Independent School District of Boise City
Accelerated Algebra 1

District Course #0813

Course Description

Open to: Grade 8 One Year Course
Prerequisite: Instructor/Counselor Approval/Accelerated Mathematics 7
Content: Students will study the structure of the real number system and will apply it to steps involved in solving algebra problems. Equations and inequalities will be solved using math axioms. Graphic and algebraic analysis of equations, inequalities, and systems of equations will be studied. Emphasis will be placed upon factoring, algebraic fractions, radicals, and problem solving.

Adopted Materials

Title: Algebra-Structure and Method Book 1
Edition: 2000
Publisher McDougal Littell
ISBN: 0-395-97722-3

Course Scope

Unit 0	Preparation and Review	
Unit 1	Introduction to Algebra	2 Weeks
Unit 2	Working with Real Numbers	2 Weeks
Unit 3	Solving Equations and Problems	3 Weeks
Unit 4	Polynomials	3 Weeks
Unit 5	Exponents and Polynomials	5 Weeks
Unit 6	Fractions (through 6.3 in Semester 1, then from 6.4 on 2nd Semester	2 Weeks
Unit 7	Applying Fractions	2 Weeks
Unit 8	Introduction to Functions	2 Weeks
Unit 9	Systems of Linear Equations	2 Weeks
Unit 10	Inequalities	2 Weeks
Unit 11	Rational and Irrational Numbers	2 Weeks
Unit 12	Quadratic Functions	1 Week
Various	Selected Topics	

Resource Materials:

Textbook:
Brown, Dolciani, Sorgenfrey, and Cole. *Algebra I. Structure and Method Book 1*
McDougal Littel, Houghton Mifflin Company 2000. (PH)
Additional Resources:
Taylor, Harold and Loretta. *Developing Skills in Algebra I Book A*. Palo Alto, Ca. Dale Seymour. 1984. (DS-A)
Taylor, Harold and Loretta. *Developing Skills in Algebra I Book B*. Palo Alto, Ca. Dale Seymour. 1984. (DS-B)

Taylor, Harold and Loretta. *Developing Skills in Algebra I Book C*. Palo Alto, Ca. Dale Seymour. 1984. (DS-C)
Taylor, Harold and Loretta. *Developing Skills in Algebra I Book D*. Palo Alto, Ca. Dale Seymour. 1984. (DS-C)
Marcy, Steve and Janis. *Middle School Math with Pizazz C revised.* Chicago. Creative Publications, 1996. (CP-C)
Marcy, Steve and Janis. *Middle School Math with Pizazz D revised.* Chicago. Creative Publications,1996. (CP-D)
Marcy, Steve and Janis. *Middle School Math with Pizazz E revised.* Chicago. Creative Publications,1996. (CP-E)
Marcy, Steve and Janis. *Algebra with Pizazz revised.* Chicago. Creative Publications, 1996. (CP-A)

Algebra 1		**District Reference** 0813
Unit 0	**Preparation and Review**	

Instructional Objective 0813.01 Review arithmetic skill prerequisites from previous years.			**Standard Reference** AI.1.1.1, AI.1.2.1, AI.5.2.1
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Demonstrate proficiency at performing basic arithmetic skills using fractions and decimals.	Text p. 43, p. 92 (Maint. Skills end of Chap)	TMA

Algebra 1		**District Reference** 0813
Unit 1	**Introduction to Algebra**	

Instructional Objective 0813.02 Understand and use procedures for operating on algebraic expressions.			**Standard Reference** AI.1.1.1
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Evaluate an algebraic expression using rational numbers.	Ch. 1-1, 1-2	TMA, EOC
Instructional Objective 0813.03 Use the proper order of operations. Perform operations with real numbers.			**Standard Reference** AI.1.3.1
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Use the order of operations to simplify numerical expressions.	Ch. 1-1, 1-2, 1-3	TMA, EOC

