Achievement Level Descriptors
Mathematics Algebra 1

ALD	Standard	Level 2	Level 3	Level 4	Level 5
Policy		Students performing at this level demonstrate a **below satisfactory** level of success with the challenging content of the *Florida Standards*.	Students performing at this level demonstrate a **satisfactory** level of success with the challenging content of the *Florida Standards*.	Students performing at this level demonstrate an **above satisfactory** level of success with the challenging content of the *Florida Standards*.	Students performing at this level demonstrate **mastery** of the most challenging content of the *Florida Standards*.
		A student performing at Level 2	**A student performing at Level 3**	**A student performing at Level 4**	**A student performing at Level 5**
Algebra and Modeling					
Range	MAFS.912.A-APR.1.1	adds two polynomials with integral coefficients, including adding when multiplying a constant to one or both polynomials using the distributive property is required	adds and subtracts polynomials, including adding or subtracting when one or both polynomials is multiplied by a monomial or binomial, with a degree no greater than 1	completes an informal argument on closure; applies multiple operations (excluding division) when simplifying polynomials	explains closure for polynomials
Range	MAFS.912.A-CED.1.1	writes or chooses a one-variable linear equation or inequality in a real-world context	writes or chooses a simple exponential (no horizontal or vertical translation) or a simple quadratic equation	writes an exponential equation with a horizontal or vertical translation or a quadratic equation; identifies the meaning of the variables	employs the modeling cycle when writing an equation
Range	MAFS.912.A-REI.2.3	solves linear equations (with variable on one side and simple benchmark fractions as the coefficient; may require the use of the distributive property and adding like terms) and inequalities (with a variable on one side and positive coefficient that may include a simple benchmark fraction as the coefficient) in one variable	solves linear equations and inequalities in one variable, where the variable is included on both sides of the equal sign or inequality, that require up to three steps to isolate the variable with rational coefficients	solves linear equations in one variable, including equations where one coefficient is represented by a letter and requires up to three steps to isolate the variable; solves compound inequalities in one variable	solves linear equations and inequalities in one variable, including equations with coefficients represented by letters that require up to four steps to isolate the variable

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Range	MAFS.912.A-CED.1.4	solves a literal linear equation in a real-world context for a variable whose coefficient is 1	solves a literal equation that requires two procedural steps	solves a literal equation that requires three procedural steps	solves a literal equation that requires four procedural steps
Range	MAFS.912.A-CED.1.2	writes or chooses a two-variable linear equation for a real-world context with integral coefficients	writes or chooses a system of linear equations or writes a single equation that has at least three variables with integral coefficients	writes a system of linear equations or writes a single equation that has at least three variables; correctly identifies the meaning of the variables	employs the modeling cycle when writing equations that have two variables
Range	MAFS.912.A-REI.3.5	identifies an equivalent system of two equations in two variables that has a multiple of one of the equations of the original system	identifies an equivalent system that has a sum of the original as one of the equations and a multiple of the other	identifies systems that have the same solutions	justifies why multiple equivalent systems would have the same solution
Range	MAFS.912.A-REI.3.6	solves a system of linear equations approximately when given a graph of the system; solves a system of equations using elimination in the form of ax + by = c and dx + ey = f with integral coefficients, where only one equation requires multiplication; solves a simple system of equations that require substitution	explains whether a system of equations has one, infinitely many, or no solutions; solves a system of equations by graphing or substitution (manipulation of equations may be required) or elimination in the form of ax + by = c and dx + ey = f, where multiplication is required for both equations	solves a system of equations with rational coefficients by graphing, substitution, or elimination; interprets solutions in a real-world context	[intentionally left blank]
Range	MAFS.912.A-REI.4.12	identifies a solution region when the graph of a linear inequality is given	graphs solutions of the system of two linear inequalities and identifies the solution set as a region of the coordinate plane that satisfies both inequalities; if the form is written in ax + by < c format, then a, b, and c should be integers	verifies ordered pairs as being a part of the solution set of a system of inequalities	justifies why an ordered pair is a part of a solution set

