

**CORRELATION**  
**of**  
**the 10 UNDERSTANDING MATH PLUS PROGRAMS**  
**with**  
**California State Board of Education ACADEMIC CONTENT STANDARDS**

For Algebra 1

**Note: a.** The Understanding Math PLUS series of programs consist of 10 programs written for Kindergarten to 10<sup>th</sup> Grade.

**The 10 programs are:**

Understanding Fractions	Understanding Whole Numbers and Integers
Understanding Probability	Understanding Percent
Understanding Exponents	Understanding Equations
Understanding Algebra	Understanding Graphing
Understanding Numeration	
Understanding Measurement and Geometry	

**Note: b.** The Understanding Numeration software for K to 3 is set up so that the teacher selects items in the following order:

Concept .. from 5 concepts .. Counting, Comparing & Ordering, Place Value, Operations and Problem Solving.

Skill .. chosen from the list of specific learning expectations

Level .. indicates the levels of development for Kindergarten to 3<sup>rd</sup> grade.

Level	Upper Range of Number
<b>A</b>	<b>10</b>
<b>B</b>	<b>20</b>
<b>C</b>	<b>100</b>
<b>D</b>	<b>1000</b>

Lesson .. 250 lessons are sequenced to build understanding of concepts.

A detailed Lesson Synopsis on the website [www.neufeldmath.com](http://www.neufeldmath.com) to assist the teacher by stating the lesson contents but also by giving lesson suggestions.

Worksheet .. off computer worksheets are selected from the CD by a code.

**Note: c.** The remaining 9 Understanding Math programs for 4<sup>th</sup> to 10<sup>th</sup> grade are set up so that they can be used in a variety of teaching and learning environments ranging from a teacher centered approach with 1 computer to a student centered lab approach. The lessons can also be used in remediation, tutorial, intervention, resource, fast-tracking.

Each topic has:

- ..an interactive concept introduction, usually with a variety of graphic approaches.
- ..a number of particular examples
- ..practice questions with random questions but particular feedback
- ..a topic test with random questions and tracking
- ..off computer worksheets selected from the website .. [www.neufeldmath.com](http://www.neufeldmath.com)

# ALGEBRA 1

## Grades 8 through 12

Mathematics Content Standards.

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.

**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:**

Content Standard	Understanding Math PLUS computer assisted lessons
1.1 Students use properties of numbers to demonstrate whether assertions are true or false.	

Content Standard	Understanding Math PLUS computer assisted lessons
<p><b>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.</b></p>	<p><b>MAT+ <u>Understanding Exponents</u></b>  <b>Topic 3: The Exponent Rules</b>            In This Topic            Multiplication of Powers with the Same Base                Expanding the Exponents                The Pattern                In General            Division of Powers with the Same Base                Expanding the Exponents                The Pattern                In General            Raising a Power to an Exponent                Expanding the Exponents                The Pattern                In General            Raising a Product to an Exponent                Expanding the Exponents                In General            A Power with Exponent 0                Explanation with <math>b</math>; Explanation with <math>a</math>                Summary            A Power with a NEGATIVE Exponent                Method 1: Explanation with <math>b</math>                Method 2: Explanation with <math>k</math>                Method 3: Bacteria Doubling            Summary of Exponent Rules            Powers with Rational Bases                Examples 1,2,3                In General            Examples Questions : Examples 1 through 11            Practice Questions; Topic Test</p>
<p><b>3.0 Students solve equations and inequalities involving absolute values.</b></p>	<p><b>MAT+ <u>Understanding Equations</u></b>  <b>Topic 7: Solving Inequalities</b>            Comparing Integers            The Integer Line</p>

