



UCLA Department of Mathematics
Center for Mathematics and Teaching presents

INTRODUCTION TO ALGEBRA

AN ALGEBRA READINESS PROGRAM
for California's students

www.introtoalg.org

Introduction to Algebra is a cohesive one-year course designed in response to California's need for an algebra readiness program for struggling eighth graders. The lessons emphasize all the required standards in Appendix E of the 2006 *Mathematics Framework for California Public Schools, Kindergarten Through Grade Twelve*, and they include substantial practice for mastery. Some lessons also address the standards currently assessed on the California Standards Test for General Mathematics.

Designed by California mathematics educators

Written by experienced California teachers

Edited by California university mathematicians

Field-tested in California middle schools

Supported with professional development

Some Special Features of the Program

- Cohesive and coherent design
- Precise mathematical explanations and definitions for teachers and students
- Emphasis on multiple representations (called the "Fourfold Way")
- Student Packets that offer students manageable chunks of material and a fresh start for success each week
- Appropriate strategies and support that give struggling students (especially special needs learners or English learners) full access to the curriculum
- Practice that leads to fluency
- A Periodic Assessment Scoring Service provided by an independent evaluator
- Professional Development in collaboration with local professional development providers

Introduction to Algebra targets students who are not ready for algebra. These students typically score far below basic, below basic, or in the low basic range on the 7th Grade California Standards Test.

7 th Grade CST	Far Below Basic	Below Basic	Basic	Proficient	Advanced
8 th Grade Program	Introduction to Algebra		?	an algebra course	

SEMESTER 1 (EMPHASIS ON FOUNDATIONAL SKILLS AND CONCEPTS)

	Week	Lesson 1	Lesson 2	Lesson 3 (Skill Builders)	Highlighted Review
	0	Getting to Know You	Pre-Assessment 1	Whole Numbers: Vocabulary, Addition and Subtraction	
Quarter 1	UNIT 1: INTEGERS				
	1	Whole Numbers: Using An Area Model to Explain Multiplication	Whole Numbers: Estimating Quotients	Whole Numbers: Place Value and Rounding	
	2	Integers: Introduction	Whole Numbers: Division with Remainder	Whole Numbers: Expanded Form and Divisibility	Whole Numbers: Addition and Subtraction, Properties of Addition
	3	Integers: Addition and Subtraction 1	Fourfold Way: Numbers, Pictures, and Words	Integers: Addition and Subtraction 2	Whole Numbers: Place Value, Rounding, and Expanded Form
	4	Integers: Multiplication and Division 1	Fourfold Way: Numbers, Pictures, Words, and Symbols	Integers: Multiplication and Division 2	Whole Numbers: Multiplication, Properties of Multiplication
	UNIT 2: RATIONAL NUMBER CONCEPTS				
	5	Fractions: Parts and Wholes	Fourfold Way: Growing Shapes	Factorization	Whole Numbers: Division
	6	Fractions: Equivalence 1	Fourfold Way: Conversion Graphs	Fractions: Renaming	Integers: Addition and Subtraction
	7	Fractions: Equivalence 2	Number Lines: Fractions	Decimals: Place Value, Rounding, and Expanded Form	Integers: Multiplication and Division
	8	Fractions: Equivalence 3	Number Lines: Rational Numbers	Decimals: Ordering, Addition and Subtraction	Multiple Representations or Quarter 1 Assessment
	UNIT3: EXPRESSIONS AND EQUATIONS				
	9	Numerical Expressions and Equations	Fractions: Addition and Subtraction 1	Fractions: Addition and Subtraction 2	Fractions: Renaming
	10	Algebraic Expressions and Equations	Balance Puzzles 1	Fractions: Addition and Subtraction 3	Decimals: Place Value, Rounding, and Expanded Form or Trimester 1 Assessment
	11	Balance Puzzles 2	Solving Equations 1	Fractions: Addition and Subtraction 4	Ordering Rational Numbers
	12	Inputs and Outputs 1	Fractions: Multiplication 1	Fractions: Multiplication 2	Factorization
	UNIT 4: LENGTH, AREA, AND VOLUME				
13	Rectangles: Fixed Area	Fractions: Division 1	Fractions: Division 2	Decimals: Ordering, Addition and Subtraction	
14	Rectangular Prisms: Volume and Surface Area	Decimals: Multiplication 1	Decimals: Multiplication 2	Fractions: Addition and Subtraction	
15	Circles: Circumference	Decimals: Division 1	Decimals: Division 2	Evaluating Algebraic Expressions	
16	Circles: Area	Cylinders: Volume and Surface Area	Review 1	Solving Equations or Quarter 2 Assessment	
Quarter 2					