Instructional Objective 0813.04 Understand and use variables, expressions, equations, and inequalities.			Standard Reference AI.3.2.2
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Translate an English phrase or sentence into an algebraic expression and vice versa.	Ch 1-4, 1-5	TMA, EOC
Instructional Objective 0813.05 Use a variety of methods, including common mathematical formulas, to solve problems drawn from daily life.			**Standard Reference** AI.1.3.2
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Use a problem-solving model to develop and apply problem-solving strategies. (e.g., guess and check, draw a diagram, make a list, work backwards, and identify a simpler problem.)	Ch. 1-6, 1-7	TMA, EOC

Algebra 1		**District Reference** 0813
Unit 2	**Working with Real Numbers**	

Instructional Objective 0813.06 Understand properties of the real number system.			Standard Reference AI.1.3.1
No.	**PerforAzmance Objective**	**Resource Reference**	**Assessment Correlation**
01	Recognize and use a property of real numbers (associative, commutative, distributive, and equality) in an algebraic expression.	Ch. 2-1	TMA, EOC
02	Identify and use identity and inverse properties in algebraic expressions.	Ch. 2-2	TMA, EOC
Instructional Objective 0813.07 Understand and use positive and negative numbers, fractions, decimals, percentages, and scientific notation.			**Standard Reference** AI.1.3.1
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Understand and perform basic operations on positive and negative numbers.	Ch. 2-2, 2-3, 2-4, 2-5, 2-6, 2-8, 2-9	TMA, EOC
Instructional Objective 0813.08 Use a variety of methods, including common mathematical formulas, to solve problems drawn from daily life.			**Standard Reference** AI.1.3.2
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Use a problem-solving model to develop and apply problem-solving strategies. (e.g., guess and check, draw a diagram, make a list, work backwards, and	Ch. 2-7	TMA, EOC

	identify a simpler problem.)		
Instructional Objective 0813.09 Make and evaluate logical arguments.			**Standard Reference** AI.1.3.2
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Make and evaluate logical arguments (e.g. explain why it is not possible to divide by zero.)	Ch. 2.9	EOC

Algebra 1		**District Reference** 0813
Unit 3	**Solving Equations and Problems**	

Instructional Objective 0813.10 Understand and use appropriate procedures to solve linear equations and inequalities such as: $3x - 4 = 2$ or $3x - 4 > 2$			**Standard Reference** AI.3.1.1, AI.3.2.1
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Solve linear equations with one variable for computational or word problems.	Ch. 3-1, 3-2, 3-3, 3-4, 3-5	TMA, EOC
Instructional Objective 0813.11 Use a variety of methods, including common mathematical formulas, to solve problems drawn from daily life.			**Standard Reference** AI.1.3.2
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Use a problem-solving model to develop and apply problem-solving strategies. (e.g., guess and check, draw a diagram, make a list, work backwards, and identify a simpler problem.)	Ch. 3-4, 3-6, 3-7	TMA, EOC
Instructional Objective 0813.12 Solve problems that involve varying quantities with variables, expressions, equations, inequalities, and absolute values.			**Standard Reference** AI.3.2.2
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Solve problems that involve varying quantities variables, expressions, equations, inequalities, and absolute values.	Ch. 3-4, 3-5	TMA, EOC

Algebra 1		**District Reference** 0813
Unit 4	**Polynomials**	

Instructional Objective 0813.13 Use the proper order of operations. Perform operations with real numbers.			Standard Reference AI.1.1.2, AI.1.3.1
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Use the order of operations to simplify numerical expressions.	Ch. 4-1	TMA, EOC
Instructional Objective 0813.14 Understand and use procedures for operating on algebraic expressions.			**Standard Reference** AI.1.1.1,AI.1.2.1, AI.1.3.3
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Evaluate an expression using exponents.	Ch. 4-1 through 4-4	TMA, EOC
02	Simplify expressions involving exponents.	Ch. 4-5 through 4-7	TMA, EOC
Instructional Objective 0813.15 Use a variety of methods, including common mathematical formulas, to solve problems drawn from daily life.			**Standard Reference** AI.1.3.2
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Use a problem-solving model to develop and apply problem-solving strategies. (e.g., guess and check, draw a diagram, make a list, work backwards, identify a simpler problem.)	Ch. 4-8 through 4-10	TMA, EOC