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Range	MAFS.912.A-CED.1.3	identifies constraints that are constant values or simple linear equations/inequalities in a real-world context	identifies variables; writes constraints as a system of linear inequalities or linear equations	models constraints using a combination of linear equations/inequalities; interprets solutions as viable or nonviable based on the context	employs the modeling cycle when writing constraints
Range	MAFS.912.A-REI.1.1	chooses the correct justifications for the steps in a two-step equation, $ax + b = c$	chooses the correct justifications for the steps in an equation of the form $a(bx + c) = d$ or $ax + b = cx + d$, where a, b, c, and d are integers	explains and justifies the steps in an equation of the form $a(bx + c) = d$ or $ax + b = cx + d$, where a, b, c, and d are rational numbers	explains and justifies the steps in an equation of the form $a(bx + c) = d(ex + f)$, where a, b, c, d, e, and f are rational numbers
Range	MAFS.912.A-REI.2.4a &b	solves quadratic equations of the form $x^2 + c = d$, where c and d are rational numbers by simple inspection or by taking square roots	solves quadratic equations of the form $x^2 + bx + c = d$, where b, c, and d are integers by completing the square, factoring, or using the quadratic formula; validates why taking the square root of both sides when solving a quadratic will yield two solutions	solves quadratic equations of the form $ax^2 + bx + c = d$, where a, b, c, and d are integers and b/a is an even integer; recognizes that a quadratic can yield nonreal solutions and that the quadratic formula is used to find complex solutions; completes steps in the derivation of the quadratic formula	determines if a quadratic will yield complex solutions; derives the quadratic formula
Range	MAFS.912.A-REI.4.11	determines an integral solution for $f(x) = g(x)$ given a graph or a table of a linear, quadratic, or exponential function, in a mathematical or real-world context	determines a solution to the nearest tenth for $f(x) = g(x)$ given a graph or a table	completes an explanation on how to find an approximate solution to the nearest tenth for $f(x) = g(x)$ given a graph or a table	explains how to find an approximate solution to the nearest tenth for $f(x) = g(x)$ given a graph or a table and justifies why the intersection of two functions is a solution to $f(x) = g(x)$
Range	MAFS.912.A-REI.4.10	distinguishes between coordinates that are solutions to linear equations in two variables and those that are not	distinguishes between coordinates that are solutions to equations in two variables (quadratic or exponential) and those that are not	recognizes that a graph is the set of all the solutions of a given equation	justifies that a graph is the set of all the solutions of an equation

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Range	MAFS.912.A-SSE.2.3a, b, and c	uses properties of exponents (one operation) and identifies the new base of an exponential function; explains the properties of the a in $y = ab^x$ in a real-world context	factors the difference of two squares with a degree of 2 and trinomials with a degree of 2 and explains the properties of the zeros; completes the square when the leading coefficient is 1 and explains the properties of the maximum or minimum; uses the properties of exponents and names the new rate	factors the difference of two squares with a common integral factor, trinomials with a common integral factor and a leading coefficient having more than four factors and explains the properties of the zeros; completes the square when the leading coefficient is greater than 1 and explains the properties of the maximum or minimum; transforms exponential functions that have more than one operation and explains the properties of expression	explains the differences between equivalent forms and why an equivalent form would provide the required property
Range	MAFS.912.A-SSE.1.1	interprets coefficients or terms of exponential and quadratic expressions in a real-world context	interprets factors of exponential and quadratic expressions	interprets more than one part of an expression	given an interpretation, chooses the correct part of the expression
Range	MAFS.912.A-SSE.1.2	works with expressions with only monomial factors and chooses the correct equivalent forms of a trinomial whose leading coefficient is 1	factors the difference of two squares with a degree of 2, trinomials with a degree of 2 whose leading coefficient has no more than 4 factors	factors the difference of two squares with a common integral factor, trinomials with a common integral factor and a leading coefficient with more than four factors	factors the difference of two squares with a degree of 4 with or without a common integral factor, and a polynomial with a degree of 3 and a leading coefficient of 1

