

Imlay City High School Algebra 1 Alignment Record

Textbook: Prentice Hall Mathematics “Algebra 1”

Chapter and Section	HSCE Code and Description
Chapter 1	
Section 1-1	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.
Section 1-2	A1.1.2 Know the definitions and properties of exponents and roots and apply them in algebraic expressions.
Section 1-3	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. L1.2.2 Interpret representations that reflect absolute value relationships (e.g., $ x-a < b$, or $a \pm b$) in such contexts as error tolerance.
Section 1-4	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. L1.1.2 Explain why the multiplicative inverse of a number has the same sign as the number, while the additive inverse has the opposite sign.
Section 1-5	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.
Section 1-6	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. L1.1.2 Explain why the multiplicative inverse of a number has the same sign as the number, while the additive inverse has the opposite sign.

	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.
Section 1-7	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. 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.
Section 1-8	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. 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.
Section 1-9	S2.1.1 Construct a scatterplot for a bivariate data set with appropriate labels and scales. S2.1.2 Given a scatterplot, identify patterns, clusters, and outliers. Recognize no correlation, weak correlation, and strong correlation. 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.
Chapter 2	
Section 2-1	A1.2.1 Write and solve equations and inequalities with one or two variables to represent mathematical or applied situations. A1.2.3 Solve linear and quadratic equations and inequalities, including systems of up to three linear equations with three unknowns. Justify steps in the solutions, and apply the quadratic formula appropriately.
Section 2-2	A1.2.3 Solve linear and quadratic equations and inequalities, including systems of up to three linear equations with three unknowns. Justify steps in the solutions, and apply the quadratic formula appropriately.
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Section 2-6	A1.2.8 Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.
Section 2-7	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.
Chapter 3	
Section 3-1	A1.2.1 Write and solve equations and inequalities with one or two variables to represent mathematical or applied situations.
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Section 3-5	A1.2.1 Write and solve equations and inequalities with one or two variables to represent mathematical or applied situations.
Section 3-6	L1.2.2 Interpret representations that reflect absolute value relationships (e.g., $ x-a < b$, or $a \pm b$) in such contexts as error tolerance. A1.2.4 Solve absolute value equations and inequalities (e.g., solve $ x - 3 \leq 6$) and justify.
Chapter 4	
Section 4-4	L1.2.2 Interpret representations that reflect absolute value relationships (e.g., $ x-a < b$, or $a \pm b$) in such contexts as error tolerance. A2.4.3 Using the adapted general symbolic form, draw reasonable conclusions about the situation being modeled. <i>In the example above, the exact solution is 365.698, but for this problem, an appropriate approximation is 365.</i>

Chapter 5	
Section 5-1	A2.1.3 Represent functions in symbols, graphs, tables, diagrams, or words and translate among representations.
Section 5-2	<p>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.</p> <p>A2.1.1 Recognize whether a relationship (given in contextual, symbolic, tabular, or graphical form) is a function and identify its domain and range.</p> <p>A2.1.2 Read, interpret, and use function notation and evaluate a function at a value in its domain.</p> <p>A2.1.3 Represent functions in symbols, graphs, tables, diagrams, or words and translate among representations.</p> <p>A2.2.1 Combine functions by addition, subtraction, multiplication, and division.</p>
Section 5-3	<p>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.</p> <p>A2.1.1 Recognize whether a relationship (given in contextual, symbolic, tabular, or graphical form) is a function and identify its domain and range.</p> <p>A2.1.2 Read, interpret, and use function notation and evaluate a function at a value in its domain.</p> <p>A2.1.3 Represent functions in symbols, graphs, tables, diagrams, or words and translate among representations.</p> <p>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 at infinity and describe these behaviors.</p> <p>A2.3.2 Describe the tabular pattern associated with functions having constant rate of change (linear) or variable rates of change.</p> <p>A2.3.3 Write the general symbolic forms that characterize each family of functions.</p>
Section 5-4	<p>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.</p> <p>A2.1.2 Read, interpret, and use function notation and evaluate a function at a value in its domain.</p>

