ALGEBRA I POWER STANDARDS

BAISD Standards	4 – Power Standard; 3 - Almost a Power Standard; 2 – Important, but not primary; 1 – important as an example supporting a Power Standard		
BAISD Ranking	**Content Code**	**Content Expectation Language**	**Expectation Breakdown**

STANDARD L1: REASONING ABOUT NUMBERS, SYSTEMS, AND QUANTITATIVE SITUATIONS

L1.1 Number Systems and Number Sense

1	L1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers.	
1	L1.1.2	Explain why the multiplicative inverse of a number has the same sign as the number, while the additive inverse of a number has the opposite sign.	
3	L1.1.3	Explain how the properties of associativity, commutativity, and distributivity, as well as identity and inverse elements, are used in arithmetic and algebraic calculations.	• Explain how the properties are used in arithmetic calculations. o Associativity o Commutativity o Distributivity o Identity o Inverse • Explain how the properties are used in Algebraic calculations. o Associativity o Commutativity o Distributivity o Identity o Inverse
1	L1.1.4	Describe the reasons for the different effects of multiplication by, or exponentiation of, a positive number by a number less than 0, a number between 0 and 1, and a number greater than 1.	• Describe the reasons for the different effects of multiplication of a positive number by o a positive number >1 o a negative number o a number between 0 and 1 • Describe the reasons for the different effects of the exponentiation of a positive number by o a positive exponent <1 o a negative exponent o an exponent between 0 and 1
1	L1.1.5	Justify numerical relationships.	

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L1.2 Representations and Relationships

3	L1.2.2	Interpret representations that reflect absolute value relationships.	• Recognize absolute value relationships o |3| = 3 & |-3| = 3 o An absolute value function is represented with a mirror image graph. • Solve equations or inequalities involving absolute value. (i.e. |x - 2| <3)
2	L1.2.4	Organize and summarize a data set in a table, plot, chart, or spreadsheet; find patterns in a display of data; understand and critique data displays in the media.	• Organize and summarize a data set in a table, plot, chart, or spreadsheet. • Find patterns in a display of data. • Understand and critique data displays in the *media*.

STANDARD L2: CALCULATION, ALGORITHMS, AND ESTIMATION

L2.1 Calculation Using Real and Complex Numbers

2	L2.1.1	Explain the meaning and uses of weighted averages.	• Explain the meaning of weighted averages. • Use weighted averages in specific situations.
4	L2.1.2	Calculate fluently with numerical expressions involving exponents. Use the rules of exponents, and evaluate numerical expressions involving rational and negative exponents, and transition easily between roots and exponents.	• Calculate numerical expressions involving exponents. • Use the rules of exponents to evaluate numerical expressions involving rational and negative exponents. • Transition easily between roots and exponents.
1	L2.1.4	Know that the imaginary number *i* is one of two solutions to $x^2 = -1$.	

Standard A1: EXPRESSIONS, EQUATIONS, AND INEQUALITIES

A1.1 Construction, Interpretation, and Manipulation of Expressions

4	A1.1.1	Give a verbal description of an expression that is presented in symbolic form, write an algebraic expression from a verbal description, and evaluate expressions given values of the variables.	• Give a verbal description of an expression that is presented in a symbolic form. • Write an algebraic expression from a verbal description. • Evaluate expressions, given values of the variables.

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4	A1.1.2	Know the properties of exponents and roots and apply them in algebraic expressions.	• Know the properties of exponents and roots. • Apply the properties of exponents and roots in algebraic expressions.
4	A1.1.3	Factor algebraic expressions using, for example, greatest common factor, grouping, and the special product identities.	• Factor algebraic expressions.

A1.2 Solutions of Equations and Inequalities

4	A1.2.1	Write equations and inequalities with one or two variables to represent mathematical or applied situations, and solve.	• Write equations w/one or two variables to represent mathematical or applied situations. • Write inequalities w/one or two variables to represent mathematical or applied situations. • Solve equations. • Solve inequalities.
4	A1.2.2	Associate a given equation with a function whose zeros are the solutions of the equation.	• Understand the relationship among the following: ▪ Zero's of a function and the solutions of the associated given equation. ▪ The zero's of the associated given equation and the x-intercepts of its graph. ▪ The x-intercepts of a functions graph and the zero's of the function.
4	A1.2.3	Solve (and justify steps in the solutions) linear and quadratic equations and inequalities, including systems of up to three linear equations with three unknowns; apply the quadratic formula appropriately.	• Solve and justify steps in the solution to linear equations. • Solve and justify steps in the solution to quadratic equations. • Solve and justify steps in the solution to linear inequalities. • Solve and justify steps in the solution to quadratic inequalities. • Solve systems of two equations and two unknowns. • Apply the quadratic formula appropriately.
1	A1.2.4	Solve absolute value equations and inequalities and justify steps in the solution.	• Solve absolute value equations.
1	A1.2.6	Solve power equations, justify steps in the solution, and explain how extraneous solutions may arise.	• Solve power equations.