Algebra 1		**District Reference** 0813
Unit 5	**Exponents and Polynomials**	

Instructional Objective 0813.16 Use number theory concepts (divisibility rules, factors, multiples, primes) to solve problems.			**Standard Reference** AI.1.3.1**,** AI.1.3.3
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Apply definitions of prime and composite numbers to solve mathematical problems.	Ch. 5-1, 5-2, 5-3	TMA, EOC
Instructional Objective 0813.17 Make and evaluate logical arguments.			**Standard Reference**
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Make and evaluate logical arguments (e.g., explain why it is not possible to divide by zero.)	Ch. 5-2	EOC

Instructional Objective	Standard Reference
0813.18 Use appropriate procedures to simplify and solve polynomial equations and inequalities such as $x^2 + 3x = 7$ or $x^2 + 3x < 7$	AI.1.3.1, AI.1.3.3

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Factor simple polynomials.	Ch. 5-3, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11	TMA, EOC
02	Factor the difference of two squares or perfect square trinomials.	Ch. 5-5, 5-6	TMA, EOC
03	Solve polynomial word problems with or without factoring.	Ch. 5-12, 5-13	TMA, EOC

Algebra 1		District Reference
		0813
Unit 6	**Fractions**	

Instructional Objective	Standard Reference
0813.19 Understand and use procedures for operating on algebraic expressions.	AI.1.1.2

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Evaluate an algebraic expression using rational numbers.	Ch. 6-1, 6-2, 6-3	TMA, EOC

Instructional Objective	Standard Reference
0813.20 Model real-world phenomena using polynomial, rational, and basic exponential functions, noting restricted domains.	AI.1.3.1

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Model real-world phenomena using polynomial, rational, and basic exponential functions.	Ch. 6-2, 6-3, 6-5, 6-6, 6-7	TMA, EOC

Algebra 1		District Reference
		0813
Unit 7	**Applying Fractions**	

Instructional Objective	Standard Reference
0813.21 Understand and use procedures for operating on algebraic expressions.	AI.3.2.2

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Evaluate an algebraic expression using rational numbers.	Ch. 7-1 through 7-3	TMA, EOC

Instructional Objective	Standard Reference
0813.22 Understand and use proportions, ratios, and scaling.	AI.3.3.1,AI.2.1.1

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Calculate the solutions to number problems using ratio, proportion, and percent.	Ch. 7-1, 7-2, 7-5, 7-6	TMA, EOC

Instructional Objective	Standard Reference
0813.23 Understand and use appropriate procedures to solve linear equations and inequalities such as: $3x - 4 = 2$ or $3x - 4 > 2$	AI.3.2.2AI.3.3.1

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Solve fractional equations	Ch. 7-3, 7-4	TMA, EOC

Instructional Objective	Standard Reference
0813.24 Make and evaluate logical arguments.	AI.1.3.2

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Make and evaluate logical arguments (e.g., explain why it is not possible to divide by zero.)	Ch. 7-4	EOC

Instructional Objective	Standard Reference
0813.25 Understand and use positive and negative numbers, fractions, decimals, percentages, and scientific notation.	AI.1.2.1, AI.1.3.1

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Convert decimals (terminating and repeating), fractions, or percents interchangeably.	Ch. 7-5, 7-6	TMA, EOC
02	Convert numbers from scientific notation (including those with negative exponents) to the standard form and vice versa.	Ch. 7-10	TMA, EOC

Instructional Objective	Standard Reference
0813.20 Model real-world phenomena using polynomial, rational, and basic exponential functions, noting restricted domains.	