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Section 5-5	A2.3.2 Describe the tabular pattern associated with functions having constant rate of change (linear) or variable rates of change.
Section 5-6	<p>L1.1.5 Justify numerical relationships (e.g., show that the sum of even integers is even; that every integer can be written as $3m + k$, where k is 0, 1, or 2, and m is an integer; or that the sum of the first n positive integers is $n(n+1)/2$).</p> <p>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.</p> <p>A2.1.5 Recognize that functions may be defined recursively. Compute values of and graph simple recursively defined functions (e.g., $f(0) = 5$, and $f(n) = f(n-1) + 2$).</p>
Chapter 6	
Section 6-2	<p>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 at infinity and describe these behaviors.</p> <p>A2.3.3 Write the general symbolic forms that characterize each family of functions.</p> <p>A3.1.1 Write the symbolic forms of linear functions (standard [i.e., $Ax + By = C$, where $B \neq 0$], point-slope, and slope-intercept) given appropriate information and convert between forms.</p> <p>A3.1.3 Relate the coefficients in a linear function to the slope and x- and y-intercepts of its graph.</p> <p>A3.5.1 Write the symbolic form and sketch the graph of simple polynomial functions.</p>
Section 6-3	<p>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 at infinity and describe these behaviors.</p> <p>A2.3.3 Write the general symbolic forms that characterize each family of functions.</p> <p>A3.1.1 Write the symbolic forms of linear functions</p>

	<p>(standard [i.e., $Ax + By = C$, where $B \neq 0$], point-slope, and slope-intercept) given appropriate information and convert between forms.</p> <p>A3.1.2 Graph lines (including those of the form $x = h$ and $y = k$) given appropriate information.</p> <p>A3.5.1 Write the symbolic form and sketch the graph of simple polynomial functions.</p>
Section 6-4	<p>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 at infinity and describe these behaviors.</p> <p>A2.3.3 Write the general symbolic forms that characterize each family of functions.</p> <p>A3.1.1 Write the symbolic forms of linear functions (standard [i.e., $Ax + By = C$, where $B \neq 0$], point-slope, and slope-intercept) given appropriate information and convert between forms.</p> <p>A3.1.2 Graph lines (including those of the form $x = h$ and $y = k$) given appropriate information.</p>
Section 6-5	<p>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 nonvertical parallel lines have equal slopes and that nonvertical perpendicular lines have slopes that multiply to give -1.</p>
Section 6-6	<p>S2.1.1 Construct a scatterplot for a bivariate data set with appropriate labels and scales.</p> <p>S2.1.2 Given a scatterplot, identify patterns, clusters, and outliers. Recognize no correlation, weak correlation, and strong correlation.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>S2.2.2 Use the equation of the least squares regression line to make appropriate predictions.</p>

Section 6-7	<p>A2.2.2 Apply given transformations (e.g., vertical or horizontal shifts, stretching or shrinking, or reflections about the x- and y-axes) to basic functions and represent symbolically.</p> <p>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 at infinity and describe these behaviors.</p> <p>A2.3.3 Write the general symbolic forms that characterize each family of functions.</p>
Chapter 7	
Section 7-2	A1.2.3 Solve linear and quadratic equations and inequalities, including systems of up to three linear equations with three unknowns. Justify steps in the solutions, and apply the quadratic formula appropriately.
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Section 7-4	A1.2.3 Solve linear and quadratic equations and inequalities, including systems of up to three linear equations with three unknowns. Justify steps in the solutions, and apply the quadratic formula appropriately.
Chapter 8	
Section 8-1	<p>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.</p> <p>A1.1.2 Know the definitions and properties of exponents and roots and apply them in algebraic expressions.</p>
Section 8-2	
Section 8-3	<p>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.</p> <p>A1.1.2 Know the definitions and properties of exponents and roots and apply them in algebraic expressions.</p>
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Section 8-6	<p>A2.1.5 Recognize that functions may be defined recursively. Compute values of and graph simple recursively defined functions (e.g., $f(0) = 5$, and $f(n) = f(n-1) + 2$).</p>