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4	A1.2.8	Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.	• Solve and justify steps in an equation involving several variables (with numerical or letter coefficients) for a designated variable.

STANDARD A2: FUNCTIONS

A2.1 Definitions, Representations, and Attributes of Functions

4	A2.1.1	Determine whether a relationship (given in contextual, symbolic, tabular, or graphical form) is a function and identify its domain and range.	• Recognize if a relationship is a function from *graphs*, *tables*, *equations*, and *words*. • Identify the function's domain and range.
4	A2.1.2	Read, interpret, and use function notation and evaluate a function at a value in its domain.	• Read function notation (ex. f(x) is read "*f of x*") • Interpret function notation (ex. f(2) means substitute 2 for each variable). • Use function notation to evaluate the function at a given value.
4	A2.1.3	Represent functions in symbols, graphs, tables, diagrams, or words and translate among representations.	• Match an equation to a graph, table, diagram, or words (or any combination above).
1	A2.1.4	Recognize that functions may be defined by different expressions over different intervals of their domains; such functions are piecewise-defined.	
1	A2.1.5	Recognize that functions may be defined recursively. Compute values of and graph simple recursively defined functions.	
4	A2.1.6	Identify the zeros of a function, the intervals where the values of a function are positive or negative, and describe the behavior of a function as x approaches positive or negative infinity, given the symbolic and graphical representations.	
3	A2.1.7	Identify and interpret the key features of a function from its graph or its formula(s).	• Identify the features of a function from its graph or its formula. • Interpret the features of a function from its graph or its formula.

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A2.2 Operations and Transformations with Functions

1	A2.2.1	Combine functions by addition, subtraction, multiplication, and division.	• Know how to add, subtract, multiply, and divide functions (not solving systems of equations). Ex. f(x) * g(x) $f(x)=x^2 + 3$ g(x) = x + 5
3	A2.2.2	Apply given transformations to parent functions and represent symbolically.	• Be able to flip, slide, stretch parent functions.
1	A2.2.3	Determine whether a function (given in tabular or graphical form) has an inverse and recognize simple inverse pairs.	

A2.3 Representations of Functions

3	A2.3.1	Identify a function as a member of a family of functions based on its symbolic or graphical representation; recognize that different families of functions have different asymptotic behavior.	• Identify a function based on its symbolic or graphical representation. • Recognize that different families of functions have different asymptotic behavior.
4	A2.3.2	Describe the tabular pattern associated with functions having a constant rate of change (linear); or variable rates of change.	• Given a function *linear* or *non-linear* describe the pattern of the table.
4	A2.3.3	Write the general symbolic forms that characterize each family of functions.	• Write the general symbolic forms that characterize each family of functions o Linear o Quadratic o Exponential o Power

A2.4 Models of Real-World Situations Using Families of Functions

4	A2.4.1	Identify the family of function best suited for modeling a given real-world situation.	No Changes
4	A2.4.2	Adapt the general symbolic form of a function to one that fits the specifications of a given situation by using the information to replace arbitrary constants with numbers.	• Given a real-world situation & a formula, substitute values for the appropriate variables, and solve for the unknown variable to answer the question.

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4	A2.4.3	Using the adapted general symbolic form, draw reasonable conclusions about the situation being modeled.	

STANDARD A3: FAMILIES OF FUNCTIONS

A3.1 Lines and Linear Functions

4	A3.1.1	Write the symbolic forms of linear functions (standard, point-slope, and slope-intercept) given appropriate information and convert between forms.	• Give appropriate information write the symbolic forms of linear functions o Standard o point-slope o slope-intercept o Convert between the forms. o Standard to point-slope o Standard to slope-intercept o point-slope to standard o point-slope to slope-intercept o slope-intercept to standard o slope-intercept to point-slope
4	A3.1.2	Graph lines (including those of the form $x = h$ and $y = k$) given appropriate information.	• Graph all lines (including those of the form $x = h$ and $y = k$) given appropriate information.
4	A3.1.3	Relate the coefficients in a linear function to the slope and x- and y-intercepts of its graph.	
3	A3.1.4	Find an equation of the line parallel or perpendicular to given line, through a given point; understand and use the facts that non-vertical parallel lines have equal slopes, and that non-vertical perpendicular lines have slopes that multiply to give -1.	

