Algebra 1 EOC

Achievement level descriptions (ALDs) describe a student's level of achievement (e.g., Below Satisfactory, On-Grade-Level, Above Satisfactory) on a large-scale assessment. The purpose of the ALD development framework is to enable valid inferences about student content area knowledge and skill in relation to a state's content standards measured on a large-scale assessment.

Achievement Level	Achievement Level Descriptions
Level 1	Students performing at Level 1 are just beginning to access the challenging content of the B.E.S.T. Standards.
Level 2	Students at this level demonstrate a **below satisfactory** level of success with the challenging content of the *Florida B.E.S.T. Standards*. A student performing at Level 2: • applies the Laws of Exponents to identify equivalent numerical expressions involving rational exponents. • identifies an equivalent algebraic expression using properties of exponents. • adds and subtracts numerical radicals limited to two with the same radicand. • identifies parts of an equation or expression that represent a quantity in terms of a mathematical context. • rearranges equations or formulas using the four arithmetic operations to isolate a quantity of interest. • adds and subtracts binomial expressions with integer coefficients. • rewrites a polynomial expression with at least two variables as a product of a monomial expression and a polynomial expression. • given a real-world context, solves one-variable multi-step linear equations. • identifies a linear two-variable equation in point-slope form or standard form that best represents the relationship between quantities from a graph, a written description, or a table of values within a mathematical context. • identifies a linear equation that is parallel or perpendicular to a given equation or a graph. • identifies the solution and graph of mathematical problems that are modeled with linear functions; identifies domain, range, and rate of change. • given a mathematical context, solves multi-step one-variable linear inequalities, representing solutions algebraically or graphically. • identifies a two-variable linear inequality that best represents the relationship between quantities from a graph within a mathematical context. • given a mathematical context, solves one-variable quadratic equations in factored form or the form $ax^2 + c = 0$ with integral coefficients over the real number system. • identifies a quadratic function in vertex form when $a = 1$ that represents the relationship between two quantities from its graph. • given an expression or equation representing a real-world quadratic function in factored form, identifies the zeroes or given in vertex form and identifies the vertex. • given a table or equation in vertex or factored form of a quadratic function, identifies the graph that represents the function and/or identifies the domain, intercepts, and/or vertex.

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Level 2	• identifies the solution and graph of mathematical problems that are modeled with a quadratic function, given in vertex form or factored form; identifies domain, intercepts, and vertex. • given a mathematical context and an equation, solves one-variable absolute value equations. • given a table or equation of an absolute value function, identifies the graph that represents the function and/or identifies the domain, intercepts, and/or vertex. • given a mathematical context, classifies a given graph of an exponential function as representing growth or decay. • identifies an exponential function that represents the relationship between two quantities from a graph. • given a table or equation in $f(x) = ab^x$ form of an exponential function, identifies the graph that represents the function and/or determines domain, range, and/or constant percent rate of change. • given a mathematical context, solves a system of two-variable linear equations algebraically or graphically. • identifies the graph or solution set of a system of two-variable inequalities. • given a real-world context, identifies a linear equation or an inequality to represent given constraints. • given a graph that defines a function, classifies the function type. • calculates the average rate of change of a real-world situation represented in a table over a specified interval. • compares key features of linear functions each represented graphically. • compares key features of linear and nonlinear functions each represented graphically. • identifies the resulting graph of a given function after replacing (x) with $(x)+k$ or $f(x+k)$ for specific values of k. • calculates the total amount of an investment earning simple interest. • identifies the graphical representation of a given data set as numerical or categorical and univariate or bivariate. • identifies a linear function based on a given scatter plot and identifies the slope and y-intercept. • completes a two-way frequency table summarizing bivariate categorical data.
Level 3	Students at this level demonstrate **on-grade-level** success with the challenging content of the *Florida B.E.S.T. Standards*. A student performing at Level 3: • applies the Laws of Exponents, with at least one law, to evaluate numerical expressions and generate equivalent numerical expressions involving rational exponents. • generates equivalent algebraic expressions using a single property of exponents. • adds, subtracts, and multiplies numerical radicals limited to a single arithmetic operation. • identifies and interprets a single part of an equation or expression that represents a quantity in terms of a mathematical or real-world context. • rearranges equations or formulas, limited to two steps, to isolate a quantity of interest.

