



Alignment Document

State of Pennsylvania And Aventa Learning Algebra 1

Algebra 1 2005-2007 Benchmark Blueprint

State Standard Number	State Standard Area / Description	Unit Name	Course Topic Description
2.1.11	Numbers, Number Systems and Number Relationships		
2.1.11.A	Use operations (e.g., opposite, reciprocal, absolute value, raising to a power, finding roots, finding logarithms).	Real Numbers	Decimals
		Real Numbers	Absolute Value
		Real Numbers	Division of Rational Numbers
		Variables and Expressions	Roots
		Variables and Expressions	Exponents
		Variables and Expressions	Expressions with Powers
		Equations	Absolute Value Equations
		Exponentials	Exponential Equations
2.2.11	Computation and Estimation		
2.2.11.A	Develop and use computation concepts, operations and procedures with real numbers in problem-solving situations.	Equations	Solving Problems
		Equations	Equations and Problem Solving
		Real Numbers	Problem Solving
		Real Numbers	Evaluating Division Expressions

2.2.11.B	Use estimation to solve problems for which an exact answer is not needed.	Real Numbers	Estimation with Real Numbers
		Real Numbers	Estimation
2.2.11.C	Construct and apply mathematical models, including lines and curves of best fit, to estimate values of related quantities.	Functions and Linear Equations	Line of Fit
		Quadratics and Radicals	Quadratic Functions
		Exponentials	Exponential Functions
2.2.11.D	Describe and explain the amount of error that may exist in a computation using estimates.	Real Numbers	Estimation
2.2.11.E	Recognize that the degree of precision needed in calculating a number depends on how the results will be used and the instruments used to generate the measure.		
2.2.11.F	Demonstrate skills for using computer spreadsheets and scientific and graphing calculators.		
2.3.11	Measurement and Estimation		
2.3.11.A	Select and use appropriate units and tools to measure to the degree of accuracy required in particular measurement situations.	Real Numbers	Estimation
2.3.11.B	Measure and compare angles in degrees and radians.		
2.3.11.C	Demonstrate the ability to produce measures with specified levels of precision.		
2.4.11	Mathematical Reasoning and Connections		
2.4.11.A	Use direct proofs, indirect proofs or proof by contradiction to validate conjectures.	Real Numbers	Writing and Justifying Steps with Properties
2.4.11.B	Construct valid arguments from stated facts.	Real Numbers	Writing and Justifying Steps with Properties
2.4.11.C	Determine the validity of an argument.	Variables and Expressions	Logic
		Variables and Expressions	Induction
		Variables and Expressions	Deduction
2.4.11.D	Use truth tables to reveal the logic of mathematical statements.		

2.4.11.E	Demonstrate mathematical solutions to problems (e.g., in the physical sciences).	Equations	Equations
		Equations	Multi-Step Equations
		Equations	Proportions and Percent
		Equations	Formulas and Absolute Value
		Equations	Problem Solving
2.5.11	Mathematical Problem Solving and Communication		
2.5.11.A	Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.	Real Numbers	Estimation and Problem Solving
		Real Numbers	Problem Solving
2.5.11.B	Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas and results.	Variables and Expressions	Some Useful Properties-Commutative, Associative, Distributive
		Functions and Linear Equations	Line of Fit
		Functions and Linear Equations	Direct Variation
		Functions and Linear Equations	Patterns and Sequences
		Quadratics and Radicals	Quadratic Functions
		Exponentials	Exponential Functions
		Rational Expressions	Indirect Variation
2.5.11.C	Present mathematical procedures and results clearly, systematically, succinctly and correctly.	Equations	Problem Solving 1 Writing and Solving Equations
		Equations	Homework 3 Writing and Solving Equations
		Equations	Homework 4 Writing and Solving Equations
		Equations	Homework 8 Writing and Solving Equations
		Equations	Homework 9 Writing and Solving Equations
		Real Numbers	Number Sets
		Real Numbers	Justifying Steps



		Variables and Expressions	Assignment 1 Commutative Property
		Variables and Expressions	Assignment 2 Associative
		Variables and Expressions	Discussion Finding Volumes
2.5.11.C	Present mathematical procedures and results clearly, systematically, succinctly and correctly.	Functions and Linear Equations	Activity 1-graphing inverses
		Functions and Linear Equations	Problem Solving 2 Writing and Graphing Linear Equations
		Functions and Linear Equations	Problem Solving 3 Using Slope and Intercept to Graph
		Functions and Linear Equations	Activity 2-Discovering Parallel and Perpendicular Slopes
		Functions and Linear Equations	Activity 3-Scatterplot Activity
		Solving Systems	Activity 1 Graphing and Using a Table to Solve Systems
		Solving Systems	Problem Solving 1 Writing and Solving Systems
		Solving Systems	Discussion-Writing and Solving Systems
		Solving Systems	Problem Solving 2- Linear Programming
		Polynomials	Activity 1-Sieve of Erosthenes
		Polynomials	Discussion-Sharing Problems in Factoring
		Quadratics and Radicals	Activity 1-Graphing a Parabola
		Quadratics and Radicals	Discussion-Looking at Maximum and Minimum
		Rational Expressions	Discussion-Writing an Inverse Variation Problem
		Exponentials	Discussion-Comparing Banks
		Exponentials	Activity 1- Looking at Growth in Ticket Prices
		Inequalities	Homework 3-Writing and Solving Inequalities

