HPS Scope Sequence
High School Math
Revised 06182012

Honors Algebra 1

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September	**Expressions**	A.SSE.1 Interpret expressions that represent a quantity in terms of its context.	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.	Use variables to write expressions.	All lessons will be assessed through daily lesson quizzes, skill checks, homework assignments, and formal quizzes and tests.	Expression, Whole Numbers, Ingegers, Real Numbers, Rational, Radical, Variables Function, Evaluate, Solve, Exponent, Order of Operations
September	**Number Systems**	N.RN.3 Explain why the 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	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 of a number has the opposite sign. 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. ***L1.1.5 Justify numerical relationships.***	Apply and identify the properties of number systems.	All lessons will be assessed through daily lesson quizzes, skill checks, homework assignments, and formal quizzes and tests.	Sum, Product, Quotient, Difference, Ingegers, Real Numbers, Rational, Radical

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September - October	**Equations**	A.REI.1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. A.REI.2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. A.CED.1. Create equations and inequalities in one variable and use them to solve problems.	A1.2.1 Write equations and inequalities with one or two variables to represent mathematical or applied situations, and solve. 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 solution, and apply the quadratic formula appropriately.	Solve 1-step , 2-step, and multi- step equations. Use proportions in real-life situations. ***Translate word problems into Algebraic equations.***	All lessons will be assessed through daily lesson quizzes, skill checks, homework assignments, and formal quizzes and tests.	Coefficient, Constant, Additive Inverse, Distributive Property, Term, Reciprocal Identify, Hypotenuse, Percent Error, Percent of Change, Perfect Square, Proportion, similar, Rate, Ratio
October	**Inequalities**	A.CED.1. Create equations and inequalities in one variable and use them to solve problems.	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 solution, and apply the quadratic formula appropriately. ***A1.2.4 Solve absolute value equations and inequalities and justify steps in the solution.***	Solve 1-step , 2-step, and multi- step inequalities. Graph inequalities on a number line. ***Absolute value equations and inequalities.***	All lessons will be assessed through daily lesson quizzes, skill checks, homework assignments, and formal quizzes and tests.	Greater than, Less than, More than, at least, at most, Compound inequalities, absolute value, intersection , union (and / or)

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November	**Functions**	F.IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ***F.BF.4 Find inverse functions.***	A.2.1.1 Determine whether a relationship (given in contextual, symbolic, tabular, or graphical form) is a function and identify its domain and range. A2.1.2 Read, interpret, and use function notation and evaluate a function at a value in its domain. A2.1.3 Represent functions in symbols, graphs, tables, diagrams, or words and translate among representations. A2.1.4 Recognize that functions may be defined by different expressions over different intervals of their domains; such functions are piecewise-defined. ***A2.2.3 Operations and Transformations: Recognize whether a function (given in tabular or graphical form) has an inverse and recognize simple inverse pairs.***	Identify functions from tables and graphs. Write function rules. ***Write a function rule using the given terms of a pattern.***	All lessons will be assessed through daily lesson quizzes, skill checks, homework assignments, and formal quizzes and tests.	Function, verical line test, coordinate plane, ordered pairs, relationship, sequences

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November	**Scatter Plots**	F.IF.4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. ***S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.*** ***S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.*** ***S.IC.6 Evaluate reports based on data.***	S2.1.1Construct 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. ***S2.1.3 Estimate and interpret Pearson's correlation coefficient for a scatter plot of a bivariate data set. Recognize that correlation measures the strength of linear association.*** ***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.***	Plot points on a coordinate grid.	All lessons will be assessed through daily lesson quizzes, skill checks, homework assignments, and formal quizzes and tests.	Scatter plot, correlation, relationship, positive / negative correlation,

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December - January	**Linear functions**	F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. F.IF.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. ***F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases, and using technology for more complicated cases.***	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. A3.1.1 Write the symbolic forms of linear functions (standard, point-slope, and slope-intercept) given appropriate information and convert between forms. A3.1.2 Graph 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. ***A1.2.3 Solve linear inequalities.*** ***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.*** ***S2.2.2 Use the equation of the least squares regression line to make appropriate predictions.***	Find the slope and y-intercept of a line, graph linear equations, identify parallel, perpendicular or intersect lines. Translations between forms and lines. ***Graphing linear inequalities on a coordinate plane.*** ***Solving application problems using the line of best fit.*** .	All lessons will be assessed through daily lesson quizzes, skill checks, homework assignments, and formal quizzes and tests.	Rate of Change, Slope, Decline / Incline, Relationship, coordinate pair, x axis, y axis, Linear Function, Standard Form, Point Slope form, Slope Intercept, Zeros, x intercepts, y intercepts, parallel, perpendicular

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			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. ***A2.1.5 Recognize that functions may be defined recursively. Compute values of and graph simple recursively defined functions.***			
February	**Systems of Equations**	A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. A.REI.5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. A.REI.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	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 solution, and apply the quadratic formula appropriately.	Solving systems of equations by graphing, substitution and elimination. ***Solve application problems involving systems including mixture problems.***	All lessons will be assessed through daily lesson quizzes, skill checks, homework assignments, and formal quizzes and tests.	Infinitely many solutions, no solutions, elimination, substitution, ordered pair, solution to system,