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Functions and Modeling					
Range	MAFS.912.F-BF.2.3	identifies the graph, the equation, or ordered pairs of a linear, quadratic, or exponential function with a vertical or horizontal shift	identifies the graph of a linear or quadratic function with a vertical or horizontal stretch or shrink; determines the value of k given a graph and its transformation; completes a table of values for a function that has a vertical or horizontal shift; graphs a function with a vertical or horizontal shift	identifies the graph of an exponential function with a vertical or horizontal stretch or shrink; completes a table of values for a function with a horizontal or vertical stretch or shrink	determines the value of k when given a set of ordered pairs for two functions or a table of values for two functions; identifies differences and similarities between a function and its transformation
Range	MAFS.912.F-IF.1.2	evaluates simple functions in their domains; evaluates functions for a simple quadratic, simple square root, and simple exponential	evaluates quadratic, polynomial of degree 3, absolute value, square root, and exponential functions for inputs in their domain; interprets statements that use function notation in terms of a real-world context for simple quadratic, simple square root, and simple exponential	uses function notation to evaluate functions for inputs in their domain and interprets statements that use function notation in terms of context	writes and evaluates functions when the function is described in a real-world context
Range	MAFS.912.F-IF.1.1	uses the definition of a function to identify whether a relation represented by a graph, a table, mapping, diagrams, or sets of ordered pairs is a function	demonstrates understanding that a function's domain is assigned to exactly one element of the range in function notation	applies and extends knowledge of domain and range to real world situations and contexts; justifies that a relation is a function using the definition of a function	[intentionally left blank]

ALD	Standard	Level 2	Level 3	Level 4	Level 5
Range	MAFS.912.F-IF.2.5	interprets and identifies domains of linear functions when presented with a graph in a real-world context	interprets and identifies domains of quadratic or exponential functions (with no translation) when presented with a graph; interprets and identifies the domain of a linear function from a context	relates the domains of linear, quadratic, or exponential functions to a graph when the function is described within the context	interprets and identifies domains of linear, quadratic, or exponential functions when presented a function described within the context
Range	MAFS.912.F-IF.2.4	identifies the key features (as listed in the standard, excluding periodicity) when given a linear, quadratic, or exponential graph in a real-world context	interprets the key features (as listed in the standard, excluding periodicity) when given a table of a linear, quadratic, or exponential; interprets key features of a linear function given as a verbal description	interprets key features of a quadratic function given as a verbal description	interprets key features of an exponential function given as a verbal description
Range	MAFS.912.F-IF.3.9	compares properties of two linear functions, each represented a different way in a real-world or mathematical context	compares the properties of two functions of the same type with different representations (such as a quadratic to a quadratic but using a table and an equation); differentiates between linear and quadratic functions that are represented using different representations (table, graph, or algebraic)	compares properties of two functions (linear, quadratic, or exponential), each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions); differentiates between exponential and quadratic functions that are represented using different representations (table, graph, or algebraic)	compares properties of two functions (linear, quadratic, or exponential) when at least one function is described verbally; differentiates between two functions (linear, quadratic, or exponential) when at least one is described verbally

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Range	MAFS.912. F-IF.2.6 S-ID.3.7	calculates the average rate of change of a function represented by a graph, table of values, or set of data in a real-world context (which may or may not be linear)	interprets the average rate of change of a function represented by a graph, table of values, or set of data or a linear regression equation; calculates the average rate of change when given a quadratic or exponential function presented algebraically; interprets the y-intercept of a linear regression equation	determines the units of a rate of change for a function presented algebraically; uses an interpretation to identify the graph	explains the interpretation, using units, of the rate of change and/or the y-intercept within the context
Range	MAFS.912. F-IF.3.8a	finds zeros of quadratics of the form $ax_2 + b = c$, where a, b, and c are integers; interprets the zero contextually; real-world or mathematical contexts	factors the difference of two squares with a degree of 2, and trinomials with a degree of 2 whose leading coefficient has up to 4 factors and interprets the zeros; completes the square when the leading coefficient is 1; interprets the extreme values	factors quadratics with a common integral factor and a leading coefficient with more than four factors and interprets the zeros; completes the square when the leading coefficient is greater than 1 and b/(2a) is an integer; interprets the extreme values	interprets the axis of symmetry
Range	MAFS.912. F-IF.3.8b	uses properties of exponents (one operation) and identifies the new base of an exponential function; interprets the a in $y = ab_x$	uses the properties of exponents and interprets the new base, in terms of a rate	transforms exponential functions that have more than one operation and explains the properties of the expressions within a real-world context	compares and contrasts different forms of exponential functions using a real-world context
Range	MAFS.912. A-APR.2.3	identifies the zeros of a function from a graph	identifies the graph of a function given in factored form for a polynomial whose leading coefficient is a positive integer	creates a rough graph given a polynomial function in factored form whose leading coefficient is an integer in a real-world or mathematical context	uses the x-intercepts of a polynomial function and end behavior to graph the function in a real-world or mathematical context

