linear inequalities in two variables on the coordinate plane ***Supporting Standard*** **(5) Linear functions, equations, and inequalities.** The student applies the mathematical process standards to solve, with and without technology, linear equations and evaluate the reasonableness of their solutions. The student is expected to: (C) solve systems of two linear equations with two variables for mathematical and real-world problems ***Readiness Standard*** **ELPS:** 2.I, 4.C, 4.D, 4.E, 4.F, 4.G **Corequisite standards:** 8.9
9: Other methods for solving systems 8 lessons	Continuing with the exploration of systems of two linear equations, this topic addresses two algebraic methods for solving systems: the	**(1) Mathematical process standards:** (B), (D), (E), (F), (G) **(2) Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems

	substitution method and the linear combination method. Students use the process standards as they write and solve systems of equations using algebraic methods. They connect the algebraic solution to the graphical solution and analyze a problem to determine which method is most effective. Students also have the opportunity to explore and justify why the linear combination method works using graphical and algebraic arguments.	of equations. The student is expected to: (C) write linear equations in two variables given a table of values, a graph, and a verbal description ***Readiness Standard*** (I) write systems of two linear equations given a table of values, a graph, and a verbal description ***Readiness Standard*** **(3) Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to: (F) graph systems of two linear equations in two variables on the coordinate plane and determine the solutions if they exist ***Supporting Standard*** (G) estimate graphically the solutions to systems of two linear equations with two variables in real-world problems ***Supporting Standard*** **(5) Linear functions, equations, and inequalities.** The student applies the mathematical process standards to solve, with and without technology, linear equations and evaluate the reasonableness of their solutions. The student is expected to: (C) solve systems of two linear equations with two variables for mathematical and real-world problems ***Readiness Standard*** **ELPS:** 1.E, 2.I, 3.C, 3.G, 4.G
Relationships that are not linear (15 lessons)		
10: Laws of exponents 6 lessons	This topic develops principles for multiplying and dividing exponential expressions with common bases. It also uses explorations of number patterns to develop the meanings of positive and negative exponents, as well as zero as an exponent. The topic also introduces students to fractional exponents. As students explore and develop the laws of exponents through pattern recognition, they are applying the process standards of communicating their ideas through diagraphs, symbols, and language. Through this concrete pattern recognition, they are able to develop symbolic rules to generalize these laws. They also have the opportunity to analyze and	**(1) Mathematical process standards:** (A), (D), (E), (F), (G) **(11) Number and algebraic methods.** The student applies the mathematical process standards and algebraic methods to rewrite algebraic expressions into equivalent forms. The student is expected to: (B) simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents ***Readiness Standard*** **ELPS:** 1.A, 3.D, 3.E, 4.G, 5.F

	connect the relationship between laws of exponents and scientific notation to work with very large and small quantities.	
11: Nonlinear relationships 9 lessons	As a prelude to students' study of exponential and quadratic functions, this topic introduces nonlinear relationships between two quantities—specifically, quadratic and exponential relationships. As students explore quadratic and exponential relationships, they engage in the process standards by analyzing tables, graphs, and images of relationships that can be represented by either quadratic or exponential functions. Student determine which type of function models the relationship, explaining why, and then using symbolic notation to represent that relationship. Students also have the opportunity to justify their mathematical thinking by working through a MARS task involving creating a quilt with different types of fabric shapes.	*This topic does not directly align to Algebra I content standards, but it sets the conceptual basis for students' work with exponential and quadratic functions in upcoming topics. This topic provides the foundation for the following standards:* **(1) Mathematical process standards:** (A), (B), (D), (E), (F), (G) **(6) Quadratic functions and equations.** The student applies the mathematical process standards when using properties of quadratic functions to write and represent in multiple ways, with and without technology, quadratic equations. The student is expected to: (A) determine the domain and range of quadratic functions and represent the domain and range using inequalities ***Readiness Standard*** **(9) Exponential functions and equations.** The student applies the mathematical process standards when using properties of exponential functions and their related transformations to write, graph, and represent in multiple ways exponential equations and evaluate, with and without technology, the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to: (A) determine the domain and range of exponential functions of the form $f(x) = ab^x$ and represent the domain and range using inequalities ***Supporting Standard*** **(12) Number and algebraic methods.** The student applies the mathematical process standards and algebraic methods to write, solve, analyze, and evaluate equations, relations, and functions. The student is expected to: (B) evaluate functions, expressed in function notation, given one or more elements in their domains ***Supporting Standard*** **ELPS:** 2.E, 2.F, 2.I, 3.E, 5.B