	<p>Example 1 ...Great Than; Example 2...Less Than</p> <p>Explanation</p> <p>Example 3...Greater Than; Example 4...Less Than</p> <p>Greater Than or Less Than Inequalities</p> <p>What are They?</p> <p>Inequality vs. Equation</p> <p>Summary of Relationships</p> <p>Inequality on the Number Line</p> <p>Examples 1-4</p> <p>Solving Inequalities</p> <p>Examples 1-6</p> <p>Graphing Linear Inequalities in Two Variables</p> <p>Concepts 1,2</p> <p>Examples 1,2,3</p> <p>Solving Systems of Linear Inequalities by Graphing</p> <p>Examples 1,2</p> <p>Linear Programming</p> <p>What is it?</p> <p>A Fund Raising Example</p> <p>The Objective Function</p> <p>Practice Questions; Topic Test</p> <p><b>Topic 8: Solving Absolute Value Equations</b></p> <p>Absolute Value...What is it?</p> <p>Concept</p> <p>Examples 1,2</p> <p>Summary</p> <p>Absolute Value Equations in 1 Variable</p> <p>Examples 1,2</p> <p>Absolute Value Inequalities in 1 Variable</p> <p>Examples 1,2</p> <p>Absolute Value Equations in 2 Variables</p> <p>Examples 1,2</p> <p>Practice Questions; Topic Test</p>
<p><b>4.0 Students simplify expressions before solving linear equations and inequalities in one variable, such as <math>3(2x-5) + 4(x-2) = 12</math>.</b></p>	<p><b>MAT+ <u>Understanding Algebra</u></b></p> <p><b>Topic 5: Adding Expressions</b></p> <p>Adding Expressions without Tiles</p> <p>Examples 1,2</p> <p>Practice Questions with Tiles</p> <p>Practice Questions without Tiles</p> <p>Topic Test</p> <p><b>MAT+ <u>Understanding Graphing</u></b></p> <p><b>Topic 8: Equation of a Straight Line</b></p> <p>Graph <math>y = mx+b</math></p> <p>Examples 1,2,3,4</p> <p>Patterns to Summary</p> <p>Examples 5,6,7</p>
<p><b>5.0 Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.</b></p> <p><b>6.0 Students graph a linear equation and compute the x- and y- intercepts (e.g., graph <math>2x + 6y = 4</math>).</b></p>	<p><b>MAT+ <u>Understanding Graphing</u></b></p> <p><b>Topic 8: Equation of a Straight Line</b></p> <p>Graph <math>y = mx+b</math></p> <p>Examples 1,2,3,4</p> <p>Patterns to Summary</p> <p>Examples 5,6,7</p> <p>Slope y-intercept Equation</p> <p>Concept</p>

<p><b>They are also able to sketch the region defined by linear inequality (e.g., they sketch the region defined by <math>2x + 6y &lt; 4</math>).</b></p>	<p>Examples 1,2,3,4  Word Problems/Applications  The Taxi  Cases 1,2  Find Equation  Graph Equation  Interpret Equation  Summary  The Walker  Basketball  Food</p> <p><b>MAT+ <u>Understanding Equations</u></b>  <b>Topic 7: Solving Inequalities</b>  Graphing Linear Inequalities in Two Variables  Concepts 1,2  Examples 1,2,3</p>
<p><b>7.0 Students verify that a point lies on a line, given an equation of the line. Students are able to derive linear equations by using the point-slope formula.</b></p>	<p><b>MAT+ <u>Understanding Graphing</u></b>  <b>Topic 8: Equation of a Straight Line</b>  Slope – Point Form of the Equation  Example 1: Solutions 1,2  Example 2 : Solution 1,2,3,4  Special Cases  Example 1 – Zero Slope  Example 2 – Undefined  Example to Summarize</p>
<p><b>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.</b></p>	<p><b>MAT+ <u>Understanding Graphing</u></b>  <b>Topic 7: Slope of a Line</b>  Parallel Lines  Examples 1,2,3  Perpendicular Lines  Examples 1,2,3</p> <p><b>Topic 8: Equation of a Straight Line</b>  Parallel and Perpendicular Lines  Concepts 1,2  Examples 1,2,3,4</p>
<p><b>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.</b></p>	<p><b>MAT+ <u>Understanding Equations</u></b>  <b>Topic 6: Solving Linear Systems</b>  In This Topic  The Meaning of a Linear System  The Meaning of Solving a Linear System  Solve a Linear System by Graphing  Examples 1,2 – Intersecting Lines  Examples 3,4 – Intersecting lines Involving Fractions  Example 5 – Parallel Lines  Example 6 – Coincidental Lines  Solve a Linear System by Substitution  Examples 1,2 – Intersecting Lines  Examples 3,4 – Intersecting lines Involving Fractions  Example 5 – Parallel Lines  Example 6 – Coincidental Lines</p> <p><b>Topic 7: Solving Inequalities</b>  Graphing Linear Inequalities in Two Variables  Concepts 1,2  Examples 1,2,3</p>

