

Mathematics

Algebra I

4/17/08

Foundations	Exploring the Skills & Strategies Underlying Mathematics	Establishing Number Sense & Operation Skills	Exploring Expressions, Equations, & Functions in the First Degree
Skills Acquired by Students in a Previous Course & Refined in This Course	Process Objectives Learned in the Context of Increasingly Complex Mathematical & Real-World Problems	Foundations	Expressions, Equations, Inequalities, Graphs, Relations, and Functions
<ol style="list-style-type: none"> 1. Set up and solve problems following the correct order of operations (including proportions, percent, and absolute value) with rational numbers (integers, fractions, decimals) 2. Find the greatest common factor and least common multiple of a set of whole numbers 3. Use rational numbers to demonstrate knowledge of additive and multiplicative inverses 4. Simplify ratios 5. Use scientific notation when working with very large or very small quantities 6. Add, subtract, multiply, and divide rational numbers, including integers, fractions, and decimals, without calculators 	<ol style="list-style-type: none"> 1. Apply problem-solving skills (e.g., identifying irrelevant or missing information, making conjectures, extracting mathematical meaning, recognizing and performing multiple steps when needed, verifying results in the context of the problem) to the solution of real-world problems 2. Use a variety of strategies (e.g., guess and check, draw a picture) to set up and solve increasingly complex problems 3. Represent data, real-world situations, and solution in increasingly complex contents (e.g., expressions, formulas, tables, charts, graph, relations, functions) and understand the relationships 4. Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbol and notations correctly 5. Make appropriate use of estimation and mental mathematics in computations and to determine the reasonableness of solutions to increasingly complex problems 6. Make mathematical connections among concepts, across disciplines, and in everyday experiences 7. Demonstrate the appropriate role of technology (e.g., calculators, software programs) in mathematics (e.g., organize data, develop concepts, explore relationships, decrease time spent on computations after a skill has been established) 8. Apply previously learned mathematical concepts in algebraic contexts 	<ol style="list-style-type: none"> 1. Evaluate and simply expressions requiring addition, subtraction, multiplication, and division with and without grouping symbols 2. Translate real-world problem into expressions using variables to represent values 3. Apply algebraic properties (e.g., commutative, associative, distributive, identity, inverse, substitution) to simplify algebraic expressions 4. Add and subtract polynomials 5. Factor a monomial from a polynomial 6. Multiply monomials, binomials, trinomials, and polynomials 	<p>Expressions, Equations, & Inequalities</p> <ol style="list-style-type: none"> 1. Solve single-step and multistep equations and inequalities in one variable 2. Solve equations that contain absolute value 3. Solve formulas for a specified variable 4. Write and graph linear equations and inequalities from real-world situations (e.g., a constant-rate distance/time problems) 5. Write linear equations in standard form and slope-intercept form when given two points, a point and the slope, or the graph of the equation 6. Identify, formulate, and obtain solution to problem involving direct, inverse, joint, and combination variation 7. Solve systems of two equations using various methods, including elimination, substitution, and graphing with and without technology <p>Graphs, Relation, and Functions</p> <ol style="list-style-type: none"> 1. Graph linear inequalities in one variable on the real number line to solve problems 2. Give the domain and range of relations and functions 3. Evaluate functions at given values 4. Identify graphs of relations and functions and analyze them to determine whether a relation is a function as well as identify functions as linear or non linear based on information given in a table, graph or equation 5. Graph linear inequalities with two variable on the standard (x,y) coordinate plane 6. Use the terminology associated with the Cartesian plane in describing points and lines 7. Recognize the concept of slope as a rate of change and determine the slope when given the equation of a line in standard form or slope-intercept form, te graph of a line, two points, or a verbal description 8. Graph a linear equation using a table of values, x- and y- intercepts, slope-intercept form, and technology 9. Translate between different representation of relations and functions: graphs, equations, sets of ordered pairs, verbal descriptions, and tables.

Mathematics

Exploring Quadratic Equations & Functions	Exploring Advanced Functions	Organizing & Analyzing Data & Applying Probability
Equations, Inequalities, Graphs, Relations, & Functions	Rational & Radical Expressions, Equations, Functions, Graphs, & Relations	Data Relations, Probability, and Statistics
<p>Equations & Inequalities</p> <ol style="list-style-type: none"> Factor perfect square trinomials and the difference of two squares Factor trinomials in the form ax^2+bx+c Solve quadratic equations using multiple methods, including graphing, factoring, quadratic formula, and the square root principle with and with out technology <p>Graphs, Relations, & Functions</p> <ol style="list-style-type: none"> Identify graphs of quadratic functions Relate factors, solutions (roots), zeros of related functions, and x-intercepts in equations that arise from quadratic functions 	<p>Rational & Radical Expressions, Equations, and Functions</p> <ol style="list-style-type: none"> Use properties of exponents (including zero and negative exponent) to evaluate and simplify expressions Estimate, compute and solve problems involving scientific notation, and numbers with integer exponents Evaluate and simplify rational expressions Add, subtract, multiply, and divide rational expression Find rational number square roots (without calculators) and approximate irrational square roots (with and without calculators) Evaluate and simplify radical expressions Multiply radical expressions Simplify and algebraic quotient by rationalizing an irrational monomial denominator <p>Graphs, Relations, & Functions</p> <ol style="list-style-type: none"> Differentiate and explain types of changes in mathematical relationships, such as linear vs. nonlinear, continuous vs. non-continuous, direct variation vs. inverse variation Describe and compare how changes in an equation affects the related graphs; e.g., for a linear equation changing the coefficient for x affects the slope and changing the constant affects the intercepts 	<ol style="list-style-type: none"> Identify the effect on mean, median, mode, and range when a ser of data is changed Interpret data from line, bar, and circle graphs, histograms, scatterplots, box-and-whisker plots, stem-and-leaf plots, and frequency tables to draw inferences and make predictions Identify and evaluate different graphical representation of the same data to determine which is the most appropriate and effective representation for an identified purpose Identify arithmetic sequences and patterns in a sat of data Identify patterns of growth (e.g., patterns of exponential growth) in a set of data Differentiate between discrete and continuous data and appropriate ways to represent each Use factorial notation, combinations and permutations to represent and solve problem situations Find the probability of a simple event Distinguish between independent and dependent events Identify an approximate line of best fit model data and make predictions Investigate theoretical and experimental probability including simulations or random numbers to estimate probabilities and to solve problems dealing with uncertainty Make predictions based on theoretical probabilities and experimental results