Algebra 1 *Standards of Learning* - 2023 Overview of Revisions

This overview includes a summary of the content embedded in four content strands.

Expressions and Operations

- Represent verbal quantitative situations algebraically and evaluate these expressions for given replacement values of the variables.
- Perform operations on and factor polynomial expressions in one variable.
- Derive and apply the laws of exponents.
- Simplify square roots of whole numbers and cube roots of integers.

Equations and Inequalities

- Represent, solve, and interpret the solution to multistep linear equations and inequalities in one variable and literal equations for a specified variable.
- Represent, solve, and interpret the solution to a system of two linear equations, a linear inequality in two variables, or a system of two linear inequalities in two variables.
- Represent, solve, and interpret the solution to a quadratic equation in one variable.

Functions

- Investigate, analyze, and compare linear functions algebraically and graphically
- Investigate, analyze, and compare characteristics of quadratic and exponential functions

Statistics

- Apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on representing bivariate data in scatterplots and determining the curve of best fit using linear and quadratic functions

Comparison of Algebra 1 Mathematics *Standards of Learning* – 2016 to 2023

2016 *Standards of Learning* Essential Knowledge and Skills (EKS) **Expressions and Operations**	2023 *Standards of Learning* Knowledge and Skills (KS) **Expressions and Operations (EO)**
A.1 The student will a) **represent verbal quantitative situations algebraically; and** b) **evaluate algebraic expressions for given replacement values of the variables.** • Translate between verbal quantitative situations and algebraic expressions and equations. (a) • Represent practical situations with algebraic expressions in a variety of representations (e.g., concrete, pictorial, symbolic, verbal). (a) • Evaluate algebraic expressions, using the order of operations, which include absolute value, square roots, and cube roots for given replacement values to include rational numbers, without rationalizing the denominator. (b)	**A.EO.1 The student will represent verbal quantitative situations algebraically and evaluate these expressions for given replacement values of the variables.** a) Translate between verbal quantitative situations and algebraic expressions, including contextual situations. b) Evaluate algebraic expressions which include absolute value, square roots, and cube roots for given replacement values to include rational numbers, without rationalizing the denominator.
A.2 The student will perform operations on polynomials, including a) **applying the laws of exponents to perform operations on expressions;** • Simplify monomial expressions and ratios of monomial expressions in which the exponents are integers, using the laws of exponents. (a)	**A.EO.3 The student will derive and apply the laws of exponents.** a) Derive the laws of exponents through explorations of patterns, to include products, quotients, and powers of bases. b) Simplify multivariable expressions and ratios of monomial expressions in which the exponents are integers, using the laws of exponents.
A.2 The student will perform operations on polynomials, including b) **adding, subtracting, multiplying, and dividing polynomials; and**	**A.EO.2 The student will perform operations on and factor polynomial expressions in one variable.**

2016 *Standards of Learning* Essential Knowledge and Skills (EKS) **Expressions and Operations**	2023 *Standards of Learning* Knowledge and Skills (KS) **Expressions and Operations (EO)**
• Model sums, differences, products, and quotients of polynomials with concrete objects and their related pictorial and symbolic representations. (b) • Determine sums and differences of polynomials. (b) • Determine products of polynomials. The factors should be limited to five or fewer terms (i.e., $(4x + 2)(3x + 5)$ represents four terms and $(x + 1)(2x^2 + x + 3)$ represents five terms). (b) • Determine the quotient of polynomials, using a monomial or binomial divisor, or a completely factored divisor. (b)	a) Determine sums and differences of polynomial expressions in one variable, using a variety of strategies, including concrete objects and their related pictorial and symbolic models. b) Determine the product of polynomial expressions in one variable, using a variety of strategies, including concrete objects and their related pictorial and symbolic models, the application of the distributive property, and the use of area models. The factors should be limited to five or fewer terms (e.g., $(4x + 2)(3x + 5)$ represents four terms and $(x + 1)(2x^2 + x + 3)$ represents five terms). d) Determine the quotient of polynomials, using a monomial or binomial divisor, or a completely factored divisor. e) Represent and demonstrate equality of quadratic expressions in different forms (e.g., concrete, verbal, symbolic, and graphical).
A.2 The student will perform operations on polynomials, including **c) factoring completely first- and second-degree binomials and trinomials in one variable.** • Factor completely first- and second-degree polynomials in one variable with integral coefficients. After factoring out the greatest common factor (GCF), leading coefficients should have no more than four factors. (c) • Factor and verify algebraic factorizations of polynomials with a graphing utility. (c)	**A.EO.2 The student will perform operations on and factor polynomial expressions in one variable.** c) Factor completely first- and second-degree polynomials in one variable with integral coefficients. After factoring out the greatest common factor (GCF), leading coefficients should have no more than four factors. e) Represent and demonstrate equality of quadratic expressions in different forms (e.g., concrete, verbal, symbolic, and graphical).