	Solving Systems of Linear Inequalities by Graphing Examples 1,2
<b>10.0 Students add, subtract, multiply, and divide monomials and polynomials. Students solve multistep problems, including word problems, by using these techniques.</b>	<p><b>MAT+ <u>Understanding Algebra</u></b>  <b>Topic 5: Adding Expressions</b>  Adding Expressions without Tiles  Examples 1,2  Practice Questions with Tiles  Practice Questions without Tiles  Topic Test</p> <p><b>Topic 6: Subtracting Expressions</b>  Subtracting Expressions without Tiles  Practice Questions; Topic Test</p> <p><b>Topic 7: Multiplying Expressions</b>  Our Problem  Multiplying Monomials and Polynomials  With Tiles... Examples 1,2,3,4  Without Tiles  Examples... True or False  Examples 1,2,3  Practice Questions; Topic Test</p> <p><b>Topic 9: Dividing Expressions</b>  Dividing a Polynomial by a Monomial  Concept  Examples 1,2,3  Summary  Dividing a Polynomial by a Binomial  Example 1...Methods 1, 2  Example 2...  Example 3...Methods 1,2  Example 4...Methods 1,2  Combination Questions  Examples 1,2,3,4  Practice Questions; Topic Test</p>
<p><b>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.</b></p> <p><b>12.0 Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to the lowest terms.</b></p>	<p><b>MAT+ <u>Understanding Algebra</u></b>  <b>Topic 8: Factoring Expressions</b>  Our Problem  Common Factoring  With Tiles  Examples 1,2 – Methods 1,2  Without Tiles  GCF  Examples 1,2  Factoring Trinomials  With Tiles – Examples 1,2  The Pattern  Without Tiles – Examples 1,2  Difference of Squares  Examples 1,2,3,4  Factoring by Grouping – Concept  Examples 1,2,3,4,5  Summary  Examples 1,2,3,4  Practice Questions; Topic Test</p>
<b>13.0 Students add, subtract, multiply, and divide rational expressions and functions. Students solve both computationally and conceptually</b>	<p><b>MAT+ <u>Understanding Whole Numbers and Integers</u></b>  <b>Topic 8: Adding Fractions</b>  Adding Fractions on a Number Line  Examples 1, 2, 3</p>

<p><b>challenging problems by using these techniques.</b></p>	<p>The Lowest Common Denominator Examples 1,2 Word Problems Alexander’s Friends Eating Candy Goal Scoring Taking a Walk Fraction Card Game Magic Square Practice Questions; Topic Test</p> <p><b>Topic 9: Subtracting Fractions</b> Subtracting Fractions on a Number Line Examples 1, 2 The Lowest Common Denominator Examples 1,2 Word Problems Pedro and Alex Race Washing the Cars Planting a Garden Practice Questions; Topic Test</p> <p><b>Topic 10: Multiplying Fractions</b> Pattern Blocks Hexagons 1,2,3 Fractions Strips Concepts 1,2 Word Problems Boris’ Money Maria’s Trip A Summary The Meaning of “OF” Order in Multiplying Examples 1,2 Multiplying Fractions with Large Numbers Examples 1,2 Practice Questions; Topic Test</p> <p><b>Topic 14: Dividing Fractions</b> Understanding Division Examples with Diagrams Soda Pop Ice Cream Shapes 1 &amp; 2 Patterns from Examples Another Explanation Examples 1 &amp; 2 Examples without Diagrams Numerical Examples 1,2 Central High School Practice Questions; Topic Test</p>
<p><b>14.0 Students solve a quadratic equation by factoring or completing the square.</b></p>	<p><b>MAT+ Understanding Graphing</b> <b>Topic 9: Quadratic Functions</b> Introductory Examples Examples 1,2 Summary Examples 1,2 Definitions Parabolas Quadratic Functions</p>