Achievement Level	Achievement Level Descriptions
Level 3	• adds, subtracts, and multiplies binomial and/or trinomial expressions with integer coefficients that results in a polynomial expression with no more than three terms. • divides a binomial expression by a monomial expression with integer coefficients. • rewrites a binomial expression or a trinomial expression as a product of linear binomial expressions. • given a real-world context, identifies and solves one-variable multi-step linear equations. • writes a linear two-variable equation to represent relationships between quantities from a graph, a written description, or a table of values within a mathematical context. • writes a linear two-variable equation for a line that is parallel or perpendicular to a given line on a graph that goes through a given point. • given a table or equation in slope-intercept or point-slope form of a linear function, identifies a graph of that function and determines the domain, range, and rate of change. • solves and graphs mathematical problems that are modeled with linear functions, given in slope-intercept or point-slope form, and interprets key features. • given a mathematical or real- world context, writes and solves multi-step one-variable linear inequalities, representing solutions algebraically or graphically. • writes a two-variable linear inequality that best represents the relationship between quantities from a graph or a written description within a mathematical context. • given a mathematical context, graphs the solution set to a two-variable linear inequality, given in slope-intercept or point-slope form. • given a mathematical or real-world context, identifies and/or solves one-variable quadratic equations over the real number system. • writes a quadratic function when $a = 1$ to represent the relationship between two quantities from a graph or a written description within a mathematical context. • given the x-intercepts and another point on the graph of a quadratic function where $a = 1$ or $a = -1$, identifies the equation of the function in factored form. • given an expression or equation representing a real-world quadratic function in factored form, identifies and interprets the zeroes or given in vertex form and identifies and interprets the vertex. • given a table or equation in vertex or factored form of a quadratic function, graphs the function and identifies its domain, range, intercepts, and/or vertex. • solves and graphs mathematical problems that are modeled with quadratic functions given in vertex or factored form and identifies key features. • given a mathematical or real-world context, identifies the equation and solves one-variable absolute value equations. • given a table or equation of an absolute value function, graphs the function and determines the domain, range, intercepts, and vertex. • given a mathematical context, classifies an exponential function as representing growth or decay, given $f(x) = a(1 \pm r)^x$.

Achievement Level	Achievement Level Descriptions
Level 3	• writes an exponential function to represent a relationship between two quantities from a graph or a written description within a mathematical context. • given a table or equation in $f(x) = ab^x$ form of an exponential function, graphs the function and determines its domain, range, y-intercept, constant percent rate of change, and interval behavior. • given a mathematical or real-world context, identifies and solves a system of two-variable linear equations algebraically or graphically. • graphs the solution set of a system of two-variable linear inequalities given slope-intercept form. • given a real-world context, represents constraints as a system of linear equations or inequalities. • given an equation or graph that defines a function, classifies the function type. • given a function represented in function notation, evaluates the function for an input in its domain given in mathematical context. • calculates the average rate of change of a real-world situation represented graphically or in a table over a specified interval. • compares key features of linear functions each represented graphically or algebraically. • compares key features of linear and nonlinear functions each represented graphically or algebraically. • determines whether a linear, quadratic, or exponential function best models a given real-world situation from a written description. • identifies the resulting graph of a given function after replacing (x) with $(x)+k$, $kf(x)$, and $f(x+k)$ for specific values of k. • calculates the total amount of an investment earning compound interest. • identifies simple interest as linear growth and compound interest as exponential growth. • given a set of data, selects an appropriate method to represent bivariate data, depending on whether it is numerical or categorical. • identifies different components and quantities of data distributions represented in various ways and identifies as numerical or categorical and univariate or bivariate. • identifies when there is correlation and not necessarily causation. • estimates a population total, using data from a sample survey. • fits a linear function to bivariate numerical data that suggests a linear association and interprets the slope and *y*-intercept of the model. • given a scatter plot with a line of fit, identifies which points will have positive and negative residuals. • completes a two-way frequency table summarizing bivariate categorical data and finds the joint and marginal frequencies.
Level 4	Students at this level demonstrate an **above satisfactory** level of success with the challenging content of the Florida B.E.S.T. Standards. A student performing at Level 4: • applies the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions involving rational exponents. • generates multiple equivalent algebraic expressions using properties of exponents.