2016 *Standards of Learning* Essential Knowledge and Skills (EKS) **Expressions and Operations**	2023 *Standards of Learning* Knowledge and Skills (KS) **Expressions and Operations (EO)**
A.3 The student will simplify **a) square roots of whole numbers and monomial algebraic expressions;** **b) cube roots of integers; and** **c) numerical expressions containing square or cube roots.** - Express the square root of a whole number in simplest form. (a) - Express the principal square root of a monomial algebraic expression in simplest form where variables are assumed to have positive values. (a) - Express the cube root of an integer in simplest form. (b) - Simplify a numerical expression containing square or cube roots. (c) - Add, subtract, and multiply two monomial radical expressions limited to a numerical radicand. (c)	**A.EO.4 The student will simplify and determine equivalent radical expressions involving square roots of whole numbers and cube roots of integers.** a) Simplify and determine equivalent radical expressions involving the square root of a whole number in simplest form. b) Simplify and determine equivalent radical expressions involving the cube root of an integer. c) Add, subtract, and multiply radicals, limited to numeric square and cube root expressions. d) Generate equivalent numerical expressions and justify their equivalency for radicals using rational exponents, limited to rational exponents of $\frac{1}{2}$ and $\frac{1}{3}$ (e.g., $\sqrt{5} = 5^{\frac{1}{2}}$; $\sqrt[3]{8} = 8^{\frac{1}{3}} = (2^3)^{\frac{1}{3}} = 2$).

2016 *Standards of Learning* Essential Knowledge and Skills (EKS) **Equations and Inequalities**	2023 *Standards of Learning* Knowledge and Skills (KS) **Equations and Inequalities (EI)**
A.4 The student will solve **a) multistep linear equations in one variable algebraically;** **c) literal equations for a specified variable;**	**A.EI.1 The student will represent, solve, explain, and interpret the solution to multistep linear equations and inequalities in one variable and literal equations for a specified variable.** a) Write a linear equation or inequality in one variable to represent a contextual situation.

2016 *Standards of Learning* Essential Knowledge and Skills (EKS) **Equations and Inequalities**	2023 *Standards of Learning* Knowledge and Skills (KS) **Equations and Inequalities (EI)**
• Determine whether a linear equation in one variable has one, an infinite number, or no solutions. (a) • Apply the properties of real numbers and properties of equality to simplify expressions and solve equations. (a, b) • Solve multistep linear equations in one variable algebraically. (a) • Solve quadratic equations in one variable algebraically. Solutions may be rational or irrational. (b) • Solve a literal equation for a specified variable. (c) • Given a system of two linear equations in two variables that has a unique solution, solve the system by substitution or elimination to identify the ordered pair which satisfies both equations. (d) • Given a system of two linear equations in two variables that has a unique solution, solve the system graphically by identifying the point of intersection. (d) • Solve and confirm algebraic solutions to a system of two linear equations using a graphing utility. (d) • Determine whether a system of two linear equations has one, an infinite number, or no solutions. (d) • Write a system of two linear equations that models a practical situation. (e) • Interpret and determine the reasonableness of the algebraic or graphical solution of a system of two linear equations that models a practical situation. (e) • Solve practical problems involving equations and systems of equations. (e)	b) Solve multistep linear equations in one variable, including those in contextual situations, by applying the properties of real numbers and/or properties of equality. d) Rearrange a formula or literal equation to solve for a specified variable by applying the properties of equality. e) Determine if a linear equation in one variable has one solution, no solution, or an infinite number of solutions. f) Verify possible solution(s) to multistep linear equations and inequalities in one variable algebraically, graphically, and with technology to justify the reasonableness of the answer(s). Explain the solution method and interpret solutions for problems given in context.
A.4 The student will solve **b) quadratic equations in one variable algebraically;**	**A.EI.3 The student will represent, solve, and interpret the solution to a quadratic equation in one variable.**