Exponential functions and equations (16 lessons)		
12: Exponential functions and equations 9 lessons	This topic builds on students' knowledge of exponential patterns by exploring different situations that can be modeled with exponential functions, including compound interest. Students use tables and graphs to contrast the repeated multiplication of exponential patterns with the repeated addition of linear patterns. They also investigate the impact of the parameters ***a*** and ***b*** on the graph of the general exponential function $f(x) = ab^x$ and create graphs of exponential functions of this form. Students apply the process standards as they compare and contrast exponential and linear growth through a real-world situation involving the growth of two types of insects. Students use graphs, tables, written language, and symbolic notation to explore how the quantities change and analyze the difference between these two function types. They describe the effects of the parameters on a graph of an exponential function using both symbols and written communication and use tools such as paper and pencil and technology as they analyze graphs of these relationships.	**(1) Mathematical process standards:** (A), (B), (D), (E), (F), (G) **(9) Exponential functions and equations.** The student applies the mathematical process standards when using properties of exponential functions and their related transformations to write, graph, and represent in multiple ways exponential equations and evaluate, with and without technology, the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to: (A) determine the domain and range of exponential functions of the form $f(x) = ab^x$ and represent the domain and range using inequalities ***Supporting Standard*** (B) interpret the meaning of the values of a and b in exponential functions of the form $f(x) = ab^x$ in real-world problems ***Supporting Standard*** (C) write exponential functions in the form $f(x) = ab^x$ (where b is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay ***Readiness Standard*** (D) graph exponential functions that model growth and decay and identify key features, including y-intercept and asymptote, in mathematical and real-world problems ***Readiness Standard*** (E) write, using technology, exponential functions that provide a reasonable fit to data and make predictions for real-world problems ***Supporting Standard*** **ELPS:** 3.C, 3.D, 3.H, 3.J, 5.G
13: Arithmetic and geometric sequences 7 lessons	In this topic students explore the basics of arithmetic and geometric sequences and connect them to linear and exponential functions. Students apply the process standards by applying arithmetic and geometric sequences to solve problems involving auditorium seating and ticket sales. Students use tables, images, and symbolic representations to analyze how the sequences grow and connect the growth to the rule that represents these sequences. Students also have the opportunity to connect	**(1) Mathematical process standards:** (A), (D), (E), (F), (G) **(12) Number and algebraic methods.** The student applies the mathematical process standards and algebraic methods to write, solve, analyze, and evaluate equations, relations, and functions. The student is expected to: (C) identify terms of arithmetic and geometric sequences when the sequences are given in function form using recursive processes ***Supporting Standard*** (D) write a formula for the nth term of arithmetic and geometric sequences, given the value of several of their terms ***Supporting Standard*** **ELPS:** 1.E, 2.C, 2.D, 3.B, 4.F, 5.F

