



Alignment Document  
State of New York and Aventa Learning Pre-Algebra

**Pre-Algebra**  
2005-2007 Benchmark Blueprint

Strand	Goals	Bands	Standards	Unit Name	Course Topic Description	
8.PS Problem Solving	Students will build new mathematical knowledge through problem solving.		8.PS.1 Use a variety of strategies to understand new mathematical content and to develop more efficient methods	Word Problems	Strategies	
			8.PS.2 Construct appropriate extensions to problem situations	Word Problems	Strategies	
			8.PS.3 Understand and demonstrate how written symbols represent mathematical ideas	Word Problems	Translating English to Math	
	Students will solve problems that arise in mathematics and in other contexts.			8.PS.4 Observe patterns and formulate generalizations	Geometry Concepts	Arithmetic Sequences
					Word Problems	Strategies
				Probability and Data Analysis	Data Analysis	
				8.PS.5 Make conjectures from generalizations	Word Problems	Strategies
					Probability and Data Analysis	Data Analysis
8.PS.6 Represent problem situations verbally, numerically, algebraically, and graphically	Word Problems	Strategies				
Equation	Simple Problem Solving					

	Students will apply and adapt a variety of appropriate strategies to solve problems.	<b>8.PS.7</b> Understand that there is no one right way to solve mathematical problems but that different methods have advantages and disadvantages	Word Problems	Strategies
		<b>8.PS.8</b> Understand how to break a complex problem into simpler parts or use a similar problem type to solve a problem	Word Problems	Strategies
		<b>8.PS.9</b> Work backwards from a solution	Equation	Simple Problem Solving
		<b>8.PS.10</b> Use proportionality to model problems	Geometry Concepts	Ratios and Proportions
		<b>8.PS.11</b> Work in collaboration with others to solve problems	Word Problems	Strategies
	Students will monitor and reflect on the process of mathematical problem solving.	<b>8.PS.12</b> Interpret solutions within the given constraints of a problem	Word Problems Equation	Strategies Simple Problem Solving
		<b>8.PS.13</b> Set expectations and limits for possible solutions	Probability & Data	Probability
		<b>8.PS.14</b> Determine information required to solve the problem	Word Problems	Strategies
		<b>8.PS.15</b> Choose methods for obtaining required information	Word Problems	Strategies
		<b>8.PS.16</b> Justify solution methods through logical argument	Basic Geometry	Geometry Formulas
	<b>8.PS.17</b> Evaluate the efficiency of different representations of a problem	Probability & Data	Probability	
<b>8.RP</b> Reasoning and Proof	Students will recognize reasoning and proof as fundamental aspects of mathematics.	<b>8.RP.1</b> Recognize that mathematical ideas can be supported by a variety of strategies	Probability	Data Analysis
	Students will make and investigate mathematical conjectures.	<b>8.RP.2</b> Use mathematical strategies to reach a conclusion	Word Problems	Strategies
		<b>8.RP.3</b> Evaluate conjectures by distinguishing relevant from irrelevant information to reach a conclusion or make appropriate estimates	Basic Geometry	Geometry Formulas

	Students will develop and evaluate mathematical arguments and proofs.		<b>8.RP.4</b> Provide supportive arguments for conjectures	Probability & Data	Data Analysis
			<b>8.RP.5</b> Develop, verify, and explain an argument, using appropriate mathematical ideas and language	Probability & Data	Data Analysis
	Students will select and use various types of reasoning and methods of proof.		<b>8.RP.6</b> Support an argument by using a systematic approach to test more than one case	Probability & Data	Data Analysis
			<b>8.RP.7</b> Devise ways to verify results or use counterexamples to refute incorrect statements	Probability & Data	Probability
			<b>8.RP.8</b> Apply inductive reasoning in making and supporting mathematical conjectures	Word Problems	Strategies
				Word Problems	Strategies
				Probability & Data	Data Analysis
<b>8.CM</b> Communication	Students will organize and consolidate their mathematical thinking through communication.		<b>8.CM.1</b> Provide a correct, complete, coherent, and clear rationale for thought process used in problem solving	Word Problems	Strategies
			<b>8.CM.2</b> Provide an organized argument which explains rationale for strategy selection	Probability & Data	Probability
			<b>8.CM.3</b> Organize and accurately label work	Equations	Solving Simple Equations
	Students will communicate their mathematical thinking coherently and clearly to peers, teachers, and others.		<b>8.CM.4</b> Share organized mathematical ideas through the manipulation of objects, numerical tables, drawings, pictures, charts, graphs, tables, diagrams, models and symbols in written and verbal form	Probability & Data	Data Analysis
			<b>8.CM.5</b> Answer clarifying questions from others	Word Problems	Translating English to Math
	Students will analyze and evaluate the mathematical thinking and strategies of others.		<b>8.CM.6</b> Analyze mathematical solutions shared by others	Probability & Data	Data Analysis
			<b>8.CM.7</b> Compare strategies used and solutions found by others in relation to their own work	Probability & Data	Data Analysis

