

Orange Unified School District

ALGEBRA I

Year Course

GRADE LEVEL: 9-12**PREREQUISITES:** See Mathematics Sequence and Course Entrance Guidelines in addendum**INTRODUCTION TO THE SUBJECT:**

Algebra I includes work with the basic properties of real numbers, equations, and inequalities, solution of problems using equations and inequalities, operations with polynomials, graphs, system of linear equations, solving problems by systems of equations, factoring polynomials, solving quadratic equations, solving problems involving quadratic equations, inductive and deductive reasoning, and basic probability and statistics.

COURSE OBJECTIVES:

Symbolic reasoning and calculations with symbols are central in algebra. Through the study of algebra, a student develops an understanding of the symbolic language of mathematics and the sciences. Algebraic skills and concepts are developed and used in a variety of problem-solving situations.

ADOPTED TEXT: *Algebra 1* ©2008 Holt, Rinehart and Winston**FIRST SEMESTER****ASSESSMENT BLUEPRINT:**

Semester	Standard	No. Items in Test
1	1.0 Properties of numbers	1
	2.0 Opposites, reciprocals, roots, powers, fractional roots	6
	3.0 Equations / Inequalities including absolute value	1
	4.0 Simplify expressions prior to solving equations/inequalities	3
	5.0 Multistep problems involving linear equations/inequalities	6
	6.0 Graph linear equations/inequalities; intercepts	5
	7.0 Point-slope formula; verify that a point lies on a line	3
	8.0 Slopes of parallel/perpendicular lines	2
	9.0 Systems of linear equations	5
	15.0 Rate problem	1

ESSENTIAL LEARNINGS AND PACING:**DAYS**

I. Chapter 1 – Standards 1, 2, prep 4, 24, 25

Essential Learnings: Students will

- Know and use properties to simplify expressions.
- Perform mathematical operations using real numbers.

A. Lesson 1-1	Variables and Expressions	1	
B. Lesson 1-2	Adding and Subtracting Real Numbers	1	
C. Lesson 1-3	Multiplying and Dividing Real Numbers	1	
D. Lesson 1-4	Powers and Exponents	1	
E. Lesson 1-5	Roots and Irrational Numbers	1	
F. Lesson 1-6	Properties of Real Numbers	1	
G. Lesson 1-7	Simplifying Expressions	1	
H. Quiz, Review and Test		<u>3</u>	10

II. Chapter 2 – Standards 2, 3, 4, 5, 15

Essential Learnings: Students will

• Solve multi-step equations, including those with absolute value.			
• Transform equations with multiple variables			
A. Lesson 2-1	One-Step Equations	1	
B. Lesson 2-2	Two-Step Equations	1	
C. Lesson 2-3	Multi-Step Equations	2	
D. Lesson 2-4	Equations with Variables on Both Sides	2	
E. Lesson 2-6	Literal Equations for a Variable	1	
F. Lesson 2-7	Absolute Value Equations (Example 1 problems only)	1	
G. Quiz, Review and Test		<u>3</u>	11

III. Chapter 3 – Standards 3, 4, 5

Essential Learnings: Students will

• Solve and graph on a number line the solution to multi-step inequalities.			
A. Lesson 3-1	Graphing and Writing Inequalities	½	
B. Lesson 3-2	Solving Inequalities by Adding or Subtracting	½	
C. Lesson 3-3	Solving Inequalities by Multiplying or Dividing	1	
D. Lesson 3-4	Two-Step and Multi-Step Inequalities	1	
E. Lesson 3-5	Inequalities with Variables on Both Sides	1	
F. Lesson 3-6	Compound Inequalities	2	
G. Quiz, Review and Test		<u>3</u>	9

End of 1st Quarter

IV. Chapter 5 – Standards 6, 7, 8

Essential Learnings: Students will

• Know and use the three forms of a linear equation.			
• Graph and equation of a line using various methods.			
• Know that the points on the line are the solution to the equation.			
• Use slope to determine if lines are parallel or perpendicular			
A. Lesson 5-1	Linear Equations and Functions	1	
B. Lesson 5-2	Using Intercepts	1	
C. Lesson 5-3	Slope	2	
D. Lesson 5-5	Slope-Intercept Form	2	
E. Lesson 5-6	Point-Slope Form	2	
F. Lesson 5-7	Slopes of Parallel and Perpendicular Lines	2	
G. Quiz, Review and Test		<u>3</u>	13

5-5—5-7 Supplement
re-writing equations
into standard form.

