

**New York State Core Curriculum**  
Standards adopted 2005  
Integrated Algebra

Strand	Heading	Reference	Description	Boardworks High School Algebra presentations
<b>Number Sense and Operations Strand</b>	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems.	A.N.1	Identify and apply the properties of real numbers (closure, commutative, associative, distributive, identity, inverse) Note: Students do not need to identify groups and fields, but students should be engaged in the ideas.	–
	Students will understand meanings of operations and procedures, and how they relate to one another.	A.N.2	Simplify radical terms (no variable in the radicand)	Manipulating radicals
		A.N.3	Perform the four arithmetic operations using like and unlike radical terms and express the result in simplest form	Manipulating radicals
		A.N.4	Understand and use scientific notation to compute products and quotients of numbers greater than 100%	Scientific notation Calculations involving scientific notation
		A.N.5	Solve algebraic problems arising from situations that involve fractions, decimals, percents (decrease/increase and discount), and proportionality/direct variation	Algebraic fractions Equations involving algebraic fractions Simplifying rational functions Fractions decimals and percentages Percentages of quantities Finding a percentage change Increasing and decreasing by a percentage Percentage problems Compound percentages Direct proportion Inverse proportion
		A.N.6	Evaluate expressions involving factorial(s), absolute value(s), and exponential expression(s)	Permutations Combinations Absolute value functions Exponents

		A.N.7	Determine the number of possible events, using counting techniques or the Fundamental Principle of Counting	Permutations Combinations
		A.N.8	Determine the number of possible arrangements (permutations) of a list of items	Permutations Combinations
Students will represent and analyze algebraically a wide variety of problem solving situations.		A.A.1	Translate a quantitative verbal phrase into an algebraic expression	Substituting into formulas Formula problems Rearranging a formula Manipulating formulas Generating formulas
		A.A.2	Write verbal expressions that match given mathematical expressions	Substituting into formulas Formula problems Rearranging a formula Manipulating formulas Generating formulas
		A.A.3	Distinguish the difference between an algebraic expression and an algebraic equation	Equations formulas and identities
		A.A.4	Translate verbal sentences into mathematical equations or inequalities	Solving linear equations Using equations to solve problems Inequalities Solving linear inequalities Inequalities and regions Inequalities in two variables
		A.A.5	Write algebraic equations or inequalities that represent a situation	Solving linear equations Using equations to solve problems Inequalities Solving linear inequalities
		A.A.6	Analyze and solve verbal problems whose solution requires solving a linear equation in one variable or linear inequality in one variable	Solving linear equations Solving linear inequalities

		Systems of equations and graphs The elimination method for systems of equations The substitution method for systems of equations Problems leading to systems of equations
	A.A.7	Analyze and solve verbal problems whose solution requires solving systems of linear equations in two variables
	A.A.8	Analyze and solve verbal problems that involve quadratic equations
	A.A.9	Analyze and solve verbal problems that involve exponential growth and decay
	A.A.10	Solve systems of two linear equations in two variables algebraically (See A.G.7)
	A.A.11	Solve a system of one linear and one quadratic equation in two variables, where only factoring is required Note: The quadratic equation should represent a parabola and the solution(s) should be integers.
Students will perform algebraic procedures accurately.	A.A.12	Multiply and divide monomial expressions with a common base, using the properties of exponents Note: Use integral exponents only.
	A.A.13	Add, subtract, and multiply monomials and polynomials
	A.A.14	Divide a polynomial by a monomial or binomial, where the quotient has no remainder
	A.A.15	Find values of a variable for which an algebraic fraction is undefined.
	A.A.16	Simplify fractions with polynomials in the numerator and denominator by factoring both and renaming them to lowest terms
		Problems leading to quadratic equations Exponentials and logarithms Exponential growth and decay The elimination method for systems of equations The substitution method for systems of equations Problems leading to systems of equations Systems of linear and quadratic equations One linear and one quadratic equation Exponents Operations with polynomials Dividing polynomials The factor theorem Simplifying rational functions Simplifying rational functions Operations with algebraic fractions Improper fractions

