

Hopkins High School

Algebra I

Power Standards

Allegan AESA/Van Buren ISD

Algebra 1 Power Standards

(10/9/08)

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The purpose of the Power Standards, or the "Safety Net Curriculum, is **not a device to ignore everything else in the curriculum**, but rather a mechanism to help teachers separate the *critical elements* and to ensure that every student understands the items inside of the Safety Net. The focus of the Power Standards is on learning, not on mere coverage". Power Standards are expectations that are most critical for student success; a carefully selected subset of the complete list of expectations that are essential for student success.

The criteria we used are:

- Endurance - Will this expectation provide knowledge and skills that will endure throughout a student's academic career and professional life?
- Leverage - Will this expectation provide knowledge and skills that will be of value in multiple disciplines?
- Readiness - Will this expectation provide knowledge and skills that are necessary for success in the next grade level, the next course, and on the MME?

Note: Each expectation was rewritten into user friendly language based upon its assessable components. Underlined phrases and words indicate concepts to be most emphasized in that particular Content Expectation.

High School Content Expectation Codes and Vocabulary

To allow for ease in referencing expectations, each mathematics expectation has been coded by strand, standard, topic, and expectation. For example:

A: Algebra and Functions strand

A1: Standard 1 of the Algebra and Functions strand

A1.2: Topic 2 in Standard A1

A.1.2.3: 3rd expectation in the 2nd topic of Standard A1

References:

- This document is a modified version of the Ottawa Area ISD Algebra I Power Standards document dated 5/23/08.
- Ainsworth, Larry. Power Standards: *Identifying the Standards that Matter the Most*. Denver: Advanced Learning Press, 2003, pp. 15 and 113.
- Reeves, Dr. Doug, Power Standards Criteria.

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

L1.1 Number Systems and Number Sense

HSCE	Original Language	AAESA/VBISD Language
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.	<ul style="list-style-type: none"> • Recognize and use the properties in arithmetic calculations. <ul style="list-style-type: none"> ○ Associativity ○ Commutativity ○ <u>Distributivity</u> ○ Identify ○ Inverse • Recognize and use the properties in algebraic calculations. <ul style="list-style-type: none"> ○ Associativity ○ Commutativity ○ <u>Distributivity</u> ○ Identify ○ Inverse

L1.2 Representations and Relationships

HSCE	Original Language	AAESA/VBISD Language
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.	<ul style="list-style-type: none"> • Organize and summarize a data set in a <u>table, plot, chart</u> 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

HSCE	Original Language	AAESA/VBISD Language
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.	<ul style="list-style-type: none"> • Calculate numerical expressions involving exponents. • Use the rules of exponents to evaluate numerical expressions involving rational and <u>negative</u> exponents. • Transition easily between roots and exponents.

STANDARD A1: EXPRESSIONS, EQUATIONS, AND INEQUALITIES

A1.1 Construction, Interpretation, and Manipulation of Expressions

HSCE	Original Language	AAESA/VBISD Language
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.	<ul style="list-style-type: none"> Give a verbal description of an expression that is presented in a symbolic form. Write an algebraic expression from a verbal description. <u>Evaluate expressions, given values of the variables.</u>
A1.1.2	Know the properties of exponents and roots and apply them in algebraic expressions.	<ul style="list-style-type: none"> Know the properties of exponents and roots. Apply the properties of exponents and roots in algebraic expressions.
A1.1.3	Factor algebraic expressions using, for example, greatest common factor, grouping, and the special product identities.	<ul style="list-style-type: none"> Factor algebraic expressions.

A1.2 Solutions of Equations and Inequalities

HSCE	Original Language	AAESA/VBISD Language
A1.2.1	Write equations and inequalities with one or two variables to represent mathematical or applied situations, and solve.	<ul style="list-style-type: none"> 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.
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.	<ul style="list-style-type: none"> 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.
A1.2.8	Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.	<ul style="list-style-type: none"> 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

HSCE	Original Language	AAESA/VBISD Language
A2.1.3	Represent functions in symbols, graphs, tables, diagrams, or words and translate among representations.	<ul style="list-style-type: none"> Identify the features of a function from its graph or its formula. Interpret the features of a function from its graph or its formula.
A2.1.7	Identify and interpret the key features of a function from its graph or its formula(s).	<ul style="list-style-type: none"> Identify the features of a function from its graph or its formula. Interpret the features of a function from its graph or its formula.

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

HSCE	Original Language	AAESA/VBISD Language
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.	<ul style="list-style-type: none"> Given a real world situation & a formula, substitute values for the appropriate variables, and solve for the unknown variable to answer the question.

STANDARD A3: FAMILIES OF FUNCTIONS

A3.1 Lines and Linear Functions

HSCE	Original Language	AAESA/VBISD Language
A3.1.1	Write the symbolic forms of linear functions (standard, point-slope, and slope-intercept) given appropriate information and convert between forms.	<ul style="list-style-type: none"> Given appropriate information write the symbolic forms of linear functions <ul style="list-style-type: none"> <u>Standard</u> point-slope <u>slope-intercept</u> Convert between the forms. <ul style="list-style-type: none"> Standard to point-slope <u>Standard to slope-intercept</u> point-slope to standard point-slope to slope-intercept <u>slope-intercept to standard</u> slope-intercept to point-slope
A3.1.2	Graph lines (including those of the form $x = h$ and $y = k$ given appropriate information.	<ul style="list-style-type: none"> Graph all lines (including those of the form $x = h$ and $y = k$) given appropriate information.
A3.1.3	Relate the coefficients in a linear function to the slope and x - and y - intercepts of its graph.	<ul style="list-style-type: none"> Given slope-intercept form ($y = mx + b$) recognize that m is the slope and b is the y-intercept.

A3.2 Exponential and Logarithmic Functions

HSCE	Original Language	AAESA/VBISD Language
A3.2.1	Write the symbolic form and sketch the graph of an exponential function given appropriate information.	<ul style="list-style-type: none"> Given appropriate information of an exponential function, write the symbolic form and sketch the graph.
A3.2.4	Understand and use the fact that the base of an exponential function determines whether the function increase or decreases and how base affects the rate of growth or decay.	<ul style="list-style-type: none"> Understand the role of the base in an exponential function (ie. $B > 1$ growth, $0 < b < 1$ decay)

A3.3 Quadratic Functions

HSCE	Original Language	AAESA/VBISD Language
A3.3.1	Write the symbolic form and sketch the graph of a quadratic function given appropriate information.	<ul style="list-style-type: none"> Given appropriate information of a quadratic function, write the symbolic form and sketch the graph.
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.
A3.3.4	Relate the number of real solutions of a quadratic equation to the graph of the associated quadratic function.	No Changes.

STANDARD S2: BIVARIATE DATA-EXAMINING RELATIONSHIPS

S2.1 Scatterplots and Correlation

HSCE	Original Language	AAESA/VBISD Language
S2.1.2	Given a scatterplot, identify patterns, clusters, and outliers. Recognize no correlation, weak correlation, and strong correlation.	<ul style="list-style-type: none"> Given a scatterplot, identify patterns, clusters, and outliers. <u>Recognize no correlation, weak correlation and strong correlation.</u>