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Model real-world phenomena using polynomial, rational, and basic exponential functions.	Ch. 7-4 through 7-8	TMA, EOC

Algebra 1		District Reference 0813
Unit 8	**Introduction to Functions**	

Instructional Objective 0813.26 Understand the purpose and capabilities or appropriate technology.			Standard Reference AI.1.3.2
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Discuss and understand the purpose and capabilities or appropriate technology.	Graphing calculator demonstration	TMA, EOC
Instructional Objective 0813.27 Understand concepts of the Cartesian Coordinate System.			**Standard Reference** AI.3.1.1, AI.3.1.2, AI.3.4.1
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Determine the slope of a line using the slope formula, the equation of the line, or the graph of the equation.	Ch. 8-1 through 8-3	TMA, EOC
02	Determine the linear equation of the line using the slope, y-intercept, or coordinates and will compare the slopes of parallel and perpendicular lines.	Ch. 8-4, 8-5	TMA, EOC
03	Determine a linear equation from analyzing the graph of the equation.	Ch. 8-4, 8-5	TMA, EOC
04	Graph a linear equation with two variables.	Ch. 8-4, 8-5	TMA, EOC
Instructional Objective 0813.28 Represent a set of data in a table, a graph, and as a mathematical relationship.			**Standard Reference** AI.3.1.1,AI.3.2.1,AI.5.2.2
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Identify whether an expression, ordered pair, or graph does or does not represent a function and justify the conclusion.	Ch. 8-6, Vertical Line Test	TMA, EOC
02	Find the range of a function, given its domain.	Ch. 8-6, 8-7, 8-8	TMA, EOC

Algebra 1		**District Reference** 0813
Unit 9	**Systems of Linear Equations**	

Instructional Objective 0813.29 Use graphs, matrices, and sequences to represent and solve problems.			Standard Reference AI.3.2.1, AI.3.2.2
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Use graphs, matrices, and sequences to represent and solve problems.	Ch. 9	TMA, EOC

Instructional Objective	Standard Reference
0813.30 Understand and use appropriate procedures to solve simple linear systems of equations and inequalities such as $x + y = 7$ $2x + 3y = 21$ or $x + y < 7$ $2x + 3y \geq 21$	AI.3.2.2

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Solve systems of linear equations in two variables.	Ch. 9-1, 9-2, 9-3, 9-4, 9-5	TMA, EOC
02	Graph a linear equation with two variables.	Ch. 9.1	TMA, EOC

Instructional Objective	Standard Reference
0813.20 Model real-world phenomena using polynomial, rational, and basic exponential functions, noting restricted domains.	

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Model real-world phenomena using polynomial, rational, and basic exponential functions.	Ch. 9-6, 9-7	TMA, EOC

Algebra 1		District Reference 0813
Unit 10	**Inequalities**	

Instructional Objective	Standard Reference
0813.31 Understand and use variables, expressions, equations, and inequalities.	AI.3.2.2

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Translate an English phrase or sentence into an algebraic expression and vice versa.	Ch. 10-1, 10-3	TMA, EOC

Instructional Objective	Standard Reference
0813.32 Understand concepts of the Cartesian Coordinate System.	AI.3.1.1

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Identify inequalities by their representation on a graph.	Ch. 10-1, 10-7, 10-8	TMA, EOC
02	Graph an inequality with one or two variables.	Ch. 10-1, 10-7, 10-8	TMA, EOC

Instructional Objective	Standard Reference
0813.33 Understand and use appropriate procedures to solve linear equations and inequalities such as: $3x - 4 = 2$ or $3x - 4 > 2$	AI.3.3.1,AI.3.2.2

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Solve absolute value equations.	Ch. 10-2, 10-3	TMA, EOC
02	Solve inequalities with one variable in computational or word problems	Ch. 10-2, 10-3	TMA, EOC

Instructional Objective	Standard Reference
0813.34 Understand properties of the real number system.	AI.3.3.1,AI.3.2.2

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Solve inequalities with one variable in computational or word problems.	Ch. 10-2, 10-3, 10-5, 10-6	TMA, EOC

Instructional Objective	Standard Reference
0813.35 Solve problems that involve varying quantities with variables, expressions, equations, inequalities, and absolute values.	AI.1.3.1,AI.3.2.2

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Solve problems that involve varying quantities variables, expressions, equations, inequalities, and absolute values.	Ch. 10-2, 10-3, 10-5, 10-6	TMA, EOC