Section 8-7	<p>A2.4.1 Identify the family of functions best suited for modeling a given real-world situation [e.g., quadratic functions for motion of an object under the force of gravity or exponential functions for compound interest. <i>In the example above, recognize that the appropriate general function is exponential ($P = P_0 a^t$)</i>].</p> <p>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. <i>In the example above, substitute the given values $P_0 = 300$ and $a = 1.02$ to obtain $P = 300(1.02)^t$.</i></p> <p>A3.2.1 Write the symbolic form and sketch the graph of an exponential function given appropriate information (e.g., given an initial value of 4 and a rate of growth of 1.5, write $f(x) = 4(1.5)^x$).</p> <p>A3.4.1 Write the symbolic form and sketch the graph of power functions.</p> <p>A3.4.3 Analyze the graphs of power functions, noting reflectional or rotational symmetry.</p>
Section 8-8	<p>A2.4.1 Identify the family of functions best suited for modeling a given real-world situation [e.g., quadratic functions for motion of an object under the force of gravity or exponential functions for compound interest. <i>In the example above, recognize that the appropriate general function is exponential ($P = P_0 a^t$)</i>].</p> <p>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. <i>In the example above, substitute the given values $P_0 = 300$ and $a = 1.02$ to obtain $P = 300(1.02)^t$.</i></p> <p>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.</p> <p>A3.2.5 Relate exponential and logarithmic functions to real phenomena, including half-life and doubling time.</p>
Chapter 9	
Section 9-2	A1.1.3 Factor algebraic expressions using, for example, greatest common factor, grouping, and the special product identities (e.g., differences of squares and cubes).
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Section 9-7	A1.1.3 Factor algebraic expressions using, for example, greatest common factor, grouping, and the special product identities (e.g., differences of squares and cubes).
Chapter 10	
Section 10-1	<p>A2.1.7 Identify and interpret the key features of a function from its graph or its formula(e), (e.g., slope, intercept(s), asymptote(s), maximum and minimum value(s), symmetry, and average rate of change over an interval).</p> <p>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 at infinity and describe these behaviors.</p> <p>A2.3.3 Write the general symbolic forms that characterize each family of functions.</p> <p>A3.3.1 Write the symbolic form and sketch the graph of a quadratic function given appropriate information (e.g., vertex, intercepts, etc.).</p> <p>A3.3.2 Identify the elements of a parabola (vertex, axis of symmetry, and 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.</p> <p>A3.3.4 Relate the number of real solutions of a quadratic equation to the graph of the associated quadratic function.</p> <p>A3.3.5 Express quadratic functions in vertex form to identify their maxima or minima and in factored form to identify their zeros.</p>
Section 10-2	<p>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 at infinity and describe these behaviors.</p> <p>A2.3.3 Write the general symbolic forms that characterize each family of functions.</p> <p>A3.2.1 Write the symbolic form and sketch the graph of an exponential function given appropriate information (e.g., given an initial value of 4 and a rate of growth of 1.5, write $f(x) = 4(1.5)^x$).</p> <p>A3.3.1 Write the symbolic form and sketch the graph of a quadratic function given appropriate information (e.g., vertex, intercepts, etc.).</p> <p>A3.3.2 Identify the elements of a parabola (vertex, axis of symmetry, and direction of opening) given its symbolic</p>

