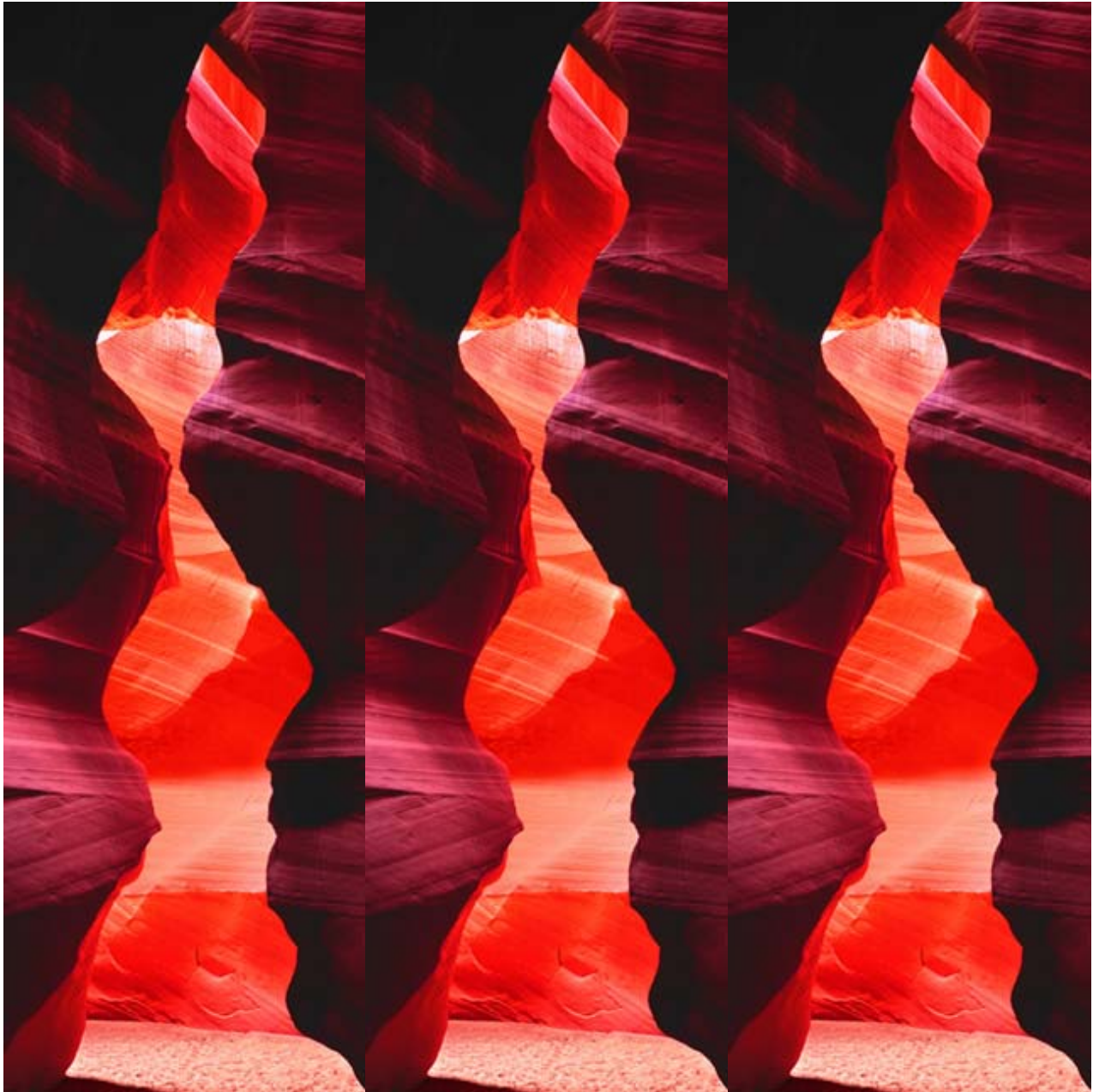


Algebra Readiness



*Secondary Mathematics
Instructional Guide
2009-2010*

Los Angeles Unified School District
Secondary Mathematics Branch

ALGEBRA READINESS AB
(Intervention Course – Grade 8)
Prerequisite: Mathematics 7AB

310317 Algebra Readiness A

310318 Algebra Readiness B

COURSE DESCRIPTION

Algebra Readiness is a one-year course designed to adequately prepare 8th grade students for Algebra. According to the *Mathematics Framework for California Public Schools (2006 Revised Edition)*, it is imperative that students master pre-algebraic skills and concepts before they enroll in a course that meets or exceeds the rigor of the content standards for Algebra I adopted by the State board of Education

The sixteen targeted standards for Algebra Readiness (thirteen from grade 7 and three from Algebra I) are grouped into the following topics: Operations on Rational Numbers, Equations and Functions, The Coordinate Plane, Graphing Proportional Relationships and Algebra (Introductory Examples). They are purposely limited in number to provide teachers the flexibility and time to rebuild the following foundational skills and concepts that may be missing from earlier grades: Whole Numbers, Operations on Whole Numbers, Rational Numbers, Operations on Rational Numbers, Symbolic Notation, Equations and Functions, and the Coordinate Plane.

COURSE SYLLABUS

Unit 1

Recommended Focus Standards

- 7 NS 1.2** Add, subtract, multiply and divide rational numbers (integers, fractions and terminating decimals) and take positive rational numbers to whole number powers.
- 7 NS 2.1** Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base.
- 7 AF 1.3** Simplify numerical expressions by applying properties of rational numbers (e.g., identity, inverse, distributive, associative and commutative) and justify the process used.
- 7 AF 2.1** Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse. Simplify and evaluate expressions that include exponents.

Scope and Sequence

Number Sense, Integers, Fractions, and Algebraic Thinking. Students work with whole numbers, integers and their operations. Next they study the properties of fractions.