A3.2 Exponential and Logarithmic Functions

4	A3.2.1	Write the symbolic form and sketch the graph of an exponential function given appropriate information.	• Given appropriate information of an exponential function, write the symbolic form and sketch the graph.
4	A3.2.4	Understand and use the fact that the base of an exponential function determines whether the function increases or decreases and how base affects the rate of growth or decay.	• Understand the role of the base in an exponential function (i.e. b>1 growth, 0<b<1 decay)

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2	A3.2.5	Relate exponential functions to real phenomena, including half-life and doubling time.	• Relate exponential functions to real phenomena, including half-life and doubling time.

A3.3 Quadratic Functions

4	A3.3.1	Write the symbolic form and sketch the graph of a quadratic function given appropriate information.	• Given appropriate information of a quadratic function, write the symbolic form and sketch the graph.
4	A3.3.2	Identify the elements of a parabola (vertex, axis of symmetry, direction of opening) given its symbolic form or its graph, and relate these elements to the coefficient(s) of the symbolic form of the function.	• Identify the critical parts of a parabola (vertex, axis of symmetry, direction of opening) given its symbolic form or its graph • Relate the critical parts of a parabola to the coefficient(s) of the symbolic form of the function.
1	A3.3.3	Convert quadratic functions from standard to vertex form by completing the square.	
3	A3.3.4	Relate the number of real solutions of a quadratic equation to the graph of the associated quadratic function.	
3	A3.3.5	Express quadratic functions in vertex form to identify their maxima or minima and in factored form to identify their zeros.	• Express quadratic functions in vertex form to identify their maxima or minima. • Express quadratic functions in factored form to identify their zeros.

A3.4 Power Functions

1	A3.4.1	Write the symbolic form and sketch the graph of power functions.	• Write the symbolic form of power functions. • Sketch the graph of power functions.
1	A3.4.2	Express directly and inversely proportional relationships as functions and recognize their characteristics.	• Express directly proportional relationships as functions. • Recognize the characteristics of directly proportional relationships / functions. • Express inversely proportional relationships as functions. • Recognize the characteristics of inversely proportional relationships / functions.
1	A3.4.3	Analyze the graphs of power functions, noting reflectional or rotational symmetry.	

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A3.5 Polynomial Functions

1	A3.5.1	Write the symbolic form and sketch the graph of simple polynomial functions.	• Write the symbolic form of simple polynomial functions. • Sketch the graph of simple polynomial functions.
1	A3.5.2	Understand the effects of degree, leading coefficient, and number of real zeros on the graphs of polynomial functions of degree.	• Understand the effects of degree, leading coefficient, and number of real zeros on the graphs of polynomial functions of degree.
1	A3.5.3	Determine the maximum possible number of zeroes of a polynomial function and understand the relationship between the x-intercepts of the graph and the factored form of the function.	• Determine the maximum possible number of zeroes of a polynomial function. • Understand the relationship between the x-intercepts of the graph and the factored form of the function.

STANDARD S2: BIVARIATE DATA-EXAMINING RELATIONSHIPS

S2.1 Scatterplots and Correlation

4	S2.1.1	Construct a scatterplot for a bivariate data set with appropriate labels and scales.	
4	S2.1.2	Given a scatterplot, identify patterns, clusters, and outliers. Recognize no correlation, weak correlation, and strong correlation.	•Given a scatterplot, identify patterns, clusters, and outliers. •Recognize no correlation, weak correlation, and strong correlation.
1	S2.1.3	Estimate and interpret Pearson's correlation coefficient for a scatterplot of a bivariate data set. Recognize that correlation measures the strength of linear association.	•Given a scatterplot, estimate the correlation coefficient (r). •Interpret the strength of a linear association, given the correlation coefficient (r).
1	S2.1.4	Differentiate between correlation and causation. Know that a strong correlation does not imply a cause-and-effect relationship. Recognize the role of lurking variables in correlation.	•

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S2.2 Linear Regression

1	S2.2.1	For bivariate data that appear to form a linear pattern, find the least squares regression line by estimating visually and by calculating the equation of the regression line. Interpret the slope of the equation for a regression line.	• For bivariate data that appear to form a linear pattern find the least squares regression line by visually estimating the equation of the regression line and by calculating the equation of a regression line. • Interpret the slope of the equation for a regression line.
1	S2.2.2	Use the equation of the least squares regression line to make appropriate predictions.	