Achievement Level	Achievement Level Descriptions
Level 4	• adds, subtracts, multiplies, and divides numerical radicals limited to a single arithmetic operation. • identifies and interprets parts of an equation or expression that represent a quantity in terms of a mathematical or real-world context, including viewing one or more of its parts as a single entity. • rearranges equations or formulas to isolate a quantity of interest. • adds, subtracts, and multiplies polynomial expressions with rational number coefficients. • divides a polynomial expression by a monomial expression with rational number coefficients. • rewrites a polynomial expression as a product of polynomials. • given a real-world context, writes and solves one-variable multi-step linear equations. • writes a linear two-variable equation to represent relationships between quantities from a graph, a written description, or a table of values within a mathematical or real-world context. • writes a linear two-variable equation for a line that is parallel or perpendicular to a given line and goes through a given point. • given a table, equation, or written description of a linear function, graphs that function and determines and interprets its key features. • solves and graphs mathematical or real-world problems that are modeled with linear functions, interprets key features, and determines constraints in terms of the context. • given a mathematical or real-world context, writes and solves one-variable linear inequalities, including compound inequalities, representing solutions algebraically or graphically. • writes two-variable linear inequalities to represent relationships between quantities from a graph or a written description within a mathematical or real-world context. • given a mathematical or real-world context, graphs the solution set to a two-variable linear inequality. • given a mathematical or real-world context, writes and solves one-variable quadratic equations over the real number system. • writes a quadratic function to represent the relationship between two quantities from a graph, a written description, or a table of values within a mathematical or real-world context. • given the x-intercepts and another point on the graph of a quadratic function, writes the equation for the function. • given an expression or equation representing a quadratic function, determines the vertex and zeros and interprets them in terms of a real-world context. • given a table, equation, or written description of a quadratic function, graphs the function and determines and interprets its key features. • solves and graphs mathematical or real-world problems that are modeled with quadratic functions; interprets key features and determines constraints in terms of context. • given a mathematical or real-world context, writes and solves one-variable absolute value equations. • given a table, equation, or written description of an absolute value function, graphs the function and determines its key features.

Achievement Level	Achievement Level Descriptions
Level 4	• given a mathematical or real-world context, classifies an exponential function as representing growth or decay. • writes an exponential function to represent a relationship between two quantities from a graph, a written description, or a table of values within a mathematical or real-world context. • given a table, equation, or written description of an exponential function, graphs that function and determines its key features. • given a mathematical or real-world context, writes and solves a system of two-variable linear equations algebraically or graphically. • graphs the solution set of a system of two-variable linear inequalities. • given a real-world context, represents constraints as systems of linear equations or inequalities. Interprets solutions to problems as viable or non-viable options. • given an equation or graph that defines a function, classifies the function type; given an input-output table, determines a function type that could represent it. • given a function represented in function notation, evaluates the function for an input in its domain; for real-world context, interprets the output. • calculates and interprets the average rate of change of a real-world situation represented graphically, algebraically, or in a table over a specified interval. • compares key features of linear functions each represented algebraically, graphically, in tables, or in written descriptions. • compares key features of linear and nonlinear functions each represented algebraically, graphically, in tables, or in written descriptions; identifies that a quantity increasing exponentially will eventually exceed a quantity increasing linearly or quadratically. • determines whether a linear, quadratic, or exponential function best models a given real-world situation. • identifies the effect on the graph or table of a given function after replacing (x) with $(x)+k$, $kf(x)$, $f(kx)$, and $f(x+k)$ for specific values of k. • solves real-world problems involving simple interest and compound interest. • explains the relationship between simple interest and linear growth or the relationship between compound interest and exponential growth. • given a set of data, selects an appropriate method to represent the data, depending on whether it is numerical or categorical data and on whether it is univariate or bivariate. • interprets data distributions represented in various ways; states whether the data is numerical or categorical and univariate or bivariate; interprets the different components and quantities in the display. • explains the difference between correlation and causation in the contexts of both numerical and categorical data. • estimates a population total, mean, or percentage using data from a sample survey; calculates the minimum and maximum of a population given a margin of error. • fits a linear function to bivariate numerical data that suggests a linear association and interprets the slope and y-intercept of the model; uses the model to solve real-world problems in terms of the context of the data.