V. Chapter 6 – Standards 6, 8, 9 ,15

Essential Learnings: Students will

- Solve linear and inequality systems by graphing, substitution and elimination.
 - A. Lesson 6-1 Solving Systems by Graphing 1
 - B. Lesson 6-2 Solving Systems by Substitution 2
 - C. Lesson 6-3 Solving Systems by Elimination 2
 - D. Lesson 6-4 Solving Special Systems 1
 - E. Lesson 6-5 Applying Systems (**Supplement mixture/rate problems**) 2
 - F. Lesson 6-6 Solving Linear Inequalities 1
 - G. Lesson 6-7 Solving Systems of Linear Equations 1-2
 - H. Quiz, Review and Test **3** 13-14

VI. Chapter 7 – Standards 2, 10

Essential Learnings: Students will

- Know and use positive, negative and fractional exponents
 - Simplify polynomials
 - A. Lesson 7-1 Integer Exponents 1
 - B. Lesson 7-3 Multiplication Properties of Exponents
 - C. Lesson 7-4 Division Properties of Exponents
 - D. Lesson 7-5 Fractional Exponents 1
 - E. Review/Test 7-1 – 7-5 2
 - F. Lesson 7-6 Polynomials 1
 - G. Lesson 7-7 Adding and Subtracting Polynomials 1
 - H. Lesson 7-8 Multiplying Polynomials 1
 - I. Lesson 7-9 Special Products of Binomials 1
 - J. Review and Test 7-6 – 7-9 **2** 12
- } 7-3 & 7-4 May opt to use before 7-1.

End of 1st Semester

SECOND SEMESTER

ASSESSMENT BLUEPRINT:

Semester	Standard	No. Items in Test
2	1.1 Properties of numbers	3
	10.0 Operations with monomials/polynomials	3
	11.0 Factoring	4
	12.0 Simplifying rational polynomials	3
	13.0 Operations with rational expressions and functions	4
	14.0 Quadratic equations (factoring/completing the square)	3
	15.0 Rate/work/percent mixture problems	4
	16.0 Relations and functions	1
	17.0 Domain and range	1
	19.0 Proof of quadratic formula	1
	20.0 Quadratic formula	2
	21.0 Graph quadratic functions	1
	22.0 Interception of graph with x -axis in 0, 1, or 2 points	2
	23.0 Apply quadratic equations to physical problems	1

VII. Chapter 8 – Standard 11

Essential Learnings: Students will

• Factor polynomials			
A. Lesson 8-1	Factors and Greatest Common Factors		1
B. Lesson 8-2	Factoring by GCF		1
C. Lesson 8-3	Factoring $x^2 + bx + c$		1
D. Lesson 8-4	Factoring $ax^2 + bx + c$		2
E. Lesson 8-5	Factoring Special Products		1
F. Lesson 8-6	Choosing a Factoring Method		2
G. Quiz, Review and Test			<u>3</u> 11

VIII. Chapter 9 – Standard 14, 17, 19, 20, 21, 22, 23

Essential Learnings: Students will

• Identify quadratic functions and equations			
• Solve quadratic equations			
A. Lesson 9-5	Solving Quadratic Equations by Factoring		1
B. Lesson 9-1	Quadratic Equations and Functions		1
C. Lesson 9-2	Characteristics of Quadratic Functions		1
D. Lesson 9-3	Graphing Quadratic Functions		1
E. Lesson 9-4	Solving Quadratic Equations by Graphing		1
F. Review/Test 9-1 – 9-5			2
G. Lesson 9-6	Solving Quadratic Equations by Using Square Roots		1
H. Lesson 9-7	Completing the Square		2
I. Lesson 9-8	The Quadratic Formula	} Option to teach 9-5 – 9-9 before 9-1.	2
J. Lesson 9-9	The Discriminant		1
K. Review and Test 9-5 – 9-9			<u>2</u> 15

IX. Chapter 10 – Standard 10, 12, 13, 15

Essential Learnings: Students will

• Divide with polynomials			
A. Lesson 10-1	Inverse Variation		1
B. Lesson 10-2	Rational Functions (1
C. Lesson 10-3	Simplifying Rational Expressions		1
D. Lesson 10-4	Multiplying and Dividing Rational Expressions		2
E. Lesson 10-5	Adding and Subtracting Rational Expressions		2
F. Lesson 10-6	Dividing Polynomials		1
G. Lesson 10-7	Solving Rational Equations		1
H. Lesson 10-8	Applying Rational Equations		3
I. Quiz, Review and Test			<u>3</u> 15