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Unit 2

Recommended Focus Standards

- 7 NS 1.2** Add, subtract, multiply and divide rational numbers (integers, fractions and terminating decimals) and take positive rational numbers to whole number powers.
- 7 NS 1.3** Convert fractions to decimals and percents and use these representations in estimations, computations and applications.
- 7 NS 1.5** Know that every rational number is either a terminating or repeating decimal and be able to convert terminating decimals into reduced fractions.
- 7 AF 4.2** Solve multistep problems involving rate, average speed, distance and time or a direct variation.
- 7 MG 1.3** Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solution; and use dimensional analysis to check the reasonableness of the answer.
- Algebra I 2.0** Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a fractional power. They understand and use the rules of exponents. [*excluding fractional powers*]

Scope and Sequence

Fractions, Decimals, Ratios and Proportions. Students transition to operations on fractions and mixed numbers and then move to work on decimals and operations with them then study ratios, rates and proportions.

Unit 3

Recommended Focus Standards

- 7 NS 1.3** Convert fractions to decimals and percents and use these representations in estimations, computations and applications.
- 7 NS 2.1** Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base.
- 7 AF 1.1** Use variables and appropriate operations to write an expression, an equation, an inequality, or a system of equations or inequalities that represents a verbal description (e.g., three less than a number, half as large as area A).
- 7 AF 1.3** Simplify numerical expressions by applying properties of rational numbers (e.g., identity, inverse, distributive, associative and commutative) and justify the process used.
- 7 AF 4.1** Solve two-step linear equations and inequalities in one variable over the rational numbers, interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the results.
- 7 AF 4.2** Solve multistep problems involving rate, average speed, distance and time or a direct variation.
- Algebra I 2.0** Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a fractional power. They understand and use the rules of exponents. [*excluding fractional powers*]

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Scope and Sequence

Percents and Algebraic Problem Solving. The unit opens with the study of percents, including percent increase and decrease. Students make the transition to algebraic problem solving including word problems including those involving average speed, distance, and time. They solve simple (one and two step) equations and inequalities.

Unit 4

Recommended Focus Standards

- 7 AF 3.3** Graph linear functions, noting that the vertical change (change in y - value) per unit of horizontal change (change in x - value) is always the same and know that the ratio ("rise over run") is called the slope of a graph.
- 7 AF 3.4** Plot the values of quantities whose ratios are always the same (e.g., cost to the number of an item, feet to inches, circumference to diameter of a circle). Fit a line to the plot and understand that the slope of the line equals the quantities.
- 7 MG 3.3** Know and understand the Pythagorean theorem and its converse and use it to find the length of the missing side of a right triangle and the lengths of other line segments and, in some situations, empirically verify the Pythagorean theorem by direct measurement.
- Algebra I 2.0** Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a fractional power. They understand and use the rules of exponents. [*excluding fractional powers*]
- Algebra I 4.0** Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x-5) + 4(x-2) = 12$. [*excluding inequalities*]
- Algebra I 5.0** Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step. [*excluding inequalities*]

Scope and Sequence

Linear Functions and their Graphs, Linear Equations, and the Pythagorean Theorem. Students use the Cartesian coordinate system to graph points and lines and work with proportional relationships and linear functions using the slope to graph linear functions. Additionally students continue algebraic problem solving including multi-step problems.

Note: As students in this course will take the General Mathematics CST examination, in Unit 4 they study additional topics in Statistics, Data Analysis and Probability, Measurement and Geometry and the Real Number System.

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REPRESENTATIVE PERFORMANCE OUTCOMES AND SKILLS

In this course, students will know and be able to:

- Demonstrate the concept of place value in whole numbers.
- Demonstrate fluency with operations on whole numbers.
- Demonstrate fluency with representing fractions, mixed numbers, decimals and percentage.
- Demonstrate fluency with operations on positive fractions
- Demonstrate fluency with the use of symbols to express verbal information.
- Demonstrate fluency in writing and solving simple linear equations.
- Demonstrate fluency in plotting points, interpreting ordered pairs from a graph, and interpreting lengths of horizontal and vertical line segments on a coordinate plane.
- Demonstrate fluency in graphing and interpreting relationships of the form $y = mx$
- Use operations such as taking the opposite, finding the reciprocal, taking a root and the rules of exponents
- Simplify expressions before solving linear equations in one variable.
- Solve multi-step problems, including word problems, involving linear equations in one variable and provide justification for each step

ASSESSMENTS will include:

- Teacher designed standards-based quizzes and tests
- Projects and group tasks
- Teacher designed formative assessments
- Periodic Assessments

TEXTS/MATERIALS

- LAUSD *Secondary Mathematics Instructional Guide*
- Textbook: District approved materials
- Supplemental materials and resources

Algebra Readiness: Unit Concept Organizer

UNIT 1

Number Sense, Integers, Fractions, and Algebraic Thinking

Understand the composition of whole numbers
7NS 1.2, 7AF 1.2, 7AF1.3, 7AF2.1

- Take positive rational numbers to whole number powers
- Interpret positive whole number power as repeated multiplication
- Simplify expressions that include exponents
- Use the order of operations including exponents
- Recognize and apply properties of rational numbers (e.g. inverse,

Understand integers and operations on integers
7NS1.2, 7NS2.1, 7NS2.5 7AF 2.1

- Write integers to represent real-life situations
- Graph integers on a number line
- Compare integers
- Understand, interpret, and determine the absolute value of integers
- Add, subtract, multiply, and divide integers

Understand the composition of fractions
 Selected Referenced Standards from Foundational Skills and Concepts (*CA Math Framework, Appendix E, p. 365*)