	sequences to problems involving tiles and cake cutting and justify their thinking and reasoning.	
Quadratic functions and polynomial expressions (23-24 lessons)		
14: Graphs of quadratic functions 8 lessons	This topic continues the study of transformations on parent functions that began with linear functions. Students build on their previous exposure to quadratic functions as they review the features of the parent parabola, $y = x^2$, and explore how changes in the values of the constants a and c in $y = ax^2 + c$ affect the graph of this parent function. In this topic, students use the process standards to explore transformations of quadratic functions through a real world scenario of tiling a floor. Students use graphs, tables, and symbolic notation to understand the effects of transformations and to represent transformations algebraically. They also justify and explain the effects of transforming the quadratic parent function using written language.	**(1) Mathematical process standards:** (A), (B), (C), (D), (E), (F), (G) **(6) Quadratic functions and equations.** The student applies the mathematical process standards when using properties of quadratic functions to write and represent in multiple ways, with and without technology, quadratic equations. The student is expected to: (A) determine the domain and range of quadratic functions and represent the domain and range using inequalities ***Readiness Standard*** **(7) Quadratic functions and equations.** The student applies the mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, the solutions to equations. The student is expected to: (A) graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including x-intercept, y-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry ***Readiness Standard*** (C) determine the effects on the graph of the parent function $f(x) = x^2$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, ~~$f(x - c)$~~, ~~$f(bx)$~~ for specific values of a, ~~b, c~~, and d ***Readiness Standard*** **ELPS:** 1.A, 2.E, 2.F, 3.D, 4.F
15: Operations on polynomials 8-9 lessons (Lesson 8 may go beyond your district's expectations for Algebra I students.)	This topic explores polynomial operations. Students learn how to multiply, add, and subtract polynomials using concrete models and analytic techniques. They also learn how to factor trinomials using concrete models and analytic techniques. Finally, students divide polynomials and connect polynomial division to the concept of a rational expression, laying the foundation for work with the arithmetic of polynomial expressions in later courses. As students explore operations on polynomials, they use the processes of choosing tools, creating and using representations, analyzing relationships, and communicating their thinking through symbols and diagrams. Students use	**(1) Mathematical process standards:** (C), (D), (E), (F) **(10) Number and algebraic methods.** The student applies the mathematical process standards and algebraic methods to rewrite in equivalent forms and perform operations on polynomial expressions. The student is expected to: (A) add and subtract polynomials of degree one and degree two ***Supporting Standard*** (B) multiply polynomials of degree one and degree two ***Supporting Standard*** (C) determine the quotient of a polynomial of degree one and polynomial of degree two when divided by a polynomial of degree one and polynomial of degree two when the degree of the divisor does not exceed the degree of the dividend ***Supporting Standard*** (D) rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property ***Supporting Standard*** (E) factor, if possible, trinomials with real factors in the form $ax^2 + bx + c$, including perfect square trinomials of degree two ***Readiness Standard***

	technology, algebra tiles, and paper and pencil methods to explore and understand the relationship between multiplying and factoring polynomials, and then generalize this process to a more algorithmic approach.	(F) decide if a binomial can be written as the difference of two squares and, if possible, use the structure of a difference of two squares to rewrite the binomial ***Supporting Standard*** **ELPS:** 1.E, 2.C, 2.E, 3.B, 4.C
16: Modeling with quadratic functions 7 lessons	This topic continues the exploration of quadratic functions, focusing on how to build quadratic functions that model real-world situations. Students learn how to use transformations of quadratic functions to write quadratic equations in vertex form and then convert this form to standard form. Best fit and the quadratic regression feature of graphic calculators are used to find a quadratic function rule in the form $\boldsymbol{y = ax^2 + bx + c}$ to fit data. Students engage in the process standards by applying what they know about quadratic functions and their transformations to several real-world scenarios. They analyze quadratic graphs and relationships to determine a function rule that models a situation, and then communicate important aspects about the relationship, such as the meaning of the maximum/minimum and zeros using language and symbols.	**(1) Mathematical process standards:** (A), (B), (D), (E), (F), (G) **(6) Quadratic functions and equations.** The student applies the mathematical process standards when using properties of quadratic functions to write and represent in multiple ways, with and without technology, quadratic equations. The student is expected to: (A) determine the domain and range of quadratic functions and represent the domain and range using inequalities ***Readiness Standard*** (B) write equations of quadratic functions given the vertex and another point on the graph, write the equation in vertex form ($f(x) = a(x - h)^2 + k$), and rewrite the equation from vertex form to standard form ($f(x) = ax^2 + bx + c$) ***Supporting Standard*** **(7) Quadratic functions and equations.** The student applies the mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, the solutions to equations. The student is expected to: (A) graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including x-intercept, y-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry ***Readiness Standard*** (C) determine the effects on the graph of the parent function $f(x) = x^2$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d ***Readiness Standard*** **(8) Quadratic functions and equations.** The student applies the mathematical process standards to solve, with and without technology, quadratic equations and evaluate the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to: (B) write, using technology, quadratic functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems ***Supporting Standard*** **ELPS:** 1.E, 3.F, 4.F, 4.G, 5.B