			<b>8.CM.8</b> Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others	Word Problems	Translating English to Math
	Students will use the language of mathematics to express mathematical ideas precisely.		<b>8.CM.9</b> Increase their use of mathematical vocabulary and language when communicating with others	Word Problems	Translating English to Math
			<b>8.CM.10</b> Use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and rationale	Word Problems	Translating English to Math
			<b>8.CM.11</b> Draw conclusions about mathematical ideas through decoding, comprehension, and interpretation of mathematical visuals, symbols, and technical writing	Probability& Data	Data Analysis
<b>8.CN</b> Connections		Students will recognize and use connections among mathematical ideas.		<b>8.CN.1</b> Understand and make connections among multiple representations of the same mathematical idea	Word Problems
			<b>8.CN.2</b> Recognize connections between subsets of mathematical ideas	Word Problems	Strategies
			<b>8.CN.3</b> Connect and apply a variety of strategies to solve problems	Word Problems	Strategies
	Students will understand how mathematical ideas interconnect and build on one another to produce a coherent whole.		<b>8.CN.4</b> Model situations mathematically, using representations to draw conclusions and formulate new situations	Probability& Data	Data Analysis
			<b>8.CN.5</b> Understand how concepts, procedures, and mathematical results in one area of mathematics can be used to solve problems in other areas of mathematics	Word Problems	Translating English to Math

Students will recognize and apply mathematics in contexts outside of mathematics.			<b>8.CN.6</b> Recognize and provide examples of the presence of mathematics in their daily lives	Number Basics Decimals and Percents Fractions	Number Properties Percents Multiplying, Dividing, Adding and Subtracting
			<b>8.CN.7</b> Apply mathematical ideas to problem situations that develop outside of mathematics	Word Problems	Strategies
			<b>8.CN.8</b> Investigate the presence of mathematics in careers and areas of interest	Word Problems Equations Number Basics Decimals and Percents Fractions	Strategies Solving Simple Equations Number Properties Percents Multiplying, Dividing, Adding and Subtracting
			<b>8.CN.9</b> Recognize and apply mathematics to other disciplines, areas of interest, and societal issues	Word Problems Equations Number Basics Decimals and Percents Fractions	Strategies Solving Simple Equations Number Properties Percents Multiplying, Dividing, Adding and Subtracting

<b>8.R Representation</b>	Students will create and use representations to organize, record, and communicate mathematical ideas.		<b>8.R.1</b> Use physical objects, drawings, charts, tables, graphs, symbols, equations, or objects created using technology as representations	Probability& Data Equations Basic Geometry	Data Analysis Solving Simple Equations Geometry Formulas
			<b>8.R.2</b> Explain, describe, and defend mathematical ideas using representations	Probability& Data Geometry Concepts Geometry Concepts	Data Analysis Reflection Translation
			<b>8.R.3</b> Recognize, compare, and use an array of representational forms	Probability& Data Equations	Data Analysis Linear Equations
			<b>8.R.4</b> Explain how different representations express the same relationship	Probability& Data Word Problems	Data Analysis Translating English to Math
			<b>8.R.5</b> Use standard and non-standard representations with accuracy and detail	Equations Translating English to Math Word Problems	Solving Simple Equations Translating English to Math Strategies
	Students will select, apply, and translate among mathematical representations to solve problems.		<b>8.R.6</b> Use representations to explore problem situations	Word Problems Equations Probability& Data	Strategies Solving Simple Equations Data Analysis
			<b>8.R.7</b> Investigate relationships between different representations and their impact on a given problem	Probability& Data Equations	Data Analysis Solving Simple equations
			<b>8.R.8</b> Use representation as a tool for exploring and understanding mathematical ideas	Word Problems	Strategies