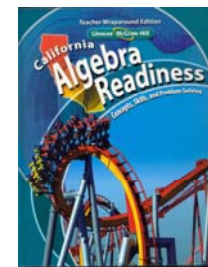
- Find the LCM, GCD, and know divisibility rules
- Identify numbers as prime and composite
- Use fractions to represent parts of a whole
- Use fractions to divide more than one whole into equally sized parts
- Write equivalent fractions
- Write fractions in simplest form
- Compare and order fractions

	7NS 1.2	7AF 1.2	7AF 1.3	7NS 2.1	7NS2.5	7AF 2.1
KEY Standards - Number of CST Items	4	3	2	1	2	1
CONCEPT LESSON:						
CAHSEE	3	1		1	1	1

Note: Standards in **BOLD** are targeted standards for Algebra Readiness

Algebra Readiness: Textbook Connections

California Algebra Readiness, Concepts, Skills, and Problem Solving



Topic

Standards

Textbook Sections

UNIT 1

Transitional Standards		Prerequisite Skills: Pg. 2-41 <i>Important:</i> Exponents, Prime Factorization, Fractions, Decimals, LCM
Number Sense and Whole Numbers	<p>7NS1.2 Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers.</p> <p>7NS2.1 Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base.</p> <p>7NS2.5 Understand the meaning of the absolute value of a number; interpret the absolute value as the distance of the number from zero on a number line; and determine the absolute value of real numbers.</p>	<p>1-1 A Plan for Problem Solving</p> <p>1-2 Expressions and Equations</p> <p>1-3 Order of Operations</p> <p>1-4 Commutative and Associative Properties</p> <p>1-5 Distributive Property</p> <p>1-6 Problem-Solving Strategy: Guess and Check</p> <p>1-7 Other Properties</p> <p>1-8 Simplifying Expressions</p>
Integers	<p>7AF1.2 Use the correct order of operations to evaluate algebraic expressions such as $3(2x + 5)^2$.</p> <p>7AF1.3 Simplify numerical expressions by applying properties of rational numbers (e.g., identity, inverse, distributive, associative, commutative) and justify the process used.</p> <p>7AF2.1 Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse. Simplify and evaluate expressions that include exponents.</p>	<p>2-2 Integers</p> <p>2-3 Adding and Subtracting Integers</p> <p>[Explore 2-3: Model Integers Operations using Cubes]</p> <p>2-4 Multiply Integers</p> <p>2-5 Divide Integers</p> <p>2-6 Problem-Solving Strategy: Look for a Pattern</p>
Composition of Fractions		<p>3-1 Fractions</p> <p>3-2 Fractions and Mixed Numbers</p> <p>3-3 Factors and Simplifying Fractions</p> <p>3-4 Problem-Solving Strategies: Draw a Diagram</p> <p>5-6 Comparing and Ordering Rational Numbers</p>

Algebra Readiness: Textbook Connections

McDougal Littell: Algebra Readiness



Topic

Standards

Textbook Sections

UNIT 1

Transitional Standards		Skills Review Handbook, pg. 476 - 485
Number Sense and Whole Numbers	<p>7NS1.2 Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers.</p> <p>7NS2.1 Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base.</p>	<p>1-1 Write and Evaluate Powers</p> <p>1-2 Use Order of Operations</p> <p>1-3 Use Formulas</p> <p>1-5 Write and Evaluate Algebraic Expressions</p> <p>1-6 Use a Problem Solving Plan</p>
Integers	<p>7NS2.5 Understand the meaning of the absolute value of a number; interpret the absolute value as the distance of the number from zero on a number line; and determine the absolute value of real numbers.</p> <p>7AF1.2 Use the correct order of operations to evaluate algebraic expressions such as $3(2x + 5)^2$.</p>	<p>4-1 Compare and Order Integers</p> <p>4-2 Add Integers</p> <p>4-3 Subtract Integers</p> <p>4-4 Multiply Integers</p> <p>4-5 Divide Integers</p>
Composition of Fractions	<p>7AF1.3 Simplify numerical expressions by applying properties of rational numbers (e.g., identity, inverse, distributive, associative, commutative) and justify the process used.</p> <p>7AF2.1 Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse. Simplify and evaluate expressions that include exponents.</p>	<p>2-1 Simplify Fractions</p> <p>2-1 Activity</p> <p>2-2 Activity</p> <p>Use the Tables on Pgs. 216 and 230 as well as ancillary material to address Properties of Rational Numbers</p> <p>Prerequisite Skills (p. 159)</p> <p>Skills Review Handbook (pg. 484 – 485)</p> <p>Prerequisite Skills (p. 51)</p>

Algebra Readiness: Textbook Connections

Prentice Hall Mathematics: California Algebra Readiness



Topic




Standards

Textbook Sections

UNIT 1

Transitional Standards		
Number Sense and Whole Numbers	<p>7NS1.2 Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers.</p> <p>7NS2.1 Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base.</p> <p>7NS2.5 Understand the meaning of the absolute value of a number; interpret the absolute value as the distance of the number from zero on a number line; and determine the absolute value of real numbers.</p>	<p>1-1 Numerical Expressions</p> <p>1-2 Algebraic Expressions</p> <p>1-3 Writing Expressions</p> <p>1-3a Modeling Expressions</p> <p>1-5 Properties of Numbers</p> <p>1-6 Distributive Property</p>
Integers	<p>7AF1.2 Use the correct order of operations to evaluate algebraic expressions such as $3(2x + 5)^2$.</p> <p>7AF1.3 Simplify numerical expressions by applying properties of rational numbers (e.g., identity, inverse, distributive, associative, commutative) and justify the process used.</p> <p>7AF2.1 Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse. Simplify and evaluate expressions that include exponents.</p>	<p>2-1 Integers and Absolute Value</p> <p>2-2a Modeling Addition of Integers</p> <p>2-2 Adding Integers</p> <p>2-3a Modeling Subtraction of Integers</p> <p>2-3 Subtracting Integers</p> <p>2-4 Multiplying Integers</p> <p>2-5 Dividing Integers</p> <p>2-6 Positive Exponents</p>
Composition of Fractions		<p>4-1 Prime Factorization</p> <p>4-2 Greatest Common Divisor</p> <p>4-3a Exploring Fractions</p> <p>4-3 Equivalent Fractions</p> <p>4-4 Equivalent Forms of Rational Numbers</p> <p>4-5a Mixed Numbers</p> <p>4-5 Comparing and Ordering Rational Numbers</p>