Quadratic equations (14 lessons)		
17: Solving quadratic equations 8 lessons	This topic focuses on solving quadratic equations that arise from quadratic functions. Students learn to solve these equations by graphing, factoring, using square roots, and completing the square, and they see how the solution methods are connected as they connect the roots of an equation, the ***x***-intercepts of a graph, and the zeros of a function. Students engage in the process standards by applying quadratic equations to several real-world scenarios. They analyze possible solutions for accuracy and in terms of a problem situation. Students analyze solution methods for accuracy and efficiency. Once they have consolidated their understanding of the solution methods, they independently select from solution methods and justify conclusions.	**(1) Mathematical process standards:** (A), (B), (C), (F), (G) **(6) Quadratic functions and equations.** The student applies the mathematical process standards when using properties of quadratic functions to write and represent in multiple ways, with and without technology, quadratic equations. The student is expected to: (C) write quadratic functions when given real solutions and graphs of their related equations ***Supporting Standard*** **(7) Quadratic functions and equations.** Student applies mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, solutions to equations. The student is expected to**:** (B) describe the relationship between the linear factors of quadratic expressions and the zeros of their associated quadratic functions ***Supporting Standard*** **(8) Quadratic functions and equations.** The student applies the mathematical process standards to solve, with and without technology, quadratic equations and evaluate the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to: (A) solve quadratic equations having real solutions by factoring, taking square roots, completing the square, ~~and applying the quadratic formula~~ ***Readiness Standard*** **ELPS:** 1.A, 1.E, 2.C, 3.D, 4.F
18: The quadratic formula 6 lessons	This topic extends the work of the previous topic by introducing students to the quadratic formula as a method for solving quadratic equations. As using this formula sometimes requires students to simplify expressions containing square roots, the connection between the algebra and the geometry of square roots is explored. Students also learn how the value of the discriminant indicates the nature of the solutions. Students use the process standards to analyze the connections between completing the square and the quadratic formula. They justify solutions to quadratic solutions and apply the solution method to real-world scenarios.	**(1) Mathematical process standards:** (A), (B), (C), (F), (G) **(8) Quadratic functions and equations.** The student applies the mathematical process standards to solve, with and without technology, quadratic equations and evaluate the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to: (A) solve quadratic equations having real solutions by ~~factoring, taking square roots, completing the square, and~~ applying the quadratic formula ***Readiness Standard*** **(11) Number and algebraic methods.** The student applies the mathematical process standards and algebraic methods to rewrite algebraic expressions into equivalent forms. The student is expected to: (A) simplify numerical radical expressions involving square roots ***Supporting Standard*** **ELPS:** 2.F, 3.D, 3.G, 4.F, 5.B, 5.G

APPENDIX: Key learnings from earlier grades

The topics in this section provide support for key skills from earlier grades and co-requisite skills students may need to be successful with concepts in this course. We have provided this set of lessons and problem-solving resources that can be used for differentiated practice and review. Specific guidance on how to use these topics is provided in the accompanying co-requisite guide, however, teachers may choose to use these topics in the way that serves their students best. Teachers may choose to assign these resources to students for independent review and practice, or they may choose to use them in facilitating small-group instruction.