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	A.A.17	Add or subtract fractional expressions with monomial or like binomial denominators	Operations with algebraic fractions
	A.A.18	Multiply and divide algebraic fractions and express the product or quotient in simplest form	Operations with algebraic fractions
	A.A.19	Identify and factor the difference of two perfect squares	Factoring quadratic expressions
	A.A.20	Factor algebraic expressions completely, including trinomials with a lead coefficient of one (after factoring a GCF)	Factoring Factoring quadratic expressions Quadratic equations and factoring
	A.A.21	Determine whether a given value is a solution to a given linear equation in one variable or linear inequality in one variable	Solving linear equations Solving linear inequalities
	A.A.22	Solve all types of linear equations in one variable	Solving linear equations Using equations to solve problems
	A.A.23	Solve literal equations for a given variable	Substituting into formulas Formula problems Rearranging a formula Manipulating formulas Generating formulas
	A.A.24	Solve linear inequalities in one variable	Inequalities Solving linear inequalities Inequalities and regions
	A.A.25	Solve equations involving fractional expressions Note: Expressions which result in linear equations in one variable.	Algebraic fractions Equations involving algebraic fractions
	A.A.26	Solve algebraic proportions in one variable which result in linear or quadratic equations	Algebraic fractions Equations involving algebraic fractions
	A.A.27	Understand and apply the multiplication property of zero to solve quadratic equations with integral coefficients and integral roots	Solving quadratic equations
	A.A.28	Understand the difference and connection between roots of a quadratic equation and factors of a quadratic expression	Quadratics and completing the square Solving quadratic equations
Students will recognize, use, and represent algebraically patterns,	A.A.29	Use set-builder notation and/or interval notation to illustrate the elements of a set, given the elements in roster form	Set notation Probability notation

relations, and functions.

A.A.30	Find the complement of a subset of a given set, within a given universe	Probability notation
A.A.31	Find the intersection of sets (no more than three sets) and/or union of sets (no more than three sets)	Probabilities from tables and Venn diagrams Probability notation
A.A.32	Graph the Explain slope as a rate of change between dependent and independent variables	Slopes and intercepts
A.A.33	Determine the slope of a line, given the coordinates of two points on the line	Slopes and intercepts
A.A.34	Write the equation of a line, given its slope and the coordinates of a point on the line	Slopes and intercepts
A.A.35	Write the equation of a line, given the coordinates of two points on the line	The equation of a straight line
A.A.36	Write the equation of a line parallel to the x- or y-axis	Linear graphs
A.A.37	Determine the slope of a line, given its equation in any form	The equation of a straight line
A.A.38	Determine if two lines are parallel, given their equations in any form	Parallel and perpendicular lines
A.A.39	Determine whether a given point is on a line, given the equation of the line	Linear graphs
A.A.40	Determine whether a given point is in the solution set of a system of linear inequalities	Inequalities Solving linear inequalities
A.A.41	Determine the vertex and axis of symmetry of a parabola, given its equation (See A.G.10 )	Graphs of quadratic functions
A.A.42	Find the sine, cosine, and tangent ratios of an angle of a right triangle, given the lengths of the sides	The three trigonometric ratios Finding trigonometric ratios
A.A.43	Determine the measure of an angle of a right triangle, given the length of any two sides of the triangle	Finding angles
A.A.44	Find the measure of a side of a right triangle, given an acute angle and the length of another side	Finding side lengths

		A.A.45	Determine the measure of a third side of a right triangle using the Pythagorean theorem, given the lengths of any two sides	Introducing the Pythagorean theorem Finding unknown lengths Applying the Pythagorean Theorem in 2-D Right triangles
<b>Geometry Strand</b>	Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.	A.G.1	Find the area and/or perimeter of figures composed of polygons and circles or sectors of a circle Note: Figures may include triangles, rectangles, squares, parallelograms, rhombuses, trapezoids, circles, semi-circles, quarter-circles, and regular polygons (perimeter only).	Cylinders, cones and spheres
		A.G.2	Use formulas to calculate volume and surface area of rectangular solids and cylinders	Cylinders, cones and spheres
	A.G.3	Determine when a relation is a function, by examining ordered pairs and inspecting graphs of relations	Functions and relations	
	A.G.4	Identify and graph linear, quadratic (parabolic), absolute value, and exponential functions	Linear graphs Graphs of important non-linear functions Graphs of quadratic functions Plotting and sketching graphs Absolute value functions Exponentials and logarithms	
	A.G.5	Investigate and generalize how changing the coefficients of a function affects its graph	Graphs of important non-linear functions	
	A.G.6	Graph linear inequalities	Inequalities Solving linear inequalities Inequalities and regions	