**Algebra Readiness
Assessment 1
Periodic Assessment Blueprint
Secondary Mathematics, 2008 – 2009**

7 th Grade Standards		No. of Items on the CST	No. of Multiple Choice Items on the Assessment	No. of Constructed Response Items on the Assessment
NS1.2 	Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers.	4	4	1
AF1.2	Use the correct order of operations to evaluate algebraic expressions such as $3(2x+5)^2$	3	4	
AF1.3 	Simplify numerical expressions by applying properties of rational numbers (e.g., identity, inverse, distributive, associative, commutative) and justify the process used.	2	3	
AF2.1	Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse. Simplify and evaluate expressions that include exponents.	1	1	
NS2.5 	Understand the meaning of the absolute value of a number; interpret the absolute value as the distance of the number from zero on a number line; and determine the absolute value of real numbers.	2	3	
NS2.1	Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base.			
Transitional Standards			No. of Multiple Choice Items on the Assessment	
6NS2.4	Determine the least common multiple and the greatest common divisor of whole numbers; use them to solve problems with fractions (e.g. to find a common denominator, to add two fractions or to find the reduced form for a fraction).			2
4NS1.7	Write the fraction represented by a drawing of parts of a figure; represent a given fraction by using drawings; and relate a fraction to a simple decimal on a number line.			1
6NS2.3	Solve addition, subtraction, multiplication, and division problems, including those arising in concrete situations that use positive and negative integers and combinations of these operations			1
6AF1.3	Apply algebraic order of operations and the communicative, associative, and distributive properties to evaluate expressions; and justify each step in the process.			1

Algebra Readiness: Unit Concept Organizer

UNIT 2

Fractions, Decimals, Ratios and Proportion

Understand the operations on fractions and mixed numbers
7NS 1.2, 7NS 2.2
Algebra 2.0

- Add and subtract like and unlike fractions
- Add and subtract fractions by using factoring to find common denominator (e.g. $\frac{2}{28} + \frac{1}{49} = \frac{2}{2 \cdot 2 \cdot 7} + \frac{1}{7 \cdot 7} = \frac{2 \cdot 2}{2 \cdot 2 \cdot 7} + \frac{1 \cdot 2 \cdot 2}{7 \cdot 7 \cdot 2}$)
- Convert between improper fractions and mixed numbers
- Multiply and divide fractions
- Add, subtract, multiply, and divide mixed numbers
- Find the reciprocal of numbers

Understand the composition of decimals and operations on decimals
7NS 1.2, 7NS1.3, 7NS1.5

- Write fractions as decimals and use these representations in estimation, computations, and applications.
- Add, subtract, multiply, and divide decimals
- Know that rational number is either repeating or terminating decimal
- Convert terminating decimals into reduced fraction

Understand ratios and proportions
7 AF 4.2
7MG 1.2, 7MG 1.3

- Write ratios as fractions
- Compare ratios
- Find unit rates
- Write and solve proportions
- Read scale drawings and models
- Solve problems using proportions
- Solve problems involving average speed, distance, and time

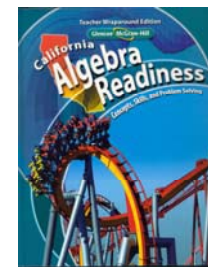
	7NS 1.2	7NS 2.2	Algebra 2.0	7NS1.3	7AF 4.2	7NS 1.5	7MG 1.2	7MG 1.3
KEY Standards – Number of CST Items	4	4		2	2	2	1	2
CONCEPT LESSON:								
CAHSEE	3	1	1	2	2		1	2

Note: Standards in **BOLD** are targeted standards for Algebra Readiness

Algebra Readiness: Textbook Connections

California Algebra Readiness, Concepts, Skills, and Problem Solving

UNIT 2



<p>Operations of Fractions</p>	<p>7NS1.2 Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers.</p> <p>7NS1.3 Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.</p> <p>7NS1.5 Know that every rational number is either a terminating or repeating decimal and be able to convert terminating decimals into reduced fractions.</p>	<p>3-5 Multiplying Fractions</p> <p>3-6 Dividing Fractions</p> <p>3-7 Adding Fractions and Subtracting Fractions with Like Denominators</p> <p>3-8 Adding Fractions with Unlike Denominators</p> <p>3-9 Subtracting Fractions with Unlike Denominators</p>
<p>Composition of and Operations on Fractions</p>	<p>7NS2.2 Add and subtract fractions by using factoring to find common denominators.</p> <p>7AF4.2 Solve multistep problems involving rate, average speed, distance, and time or a direct variation.</p>	<p>4-1 Fractions and Decimals</p> <p>4-2 Adding and Subtracting Decimals</p> <p>4-2 Extend: The Whole Thing</p> <p>4-3 Multiplying Decimals</p> <p>4-4 Dividing Decimals</p>
<p>Ratios and Proportions</p>	<p>7MG1.2 Construct and read drawings and models made to scale.</p> <p>7MG1.3 Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer.</p> <p>1A2.0 Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root. They understand and use the rules of exponents.</p>	<p>4-5 Problem-Solving Strategy: Work Backward</p> <p>6-1 Ratios and Rates</p> <p>6-3 Proportions and Proportional Reasoning</p> <p>6-3 Extend: Capture and Recapture</p>