Agile Mind Topics	Topic Descriptions	Texas Essential Knowledge and Skills for Mathematics • Standards listed in black are the primary instructional focus of the topic. • Standards in gray support topic content or indicate foundations for future work.
Solidifying your fluency with computation	In this topic, students can review and strengthen their fluency with rational number operations as they work with positive whole numbers, decimals, and fractions. This topic also contains resources for review of signed number operations. In addition to paper-and-pencil and online tasks, students engage with simulations and interactive animations that provide thousands of opportunities to build their knowledge and skills.	**(6.3) Number and operations.** The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying solutions. The student is expected to: (A) recognize that dividing by a rational number and multiplying by its reciprocal result in equivalent values (D) add, subtract, multiply, and divide integers fluently; and multiply and divide positive rational numbers fluently (E) multiply and divide positive rational numbers fluently **(7.3) Number and operations.** The student applies mathematical process standards to add, subtract, multiply, and divide while solving problems and justifying solutions. The student is expected to: (A) add, subtract, multiply, and divide rational numbers fluently (B) apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers
Solidifying your skills with equations	In this topic, students can review properties of equality and strengthen their fluency with solving single-step and multi-step equations with rational coefficients, including equations with variables on both sides and equations that require the distributive property. In addition to paper-and-pencil and online resources, students engage with simulations and interactive animations that provide thousands of opportunities to build their knowledge and skills.	**(6.10) Expressions, equations, and relationships.** The student applies mathematical process standards to use equations and inequalities to solve problems. The student is expected to: (A) model and solve one-variable, one-step equations ~~and inequalities~~ that represent problems, ~~including geometric concepts~~ (B) determine if the given value(s) make(s) one-variable, one-step equations or inequalities true. **(7.11) Expressions, equations, and relationships.** The student applies mathematical process standards to solve one-variable equations and inequalities. The student is expected to: (A) model and solve one-variable, two-step equations ~~and inequalities~~ **(8.8) Expressions, equations, and relationships.** The student applies mathematical

		process standards to use one-variable equations or inequalities in problem situations. The student is expected to: (C) model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical ~~and real-world~~ problems using rational number coefficients and constants
Exploring rate of change in motion problems	Understanding the rate at which one quantity changes with respect to another is key to understanding how the two quantities are related. In this topic, students explore the concept of rate by analyzing motion over time. Students investigate the rate at which distance changes numerically and graphically.	**(8.4) Proportionality.** The student applies mathematical process standards to explain proportional and non-proportional relationships involving slope. The student is expected to: (C) use data from a table or graph to determine the rate of change ~~or slope~~ and y-intercept in mathematical and real-world problems *Readiness Standard*
Linear equations and inequalities	In this topic, students learn how linear equations are related to functions. The topic explores how different representations of a function lead to techniques to solve linear equations, including tables, graphs, concrete models, algebraic operations, and "undoing" (reasoning backwards). Students solve on-variable equations with variables on both sides of the equation with rational number coefficients. They also write one-variable equations and inequalities with variables on both sides. Finally, students will investigate situations in which there are no solutions or infinitely many solutions.	**(8.8) Expressions, equations, and relationships.** The student applies mathematical process standards to use one-variable equations or inequalities in problem situations. The student is expected to: (A) write one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants ***Supporting Standard*** (B) write a corresponding real-world problem when given a one-variable equation or inequality with variables on both sides of the equal sign using rational number coefficients and constants ***Supporting Standard*** (C) model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants ***Readiness Standard***
Formulating and solving systems	Systems of linear equations, in which two conditions apply to a situation, are introduced. Students learn how to set up a system of linear equations, solve it using graphs and tables, and check the solution for reasonableness.	**(8.5) Proportionality.** The student applies mathematical process standards to use proportional and non- proportional relationships to develop foundational concepts of functions. The student is expected to: (I) write an equation in the form $y = mx + b$ to model a linear relationship between two quantities using verbal, numerical, tabular, and graphical representations ***Readiness Standard*** **(8.9) Expressions, equations, and relationships.** The student applies mathematical process standards to use multiple representations to develop foundational concepts of simultaneous linear equations. The student is expected to identify and verify the values of x and y that simultaneously satisfy two linear equations in the form $y = mx + b$ from the intersections of the graphed equations. ***Supporting Standard***