2016 *Standards of Learning* Essential Knowledge and Skills (EKS) **Equations and Inequalities**	2023 *Standards of Learning* Knowledge and Skills (KS) **Equations and Inequalities (EI)**
• Apply the properties of real numbers and properties of equality to simplify expressions and solve equations. (a, b) • Solve quadratic equations in one variable algebraically. Solutions may be rational or irrational. (b)	a) Solve a quadratic equation in one variable over the set of real numbers with rational or irrational solutions, including those that can be used to solve contextual problems. b) Determine and justify if a quadratic equation in one variable has no real solutions, one real solution, or two real solutions. c) Verify possible solution(s) to a quadratic equation in one variable algebraically, graphically, and with technology to justify the reasonableness of answer(s). Explain the solution method and interpret solutions for problems given in context.
A.4 The student will solve d) **systems of two linear equations in two variables algebraically and graphically; and** • Given a system of two linear equations in two variables that has a unique solution, solve the system by substitution or elimination to identify the ordered pair which satisfies both equations. (d) • Given a system of two linear equations in two variables that has a unique solution, solve the system graphically by identifying the point of intersection. (d) • Solve and confirm algebraic solutions to a system of two linear equations using a graphing utility. (d) • Determine whether a system of two linear equations has one, an infinite number, or no solutions. (d)	**A.EI.2 The student will represent, solve, explain, and interpret the solution to a system of two linear equations, a linear inequality in two variables, or a system of two linear inequalities in two variables.** b) Apply the properties of real numbers and/or properties of equality to solve a system of two linear equations in two variables, algebraically and graphically. c) Determine whether a system of two linear equations has one solution, no solution, or an infinite number of solutions.

A.4 The student will solve
  e) **practical problems involving equations and systems of equations**
	A.EI.2 The student will represent, solve, explain, and interpret the solution to a system of two linear equations, a linear inequality in two variables, or a system of two linear inequalities in two variables
	  a) Create a system of two linear equations in two variables to represent a contextual situation.

2016 *Standards of Learning* Essential Knowledge and Skills (EKS) **Equations and Inequalities**	2023 *Standards of Learning* Knowledge and Skills (KS) **Equations and Inequalities (EI)**
• Write a system of two linear equations that models a practical situation. (e) • Interpret and determine the reasonableness of the algebraic or graphical solution of a system of two linear equations that models a practical situation. (e) • Solve practical problems involving equations and systems of equations. (e)	h) Verify possible solution(s) to a system of two linear equations, a linear inequality in two variable, or a system of two linear inequalities algebraically, graphically, and with technology to justify the reasonableness of the answer(s). Explain the solution method and interpret solutions for problems given in context. **A.EI.1 The student will represent, solve, explain, and interpret the solution to multistep linear equations and inequalities in one variable and literal equations for a specified variable.** a) write a linear equation or inequality in one variable to represent a contextual situation;

A.5 The student will
a) solve multistep linear inequalities in one variable algebraically and represent the solution graphically;
b) represent the solution of linear inequalities in two variables graphically;
 	
• Solve multistep linear inequalities in one variable algebraically and represent the solution graphically. (a)
• Apply the properties of real numbers and properties of inequality to solve multistep linear inequalities in one variable algebraically. (a)
• Represent the solution of a linear inequality in two variables graphically. (b)
• Determine and verify algebraic solutions using a graphing utility. (a, b, c, d)
	A.EI.1 The student will represent, solve, explain, and interpret the solution to multistep linear equations and inequalities in one variable and literal equations for a specified variable.
	
	  c) Solve multistep linear inequalities in one variable algebraically and graph the solution set on a number line, including those in contextual situations, by applying the properties of real numbers and/or properties of inequality.
	
	A.EI.2 The student will represent, solve, explain, and interpret the solution to a system of two linear equations, a linear inequality in two variables, or a system of two linear inequalities in two variables.
	
	  d) Create a linear inequality in two variables to represent a contextual situation.