Instructional Objective	Standard Reference
0813.36 Understand and use appropriate procedures to solve simple linear systems of equations and inequalities such as $x + y = 7$ $2x + 3y = 21$ or $x + y < 7$ $2x + 3y \geq 21$	AI.3.1.1,AI.3.2.1, AI.3.2.2

No.	Performance Objective	Resource Reference	Assessment Correlation
01	Evaluate an inequality in two variables.	Ch. 10-7, 10-8	TMA, EOC
02	Write an inequality to represent a problem situation or write a possible situation that an inequality could represent.	Ch. 10-3	TMA, EOC
03	Find the solutions set for an inequality.	Ch. 10	TMA, EOC

Algebra 1		District Reference
		0813
Unit 11	**Rational and Irrational Numbers**	

Instructional Objective		Standard Reference	
0813.37 Understand properties of roots, exponents, and logarithms.		AI.1.1.2	
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Perform operations on numerical expressions containing roots and integral exponents.	Ch. 11-3, 11-4, 11-5, 11-7, 11-8	TMA, EOC
02	Perform basic operations to simplify radical expressions containing variables.	Ch. 11-5, 11-6, 11-10	TMA, EOC
Instructional Objective		**Standard Reference**	
0813.38 Understand properties of the real number system.		AI.1.1.2,AI.1.3.1, AI.3.2.2	
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Solve radical equations.	Ch. 11-10	TMA, EOC
Instructional Objective		**Standard Reference**	
0813.39 Know and apply the Pythagorean Theorem to solve real world problems.		AI.1.3.1, AI.1.3.2	
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Find the lengths of the sides or a right triangle using the Pythagorean Theorem, and use the distance formula to find the distance between any two points in a Cartesian plane.	Ch. 11.6	TMA, EOC

Algebra 1		District Reference
		0813
Unit 12	**Quadratic Functions**	**Time Frame**

Instructional Objective		Standard Reference	
0813.40 Understand and use procedures for operating on algebraic expressions.		AI.1.2.1,AI.1.1.2, AI.1.3.3	
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Evaluate an algebraic expression using rational numbers.	Ch. 12-1	TMA, EOC
02	Evaluate an expression using exponents.	Ch. 12-1	TMA, EOC
Instructional Objective		**Standard Reference**	
0813.41 Use appropriate procedures to simplify and solve polynomial equations and inequalities such as $x^2 + 3x = 7$ or $x^2 + 3x < 7$		AI.1.3.3,AI.3.2.2,AI.5.2.2	
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	State and apply the quadratic formula to simple	Ch. 12-3	TMA, EOC

	quadratic equations.		

Algebra 1		District Reference 0813
Unit Various	**Selected Topics**	**Time Frame**

Instructional Objective 0813.45 Understand the nature and use of mathematical models.			**Standard Reference** AI.2.1.1
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Understand the nature and use of mathematical models.	Throughout Text	TMA, EOC
Instructional Objective 0813.46 Determine length, area, capacity, weight, time, and temperature with appropriate units.			Standard Reference AI.2.1.1
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Use US customary and metric units of measurement to calculate perimeter, area, surface area, and volume.	Throughout Text	TMA, EOC
Instructional Objective 0813.47 Understand equivalent units, comparable units, and conversions			**Standard Reference** AI.2.1.1,AI.2.2.1
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Understand equivalent units, comparable units, and conversions.	Throughout Text	TMA, EOC
Instructional Objective 0813.48 Understand units and their relationship to one another and to real world applications.			**Standard Reference** AI.2.1.1,AI.2.2.1
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Use measurement in word problems (e.g., rate, work, distance, power, percent mixture)	Throughout Text and specifically Ch. 8.5, 10.7-10.8	TMA, EOC
Instructional Objective 0813.49 Understand that error accumulates in a computation when there is rounding at intermediate steps.			**Standard Reference** AI.2.1.1
No.	**Performance Objective**	**Resource Reference**	**Assessment Correlation**
01	Determine the reasonableness to computation and word problems, choosing an appropriate method (e.g., using estimation, evaluating according to context).	Throughout Text	TMA, EOC

IDAHO CONTENT STANDARDS
ALGEBRA I
MATHEMATICS

Students are expected to know content and apply skills from the K-8 standards.