End of 3rd Quarter

X. Lesson 4-2 Relations and Functions	1
CST Review	dependent on calendar

XI. Chapter 11
Skipped Sections

DATE OF LAST CONTENT REVISION: August 2008

DATE OF CURRENT CONTENT REVISION: February 2010

DATE OF BOARD APPROVAL: October 13, 2005

**CALIFORNIA STANDARDS TEST
ALGEBRA I**
(Blueprint adopted by the State Board of Education 10/02)

<u>CALIFORNIA CONTENT STANDARDS: ALGEBRA I</u>	# of Items
Symbolic reasoning and calculations with symbols are central in algebra. Through the study of algebra, a student develops an understanding of the symbolic language of mathematics and the sciences. In addition, algebraic skills and concepts are developed and used in a wide variety of problem-solving situations.	
Algebra I	65
Standard Set 1.0 Students identify and use the arithmetic properties of subsets of integers and rational, irrational, and real numbers, including closure properties for the four basic arithmetic operations where applicable:	
1.1 Students use properties of numbers to demonstrate whether assertions are true or false.	1/2**
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.	4
3.0 Students solve equations and inequalities involving absolute values.	1
4.0* Students simplify expressions prior to solving linear equations and inequalities in one variable, such as $3(2x-5) + 4(x-2) = 12$.	3
5.0* Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.	6
6.0* Students graph a linear equation and compute the x - and y - intercepts (e.g., graph $2x + 6y = 4$). They are also able to sketch the region defined by linear inequality (e.g., they sketch the region defined by $2x + 6y < 4$).	4
7.0* Students verify that a point lies on a line, given an equation of the line. Students are able to derive linear equations using the point-slope formula.	4
8.0 Students understand the concepts of parallel lines and perpendicular lines and how those slopes are related. Students are able to find the equation of a line perpendicular to a given line that passes through a given point.	1
9.0* Students solve a system of two linear equations in two variables algebraically and are able to interpret the answer graphically. Students are able to solve a system of two linear inequalities in two variables and to sketch the solution sets.	5
10.0* Students add, subtract, multiply, and divide monomials and polynomials. Students solve multistep problems, including word problems, by using these techniques.	4
11.0 Students apply basic factoring techniques to second- and simple third-degree polynomials. These techniques include finding a common factor for all terms in a polynomial, recognizing the difference of two squares, and recognizing perfect squares of binomials.	2
12.0* Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to the lowest terms.	3

13.0*Students add, subtract, multiply, and divide rational expressions and functions. Students solve both computationally and conceptually challenging problems by using these techniques.	4
14.0*Students solve a quadratic equation by factoring or completing the square.	3
15.0*Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.	4
16.0 Students understand the concepts of a relation and a function, determine whether a given relation defines a function, and give pertinent information about given relations and functions.	1/2**
17.0 Students determine the domain of independent variables and the range of dependent variables defined by a graph, a set of ordered pairs, or a symbolic expression.	1
18.0 Students determine whether a relation defined by a graph, a set of ordered pairs, or a symbolic expression is a function and justify the conclusion.	1/2**
19.0*Students know the quadratic formula and are familiar with its proof by completing the square.	2
20.0*Students use the quadratic formula to find the roots of a second-degree polynomial and to solve quadratic equations.	3
21.0*Students graph quadratic functions and know that their roots are the x -intercepts.	3
22.0 Students use the quadratic formula or factoring techniques or both to determine whether the graph of a quadratic function will intersect the x -axis in zero, one, or two points.	1
23.0*Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity.	3
Standard Set 24.0 Students use and know simple aspects of a logical argument:	
24.1 Students explain the difference between inductive and deductive reasoning and identify and provide examples of each.	1/3**
24.2 Students identify the hypothesis and conclusion in logical deduction.	1/3**
24.3 Students use counterexamples to show that an assertion is false and recognize that a single counterexample is sufficient to refute an assertion.	1/3**
Standard Set 25.0 Students use properties of the number system to judge the validity of results, to justify each step of a procedure, and to prove or disprove statements:	
25.1 Students use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions.	1/2**
25.2 Students judge the validity of an argument according to whether the properties of the real number system and the order of operations have been applied correctly at each step.	1/2**
25.3 Given a specific algebraic statement involving linear, quadratic, or absolute value expressions or equations or inequalities, students determine whether the statement is true sometimes, always, or never.	1/2**
ALGEBRA I TOTAL	65

* Key standards comprise a minimum of 70% of the test

** Fractional values indicate rotated standards (e.g., 1/2 = rotated every two years; 1/3 = rotated every three years)