2016 *Standards of Learning* Essential Knowledge and Skills (EKS) **Equations and Inequalities**	2023 *Standards of Learning* Knowledge and Skills (KS) **Equations and Inequalities (EI)**
	e) Represent the solution of a linear inequality in two variables graphically on a coordinate plane.
A.5 The student will **c) solve multistep linear inequalities in one variable algebraically and represent the solution graphically;** ● Solve practical problems involving linear inequalities. (c) ● Determine whether a coordinate pair is a solution of a linear inequality or a system of linear inequalities. (c) ● Determine and verify algebraic solutions using a graphing utility. (a, b, c, d)	**A.EI.1 The student will represent, solve, explain, and interpret the solution to multistep linear equations and inequalities in one variable and literal equations for a specified variable.** a) Write a linear equation or inequality in one variable to represent a contextual situation. c) Solve multistep linear inequalities in one variable algebraically and graph the solution set on a number line, including those in contextual situations, by applying the properties of real numbers and/or properties of inequality.
A.5 The student will **d) represent the solution to a system of inequalities graphically** ● Represent the solution of a system of two linear inequalities graphically. (d) ● Determine and verify algebraic solutions using a graphing utility. (a, b, c, d)	**A.EI.2 The student will represent, solve, explain, and interpret the solution to a system of two linear equations, a linear inequality in two variables, or a system of two linear inequalities in two variables.** f) Create a system of two linear inequalities in two variables to represent a contextual situation. g) Represent the solution set of a system of two linear inequalities in two variables, graphically on a coordinate plane. h) Verify possible solution(s) to a system of two linear equations, a linear inequality in two variable, or a system of two linear inequalities algebraically, graphically, and with technology to justify the reasonableness of the answer(s). Explain the solution method and interpret solutions for problems given in context.

2016 *Standards of Learning* Essential Knowledge and Skills (EKS) **Functions**	2023 *Standards of Learning* Knowledge and Skills (KS) **Functions (F)**
A.6 The student will **a) determine the slope of a line when given an equation of the line, the graph of the line, or two points on the line;** ● Determine the slope of the line, given the equation of a linear function. (a) ● Determine the slope of a line, given the coordinates of two points on the line. (a) ● Determine the slope of a line, given the graph of a line. (a) ● Recognize and describe a line with a slope or rate of change that is positive, negative, zero, or undefined. (a)	**A.F.1 The student will investigate, analyze, and compare linear functions algebraically and graphically, and model linear relationships.** a) Determine and identify the domain, range, zeros, slope, and intercepts of a linear function, presented algebraically or graphically, including the interpretation of these characteristics in contextual situations.

A.6 The student will
b) write the equation of a line when given the graph of the line, two points on the line, or the slope and a point on the line; and
 	
● Write the equation of a line when given the graph of a line. (b)
● Write the equation of a line when given two points on the line whose coordinates are integers. (b)
● Write the equation of a line when given the slope and a point on the line whose coordinates are integers. (b)
● Write the equation of a vertical line as $x = a$. (b)
● Write the equation of a horizontal line as $y = c$. (b)
● Write the equation of a line parallel or perpendicular to a given line through a given point. (b)
	A.F.1 The student will investigate, analyze, and compare linear functions algebraically and graphically.
	
	c) Write equivalent algebraic forms of linear functions, including slope-intercept form, standard form, and point-slope form, and analyze and interpret the information revealed by each form.
	d) Write the equation of a linear function to model a linear relationship between two quantities, including those that can represent contextual situations. Writing the equation of a linear function will include the following situations:
	  i) given the graph of a line;
	  ii) given two points on the line whose coordinates are integers;
	  iii) given the slope and a point on the line whose coordinates are integers;
	  iv) vertical lines as $x = a$; and
	  v) horizontal lines as $y = c$.

2016 *Standards of Learning* Essential Knowledge and Skills (EKS) **Functions**	2023 *Standards of Learning* Knowledge and Skills (KS) **Functions (F)**
	e) Write the equation of a line parallel or perpendicular to a given line through a given point.
A.6 The student will **c) graph linear equations in two variables.** ● Graph a linear equation in two variables, including those that arise from a variety of practical situations. (c) ● Use the parent function $y = x$ and describe transformations defined by changes in the slope or y-intercept. (c)	**A.F.1 The student will investigate, analyze, and compare linear functions algebraically and graphically.** b) Investigate and explain how transformations to the parent function $y = x$ affects the rate of change (slope) and the y-intercept of a linear function. f) Graph a linear function in two variables, with and without the use of technology, including those that can represent contextual situations. g) For any value, x, in the domain of f, determine $f(x)$, and determine x given any value $f(x)$ in the range of f, given an algebraic or graphical representation of a linear function. h) Compare and contrast the characteristics of linear functions represented algebraically, graphically, in tables, and in contextual situations.
A.7 The student will investigate and analyze linear and quadratic function families and their characteristics both algebraically and graphically, including **a) determining whether a relation is a function;** **b) domain and range;** **c) zeros;** **d) intercepts;** ● Determine whether a relation, represented by a set of ordered pairs, a table, a mapping, or a graph is a function. (a)	**A.F.2 The student will investigate, analyze, and compare characteristics of functions, including quadratic and exponential functions, and model quadratic and exponential relationships.** a) Determine whether a relation, represented by a set of ordered pairs, a table, a mapping, or a graph is a function; for relations that are functions, determine the domain and range. b) Given an equation or graph, determine key characteristics of a quadratic function including x-intercepts (zeros), y-intercept, vertex (maximum or minimum), and domain and range (including when restricted by context); interpret key