TOPIC CLUSTERS

Whole Numbers	Rational Numbers	Symbolic Algebra
Integers	Ratio, Proportion, Percent	Linear Functions
Exponents and Roots	Probability and Statistics	Geometry

SEMESTER 2 (EMPHASIS ALGEBRA READINESS STANDARDS)

	Week	Lesson 1	Lesson 2	Lesson 3 (Skill Builders)	Highlighted Review
	00	Statistics: Analyzing Name Scores	Statistics: Data Displays	Pre-Assessment 2	
Quarter 3	UNIT 5: RATIO, PROPORTION, AND PERCENT				
	17	Proportional Reasoning	Understanding Percents	Ratios, Rates, and Proportions	Fractions: Multiplication and Division
	18	Percent Increase and Decrease	Simple Interest	Percent Problems	Decimals: Multiplication and Division
	19	Linking Percents and Proportions	Probability: Spinner Puzzles	Dimensional Analysis	Integers Revisited
	20	Solving Proportions 1	Probability: Flip and Roll	Solving Proportions 2	Fraction, Decimal, and Percent Equivalences or Trimester 2 Assessment
	UNIT 6: CONJECTURE AND JUSTIFICATION				
	21	Areas of Polygons	Squares and Square Roots	Defining Exponents	Direct Variation
	22	Conjectures About Exponents 1	Time-Distance Graphs	Rules for Exponents 1	Percent Applications
	23	Conjectures About Exponents 2	Probability: Fair Games	Rules for Exponents 2	Ratio and Proportion
	24	The Pythagorean Theorem	Applications of the Pythagorean Theorem	Statistics: Measures of Center	Finding Lengths and Areas or Quarter 3 Assessment
	UNIT 7: SYMBOLIC ALGEBRA				
	25	Using Algebra to Prove Conjectures 1	Using Algebra to Prove Conjectures 2	Order of Operations	Exponents and Roots
26	Solving Equations 2	Algebra Applications: Perimeter Problems	Simplifying Expressions	The Pythagorean Theorem	
27	Solving Equations 3	Algebra Applications: Number Problems	Solving Equations 4	Probability and Statistics	
28	Inequalities	Algebra Applications: Train Problems	Algebra Applications	Writing Algebraic Expressions	
UNIT 8: LINEAR FUNCTIONS					
29	Introduction to Slope	Rate Graphs	Properties of Arithmetic and Equality	Simplifying Expressions, Properties of Arithmetic	
30	Inputs and Outputs 2	Introduction to Lines	Finding Slopes of Lines	Equations and Inequalities, Properties of Equality or Trimester 3 Assessment	
31	Introduction to Systems of Equations	Using Multiple Strategies to Solve Problems	Writing Equations of Lines	Algebra Applications	
32	Stacking Cups	Lefty-Righty Experiment	Review 2	Slope or Quarter 4 Assessment	
Quarter 4	UNIT 7: SYMBOLIC ALGEBRA				
	25	Using Algebra to Prove Conjectures 1	Using Algebra to Prove Conjectures 2	Order of Operations	Exponents and Roots
	26	Solving Equations 2	Algebra Applications: Perimeter Problems	Simplifying Expressions	The Pythagorean Theorem
	27	Solving Equations 3	Algebra Applications: Number Problems	Solving Equations 4	Probability and Statistics
28	Inequalities	Algebra Applications: Train Problems	Algebra Applications	Writing Algebraic Expressions	
UNIT 8: LINEAR FUNCTIONS					
29	Introduction to Slope	Rate Graphs	Properties of Arithmetic and Equality	Simplifying Expressions, Properties of Arithmetic	
30	Inputs and Outputs 2	Introduction to Lines	Finding Slopes of Lines	Equations and Inequalities, Properties of Equality or Trimester 3 Assessment	
31	Introduction to Systems of Equations	Using Multiple Strategies to Solve Problems	Writing Equations of Lines	Algebra Applications	
32	Stacking Cups	Lefty-Righty Experiment	Review 2	Slope or Quarter 4 Assessment	

TYPICAL COMPOSITION OF SKILL BUILDERS

	ABOUT 25%	ABOUT 25%	ABOUT 25%	ABOUT 25%
Skill Builder 1	Skill Builder Topic of the Week			
Skill Builder 2	Skill Builder Topic of the Week		Highlighted Review	Past Skills and Concepts
Skill Builder 3	Skill Builder Topic of the Week	Highlighted Review	Future Highlighted Reviews (next 3-4 weeks)	