		A.G.7	Graph and solve systems of linear equations and inequalities with rational coefficients in two variables (See A.A.10)	Inequalities in two variables Systems of equations and graphs The elimination method for systems of equations The substitution method for systems of equations Problems leading to systems of equations
		A.G.8	Find the roots of a parabolic function graphically Note: Only quadratic equations with integral solutions.	Solving quadratic equations Graphs of quadratic functions
		A.G.9	Solve systems of linear and quadratic equations graphically Note: Only use systems of linear and quadratic equations that lead to solutions whose coordinates are integers.	Systems of linear and quadratic equations One linear and one quadratic equation
		A.G.10	Determine the vertex and axis of symmetry of a parabola, given its graph (See A.A.41) Note: The vertex will have an ordered pair of integers and the axis of symmetry will have an integral value.	Graphs of quadratic functions
<b>Measurement Strand</b>	Students will determine what can be measured and how, using appropriate methods and formulas.	A.M.1	Calculate rates using appropriate units (e.g., rate of a space ship versus the rate of a snail)	–
		A.M.2	Solve problems involving conversions within measurement systems, given the relationship between the units	–
	Students will understand that all measurement	A.M.3	Calculate the relative error in measuring square and cubic units, when there is an error in the linear measure	–
Students will collect, organize, display, and analyze data.		A.S.1	Categorize data as qualitative or quantitative	Types of data
		A.S.2	Determine whether the data to be analyzed is univariate or bivariate	Scatter plots
		A.S.3	Determine when collected data or display of data may be biased	Methods of sampling part 1 Methods of sampling part 2 Misleading charts

**Statistics and**

A.S.4	Compare and contrast the appropriateness of different measures of central tendency for a given data set	The mode The mean The median Which measure of central tendency
A.S.5	Construct a histogram, cumulative frequency histogram, and a box-and-whisker plot, given a set of data	Histograms Box and whisker plots
A.S.6	Understand how the five statistical summary (minimum, maximum, and the three quartiles) is used to construct a box-and-whisker plot	Box and whisker plots
A.S.7	Create a scatter plot of bivariate data	Scatter plots
A.S.8	Construct manually a reasonable line of best fit for a scatter plot and determine the equation of that line	Lines of best fit
A.S.9	Analyze and interpret a frequency distribution table or histogram, a cumulative frequency distribution table or histogram, or a box-and-whisker plot	Calculating the mean from frequency tables Histograms Frequency diagrams Cumulative frequency step polygons Cumulative frequency graphs Box and whisker plots
A.S.10	Evaluate published reports and graphs that are based on data by considering: experimental design, appropriateness of the data analysis, and the soundness of the conclusions	Misleading charts
A.S.11	Find the percentile rank of an item in a data set and identify the point values for first, second, and third quartiles	Cumulative frequency step polygons The range and interquartile range
A.S.12	Identify the relationship between the independent and dependent variables from a scatter plot (positive, negative, or none)	Scatter plots
A.S.13	Understand the difference between correlation and causation	Scatter plots
A.S.14	Identify variables that might have a correlation but not a causal relationship	Scatter plots

**Probability  
Strand**

Students will make predictions that are based upon data analysis.	A.S.15	Identify and describe sources of bias and its effect, drawing conclusions from data	Specifying the problem and planning Collecting data Methods of sampling part 1 Methods of sampling part 2
	A.S.16	Recognize how linear transformations of one-variable data affect the data's mean, median, mode, and range	The mode The mean The median The range and interquartile range Linear transformations and the mean
	A.S.17	Use a reasonable line of best fit to make a prediction involving interpolation or extrapolation	Lines of best fit
Students will understand and apply concepts of probability.	A.S.18	Know the definition of conditional probability and use it to solve for probabilities in finite sample spaces	Dependent events
	A.S.19	Determine the number of elements in a sample space and the number of favorable events	Probability notation
	A.S.20	Calculate the probability of an event and its complement	Probability notation
	A.S.21	Determine empirical probabilities based on specific sample data	Probability from experiments
	A.S.22	Determine, based on calculated probability of a set of events, if:	
		some or all are equally likely to occur	Combined events part 1 Combined events part 2 Probability notation
		one is more likely to occur than another	Combined events part 1 Combined events part 2 Probability notation
		whether or not an event is certain to happen or not to happen	Combined events part 1 Combined events part 2 Probability notation
	A.S.23	Calculate the probability of:	
		a series of independent events	Combined events part 1 Combined events part 2 Probability notation

		two mutually exclusive events	Combined events part 1 Combined events part 2 Probability notation
		two events that are not mutually exclusive	Combined events part 1 Combined events part 2 Probability notation