

**Connecticut State Core Curriculum**  
Standards adopted 2010  
Algebra I

Strand	Reference	Description	Boardworks High School Algebra presentations
	<b>1.1</b>	<b>Understand and describe patterns and functional relationships.</b>	
	1.1.1	Identify, describe and analyze patterns and functions (including arithmetic and geometric sequences) from real-world contexts using tables, graphs, words and symbolic rules.	Sequences and rules Arithmetic sequences Geometric sequences Other types of sequences
	1.1.2	Determine the $n$ th term of a sequence with and without the use of technology.	Sequences and rules Arithmetic sequences Geometric sequences Other types of sequences
	1.1.3	Translate one representation of a pattern into another representation.	Arithmetic sequences
	1.1.4	Write both a recursive rule and an explicit rule for a sequence.	Other types of sequences
	1.1.5	Describe the independent and dependent variables and how they are related to the domain and range of a function that describes a real-world problem.	Functions and relations Domain, range and composite functions
	1.1.6	Recognize that linear functions, which can be written symbolically as $y = mx + b$ , represent constant additive change; a unit increase in the independent variable ( $x$ ) causes the value of the dependent variable ( $y$ ) to change by $m$ units; arithmetic sequences are linear functions.	Linear graphs Slopes and intercepts Arithmetic sequences
	1.1.7	Recognize that exponential functions represent constant multiplicative change, written symbolically as $y = a \cdot b^x$ ; a unit increase in the independent variable ( $x$ ) causes the value of the dependent variable ( $y$ ) to be multiplied by $b$ ; geometric sequences are exponential functions.	The laws of logarithms Solving equations involving logarithms Exponentials and logarithms Exponential growth and decay Geometric sequences Graphs of important non-linear functions

**Algebraic Reasoning:  
Patterns and Functions:  
Patterns and functional  
relationships can be  
represented and analyzed  
using a variety of  
strategies, tools and  
technologies.**

1.1.8	Compare and contrast linear and exponential growth.	Graphs of important non-linear functions Exponentials and logarithms Exponential growth and decay
1.1.9	Illustrate and compare functions using a variety of technologies (i.e., graphing calculators, spreadsheets and online resources).	–
1.1.10	Make and justify predictions based on patterns.	–
<b>1.2</b>	<b>Represent and analyze quantitative relationships in a variety of ways.</b>	
1.2.1	Represent functions (including linear and nonlinear functions such as square, square root and piecewise functions) with tables, graphs, words and symbolic rules; translate one representation of a function into another representation.	Linear graphs Non-linear functions Graphs of important non-linear functions Graphs of quadratic functions Plotting and sketching graphs Exponentials and logarithms
1.2.2	Create graphs of functions representing real-world situations with appropriate axes and scales.	Real life graphs
1.2.3	Explain how changes in the parameters $m$ and $b$ affect the graph of a linear function.	Linear graphs Slopes and intercepts
1.2.4	Recognize and explain the meaning and practical significance of the slope and the $x$ - and $y$ -intercepts as they relate to a context, graph, table or equation.	Slopes and intercepts
1.2.5	Determine a linear function from two nonvertical ordered pairs or from a single ordered pair and a rate of change.	Coordinate geometry The equation of a straight line
1.2.6	Explain how changes in the parameters $a$ and $b$ affect the graph of an exponential function and validate the practical significance of the parameters in a real-world problem.	Graphs of important non-linear functions Exponentials and logarithms Exponential growth and decay
<b>1.3</b>	<b>Use operations, properties and algebraic symbols to determine equivalence and solve problems.</b>	
1.3.1	Simplify expressions and solve equations and inequalities.	Solving linear equations Equations with parentheses and fractions Using equations to solve problems Inequalities Solving linear inequalities Inequalities and regions Inequalities in two variables

	1.3.2	Use function notation, $y = f(x)$ , to find $y$ for a given $x$ and to find $x$ for a given $y$ .	Non-linear functions Function notation
	1.3.3	Model and solve problems with linear and exponential functions and linear inequalities.	Inequalities Solving linear inequalities Inequalities and regions Inequalities in two variables Exponentials and logarithms Exponential growth and decay
	1.3.4	Solve systems of linear equations that model real world situations using both graphical and algebraic methods.	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
	1.3.5	Pose a hypothesis based upon an observed pattern and use mathematics to test predictions.	–
<b>Numerical and Proportional Reasoning: Quantitative relationships can be</b>	2.1	<b>Understand that a variety of numerical representations can be used to describe quantitative relationships.</b>	
	2.1.1	Compare, locate, label and order real numbers including integers and rational numbers on number lines, scales and coordinate grids.	Classifying numbers Calculating with integers
	2.1.2	Select and use an appropriate form of number (integer, fraction, decimal, ratio, percent, exponent, irrational) to solve practical problems involving order, magnitude, measures, locations and scales.	Calculating with integers Exponents and roots Exponent laws Negative exponents and reciprocals Rational exponents Radicals Fractions, decimals and percentages Percentages of quantities Finding a percentage change Increasing and decreasing by a percentage Percentage problems Compound percentages Ratio Dividing in a given ratio