LESSON CLUSTER MAP

WHOLE NUMBERS	RATIONAL NUMBERS	SYMBOLIC ALGEBRA
0.3 Whole Numbers: Vocabulary, Addition and Subtraction 1.1 Whole Numbers: Using an Area Model to Explain Multiplication 1.2 Whole Numbers: Estimating Quotients 1.3 Whole Numbers: Place Value and Rounding 2.2 Whole Numbers: Division with Remainder 2.3 Whole Numbers: Expanded Form and Divisibility 5.3 Factorization	5.1 Fractions: Parts and Wholes 6.1 Fractions: Equivalence 1 6.3 Fractions: Renaming 7.1 Fractions: Equivalence 2 7.2 Number Line: Fractions 7.3 Decimals: Place Value, Rounding, and Expanded Form 8.1 Fractions: Equivalence 3 8.2 Number Line: Rational Numbers 8.3 Decimals: Ordering, Addition and Subtraction 9.2 Fractions: Addition and Subtraction 1 9.3 Fractions: Addition and Subtraction 2 10.3 Fractions: Addition and Subtraction 3 11.3 Fractions: Addition and Subtraction 4 12.2 Fractions: Multiplication 1 12.3 Fractions: Multiplication 2 13.2 Fractions: Division 1 13.3 Fractions: Division 2 14.2 Decimals: Multiplication 1 14.3 Decimals: Multiplication 2 15.2 Decimals: Division 1 15.3 Decimals: Division 2	9.1 Numerical Expressions and Equations 10.1 Algebraic Expressions and Equations 10.2 Balance Puzzles 1 11.1 Balance Puzzles 2 11.2 Solving Equations 1 25.1 Using Algebra to Prove Conjectures 1 25.2 Using Algebra to Prove Conjectures 2 25.3 Order of Operations 26.1 Solving Equations 2 26.2 Algebra Applications: Perimeter Problems 26.3 Simplifying Expressions 27.1 Solving Equations 3 27.2 Algebra Applications: Number Problems 27.3 Solving Equations 4 28.1 Inequalities 28.2 Algebra Applications: Train Problems 28.3 Algebra Applications 29.3 Properties of Arithmetic and Equality 31.2 Using Multiple Strategies to Solve Problems
INTEGERS	RATIO, PROPORTION, PERCENT	LINEAR FUNCTIONS
2.1 Integers: Introduction 3.1 Integers: Addition and Subtraction 1 3.3 Integers: Addition and Subtraction 2 4.1 Integers: Multiplication and Division 1 4.3 Integers: Multiplication and Division 2	17.1 Proportional Reasoning 17.2 Understanding Percents 17.3 Ratios, Rates, and Proportions 18.1 Percent Increase and Decrease 18.2 Simple Interest 18.3 Percent Problems 19.1 Linking Percents and Proportions 19.3 Dimensional Analysis 20.1 Solving Proportions 1 20.3 Solving Proportions 2	3.2 Fourfold Way: Numbers, Pictures, and Words 4.2 Fourfold Way: Numbers, Pictures, Words, and Symbols 5.2 Fourfold Way: Growing Shapes 6.2 Fourfold Way: Conversion Graphs 12.1 Inputs and Outputs 1 22.2 Time-Distance Graphs 29.1 Introduction to Slope 29.2 Rate Graphs 30.1 Inputs and Outputs 2 30.2 Introduction to Lines 30.3 Finding Slopes of Lines 31.1 Introduction to Systems of Equations 31.3 Writing Equations of Lines 32.1 Stacking Cups 32.2 Lefty-Righty Experiment
EXPONENTS AND ROOTS	PROBABILITY AND STATISTICS	GEOMETRY
21.2 Squares and Square Roots 21.3 Defining Exponents 22.1 Conjectures About Exponents 1 22.3 Rules for Exponents 1 23.1 Conjectures About Exponents 2 23.3 Rules for Exponents 2	00.1 Statistics: Analyzing Name Scores 00.2 Statistics: Data Displays 19.2 Probability: Spinner Puzzles 20.2 Probability: Flip and Roll 23.2 Probability: Fair Games 24.3 Statistics: Measures of Center	13.1 Rectangles: Fixed Area 14.1 Rectangular Prisms: Volume and Surface Area 15.1 Circles: Circumference 16.1 Circles: Area 16.2 Cylinders: Volume and Surface Area 21.1 Areas of Polygons 24.1 The Pythagorean Theorem 24.2 Applications of the Pythagorean Theorem

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