Algebra Readiness: Textbook Connections

McDougal Littell: Algebra Readiness

UNIT 2



<p>Operations of Fractions</p>	<p>7NS1.2 Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers.</p> <p>7NS1.3 Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.</p> <p>7NS1.5 Know that every rational number is either a terminating or repeating decimal and be able to convert terminating decimals into reduced fractions.</p> <p>7NS2.2 Add and subtract fractions by using factoring to find common denominators.</p> <p>7AF4.2 Solve multistep problems involving rate, average speed, distance, and time or a direct variation.</p> <p>7MG1.2 Construct and read drawings and models made to scale.</p> <p>7MG1.3 Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer.</p>	<p>2-2 Write Mixed Numbers and Improper Fractions</p> <p>2-3 Add and Subtract Fractions with the Same Denominator</p> <p>2-4 Add and Subtract Fractions with Different Denominators</p> <p>2-5 Multiply Fractions</p> <p>2-6 Find Reciprocals</p> <p>2-7 Divide Fractions</p> <p>3-1 Add and Subtract Decimals</p> <p>3-2 Multiply Decimals</p> <p>3-3 Divide Decimals</p> <p>3-4 Convert Between Fractions and Decimals</p> <p>5-2 Add and Subtract Rational Numbers</p> <p>5-3 Use the Properties of Addition</p> <p>5-4 Multiply and Divide Rational Numbers</p> <p>5-5 Use the Properties of Multiplication</p> <p>5-6 Use the Distributive Property</p> <p>5-1 Compare and Order Rational Numbers</p>
<p>Composition of and Operations on Fractions</p> <p>Ratios and Proportions</p>	<p>1A2.0 Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root. They understand and use the rules of exponents.</p>	<p>3-5 Write Percents as Fractions and Decimals p. 483 Skills Review Handbook Note: Proportions are not covered in this text</p>

Algebra Readiness: Textbook Connections



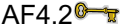



Prentice Hall Mathematics: California Algebra Readiness

UNIT 2



Composition of and Operations on Fractions	<p>7NS1.2 Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers.</p> <p>7NS1.3 Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.</p> <p>7NS1.5 Know that every rational number is either a terminating or repeating decimal and be able to convert terminating decimals into reduced fractions.</p> <p>7NS2.2 Add and subtract fractions by using factoring to find common denominators.</p>	<p>4-4 Equivalent Forms of Rational Numbers</p> <p>4-5 Comparing and Ordering Rational Numbers</p> <p>5-1 Adding Rational Numbers</p> <p>5-2 Subtracting Rational Numbers</p> <p>5-3 Multiplying Rational Numbers</p> <p>5-3a Modeling Fraction Multiplication</p> <p>5-4 Dividing Rational Numbers</p>
Ratios and Proportions	<p>7AF4.2 Solve multistep problems involving rate, average speed, distance, and time or a direct variation.</p> <p>7MG1.2 Construct and read drawings and models made to scale.</p> <p>7MG1.3 Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer.</p> <p>1A2.0 Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root. They understand and use the rules of exponents.</p>	<p>6-1 Ratios</p> <p>6-2 Rates</p> <p>6-2b Simplifying Rates</p> <p>6-3 Dimensional Analysis</p> <p>6-4 Applications of Rates</p> <p>6-5 Proportions</p>

**Algebra Readiness
Assessment 2
Periodic Assessment Blueprint
Secondary Mathematics, 2008 – 2009**

7 th Grade Standards		No. of Items on the CST	No. of Multiple Choice Items on the Assessment	No. of Constructed Response Items on the Assessment
NS 1.2 	Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers.	4	5	
NS2.2 	Add and subtract fractions by using factoring to find common denominators.	4	4	
AF4.2 	Solve multistep problems involving rate, average speed, distance, and time or a direct variation.	2	3	1
NS1.5 	Know that every rational number is either a terminating or repeating decimal and be able to convert terminating decimals into reduced fractions.	2	2	
MG1.2	Construct and read drawings and models made to scale.	1	1	
MG1.3 	Use measures expressed as rates (e.g. speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer.	2	2	
NS1.3	Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.	4	2	
Transitional Standard			No. of Multiple Choice Items on the Assessment	
6NS1.2 	Interpret and use ratios in different contexts (e.g., batting averages, miles per hour) to show the relative sizes of two quantities, using appropriate notations (a/b , a to b , $a:b$).		1	

Algebra Readiness: Unit Concept Organizer

Percents and Algebraic Problem Solving

**U
N
I
T
3**

Understand percents

7NS 1.3, 7NS 1.6, 7NS 1.7

- Write percents as decimals and fractions
- Write decimals and fractions as percents
- Use benchmark percents (1% and 10%) to find the percent of a number
- Use a proportion to find the percent of a number and to find a number that corresponds to 100%
- Use a proportion to find percent, given two numbers
- Find the percent increase or decrease of a quantity
- Solve problems involving discounts, markup, commission, and profit
- Compute simple and compound interest

Understand how to solve linear equations including simplifying expressions







7AF 1.1, 7AF 1.3, 7AF 4.1, 7AF4.2, 7NS 2.1, 7NS 2.3, Algebra 2.0

- Use variables and appropriate operations to write an expression and equation that represents a verbal description
- Simplify and evaluate expressions that include exponents
- Understand and use the rules of exponents
- Evaluate expressions
- Solve one-step and two-step equations
- Simplify expressions
- Solve problems involving average speed, distance, and time

Understand Inequalities

7AF 1.1, 7AF 4.1

- Write an inequality that represents a verbal description
- Solve problems involving inequalities