	<p>The Role of <math>a</math>  The Plan: <math>a = 1, 2, 3</math>; <math>a = -1, -2, -3</math>  The Role of <math>b</math>  Examples 1, 2, 3, 4  Summary and Pattern  In General  Intercepts of a Quadratic Function  Method 1: Graphing; Method 2: Factoring (if possible)</p>
<b>15.0 Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.</b>	
<b>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.</b>  <b>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.</b>	<p><b>MAT+ <u>Understanding Graphing</u></b>  <b>Topic 5: Relations, Equations, and Functions</b>  In this topic  Relations  What is a Relation?  Domain and Range  Example 1 – Triangles  Example 2 – Tiles, Part 1  Example 3 – Tiles, Part 2  Example 4 – Running  Example 5 – Hit the Ball  Functions  What is a Function – Examples 1, 2, 3  Vertical Line Test  Examples 1, 2, 3  Function Notation  Examples 1, 2</p>
<b>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.</b>	<p><b>MAT+ <u>Understanding Graphing</u></b>  <b>Topic 5: Relations, Equations, and Functions</b>  Patterns to Words to Equations  Examples 1, 2, 3, 4  Practice Questions; Topic Test</p>
<b>19.0 Students know the quadratic formula and are familiar with its proof by completing the square.</b>  <b>20.0 Students use the quadratic formula to find the roots of a second-degree polynomial and to solve quadratic equations.</b>  <b>21.0 Students graph quadratic functions and know that their roots are the <math>x</math>- intercepts.</b>  <b>22.0 Students use the quadratic formula or factoring techniques or both to determine whether the graph of a quadratic function will intersect the <math>x</math>-axis in zero, one, or two points.</b>  <b>23.0 Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity.</b>	<p><b>MAT+ <u>Understanding Graphing</u></b>  <b>Topic 9: Quadratic Functions</b>  Intercepts of a Quadratic Function  Method 1: Graphing; Method 2: Factoring (if possible); Method 3: Using the Quadratic Formula  Maximize Cage Area  Trial and Error  Use Quadratic Function  Graph  Conclusions  Summary  Maximize Potato Income  Trial and Error  Use Quadratic Function  Graph  Summary  Bob’s Beach Ball  Find Maximum Height  Graph Equation  Summary  Practice Questions; Topic Test</p>

**24.0 Students use and know simple aspects of a logical argument:**

Content Standard	Understanding Math PLUS computer assisted lessons
24.1 Students explain the difference between inductive and deductive reasoning and identify and provide examples of each.	
24.2 Students identify the hypothesis and conclusion in logical deduction.	
24.3 Students use counterexamples to show that an assertion is false and recognize that a single counterexample is sufficient to refute an assertion.	

**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:**

Content Standard	Understanding Math PLUS computer assisted lessons
25.1 Students use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions.	Understanding Math PLUS... <i>all sections...all programs</i>
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.	Understanding Math PLUS... <i>all sections...all programs</i>
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.	<b>MAT+ <u>Understanding Graphing</u></b> <b>Topic 8: Equation of a Straight Line...ALL SECTIONS</b>  <b>Topic 9: Quadratic Functions...ALL SECTIONS</b>  <b>MAT+ <u>Understanding Equations</u></b> <b>Topic 7: Solving Inequalities... ALL SECTIONS</b>  <b>Topic 8: Solving Absolute Value Equations...ALL SECTIONS</b>