Mathematical reasoning and problem solving processes will be incorporated throughout all mathematics standards. When solving problems, students should think ahead about a strategy, form conjectures, test ideas with special cases, try different approaches, check for errors and reasonableness of solutions as a regular part of routine work, and devise independent ways to verify results. Students will demonstrate knowledge and communicate mathematical thinking through words, numbers, symbols, charts, graphs, tables, diagrams, and models.

Maintenance Concepts should have been taught previously and are important foundational concepts that will be applied in this course. Continued facility with and understanding of the Maintenance Concepts is essential for success in the objectives for this course.

Objectives provide the focus for this course. They will be taught using a variety of methods and applications so that students attain a deep understanding of these concepts and are able to apply them to solve contextual situations.

Skill Statements are provided when appropriate for clarity and direction to achieve each objective. Students need to demonstrate proficiency in these skills upon completion of this course.

The appropriate use of technological tools is encouraged to assist students in the formation and testing of conjectures, creating graphs and data displays, and determining and assessing lines of best fit for data.

Standard 1: Number and Operation

Maintenance Concepts for Standard 1

- Compare, order, describe, and classify rational numbers to include integers, fractions, decimals, and absolute values.
- Add, subtract, multiply, and divide rational numbers.
- Read, write, and represent rational numbers.
- Convert between standard and scientific notation.
- Evaluate numerical expressions with whole number exponents.
- Apply number theory concepts to include primes, composites, prime factorizations, least common multiples, and greatest common factors.
- Evaluate numerical expressions using order of operations.
- Estimate to predict computation results.
- Understand the meanings and effects of operations with fractions, decimals, and integers.

Goal 1.1: Understand numbers, ways of representing numbers, relationships among numbers, and number systems.

Objective(s): By the end of Algebra I, the student will be able to:

AI.1.1.1 Demonstrate meanings for real numbers, absolute value, integer exponents, and square roots.

Skill Statements:

a. Classify real numbers as rational or irrational.
b. Distinguish between exact and approximate values of irrational numbers.
c. Locate the position of a number on the number line and know its distance from the origin is its absolute value.
d. Approximate the location of an irrational number on a number line.
e. Demonstrate the meanings of terms with exponents which are integers.

AI.1.1.2 Demonstrate how the properties of real numbers apply to rational numbers.

Skill Statement:

a. Demonstrate that squaring and taking the square root are inverse operations.

Goal 1.2: Understand meanings of operations and how they relate to one another.

Objective(s): By the end of Algebra I, the student will be able to:

AI.1.2.1 Judge the effects of multiplication, division, addition, subtraction, exponents, and square roots on the magnitudes of quantities.

Skill Statement:

a. Estimate square roots between consecutive integers.

Goal 1.3: Compute fluently and make reasonable estimates.

Objective(s): By the end of Algebra I, the student will be able to:

AI.1.3.1 Perform computations with exponents, radicals, and scientific notation.

Skill Statements:

a. Use order of operations and the properties of real numbers (substitution, commutative, associative, distributive, inverse, identity, multiplicative property of zero) to simplify expressions including polynomials, rational expressions, and expressions containing radicals and absolute values.
b. Simplify square roots containing radicands which are not perfect squares.
c. Add, subtract, and multiply square roots.
d. Multiply and divide numbers in scientific notation.

AI.1.3.2 Apply number sense to contextual situations and judge reasonableness of solutions.

Skill Statements:

a. Use appropriate methods to estimate answers and know if they are reasonable.
b. Select a suitable method of computing from mental mathematics, paper and pencil, calculators, or computers.

AI.1.3.3 Use the properties of real numbers to simplify expressions.

Skill Statements:

a. Use the properties of exponents to add, subtract, and multiply polynomials, and to divide a polynomial by a monomial.
b. Factor polynomials using greatest common factor.
c. Factor quadratic expressions where the leading coefficient is 1 or -1.