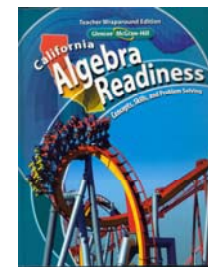
	7AF 1.1	7AF 1.3	7AF 4.1	7AF 4.2	7NS 1.3	7NS 1.6	7NS2.1	7NS2.3	Algebra 2.0	7NS 1.7
 KEY Standards										
Number of CST Items	3	 2	 4	 2	4	1	1	 2		 2
CONCEPT LESSON:										
CAHSEE	2		3	2	2	1	1	1	1	2

Note: Standards in **BOLD** are targeted standards for Algebra Readiness

Algebra Readiness: Textbook Connections

California Algebra Readiness, Concepts, Skills, and Problem Solving

UNIT 3



<p>Linear Equations</p>	<p>7NS1.3 Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.</p> <p>7NS1.6 Calculate the percentage of increases and decreases of a quantity.</p> <p>7NS1.7 Solve problems that involve discounts, markups, commissions, and profit and compute simple and compound interest.</p> <p>7NS2.1 Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base.</p> <p>7NS2.3 Multiply, divide, and simplify rational numbers by using exponent rules.</p>	<p>2-1 Equations</p> <p>2-7 Solving Equations</p> <p>3-10 Fractions in Expressions and Equations</p> <p>4-6 Decimals in Expressions and Equations</p> <p>5-1 Exponents</p> <p>5-2 Integers Exponents</p> <p>5-3 Problem-Solving Strategies: Solve a Simpler Problem</p> <p>5-5 Simplifying and Evaluating Expressions</p> <p>6-2 Fractions, Decimals, and Percents</p> <p>6-4 The Percent Proportion</p> <p>6-5 Problems Involving Percents</p> <p>6-6 Direct Variation</p> <p>6-7 Problem-Solving Strategy: Make a Table</p>
<p>Percents</p>	<p>7AF1.1 Use variables and appropriate operations to write an expression, an equation, an inequality, or a system of equations or inequalities that represents a verbal description (e.g., three less than a number, half as large as area A).</p> <p>7AF1.3 Simplify numerical expressions by applying properties of rational numbers (e.g., identity, inverse, distributive, associative, commutative) and justify the process used.</p> <p>7AF4.1 Solve two-step linear equations and inequalities in one variable over the rational numbers, interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the results.</p> <p>7AF4.2 Solve multistep problems involving rate, average speed, distance, and time or a direct variation.</p> <p>1A2.0 Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root. They understand and use the rules of exponents.</p>	<p>Note: Compound Interest is not covered in this text. Use Ancillary Materials</p>
<p>Linear Inequalities</p>	<p>7AF4.1 Solve two-step linear equations and inequalities in one variable over the rational numbers, interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the results.</p> <p>7AF4.2 Solve multistep problems involving rate, average speed, distance, and time or a direct variation.</p> <p>1A2.0 Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root. They understand and use the rules of exponents.</p>	<p>Note: Inequalities are not covered in this text. Use Ancillary Materials</p>

Algebra Readiness: Textbook Connections

McDougal Littell: Algebra Readiness

UNIT 3



<p>Linear Equations</p>	<p>7NS1.3 Convert fractions to decimals and percents and use these representations in estimations, computations, and applications. 7NS1.6 Calculate the percentage of increases and decreases of a quantity. 7NS1.7 Solve problems that involve discounts, markups, commissions, and profit and compute simple and compound interest. 7NS2.1 Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base. 7NS2.3 Multiply, divide, and simplify rational numbers by using exponent rules. 7AF1.1 Use variables and appropriate operations to write an expression, an equation, an inequality, or a system of equations or inequalities that represents a verbal description (e.g., three less than a number, half as large as area A).</p>	<p>6-1 Multiply Powers with the Same Base 6-2 Divide Powers with the Same Base 6-3 Use Zero and Negative Exponents 6-4 Simplify Expressions Involving Exponents 8-1 Solve Equations Involving Addition or Subtraction 8-2 Solve Equations Involving Multiplication or Division 8-3 Solve Two-Step Equations 8-4 Solve Equations with Fractions and Decimals</p>
<p>Percents</p>	<p>7AF1.3 Simplify numerical expressions by applying properties of rational numbers (e.g., identity, inverse, distributive, associative, commutative) and justify the process used.</p>	<p>3-5 Write Percents as Fractions and Decimals 3-6 Write Decimals and Fractions as Percents 3-7 Find a Percent of a Number</p>
<p>Linear Inequalities</p>	<p>7AF4.1 Solve two-step linear equations and inequalities in one variable over the rational numbers, interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the results. 7AF4.2 Solve multistep problems involving rate, average speed, distance, and time or a direct variation. 1A2.0 Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root. They understand and use the rules of exponents.</p>	<p>9-1 Write and Graph Simple Inequalities 9-2 Solve Inequalities Involving Addition or Subtraction 9-3 Solve Inequalities Involving Multiplication or Division 9-4 Solve Two-Step Inequalities</p>