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February	**Family of Functions**	F.IF.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function F.LE.2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). ***F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.***	A2.4.1 Identify the family of function best suited for modeling a given real-world situation. A2.4.2 Adapt the general symbolic form of a function to one that fits the specification of a given situation by using the information to replace arbitrary constants with numbers. A2.4.3 Using the adapted general symbolic form, draw reasonable conclusions about the situation being modeled. ***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 infi nity and describe these behaviors.*** ***A2.3.2 Describe the tabular pattern associated with functions having constant rate of change (linear) or variable rates of change.*** ***A2.3.3 Write the general symbolic forms that characterize each family of functions.*** ***A3.4.1 Write the symbolic form and sketch the graph of power functions.*** ***A3.5.1 Polynomial Functions: Write the symbolic form and sketch the graph of simple polynomial functions.***	Write equations for and graph exponential functions, ***Real-world appliction problems that relate to geometry and statistics. Identifying functions as linear, quadratic, or exponential based on differences in y-values.***	All lessons will be assessed through daily lesson quizzes, skill checks, homework assignments, and formal quizzes and tests.	Exponential, quadratic, linear, parabola, absolute values, cubic function,

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			A3.5.2 Understand the effects of degree, leading coefficient, and number of real zeros on the graphs of polynomial functions of degrees greater than 2.			

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March	**Exponents**	N-RN.1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents	A1.1.2 Know the properties of exponents and roots and apply them in algebraic expressions. ***A3.2.1 Write the symbolic form and sketch the graph of an exponential function given appropriate information.*** ***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.*** ***A3.2.5 Relate exponential functions to real phenomena, including half-life and doubling time.*** ***L2.1.2 Calculate fluently with numerical expressions involving exponents; use the rules of exponents; evaluate numerical expressions involving rational and negative exponents; transition easily between roots and exponents.***	Simplify expressions using exponential properties. ***Real-world applications problems with both positive and negative exponents.*** ***Use rational numbers in exponential equations.***	All lessons will be assessed through daily lesson quizzes, skill checks, homework assignments, and formal quizzes and tests.	Exponent, base, power, power of a power, compound interest, quotient of a power, negative exponents, growth factor, decay factor

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March/April	**Polynomial**	A.APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. ***F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. F.IF.7c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.***	A2.2.1 Combine functions by addition, subtraction, multiplication, and division. A1.1.3 Factor algebraic expressions using, for example, greatest common factor, ***grouping***, and the special product identities. ***A3.5.3 Determine the maximum possible number of zeros of a polynomial function, and understand the relationship between the x-intercepts of the graph and the factored form of the function.***	Operations with polynomials and factoring. ***Factoring by grouping.***	All lessons will be assessed through daily lesson quizzes, skill checks, homework assignments, and formal quizzes and tests.	Monomial, Binomial, Polynomial, Trinomial, Degree, factors, zeros, difference of squares, standard form

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April/May	**Quadratics Equations and Functions**	F.LE.3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. F.IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases A.REI.4. Solve quadratic equations in one variable.	A1.2.3 Solve linear and quadratic equations and inequalities including systems of up to three linear equations with three unknowns. A1.2.2 Associate a given equation with a function whose zeros are the solutions of the equation. ***A2.2.2 Apply given transformations to parent functions and represent symbolically.*** ***A3.3.1 Write the symbolic form and sketch the graph of a quadratic function given appropriate information.*** ***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.*** ***A3.3.4 Relate the number of real solutions of a quadratic equation to the graph of the associated quadratic function. A3.3.5 Express quadratic functions in vertex form to identify their maxima or minima and in factored form to identify their zeros.***	Use quadratic formula to solve quadratic equations. Graph quadratic equations and identify vertex, max or min, line of symmetry, and intercepts. ***Use the discriminant to determine the number of zeros.*** ***Use the vertex to determine symmetry.*** ***Use "chunking" to solve quadratic equations. Know what an imaginary number is and how it relates to solutions of quadratic equations.***	All lessons will be assessed through daily lesson quizzes, skill checks, homework assignments, and formal quizzes and tests.	quadratic, axis of symmetry, discriminant, maxima, minima, parabola, positive / negative, quadratic equation, quadratic formula, vertex,

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			A2.1.7 Identify and interpret the key features of a function from its graph or its formula(s). ***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.*** ***L2.1.4 Know that the imaginary number i is one of two solutions to x2 = -1.***			
May - June	**Radicals**	N-RN.2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.	A1.2.6 Solve power equations and equations including radical expressions; justify steps in the solution, and explain how extraneous solutions may arise. ***A2.4.1 Identify the family of function best suited for modeling a given real-world situation.***	Simplify the radical. Solve radical equations. ***Utilize rationalization in solving equations.*** ***Applied distance formula questions.***	All lessons will be assessed through daily lesson quizzes, skill checks, homework assignments, and formal quizzes and tests.	Radical expression, radical equations, simplify, solve