Suggested Vocabulary and Symbols

absolute value, base, power, exponent, radical, radicand, rationalize, distributive property, evaluate, irrational number, perfect squares and cubes, principal square root, properties of the real number system, rational number, real number system, square root, squaring, monomial, binomial, trinomial, polynomial, coefficient, leading coefficient, like terms, factor (noun and verb), FOIL, simplest form, term, constant, degree of polynomial, degree of a term

Standard 2: Concepts and Principles of Measurement

Maintenance Concepts for Standard 2

- Understand both metric and customary systems of measurement.
- Understand relationships among units and convert from one unit to another within the same system.
- Understand, select, and use units of appropriate size and type to measure angles, perimeter, area, surface area, and volume.
- Use appropriate methods and units to estimate measurements.
- Select and apply techniques and tools to accurately find length, area, volume, and angle measures to appropriate levels of precision.
- Select and use formulas to determine the circumference and area of circles.
- Select and use formulas to determine the perimeters and areas of triangles and quadrilaterals.
- Develop strategies to determine the areas of irregular shapes.
- Solve problems involving scale factors, rates, ratios, and proportions.

Goal 2.1: Understand measurable attributes of objects and the units, systems, and processes of measurement.

Objective(s): By the end of Algebra I, the student will be able to:

AI.2.1.1 Make decisions about units and scales that are appropriate for a given problem.

Skill Statement:

a. Appropriately scale a graph for a given situation.

Goal 2.2: Apply appropriate techniques, tools, and formulas to determine measurements.

Objective(s): By the end of Algebra I, the student will be able to:

AI.2.2.1 Convert rates using dimensional analysis.

Skill Statement:

a. Use dimensional analysis to convert rates within the U.S. customary system and within the metric system.

Suggested Vocabulary and Symbols
dimensional analysis, unit rate, scaling, intervals

Standard 3: Concepts and Language of Algebra and Functions

Maintenance Concepts for Standard 3

- Represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic rules.
- Relate and compare different forms of representation for a relationship.
- Demonstrate an initial conceptual understanding of different uses of variables.
- Determine solutions for one- and two-step linear equations.
- Recognize and generate equivalent forms for simple algebraic expressions.
- Model and solve contextualized problems using various representations such as graphs, tables, and equations.
- Identify attributes of the Cartesian coordinate system, such as quadrants, origin, and axes.

Goal 3.1: Understand patterns, relations, and functions.

Objective(s): By the end of Algebra I, the student will be able to:

AI.3.1.1 Represent linear patterns and functional relationships in a table and as a graph.

Skill Statements:

a. Determine whether a relation is a function given graphs, charts, ordered pairs, mappings, or equations.
b. Define and interpret relations and functions numerically, graphically, and algebraically.
c. Use patterns of change in function tables to develop the concept of rate of change.
d. Identify domain and range for given graphs, charts, ordered pairs, and mappings.
e. Graph linear equations and inequalities on a coordinate plane when given a contextual situation, a table of values, two or more colinear points, the slope and intercept of the line, or an equation.
f. Create a table of values given a contextual situation or a linear equation.
g. Graph one-variable inequalities, compound inequalities, and absolute value equations and inequalities on a number line.

AI.3.1.2 Describe the graphs of linear and quadratic functions and discuss their appearances in terms of the basic concepts of intercepts and rate of change.

Skill Statements:

a. Given the graph of a line, appropriate context, two or more collinear points, or an equation, determine the slope, x-intercept, and y-intercept of a line.
b. Identify a quadratic function by its degree.
c. Identify the graphs of quadratic functions as parabolas that open up or down depending upon the leading coefficients in the equations.
d. Relate the solutions of quadratic functions to the points where the graphs of the functions cross the x-axes.

Goal 3.2: Represent and analyze mathematical situations and structures using algebraic symbols.

Objective(s): By the end of Algebra I, the student will be able to:

AI.3.2.1 Represent linear patterns and relationships with an equation.

Skill Statements:

a. Evaluate functions written in function notation.
b. Write linear equations and inequalities in various forms given the graph of a line, a contextual situation, two or more collinear points, a point and the slope of a line, or a set of data.