Algebra Readiness: Textbook Connections





Prentice Hall Mathematics: California Algebra Readiness

UNIT 3



<p>Linear Equations</p>	<p>7NS1.3 Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.</p> <p>7NS1.6 Calculate the percentage of increases and decreases of a quantity.</p> <p>7NS1.7 Solve problems that involve discounts, markups, commissions, and profit and compute simple and compound interest.</p> <p>7NS2.1 Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base.</p> <p>7NS2.3 Multiply, divide, and simplify rational numbers by using exponent rules.</p>	<p>1-2 Algebraic Expressions</p> <p>3-1 Solving Addition Equations</p> <p>3-2a Modeling Equations</p> <p>3-2 Solving Subtraction Equations</p> <p>3-3 Solving Multiplication and Division Equations</p> <p>3-4a Modeling Two-Step Equations</p> <p>3-4 Solving Two-Step Equations</p> <p>5-5 Solving Equations by Adding or Subtracting</p> <p>5-6 Solving Equations by Multiplying</p> <p>5-7 Zero and Negative Exponents</p>
<p>Percents</p>	<p>7AF1.1 Use variables and appropriate operations to write an expression, an equation, an inequality, or a system of equations or inequalities that represents a verbal description (e.g., three less than a number, half as large as area A).</p> <p>7AF1.3 Simplify numerical expressions by applying properties of rational numbers (e.g., identity, inverse, distributive, associative, commutative) and justify the process used.</p>	<p>7-1 Fractions, Decimals, and Percents</p> <p>7-2 Finding a Percent of a Number</p> <p>7-3 Percents and Proportions</p> <p>7-4 Percent of Change</p> <p>7-5b Simple Interest</p> <p>7-5 Applications of Percent</p>
<p>Linear Inequalities</p>	<p>7AF4.1 Solve two-step linear equations and inequalities in one variable over the rational numbers, interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the results.</p> <p>7AF4.2 Solve multistep problems involving rate, average speed, distance, and time or a direct variation.</p> <p>1A2.0 Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root. They understand and use the rules of exponents.</p>	<p>9-1 Writing Inequalities</p> <p>9-2 Solving Inequalities by Addition or Subtracting</p> <p>9-3 Solving Inequalities by Dividing</p> <p>9-4 Solving Inequalities by Multiplying</p> <p>9-5b Systems of Inequalities</p> <p>9-5 Solving Two-Step Inequalities</p> <p>10-1 Properties of Exponents</p> <p>10-2 Power Rules</p>

**Algebra Readiness
Assessment 3
Periodic Assessment Blueprint
Secondary Mathematics, 2008 – 2009**

7 th Grade Standards		No. of Items on the CST	No. of Multiple Choice Items on the Assessment	No. of Constructed Response Items on the Assessment
AF1.1	Use variables and appropriate operations to write an expression, an equation, an inequality, or a system of equations or inequalities that represents a verbal description (e.g., three less than a number, half as large as area A).	3	2	1
AF 1.3	Simplify numerical expressions by applying properties of rational numbers (e.g., identity, inverse, distributive, associative, commutative) and justify the process used.	2	2	
AF2.1	Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse. <i>Simplify and evaluate expressions that include exponents.</i>	1	1	
AF4.1 	Solve two-step linear equations and inequalities in one variable over the rational numbers, interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the results.	4	5	
AF4.2 	Solve multistep problems involving rate, average speed, distance, and time or a direct variation.	2	1	
NS1.3	Convert fractions to <i>decimals</i> and percents and use these representations in estimations, computations, and applications.	4	3	
NS 2.3 	Multiply, divide, and simplify rational numbers by using exponent rules.	2	2	
NS1.6	Calculate the percentage of increases and decreases of a quantity.	1	1	
NS1.7 	Solve problems that involve discounts, markups, commissions, and profit and compute simple and compound interest.	2	2	
NS2.1	Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base.	1	1	

Algebra Readiness: Unit Concept Organizer

UNIT 4

Linear Functions and their Graphs, Linear Equations, and Pythagorean Theorem

Understand linear functions and graph lines
7AF 1.5, 7AF 3.1, 7AF 3.3, 7AF 3.4
 Understand Pythagorean Theorem
7MG 3.3

CST Preparation

Understand algebraic problem solving (linear applications) involving multistep problems

Algebra 2.0, Algebra 4.0
Algebra 5.0

- Identify and graph points in the coordinate plane
- Use tables and graphs to represent function
- Find the slope of a line as a ratio and as a rate of change
- Use equations, tables, and graphs to solve problems
- Find squares of numbers and find and estimate the square roots of numbers
- Use the Pythagorean Theorem to solve problems
- Use the converse of the Pythagorean Theorem
- Find Pythagorean triples

Review all prior standards for CST including these:

7SDAP 1.1, 7SDAP 1.3, 7SDAP 1.2
6SDAP 1.1, 3.1, 3.3, 3.5, 3.3
7MG 2.3, 7MG 2.4, 7MG 3.2,
7MG 2.1, 7MG 2.2, 7NS 1.1

- Take the root
- Simplify expressions before solving linear equations
- Solve multistep problems involving linear equations in one variable

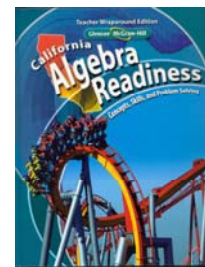
	7AF 3.1	7AF 3.3	7AF 3.4	7MG 3.3	Algebra 4.0	Algebra 5.0	Algebra 2.0
KEY Standards - Number of CST Items	1	2	1	3			
CONCEPT LESSON:							
CAHSEE	1	2	1	2	3	2	2

