

MIDDLE SCHOOL COURSE OUTLINE

Course Title: Algebra Ia (10 Credits)
Grade Level: 8
Prerequisites: Teacher/counselor recommendation

Course Description:

Algebra Ia is the first year of a two-year integrated college preparatory mathematics course covering all the key components of the Mathematics Framework for California Public Schools and the Mathematics Content Standards. Algebra Ia provides students the course content equivalent to the first semester of first-year Algebra I. The course is designed to allow students adequate learning time as they transition from the concepts of Pre-Algebra to the rigors of first-year Algebra. Students learn to reason symbolically, and the complexity, types of equations and problems they are able to solve increase dramatically as a consequence. The key content of Algebra Ia includes writing, solving, and graphing linear (first degree) equations. Students will also solve problems using monomial and polynomial expressions using a variety of techniques. Students begin to factor polynomials as a preparation to solving quadratic equations. Application of problem-solving skills is an integral component in this course.

Student Performance

Objectives* for this Course:

Students will

1. 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:
 - use properties of numbers to demonstrate whether assertions are true or false.
2. use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a fractional power. Students will also use the rules of exponents.
3. solve equations and inequalities involving absolute values.
4. simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x-5) + 4(x-2) = 12$.
5. solve multi-step problems, including work problems, involving linear equations and linear inequalities in one variable and provide justification for each step.
6. graph a linear equation and compute the x- and y-intercepts (e.g., graph $2x + 6y = 4$). They will also sketch the region defined by linear inequality (e.g., they sketch the region defined by $2x + 6y < 4$).

Note: The State's Mathematics Content Standards for Algebra have been used as the performance objectives for the District's Algebra Ia course. The numbering of the objectives correlates with the State Content Standards.

7. verify that a point lies on a line, given an equation of the line. Students derive linear equations by using the point-slope formula.
8. demonstrate an understanding of the concepts of parallel lines and perpendicular lines and how those slopes are related. Students find the equation of a line perpendicular to a given line that passes through a given point.
16. describe 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.
17. determine the domain of independent variables and the range of dependent variables defined by a graph, a set or ordered pairs, or a symbolic expression.
18. determine whether a relation defined by a graph, a set of ordered pairs, or a symbolic expression is a function and justify the conclusion.
24. utilize simple aspects of a logical argument:
 - explain the difference between inductive and deductive reasoning and identifying and provide examples of each.
 - identify the hypothesis and conclusion in logical deduction.
 - use counterexamples to show that an assertion is false and recognize that a single counter-example is sufficient to refute an assertion.
25. 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:
 - use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions.
 - 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.
 - 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*.

Instructional Strategies

1. Lecture – Directed Lessons
2. Small Group Activities/Discussion
3. Reading Assignments
4. Written Assignments
5. Utilization of Computer Software
6. Extended Activities – Application/Projects

Instructional Units

FIRST SEMESTER

<u>Weeks</u>	<u>Units</u>
2	Prerequisite Skills
2	Chapter 1: Connections to Algebra
5	Chapter 2: Properties of Real Numbers
6	Chapter 3: Solving Linear Equations

SECOND SEMESTER

<u>Weeks</u>	<u>Units</u>
5	Chapter 4: Graphing Linear Equations and Functions
4	Chapter 5: Writing Linear Equations
6	Chapter 6: Solving and Graphing Linear Inequalities
2	Review

Evaluation

Student progress will be evaluated by:

1. Daily Class and Homework Assignments
2. Quizzes, Tests
3. Student Projects
4. Class Participation
5. Teacher Observation

Materials and Resources

Student Textbook:

Algebra Ia: Concepts and Skills (Volume 1)
Larson, Boswell, Kanold, Stiff
McDougal Littell, Inc.