	<p>form or its graph and relate these elements to the coefficient(s) of the symbolic form of the function.</p> <p>A3.3.4 Relate the number of real solutions of a quadratic equation to the graph of the associated quadratic function.</p> <p>A3.5.1 Write the symbolic form and sketch the graph of simple polynomial functions.</p> <p>A3.5.2 Understand the effects of degree, leading coefficient, and number of real zeros on the graphs of polynomial functions of degree greater than 2.</p>
Section 10-3	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.
Section 10-4	<p>A1.2.2 Associate a given equation with a function whose zeros are the solutions of the equation.</p> <p>A1.2.6 Solve power equations (e.g., $(x + 1)^3 = 8$) and equations including radical expressions (e.g., $\sqrt{3x - 7} = 7$), justify steps in the solution, and explain how extraneous solutions may arise.</p> <p>A2.4.3 Using the adapted general symbolic form, draw reasonable conclusions about the situation being modeled. <i>In the example above, the exact solution is 365.698, but for this problem, an appropriate approximation is 365.</i></p> <p>A3.5.2 Understand the effects of degree, leading coefficient, and number of real zeros on the graphs of polynomial functions of degree greater than 2.</p> <p>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.</p>
Section 10-5	A1.2.2 Associate a given equation with a function whose zeros are the solutions of the equation.
Section 10-6	<p>A1.2.6 Solve power equations (e.g., $(x + 1)^3 = 8$) and equations including radical expressions (e.g., $\sqrt{3x - 7} = 7$), justify steps in the solution, and explain how extraneous solutions may arise.</p> <p>A3.3.3 Convert quadratic functions from standard to vertex form by completing the square.</p>
Section 10-7	<p>A1.2.3 Solve linear and quadratic equations and inequalities, including systems of up to three linear equations with three unknowns. Justify steps in the solutions, and apply the quadratic formula appropriately.</p> <p>A1.2.6 Solve power equations (e.g., $(x + 1)^3 = 8$) and equations including radical expressions</p>

	<p>(e.g., $\sqrt{3x - 7} = 7$), justify steps in the solution, and explain how extraneous solutions may arise.</p> <p>A2.4.3 Using the adapted general symbolic form, draw reasonable conclusions about the situation being modeled. <i>In the example above, the exact solution is 365.698, but for this problem, an appropriate approximation is 365.</i></p>
Section 10-8	
Section 10-9	A2.4.1 Identify the family of functions best suited for modeling a given real-world situation [e.g., quadratic functions for motion of an object under the force of gravity or exponential functions for compound interest. <i>In the example above, recognize that the appropriate general function is exponential ($P = P_0 a^t$)</i>].
Chapter 11	
Section 11-1	A1.2.6 Solve power equations (e.g., $(x + 1)^3 = 8$) and equations including radical expressions (e.g., $\sqrt{3x - 7} = 7$), justify steps in the solution, and explain how extraneous solutions may arise.
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Section 11-4	
Section 11-5	A1.2.6 Solve power equations (e.g., $(x + 1)^3 = 8$) and equations including radical expressions (e.g., $\sqrt{3x - 7} = 7$), justify steps in the solution, and explain how extraneous solutions may arise.
Chapter 12	
Section 12-1	A3.4.2 Express direct and inverse relationships as functions (e.g., $y = kx^n$ and $y = kx^{-n}$, $n > 0$) and recognize their characteristics (e.g., in $y = x^3$, note that doubling x results in multiplying y by a factor of 8).
Needs Supplemental Materials	<p>L2.1.1 Explain the meaning and uses of weighted averages (e.g., GNP, consumer price index, grade point average).</p> <p>L2.1.4 Know that the complex number i is one of two solutions to $x^2 = -1$.</p> <p>A2.1.4 Recognize that functions may be defined by different expressions over different intervals of their domains. Such functions are piecewise defined (eg., absolute value and greatest integer functions).</p> <p>A2.1.6 Identify the zeros of a function and the intervals where the values of a function are positive or negative.</p>

Describe the behavior of a function as x approaches positive or negative infinity, given the symbolic and graphical representations.

A2.2.3 Recognize whether a function (given in tabular or graphical form) has an inverse and recognize simple inverse pairs
(e.g., $f(x) = x^3$ and $g(x) = x^{1/3}$).

A3.3.5 Express quadratic functions in vertex form to identify their maxima or minima and in factored form to identify their zeros.