Note: Standards in **BOLD** are targeted standards for Algebra Readiness

Algebra Readiness: Textbook Connections

California Algebra Readiness, Concepts, Skills, and Problem Solving

UNIT 4



<p>Linear Functions and their Graphs</p>	<p>7AF3.1 Graph functions of the form $y = nx^2$ and $y = nx^3$ and use in solving problems.</p> <p>7AF3.3 Graph linear functions, noting that the vertical change (change in y-value) per unit of horizontal change (change in x-value) is always the same and know that the ratio (“rise over run”) is called the slope of a graph.</p>	<p>7-1 The Coordinate Plane 7-2 Problem-Solving Strategy: Draw a Graph 7-3 Relationships Involving Equal Ratios 7-5 Slope 7-6 Linear Functions 7-7 The Pythagorean Theorem</p>
<p>Pythagorean Theorem</p>	<p>7AF3.4 Plot the values of quantities whose ratios are always the same (e.g., cost to the number of an item, feet to inches, circumference to diameter of a circle). Fit a line to the plot and understand that the slope of the line equals the quantities.</p>	<p>5-4 Roots 5-5 Simplifying and Evaluating Expressions</p>
<p>Multistep Algebraic Problem Solving Area and Volume</p>	<p>7MG3.3 Know and understand the Pythagorean theorem and its converse and use it to find the length of the missing side of a right triangle and the lengths of other line segments and, in some situations, empirically verify the Pythagorean theorem by direct measurement.</p>	<p>8-3 Coordinate Geometry 8-4 Perimeter 8-5 Area 8-6 Problem-Solving 8-7 Explore: Find Volume and Surface Area 8-7 Solid Figures and Volume 8-8 Surface Area</p>
<p>Probability and Statistics</p>	<p>1A2.0 Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root. They understand and use the rules of exponents.</p> <p>1A4.0 Students simplify expressions prior to solving linear equations in one variable, such as $3(2x-5) + 4(x-2) = 12$.</p> <p>1A5.0 Students solve multistep problems, including word problems, involving linear equations in one variable and provide justification for each step.</p>	<p>The standards: MG 2.1, 2.2, 2.3, 2.4, and 3.2 are to be additionally addressed for General Math CST</p> <p>Note: Use Ancillary Materials to Review Applicable Probability and Statistics Standards for CST</p>

Algebra Readiness: Textbook Connections

McDougal Littell: Algebra Readiness

UNIT 4



<p>Linear Functions and their Graphs</p>	<p>7AF3.1 Graph functions of the form $y = nx^2$ and $y = nx^3$ and use in solving problems.</p> <p>7AF3.3 Graph linear functions, noting that the vertical change (change in y-value) per unit of horizontal change (change in x-value) is always the same and know that the ratio (“rise over run”) is called the slope of a graph.</p> <p>7AF3.4 Plot the values of quantities whose ratios are always the same (e.g., cost to the number of an item, feet to inches, circumference to diameter of a circle). Fit a line to the plot and understand that the slope of the line equals the quantities.</p>	<p>10-1 Graph in the Coordinate Plane 10-2 Graph Linear Equations in Standard Form 10-3 Graph Horizontal and Vertical Lines 10-4 Graph Linear Equations Using Intercepts 10-5 Find Slopes of Lines 10-6 Graph Equations in Slope-Intercept Form 10-7 Solve Direct Variation Problems Using Algebra</p>
<p>Pythagorean Theorem</p>	<p>7MG3.3 Know and understand the Pythagorean theorem and its converse and use it to find the length of the missing side of a right triangle and the lengths of other line segments and, in some situations, empirically verify the Pythagorean theorem by direct measurement.</p>	<p>7-1 Find Square Roots of Perfect Squares 7-2 Approximate Square Roots 7-3 Use the Pythagorean Theorem 7-4 Use the Converse of the Pythagorean</p>
<p>Multistep Algebraic Problem Solving Area and Volume</p>	<p>1A2.0 Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root. They understand and use the rules of exponents.</p> <p>1A4.0 Students simplify expressions prior to solving linear equations in one variable, such as $3(2x-5) + 4(x-2) = 12$.</p>	<p>8-5 Solve Equations Using the Distributive Property 8-6 Solve Rate Problems</p> <p>Use Ancillary Materials to Review these Standards: MG 2.1, 2.2, 2.3, 2.4, and 3.2 for CST</p>
<p>Probability and Statistics</p>	<p>1A5.0 Students solve multistep problems, including word problems, involving linear equations in one variable and provide justification for each step.</p>	<p>Use Ancillary Materials to Review Applicable Probability and Statistics Standards for CST</p>

Algebra Readiness: Textbook Connections

Prentice Hall Mathematics: California Algebra Readiness

UNIT 4



<p>Linear Functions and their Graphs</p>	<p>7AF3.1 Graph functions of the form $y = nx^2$ and $y = nx^3$ and use in solving problems.</p> <p>7AF3.3 Graph linear functions, noting that the vertical change (change in y-value) per unit of horizontal change (change in x-value) is always the same and know that the ratio (“rise over run”) is called the slope of a graph.</p> <p>7AF3.4 Plot the values of quantities whose ratios are always the same (e.g., cost to the number of an item, feet to inches, circumference to diameter of a circle). Fit a line to the plot and understand that the slope of the line equals the quantities.</p>	<p>8-1 Graphing in the Coordinate Plane 8-2 Length in the Coordinate Plane 8-2b Graphs of Right Triangles 8-3a Tables and Equations 8-3 Functions 8-4 Graphing Linear Functions 8-5 Slope 8-6 Slope and Direct Variation</p>
<p>Pythagorean Theorem</p>	<p>7MG3.3 Know and understand the Pythagorean theorem and its converse and use it to find the length of the missing side of a right triangle and the lengths of other line segments and, in some situations, empirically verify the Pythagorean theorem by direct measurement.</p>	<p>3-5 Square Roots 3-6 The Pythagorean Theorem 3-7 Using the Pythagorean Theorem 3-7b Verifying Right Triangles</p>
<p>Multistep Algebraic Problem Solving</p>	<p>1A2.0 Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root. They understand and use the rules of exponents.</p> <p>1A4.0 Students simplify expressions prior to solving linear equations in one variable, such as $3(2x-5) + 4(x-2) = 12$.</p>	<p>10-3 Exploring Roots 10-4a: Modeling Expressions 10-4 Simplifying Algebraic Expressions 10-5a: Modeling Multi-Step Equations 10-5 Solving Multi-Step Equations 10-6 Solving Equations With Variables on Both Sides</p>
<p>Area and Volume</p>	<p>1A5.0 Students solve multistep problems, including word problems, involving linear equations in one variable and provide justification for each step.</p>	<p>Use Ancillary Materials to Review these Standards: MG 2.1, 2.2, 2.3, 2.4, and 3.2 for CST</p>
<p>Probability and Statistics</p>		<p>Use Ancillary Materials to Review Applicable Probability and Statistics Standards for CST</p>