		Inequalities	Homework 4-Writing and Solving Complex Inequalities
		Inequalities	Homework 5-Showing Steps in Solving Absolute Value Inequalities
2.5.11.D	Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.	Equations	Equations with Variables on Each Side
2.6.11	Statistics and Data Analysis		
2.6.11.A	Design and conduct an experiment using random sampling. Describe the data as an example of a distribution using statistical measures of center and spread. Organize and represent the results with graphs. (Use standard deviation, variance and t-tests.)		
2.6.11.B	Use appropriate technology to organize and analyze data taken from the local community.		
2.6.11.C	Determine the regression equation of best fit (e.g., linear, quadratic, exponential).	Functions and Linear Equations	Line of Fit
		Functions and Linear Equations	Patterns and Sequences
2.6.11.D	Make predictions using interpolation, extrapolation, regression and estimation using technology to verify them.	Functions and Linear Equations	Line of Fit
		Functions and Linear Equations	Patterns and Sequences
2.6.11.E	Determine the validity of the sampling method described in a given study.		
2.6.11.F	Determine the degree of dependence of two quantities specified by a two-way table.		
2.6.11.G	Describe questions of experimental design, control groups, treatment groups, cluster sampling and reliability.		

2.6.11.H	Use sampling techniques to draw inferences about large populations.		
2.6.11.I	Describe the normal curve and use its properties to answer questions about sets of data that are assumed to be normally distributed.		
2.7.11	Probability and Predictions		
2.7.11.A	Compare odds and probability.		
2.7.11.B	Apply probability and statistics to perform an experiment involving a sample and generalize its results to the entire population.		
2.7.11.C	Draw and justify a conclusion regarding the validity of a probability or statistical argument.		
2.7.11.D	Use experimental and theoretical probability distributions to make judgments about the likelihood of various outcomes in uncertain situations.	Rational Expressions	Counting: An introduction to the Multiplication Principle
		Rational Expressions	The Basics of Probability
2.7.11.E	Solve problems involving independent simple and compound events.		
2.8.11	Algebra and Functions		
2.8.11.A	Analyze a given set of data for the existence of a pattern and represent the pattern algebraically and graphically.	Functions and Linear Equations	Linear Patterns
		Functions and Linear Equations	Line of Fit
		Functions and Linear Equations	Number Patterns
2.8.11.B	Give examples of patterns that occur in data from other disciplines.	Functions and Linear Equations	Number Patterns
2.8.11.C	Use patterns, sequences and series to solve routine and non-routine problems.	Exponentials	Geometric Sequences
		Functions and Linear Equations	Line of Fit
		Functions and Linear Equations	Number Patterns
		Functions and Linear Equations	Arithmetic Sequences
		Functions and Linear Equations	Linear Patterns

2.8.11.D	Formulate expressions, equations, inequalities, systems of equations, systems of inequalities and matrices to model routine and non-routine problem situations.	Equations	Multiplication and Division in Equations
		Equations	Mixture Problems
		Equations	Rate Problems
		Equations	Solving Problems
		Equations	Equations with Variables on Each Side
		Equations	Equations and Problem Solving
		Equations	Parentheses in Equations
		Equations	Solving Multi-Step Equations
		Equations	Distance Formula
		Exponentials	Exponential Equations
		Solving Systems	Systems of equations
		Solving Systems	Graphing Systems of Inequalities
		Solving Systems	Problem Solving with Systems
		Solving Systems	Solving with Substitution
		Solving Systems	Solving with Elimination
		Inequalities	Graphing Inequalities in Two Variables
		Inequalities	Solving Inequalities Using Multiplication and Division
		Inequalities	Inequalities in Two Variables
		Inequalities	Multi-Step Inequalities
		Inequalities	Solving Inequalities by Addition and Subtraction
2.8.11.E	Use equations to represent curves (e.g., lines, circles, ellipses, parabolas, hyperbolas).		
2.8.11.F	Identify whether systems of equations and inequalities are consistent or inconsistent.	Solving Systems	Systems of equations
		Solving Systems	Problem Solving with Systems
		Solving Systems	Solving with Substitution
		Solving Systems	Solving with Elimination
		Solving Systems	Systems of Inequalities