	Students will use representations to model and interpret physical, social, and mathematical phenomena.		<p><b>8.R.9</b> Use mathematics to show and understand physical phenomena (e.g., make and interpret scale drawings of figures or scale models of objects)</p> <p><b>8.R.10</b> Use mathematics to show and understand social phenomena (e.g., determine profit from sale of yearbooks)</p> <p><b>8.R.11</b> Use mathematics to show and understand mathematical phenomena (e.g., use tables, graphs, and equations to show a pattern underlying a function)</p>	<p>Probability &amp; Data</p> <p>Basic Geometry</p> <p>Word Problems</p> <p>Word Problems</p> <p>Equations</p> <p>Probability &amp; Data</p>	<p>Data Analysis</p> <p>Geometry Formulas</p> <p>Strategies</p> <p>Strategies</p> <p>Solve Simple Equations</p> <p>Data Analysis</p>
<b>8.N</b> Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another.	Operations	<p><b>8.N.1</b> Develop and apply the laws of exponents for multiplication and division</p> <p><b>8.N.2</b> Evaluate expressions with integral exponents</p> <p><b>8.N.3</b> Read, write, and identify percents less than 1% and greater than 100%</p> <p><b>8.N.4</b> Apply percents to:</p> <p><b>8.N.4.a</b> Tax</p> <p><b>8.N.4.b</b> Percent increase/decrease</p>	<p>Polynomials</p> <p>Polynomials</p> <p>Basics</p> <p>Fractions</p> <p>Decimals and Percents</p> <p>Decimals and Percents</p> <p>Decimals and Percents</p> <p>Number Basics</p> <p>Decimals and Percents</p> <p>Number Basics</p>	<p>Evaluating Polynomials</p> <p>Evaluating Polynomials</p> <p>Exponents</p> <p>Negative Exponents</p> <p>Decimals &amp; Percents</p> <p>Percents</p> <p>Decimals and Percents</p> <p>Significant Digits, Rounding</p> <p>Decimals and Percents</p> <p>Significant Digits, Rounding</p>

			<b>8.N.4.c</b> Simple interest	Decimals and Percents Number Basics	Decimals and Percents Significant Digits, Rounding
			<b>8.N.4.d</b> Sale price	Word Problems	Strategies
			<b>8.N.4.e</b> Commission	Decimals and Percents Number Basics	Decimals and Percents Significant Digits, Rounding
			<b>8.N.4.f</b> Interest rates	Decimals and Percents Number Basics	Decimals and Percents Significant Digits, Rounding
			<b>8.N.4.g</b> Gratuities	Decimals and Percents Number Basics	Decimals and Percents Number Basics
	Students will compute accurately and make reasonable estimates.	Estimation	<b>8.N.5</b> Estimate a percent of quantity, given an application	Decimals and Percents Number Basics	Decimals and Percents Number Basics
			<b>8.N.6</b> Justify the reasonableness of answers using estimation	Probability & Data	Data Analysis
<b>8.A</b> Algebra	Students will represent and analyze algebraically a wide variety of problem solving situations.	Variables and Expressions	<b>8.A.1</b> Translate verbal sentences into algebraic inequalities	Word Problems	Translating English to Math
			<b>8.A.2</b> Write verbal expressions that match given mathematical expressions	Word Problems Word Problems	Translating English to Math Strategies
			<b>8.A.3</b> Describe a situation involving relationships that matches a given graph	Equations	Linear Equations
			<b>8.A.4</b> Create a graph given a description or an expression for a situation involving a linear or nonlinear relationship	Equations	Linear Equations

			<b>8.A.5</b> Use physical models to perform operations with polynomials	Polynomials	Evaluating Polynomials)
Students will perform algebraic procedures accurately.	Variables and Expressions		<b>8.A.6</b> Multiply and divide monomials	Polynomials	Multiplying
			<b>8.A.7</b> Add and subtract polynomials (integer coefficients)	Polynomials	Adding and Subtracting
			<b>8.A.8</b> Multiply a binomial by a monomial or a binomial (integer coefficients)	Polynomials	Multiplying
			<b>8.A.9</b> Divide a polynomial by a monomial (integer coefficients) Note: The degree of the denominator is less than or equal to the degree of the numerator for all variables.	Polynomials	Evaluating Polynomials
			<b>8.A.10</b> Factor algebraic expressions using the GCF	Factoring and Geometric Formulas	Factoring
			<b>8.A.11</b> Factor a trinomial in the form $ax^2 + bx + c$ ; $a=1$ and $c$ having no more than three sets of factors	Factoring and Geometric Formulas	Factoring
	Equations and Inequalities		<b>8.A.12</b> Apply algebra to determine the measure of angles formed by or contained in parallel lines cut by a transversal and by intersecting lines	Equations	Solving Simple Equations
				Equations	Linear Equations
			<b>8.A.13</b> Solve multi-step inequalities and graph the solution set on a number line	Equations	Solving Simple Equations
				Equations	Linear Equations
			<b>8.A.14</b> Solve linear inequalities by combining like terms, using the distributive property, or moving variables to one side of the inequality (include multiplication or division of inequalities by a negative number)	Number Basics	Number Properties
Students will recognize, use, and represent algebraically patterns, relations, and functions.	Patterns, Relations, And Functions		<b>8.A.15</b> Understand that numerical information can be represented in multiple ways: arithmetically, algebraically, and graphically	Word Problems	Strategies
				Equations	Solving Simple Equations