Achievement Level	Achievement Level Descriptions
Level 4	• given a scatter plot with a line of fit and residuals, determines the strength and direction of the correlation; interprets strength and direction within a real-world context. • constructs a two-way frequency table summarizing bivariate categorical data; interprets joint and marginal frequencies and determines possible associations in terms of real-world context.
Level 5	Students at this level demonstrate **mastery** of the most challenging content of the *Florida B.E.S.T. Standards*. A student performing at Level 5: • applies the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions involving rational exponents; analyzes the error or justifies why expressions are or are not equivalent. • generates multiple equivalent algebraic expressions using properties of exponents; uses error analysis, justification, or explanation to show why expressions are or are not equivalent. • adds, subtracts, multiplies, and divides numerical radicals limited to multiple arithmetic operations. • interprets parts of an equation or expression in comparison to an equivalent equation or expression in terms of a real-world context. • rearranges equations or formulas using factoring or properties of exponents to isolate a quantity of interest. • determines a missing polynomial expression in an equation that results in a given solution; demonstrates understanding of the closure property of polynomial expressions for addition, subtraction, and multiplication. • determines a missing dividend that is a polynomial expression in an equation that results in a given quotient. • rewrites a polynomial expression as a product of three or more polynomials. • given a real-world context, analyzes errors in equations written or steps solved for one-variable multi-step linear equations. • analyzes errors of linear two-variable equations written that represent relationships between quantities from a graph, a written description, or a table of values within a mathematical or real-world context. • analyzes errors of an equation written for a line that is parallel or perpendicular to a given line and goes through a given point. • given key features of a linear function, identifies the corresponding equation. • justifies solutions and/or constraints in terms of the context. • given a mathematical or real-world context, writes and solves one-variable linear inequalities, including compound inequalities, representing solutions algebraically or graphically; identifies and interprets possible solutions in the solution set in terms of the context. • analyzes errors of two-variable linear inequalities written that represent relationships between quantities from a graph or a written description within a mathematical or real-world context. • identifies and interprets possible solutions in the solution set in terms of the context.

Achievement Level	Achievement Level Descriptions
Level 5	• given a mathematical or real-world context, writes and solves one-variable quadratic equations over the real number system, then justifies or interprets the solution in context. • analyzes multiple representations of a quadratic function for a relationship between two quantities to determine errors. • given the x-intercepts, another point on the graph of a quadratic function, and the equation of the quadratic function, analyzes errors in the written equation. • analyzes errors in the interpretation of the identified vertex and/or zeroes for a given expression or equation representing a quadratic function. • given key features and/or a graph of a quadratic function, identifies the corresponding equation. • justifies the solutions and/or constraints in terms of the context. • given a mathematical or real-world context, writes and solves one-variable absolute value equations, then justifies or interprets the solution in context. • given key features and/or a graph of an absolute value function, identifies the corresponding equation. • given a mathematical or real-world context, classifies an exponential function as representing growth or decay and justifies within the context why it does or does not model growth or decay. • analyzes errors of a written exponential function that represents a relationship between quantities from a graph, a written description, or a table of values within a mathematical or real-world context. • given key features and/or a graph of an exponential function, identifies the corresponding equation and/or graph. • given a real-world context, writes, solves, and interprets a system of two-variable linear equations algebraically and graphically. • given a point and an inequality, determines another inequality that would make the given point a solution to the system. • given a real-world context, analyzes errors in written constraints or interpretations of solutions for given systems of linear equations or inequalities. • given a function represented in function notation, identifies and explains the error when the function has been evaluated for an input in its domain and interprets the output in a real-world context. • compares the average rates of change of at least two specified intervals and explains which one is greater or less than. • verifies and explains that a quantity increasing exponentially will eventually exceed a quantity increasing linearly or quadratically. • analyzes errors in the interpretation of a chosen function that models a given real-world situation. • analyzes errors in an identified effect on the graph or table of a function after replacing (x) with $(x)+k$, $kf(x)$, $f(kx)$, and $f(x+k)$ for specific values of k. • compares merits of two investments involving simple interest and/or compound interest. • analyzes errors in the interpretation and explanation of the relationship between simple interest and linear growth or the relationship between compound interest and exponential growth. • given a set of data, selects and explains an appropriate method to represent the data, depending on whether it is numerical or categorical data and on whether it is univariate or bivariate.

Achievement Level	Achievement Level Descriptions
Level 5	• explains the difference between correlation and causation in the contexts of both numerical and categorical data to draw conclusions or inferences. • estimates a population total, mean, or percentage using data from a sample survey and explains a given margin of error. • fits a linear function to bivariate numerical data that suggests a linear association and interprets the slope and *y*-intercept of the model; uses the model to solve real-world problems in terms of the context of the data; makes a prediction inside the range of data and compares it to the actual data. • justifies or explains the correlation and strength using residuals. • uses joint and marginal frequencies defined as verbal ratios to justify possible associations in terms of a real-world context.