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Range	MAFS.912.F-IF.3.7a and e	identifies the graph of a linear, simple quadratic, or simple exponential function given its equation	constructs the graph of a linear function, quadratic, or exponential given its equation; constructs a linear function using x- and y-intercepts	constructs the graph of a quadratic function given the x- and y-intercepts or vertex and end behavior; key features can be presented in both a mathematical and a real-world context	constructs the graph of an exponential function given the x- and y-intercepts and end behavior
Range	MAFS.912.F-LE.1.1a, b, c	identifies relationships in tables and graphs that can be modeled with linear functions (constant rate of change) and with exponential functions (exponential rate of change)	proves that linear functions grow by equal differences over equal intervals; proves that exponential functions grow by equal factors over equal intervals; identifies the constant rate or rate of growth or decay; chooses an explanation as to why a context may be modeled by a linear or exponential function	identifies situations given as a written description in a real-world context in which one quantity changes at a constant rate per unit interval relative to another or grows by equal factors over equal intervals	[intentionally left blank]
Range	MAFS.912.F-LE.2.5	identifies which values are constant from a given context	interprets the slope and x- and y-intercepts in a linear function; interprets the base value and vertical shifts in an exponential function of the form $f(x) = b^x + k$, where b is an integer and k can equal zero; in a real-world context	interprets the base value and initial value in an exponential function of the form $f(x) = ab^x$, where b is an integer and can be any positive integer	[intentionally left blank]
Range	MAFS.912.F-LE.1.2	constructs linear functions of arithmetic sequences when given a graph in a real-world context	constructs linear functions, including arithmetic sequences, given a graph or input-output pairs; constructs exponential functions, including geometric sequences given a graph	constructs linear functions and exponential functions, including arithmetic sequences and geometric sequences, given input-output pairs, including those in a table	constructs linear and exponential functions, including arithmetic and geometric sequences, given the description of a relationship

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Range	MAFS.912.F-BF.1.1a	recognizes an explicit expression that is linear for arithmetic sequences whose common difference is an integer in a real-world context	writes an explicit function for arithmetic sequences and geometric sequences; writes a recursive formula for an arithmetic sequence; completes a table of calculations	writes a recursive formula for a geometric sequence	writes a recursive formula for a sequence that is not arithmetic or geometric
Range	MAFS.912.F-BF.1.1b, c	combines standard function types using addition and subtraction when the functions are given within a real-world context	combines standard function types using addition, subtraction, and multiplication when the functions are given within the context; writes a composition of functions that involve two linear functions in a real-world context	writes a composition of functions that involve linear and quadratic functions	writes a new function that uses both a composition of functions and operations
Range	MAFS.912.F-IF.1.3	identifies an arithmetic sequence as a linear function when the sequence is presented as a sequence	identifies an arithmetic sequence as a linear function when the sequence is presented as a graph or table; identifies that a geometric sequence is a function when the sequence is presented as a sequence, graph, or table; recognizes the domain of a sequence as a set of integers or a subset of integers	identifies non-arithmetic and non-geometric sequences as a function when given as a sequence	identifies non-arithmetic and non-geometric sequences as a function when given as a graph or table; explains why the domain of sequences are a set or a subset of integers