AI.3.2.2 Recognize and generate equivalent forms of algebraic expressions and solve equations, inequalities, and systems of equations.

Skill Statements:

a. Model contextual situations by writing systems of linear equations containing no more than two variables.
b. Solve an equation involving several variables for one variable in terms of the others.
c. Solve multi-step linear equations and inequalities.
d. Solve one-variable compound inequalities.
e. Solve one-variable absolute value equations and inequalities.
f. Solve linear systems of equations and inequalities involving two variables using multiple strategies.
g. Solve quadratic equations by factoring.

Goal 3.3: Use mathematical models to represent and understand quantitative relationships.

Objective(s): By the end of Algebra I, the student will be able to:

AI.3.3.1 Develop proportional relationships to solve problems.

Skill Statements:

a. Solve problems using proportions.
b. Solve percent application problems.

Goal 3.4: Analyze change in various contexts.

Objective(s): By the end of Algebra I, the student will be able to:

AI.3.4.1 Interpret changes to the parent function $y = x$.

Skill Statement:

a. Compare and contrast the graphs of $x = k$, $y = k$, $y = kx$ and $y = kx + b$ where k and b are rational numbers.

Suggested Vocabulary and Symbols

compound inequality, direct variation, inverse variation, domain, range, function, equation, function notation $\left(f\left(x \right) \right)$, half-plane, inequality, intersecting lines, linear, parabola, roots, zeros, parallel, perpendicular, percent of increase and decrease, point-slope form, proportion, quadratic equation in standard form, rate of change, relation, slope, slope-intercept form, solution, standard form, system of linear equations, x-intercept, y-intercept, zero product property, addition and multiplication properties of equality

Standard 4: Concepts and Principles of Geometry

No objectives at this course level.

Standard 5: Data Analysis, Probability, and Statistics

Rather than looking at statistics and algebra as separate entities, these concepts will be interwoven throughout the course. The study of graphs and functions will be conducted in conjunction with real data sets to further develop the natural link between statistics and algebra.

Maintenance Concepts for Standard 5

- Analyze and interpret tables, charts, and graphs including frequency tables, scatter plots, broken line graphs, line plots, bar graphs, histograms, circle graphs, and stem-and-leaf plots.
- Explain and justify conclusions drawn from tables, charts, and graphs.
- Collect, organize, and display data with appropriate notation in tables, charts, and graphs, including scatter plots, broken line graphs, line plots, bar graphs, histograms, and stem-and-leaf plots.
- Choose and calculate the appropriate measure of central tendency—mean, median, and mode.

- Explain the significance of distribution of data, including range, frequency, gaps, and clusters.
- Model situations of probability using simulations.
- Recognize equally likely outcomes.
- Explain that probability ranges from 0% to 100% and identify a situation as having high or low probability.
- Make predictions based on experimental and theoretical probabilities.
- Conduct statistical experiments and interpret results using tables, charts, or graphs.
- Use proportionality and the basic understanding of probability to make and test conjectures about the results of experiments and simulations.

Goal 5.1: Collect, organize, and display data using a variety of formats.

No objectives at this course level.

Goal 5.2: Select and use appropriate statistical methods to analyze data.

Objective(s): By the end of Algebra I, the student will be able to:

AI.5.2.1 Make predictions and draw conclusions based on measures of central tendency.

Skill Statements:

a. Find missing data when given an expected mean.
b. Predict how changes in data (such as inclusion/exclusion of additional data or outliers) will affect measures of central tendency.
c. Identify and explain misleading uses of data.

AI.5.2.2 Make predictions using linear relations, scatter plots, trend lines, charts, and tables.

Skill Statements:

a. Graph scatter plots, sketch lines of best fit, and identify positive and negative correlations.
b. Predict how changes in data will affect line of best fit.
c. Write the equation of a line of best fit.

Goal 5.3: Develop and evaluate inferences and predictions that are based on data.

No objectives at this course level.

Goal 5.4: Understand basic concepts of probability.

No objectives at this course level.

Suggested Vocabulary and Symbols
line of best fit, positive and negative correlation, data, central tendency, frequency, gap, cluster, probability