2016 *Standards of Learning* Essential Knowledge and Skills (EKS) **Functions**	2023 *Standards of Learning* Knowledge and Skills (KS) **Functions (F)**
• Identify the domain, range, zeros, and intercepts of a function presented algebraically or graphically. (b, c, d) • Use the *x*-intercepts from the graphical representation of a quadratic function to determine and confirm its factors. (c, d) • Investigate and analyze characteristics and multiple representations of functions with a graphing utility. (a, b, c, d, e, f)	characteristics as related to contextual situations, where applicable. c) Graph a quadratic function, *f(x)*, in two variables using a variety of strategies, including transformations $f(x) + k$ and $kf(x)$, where *k* is limited to rational values. d) Make connections between the algebraic (standard and factored forms) and graphical representation of a quadratic function.
A.7 The student will investigate and analyze linear and quadratic function families and their characteristics both algebraically and graphically, including **e) values of a function for elements in its domain; and** **f) connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs.** • For any value, *x,* in the domain of *f*, determine *f(x)*. (e) • Represent relations and functions using verbal descriptions, tables, equations, and graph. Given one representation, represent the relation in another form. (f) • Investigate and analyze characteristics and multiple representations of functions with a graphing utility. (a, b, c, d, e, f)	**A.F.2 The student will investigate, analyze, and compare characteristics of functions, including quadratic and exponential functions, and model quadratic and exponential relationships.** e) Given an equation or graph of an exponential function in the form $y = ab^x$ (where *b* is limited to a natural number), interpret key characteristics, including *y*-intercepts and domain and range; interpret key characteristics as related to contextual situations, where applicable. f) Graph an exponential function, *f(x)*, in two variables using a variety of strategies, including transformations $f(x) + k$ and $kf(x)$, where *k* is limited to rational values. g) For any value, *x*, in the domain of *f*, determine *f(x)* of a quadratic or exponential function. Determine *x* given any value *f(x)* in the range of *f* of a quadratic function. Explain the meaning of *x* and *f(x)* in context. h) Compare and contrast the key characteristics of linear functions ($f(x) = x$), quadratic functions ($f(x) = x^2$), and exponential functions ($f(x) = b^x$) using tables and graphs.

2016 *Standards of Learning* Essential Knowledge and Skills (EKS) **Statistics**	2023 *Standards of Learning* Knowledge and Skills (KS) **Statistics (ST)**
A.8 The student, given a data set or practical situation, will analyze a relation to determine whether a direct or inverse variation exists, and represent a direct variation algebraically and graphically and an inverse variation algebraically. • Given a data set or practical situation, determine whether a direct variation exists. • Given a data set or practical situation, determine whether an inverse variation exists. • Given a data set or practical situation, write an equation for a direct variation. • Given a data set or practical situation, write an equation for an inverse variation. • Given a data set or practical situation, graph an equation representing a direct variation.	**[Direct variation is included in Grade 7]** **[Both direct and inverse variation are included in Algebra 2]**
A.9 The student will collect and analyze data, determine the equation of the curve of best fit in order to make predictions, and solve practical problems, using mathematical models of linear and quadratic functions. • Determine an equation of a curve of best fit, using a graphing utility, given a set of no more than twenty data points in a table, a graph, or a practical situation. • Make predictions, using data, scatterplots, or the equation of the curve of best fit. • Solve practical problems involving an equation of the curve of best fit.	**A.ST.1 The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on representing bivariate data in scatterplots and determining the curve of best fit using linear and quadratic functions.** a) Formulate investigative questions that require the collection or acquisition of bivariate data. b) Determine what variables could be used to explain a given contextual problem or situation or answer investigative questions. c) Determine an appropriate method to collect a representative sample, which could include a simple random sample, to answer an investigative question.