<p>relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technologies.</p>	2.1.3	Analyze and evaluate large amounts of numerical information using technological tools such as spreadsheets, probes, algebra systems and graphing utilities to organize.	-
	2.2	<b>Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantities.</b>	
	2.2.1	Use algebraic properties, including associative, commutative and distributive, inverse and order of operations to compute with real numbers and simplify expressions.	Multiplying parentheses The distributive property Factoring Factoring quadratic expressions Algebraic fractions Solving linear equations Equations with parentheses and fractions Using equations to solve problems
	2.2.2	Choose from among a variety of strategies to estimate solutions to problems and find values of formulas, functions and roots.	Substituting into formulas Formula problems Rearranging a formula Manipulating formulas Generating formulas Non-linear functions Graphs of quadratic functions
	2.2.3	Judge the reasonableness of estimations, computations and predictions.	-
	3.1	<b>Use properties and characteristics of two- and three-dimensional shapes and geometric theorems to describe relationships, communicate ideas and solve problems.</b>	
	3.1.1	Make, test and describe conjectures involving properties of two- and three-dimensional figures using models.	Applying the Pythagorean Theorem in 2-D Applying the Pythagorean theorem in space Cylinders cones and spheres
	3.2	<b>Use spatial reasoning, location and geometric relationships to solve problems.</b>	Coordinate geometry The equation of a straight line The equation of a circle

<p style="text-align: center;"><b>Geometry and Measurement: Shapes and structures can be analyzed, visualized, measured and transformed using a variety of strategies, tools and technologies.</b></p>	3.2.1	Interpret geometric relationships using equations and inequalities.	Coordinate geometry The equation of a straight line The equation of a circle
	3.3	<b>Develop and apply units, systems, formulas and appropriate tools to estimate and measure.</b>	
	3.3.1	Select and use appropriate units, scales and degree of precision to measure length, angle measure, area and volume of geometric models.	Introducing the Pythagorean Theorem Pythagorean triples Finding unknown lengths Applying the Pythagorean Theorem in 2-D Applying the Pythagorean Theorem in space Right triangles The three trigonometric ratios Finding trigonometric ratios Finding side lengths Finding angles Cylinders cones and spheres Coordinate geometry The equation of a straight line The equation of a circle
	3.3.2	Develop and apply formulas to solve measurement problems indirectly.	Equations, formulas and identities Substituting into formulas Formula problems Rearranging a formula Generating formulas
	4.1	<b>Collect, organize and display data using appropriate statistical and graphical methods.</b>	
	4.1.1	Collect real data and create meaningful graphical representations (e.g., scatter plots, line graphs) of the data with and without technology.	Scatter plots Bar graphs Box and whisker plots Histograms Frequency diagrams Cumulative frequency step polygons Cumulative frequency graphs
	4.1.2	Determine the association between two variables (i.e., positive or negative, strong or weak) from tables and scatter plots of real data.	Scatter plots Lines of best fit

<p><b>Working with Data: Probability and Statistics</b> Data can be analyzed to make informed decisions using a variety of strategies, tools and technologies.</p>	4.2	<b>Analyze data sets to form hypotheses and make predictions</b>	
	4.2.1	Analyze the relationship between two variables using trend lines and regression analysis.	Non-linear relationships Measuring correlation Scatter plots Lines of best fit Linear regression
	4.2.2	Estimate an unknown value between data points on a graph or list (interpolation) and make predictions by extending the graph or list (extrapolation).	Scatter plots Lines of best fit
	4.2.3	Explain the limitations of linear and nonlinear models and regression (e.g., causation v. correlation).	Non-linear relationships Scatter plots Lines of best fit
	4.3	<b>Understand and apply basic concepts of probability. The basic concepts of probability are included in the grade-level expectations in earlier grades. Applications of these concepts should be reviewed or integrated as needed.</b>	Introduction to probability Probabilities of single events Combined events part 1 Combined events part 2 Probabilities from tables and Venn diagrams Dependent events Probability from experiments The normal distribution The binomial distribution part 1 The binomial distribution part 2 Probability notation