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Range	MAFS.912.F-LE.1.3	given graphs or a linear and exponential function on the same coordinate plane, describes how the graphs compare; identifies which function is a linear function, an exponential function, or a quadratic function given in a real-world context by interpreting the functions' graphs or tables	identifies that an exponential growth function will eventually increase faster than a linear function or a quadratic function given in a real-world context by interpreting the functions' tables	identifies that a quantity increasing exponentially eventually exceeds a quantity increasing linearly using graphs and tables; explains that an exponential growth function will eventually increase faster than a linear function or a quadratic function given in a real-world context by interpreting the functions' graphs or tables	describes and compares the changes of behavior between a linear and an exponential function including the approximate point(s) of intersection; justifies that an exponential function will eventually increase faster than a linear function or a quadratic function given in a real-world context by interpreting the functions' graphs or tables using rates
Statistics and the Number System					
Range	MAFS.912.N-RN.1.2	converts radical notation to rational exponent notation and vice versa	identifies equivalent forms of expressions involving rational exponents and radical expressions where there is one operation	identifies equivalent forms of expressions involving rational exponents and radical expressions where there are two operations	[intentionally left blank]
Range	MAFS.912.N-RN.1.1	applies and explains properties of integer exponents	defines rational exponents by extending the properties of integer exponents	explains and uses the meaning of rational exponents in terms of properties of integer exponents, and uses notation for radicals in terms of rational exponents	proves the properties of rational exponents (which are an extension of the properties of integer exponents)

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Range	MAFS.912.N-RN.2.3	[intentionally left blank]	completes an informal proof to show that a sum or product of two rational numbers is rational, that the sum of a rational number and an irrational number is irrational, and that the product of a nonzero rational number and an irrational number is irrational	generalizes rules for sum and product properties of rational and irrational numbers	[intentionally left blank]
Range	MAFS.912.S-ID.1.1	identifies dot plots, histograms, and box plots for a given set of data in a real-world context	uses real-world data (represented in a table or in another display) to create dot plots, histograms, or box plots applying correct labels for components and/or axes, applying appropriate scale in a graph	completes a dot plot, histogram, or box plot for data that requires some interpretation or inference	determines and justifies which type of data plot would be most appropriate for a set of data; identifies advantages and disadvantages of different types of data plots
Range	MAFS.912.S-ID.1.2 & S-ID.1.3	determines the mean/median and interquartile range of a single set of data from a visual representation (e.g., table)	interprets the difference in mean, median, and interquartile range in the context of a data set and compares the similarities or differences in mean, median, and interquartile range between two sets of data; predicts the effect of an outlier on the shape and center of a data set; uses the empirical rule with data values that are one or more standard deviation about the mean	explains similarities and differences using specific measures of center and spread, given two sets of data; predicts the effect of an outlier on the spread of a data set; uses the empirical rule with two data values that have integers as standard deviations, up to 3, above or below the mean	plots data based on situations with multiple data sets, and then compares and discusses using measures of center and spread, normal distribution; justifies which measure(s) are most appropriate for comparison; identifies advantages and disadvantages of using each measure of center and spread

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Range	MAFS.912.S-ID.2.5	completes a two-way frequency table that requires completion of frequencies	creates or completes a two-way frequency table when up to two joint, marginal, or conditional relative frequencies are described within the context; finds the values for joint, marginal, or conditional relative frequency	chooses an interpretation of joint, marginal, and conditional relative frequencies; recognizes possible associations and trends in the data	interprets joint, marginal, and conditional relative frequencies; identifies and concludes associations and trends using a two-way frequency table
Range	MAFS.912.S-ID.2.6a, b, and c S-ID.3.8 & S-ID.3.9	creates a scatter plot of bivariate data	identifies a linear, quadratic, or exponential regression model that fits the data; uses a regression equation to solve problems within the context; interprets correlation coefficient; calculates residuals	creates a residual plot and determines whether the function is an appropriate fit for the data; explains why a situation with correlation does not imply causation	distinguishes variables that are correlated because one is a cause of another; explains why the correlation coefficient may not show a strong correlation; identifies flaws in data where causation is claimed