2016 *Standards of Learning* Essential Knowledge and Skills (EKS) **Statistics**	2023 *Standards of Learning* Knowledge and Skills (KS) **Statistics (ST)**
• Evaluate the reasonableness of a mathematical model of a practical situation.	d) Given a table of ordered pairs or a scatterplot representing no more than 30 data points, use available technology to determine whether a linear or quadratic function would represent the relationship, and if so, determine the equation of the curve of best fit. e) Use linear and quadratic regression methods available through technology to write a linear or quadratic function that represents the data where appropriate and describe the strengths and weaknesses of the model. f) Use a linear model to predict outcomes and evaluate the strength and validity of these predictions, including through the use of technology. g) Investigate and explain the meaning of the rate of change (slope) and *y*-intercept (constant term) of a linear model in context. h) Analyze relationships between two quantitative variables revealed in a scatterplot. i) Make conclusions based on the analysis of a set of bivariate data and communicate the results.

2023 Algebra 1 Mathematics SOL – Summary of Changes

Algebra 1 (2016 SOL to 2023 SOL Numbering)	Parameter Changes/Clarifications (2023 SOL)
- A.1a,b → A.EO.1 - A.2b → A.EO.2 - A.2a → A.EO.3 - A.3a-c → A.EO.4 - A.4a,c,e → A.EI.1 - A.4d,e → A.EI.2 - A.4b → A.EI.3 - A.5a,c → A.EI.1 - A.5b,c,d → A.EI.2 - A.6a-c → A.F.1 - A.7a-h → A.F.2 - A.8 → [Included in Grade 7] - A.9 → A.ST.1	- A.EO.2 – Use area models to determine the product of polynomial expressions in one variable; use concrete, verbal, symbolic, and graphical forms to represent equality of quadratic expressions - A.EO.3 – Derive the laws of exponents specified - A.EI.1 – Justify answers, explain solution methods, and interpret solutions for problems in context when solving multistep linear equations and inequalities in one variable - A.EI.2 - Justify solutions to systems of two linear equations, a linear inequality with two variables, or a system of linear inequalities with technology; explain solution methods and interpret solution for problems in context involving systems of equations, linear inequalities, and systems of linear inequalities - A.EI.3 – Solve quadratic equations in one variable including those that can be used to solve contextual problems; justify solutions to quadratic equations with technology; explain solution methods and interpret solution for problems in context involving quadratic equations - A.ST.1 - Represent no more than 30 collected data points with a scatter plot using available technology; explain the meaning of the slope and y-intercept of a linear model; analyze relationships between two quantitative variables revealed in a scatterplot

Deletions from Algebra 1 (2016 SOL)	**Additions to Algebra 1 (2023 SOL)**
• A.3a - Express the principal square root of a monomial algebraic expression in simplest form [Included in A2.EO.2] • A.8 – Analyze a relation to determine if a direct or inverse variation exists and represent a direct variation algebraically and graphically and an inverse variation algebraically [Direct variation included in 7.PFA.1; Direct and inverse variation included in A2.F.1d]	• A.EO.4 - Add, subtract, and multiply radicals includes numeric cube root expressions; generate equivalent numerical expressions for radicals using rational exponents, limited to rational exponents of $\frac{1}{2}$ and $\frac{1}{3}$ • A.EI.2 – Create a system of two linear inequalities in two variables to represent a contextual situation • A.EI.3 – Determine and justify if a quadratic equation has no real solutions, one real solution, or two real solutions • A.F.1 – Analyze and interpret information revealed by slope-intercept, standard, and point-slope forms of a linear function; compare and contrast characteristics of linear functions • A.F.2 - Identify the vertex (maximum and minimum) of a quadratic function; investigate, analyze, and compare functions, including quadratic and exponential functions; graph quadratic and exponential functions using transformations • A.ST.1 - Formulate and investigate questions about bivariate data using a data cycle; determine what variables could be used to explain a contextual problem or answer investigative questions; determine an appropriate method to collect a sample, including a simple random sample; describe strengths and weaknesses of a linear or quadratic model

KEY: EO = Expressions and Operations; EI = Equations and Inequalities; F = Functions; ST = Statistics; EKS = Essential Knowledge and Skills (2016); KS = Knowledge and Skills (2023); US = Understanding the Standard