			<b>8.A.16</b> Find a set of ordered pairs to satisfy a given linear numerical pattern (expressed algebraically); then plot the ordered pairs and draw the line	Equations	Linear Equations
			<b>8.A.17</b> Define and use correct terminology when referring to function (domain and range)	Equations	Linear Equations
			<b>8.A.18</b> Determine if a relation is a function	Equations	Solving Simple Equations
			<b>8.A.19</b> Interpret multiple representations using equation, table of values, and graph	Equations	Linear Equations
				Probability and Data Analysis	Solving Simple Equations
				Probability and Data Analysis	Data Analysis
<b>8.G</b> Geometry	Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.	Constructions	<b>8.G.0</b> Construct the following, using a straight edge and compass:	Basic Geometry	Geometry Formulas
			<b>8.G.0.a</b> Segment congruent to a segment	Basic Geometry	Geometry Formulas
			<b>8.G.0.b</b> Angle congruent to an angle	Basic Geometry	Geometry Formulas
			<b>8.G.0.c</b> Perpendicular bisector	Basic Geometry	Geometry Formulas
			<b>8.G.0.d</b> Angle bisector	Basic Geometry	Geometry Formulas
	Students will identify and justify geometric relationships, formally and informally.	Geometric Relationships	<b>8.G.1</b> Identify pairs of vertical angles as congruent	Basic Geometry	Geometry Formulas
			<b>8.G.2</b> Identify pairs of supplementary and complementary angles	Basic Geometry	Geometry Formulas
			<b>8.G.3</b> Calculate the missing angle in a supplementary or complementary pair	Basic Geometry	Geometry Formulas
			<b>8.G.4</b> Determine angle pair relationships when given two parallel lines cut by a transversal	Basic Geometry	Geometry Formulas

			<b>8.G.5</b> Calculate the missing angle measurements when given two parallel lines cut by a transversal	Basic Geometry	Geometry Formulas
			<b>8.G.6</b> Calculate the missing angle measurements when given two intersecting lines and an angle	Basic Geometry	Geometry Formulas
Students will apply transformations and symmetry to analyze problem-solving situations.	Transformational Geometry		<b>8.G.7</b> Describe and identify transformations in the plane, using proper function notation (rotations, reflections, translations, and dilations)	Geometry Concepts	Rotations, Reflections, Translations and Dilations
			<b>8.G.8</b> Draw the image of a figure under rotations of 90 and 180 degrees	Geometry Concepts	Rotations
			<b>8.G.9</b> Draw the image of a figure under a reflection over a given line	Geometry Concepts	Reflections
			<b>8.G.10</b> Draw the image of a figure under a translation	Geometry Concepts	Translations
			<b>8.G.11</b> Draw the image of a figure under a dilation	Geometry Concepts	Dilations
			<b>8.G.12</b> Identify the properties preserved and not preserved under a reflection, rotation, translation, and dilation	Geometry Concepts	Rotations, Reflections, Translations and Dilations
		Students will apply coordinate geometry to analyze problem-solving situations.	Coordinate Geometry		<b>8.G.13</b> Determine the slope of a line from a graph and explain the meaning of slope as a constant rate of change
	<b>8.G.14</b> Determine the y-intercept of a line from a graph and be able to explain the y-intercept			Equations	Linear Equations
	<b>8.G.15</b> Graph a line using a table of values			Equations	Linear Equations
	<b>8.G.16</b> Determine the equation of a line given the slope and the y-intercept			Equations	Linear Equations
	<b>8.G.17</b> Graph a line from an equation in slope-intercept form ( $y = mx + b$ )			Equations	Linear Equations

			<b>8.G.18</b> Solve systems of equations graphically (only linear, integral solutions, $y = mx + b$ format, no vertical/horizontal lines)	Equations	Linear Equations
			<b>8.G.19</b> Graph the solution set of an inequality on a number line	Equations	Linear Equations
			<b>8.G.20</b> Distinguish between linear and nonlinear equations $ax^2 + bx + c$ ; $a=1$ (only graphically)	Equations	Linear Equations
			<b>8.G.21</b> Recognize the characteristics of quadratics in tables, graphs, equations, and situations	Equations	Solving Simple Equations
<b>8.M</b> Measurement	Students will determine what can be measured and how, using appropriate methods and formulas.	Units of Measurement	<b>8.M.1</b> Solve equations/proportions to convert to equivalent measurements within metric and customary measurement systems Note: Also allows Fahrenheit to Celsius and vice versa.	Equations	Solving Simple Equations