2.8.11.G	Analyze and explain systems of equations, systems of inequalities and matrices.	Solving Systems	Solving with Elimination
		Solving Systems	Systems of equations
		Solving Systems	Graphing Systems of Inequalities
		Solving Systems	Problem Solving with Systems
		Solving Systems	Solving with Substitution
		Solving Systems	Graphing Systems
2.8.11.H	Select and use an appropriate strategy to solve systems of equations and inequalities using graphing calculators, symbol manipulators, spreadsheets and other software.	Solving Systems	Graphing Systems of Inequalities
		Solving Systems	Solving with Substitution
		Solving Systems	Problem Solving
		Solving Systems	Solving with Elimination
		Solving Systems	Solving with Graphing
2.8.11.I	Use matrices to organize and manipulate data, including matrix addition, subtraction, multiplication and scalar multiplication.	Solving Systems	The Matrix
		Solving Systems	Addition of Matrices
		Solving Systems	Scalar Multiplication of Matrices
2.8.11.J	Demonstrate the connection between algebraic equations and inequalities and the geometry of relations in the coordinate plane.	Inequalities	Graphing Inequalities in Two Variables
		Inequalities	Inequalities in Two Variables
		Solving Systems	Review of Graphing Inequalities
		Functions and Linear Equations	Relations
		Functions and Linear Equations	Functions



2.8.11.K	Select, justify and apply an appropriate technique to graph a linear function in two variables, including slope-intercept, x- and y-intercepts, graphing by transformations and the use of a graphing calculator.	Solving Systems	Review of Graphing Linear Equations
		Functions and Linear Equations	Graphing an Equation Using Slope and Y-Intercept
		Functions and Linear Equations	Graphing Using x and y Intercepts
		Functions and Linear Equations	Graphing Using Point Plotting
2.8.11.L	Write the equation of a line when given the graph of the line, two points on the line, or the slope of the line and a point on the line.	Functions and Linear Equations	Graphing an Equation Using Slope and Y-Intercept
		Functions and Linear Equations	Linear Patterns
		Functions and Linear Equations	Writing Linear Equations
		Functions and Linear Equations	Direct Variation
		Functions and Linear Equations	Slope-Intercept Form
		Functions and Linear Equations	Point-Slope Form
		Functions and Linear Equations	Which Form Will We Use
		Functions and Linear Equations	Parallel and Perpendicular Lines
		Functions and Linear Equations	Line of Fit
2.8.11.M	Given a set of data points, write an equation for a line of best fit.	Functions and Linear Equations	Line of Fit
2.8.11.N	Solve linear, quadratic and exponential equations both symbolically and graphically.	Quadratics and Radicals	The Quadratic Formula
		Quadratics and Radicals	Solving Quadratic Equations with Graphs
		Quadratics and Radicals	Solving by Using Square Roots
		Functions and Linear Equations	Linear Patterns

		Functions and Linear Equations	Writing Linear Equations
		Functions and Linear Equations	Direct Variation
		Functions and Linear Equations	Slope-Intercept Form
		Functions and Linear Equations	Point-Slope Form
		Functions and Linear Equations	Which Form Will We Use
		Functions and Linear Equations	Parallel and Perpendicular Lines
		Functions and Linear Equations	Line of Fit
		Polynomials	Solving Equations Using Factoring
		Polynomials	Solving Equations by Factoring Trinomials
		Polynomials	Factoring Other Trinomials
		Exponentials	Growth and Decay
		Exponentials	Exponential Equations
		Exponentials	Graphing Exponential Equations
2.8.11.O	Determine the domain and range of a relation, given a graph or set of ordered pairs.	Functions and Linear Equations	Relations
2.8.11.P	Analyze a relation to determine whether a direct or inverse variation exists and represent it algebraically and graphically.	Rational Expressions	Problem Solving
		Rational Expressions	Inverse Variation
		Functions and Linear Equations	Direct Variation
2.8.11.Q	Represent functional relationships in tables, charts and graphs.	Functions and Linear Equations	Functions
		Functions and Linear Equations	Direct Variation
		Functions and Linear Equations	Linear Pattern
		Functions and Linear Equations	Linear Equations
		Quadratics and Radicals	Quadratic Functions
		Rational Expressions	Inverse Variation
		Exponentials	Exponential Functions
		Exponentials	Growth and Decay



2.8.11.R	Create and interpret functional models.	Solving Systems	Discussion-Writing and Solving Systems
2.8.11.S	Analyze properties and relationships of functions (e.g., linear, polynomial, rational, trigonometric, exponential, logarithmic).	Quadratics and Radicals	Quadratic Functions
		Functions and Linear Equations	Relations
		Functions and Linear Equations	Functions
		Functions and Linear Equations	Linear Patterns
		Exponentials	Exponential Functions
		Exponentials	Growth and Decay
2.8.11.T	Analyze and categorize functions by their characteristics.	Quadratics and Radicals	Quadratic Functions
		Functions and Linear Equations	Relations
		Functions and Linear Equations	Functions
		Functions and Linear Equations	Linear Patterns
		Exponentials	Exponential Functions
		Exponentials	Growth and Decay