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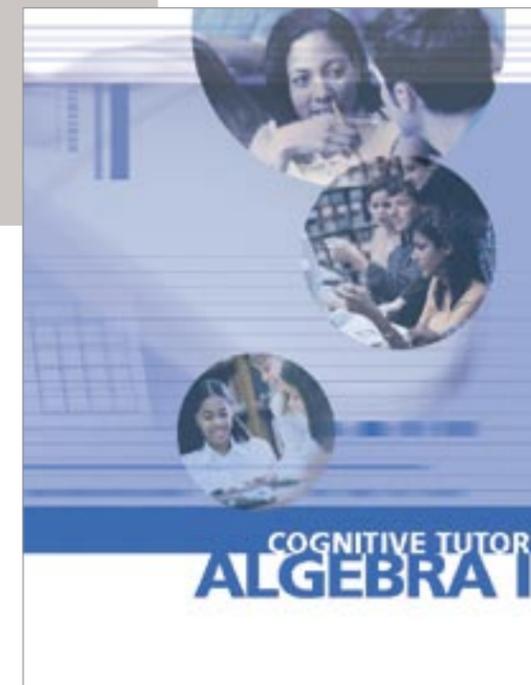
Cognitive Tutor®
Algebra I

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Classroom Lessons		Skills Covered
Print	**Software**	
Patterns and Linear Functions	Units 1-5 • Generating Input and Output Tables • Plotting Points in One Quadrant • Isolating the Variable in a Single Step • Given Output, Find Input • Isolating the Variable in Multiple Steps	Students will attain competency in reasoning inductively and deductively. Identify an algebraic or geometric pattern and represent it symbolically. Write and evaluate algebraic expressions. Find the next term, tenth term, and nth term in a sequence, and verbalize this procedure. Model situations symbolically. Understand the relationship between independent and dependent variables. Define functions. Solve simpler problems. Plot points and create graphs for linear functions. Compare and contrast functional relationships.
Proportional Reasoning and Linear Functions	Units 6 and 26 • Direct Variation • Reviewing Solving Equations	In addition to the skills developed in prior units, students will solve problems involving proportional change. Relate direct variation to linear functions. Graph linear functions. Understand and use fractions, decimals, and percents in given situations. Understand a ratio as a constant rate of change. Represent verbal quantitative situations algebraically. Solve linear equations.
Modeling Situations Using Multiple Representations	Units 7, 8, and 23 • Plotting Points in Two Quadrants • Solving by Combining Similar Terms • Plotting Using Two Points	In addition to skills developed in prior units, students will understand the relationship between input and output variables. Express one variable in terms of another (e.g., length in terms of width). Model real-world phenomena with linear equations. Create graphs using four quadrants. Use graphical techniques to find solutions to problem situations. Solve multi-step linear equations. Evaluate and simplify algebraic expressions. Describe a linear relationship as a linear function, interpret that function, and make inferences based upon the function. Describe problem situations by using and relating multiple representations, including numerical, symbolic, graphical, and verbal ones. Compare numbers using inequalities. Represent inequalities on a number line and in the coordinate plane. Connect meaning between graphical, symbolic, and numeric representations of inequalities.

Classroom Lessons		Skills Covered
Print	**Software**	
Linear Equations and Systems of Equations	Units 9 – 14, and 24 – 25 • Graphing Using Slope and Y-Intercept • Linear Transformations • Solving Using the Distributive Property • Transforming to Point-Slope Form • Solving Literal Equations • Systems of Equations	In addition to the skills developed in prior units, students will represent verbal quantitative situations algebraically. Use appropriate procedures to solve linear equations in one variable. Graph linear functions in two variables. Compute x and y intercepts. Determine domain and range of functions. Describe problem situations by using and relating numerical, symbolic, graphical, and verbal representations. Graph lines defined by y=mx+b. Develop the concept of slope as a rate of change; for a fixed change in x, there is a fixed change in y. Interpret the meaning of slope in given situations. Create an equation by finding slope and y-intercept. Determine the intercepts and slope of a line, given its equation. Investigate, describe, and predict the effects of changes in m and b on the graph of y=mx+b. Interpret and predict the effects of changing slope and y-intercept in applied situations. Investigate vertical and horizontal transformations. Sketch the graph of y=k. Apply the distributive property. Use the distributive property to simplify algebraic expressions. Factor out common monomials to "reverse" the distributive property. Calculate absolute values. Graph absolute value functions. Solve equations involving absolute values. Find the intercepts of absolute value equations. Find the coordinates of the minimum or maximum of an absolute value graph. Solve systems of linear equations. Compare and contrast two functions to the left and to the right of the point of intersection.
Statistical Analysis	Units 15 – 18 • Solving by Collecting Similar Terms • Modeling Using Two Points • Graphing in the Half-Plane • Systems of Equations	In addition to the skills developed in prior units, students will organize and visualize data using stem and leaf plots, histograms, and box plots. Understand measures of central tendency and dispersion, and calculate and apply descriptive and inferential statistics. Design, conduct, and interpret the results of a simple study. Model data using scatterplots and regression equations to find the best fit. Understand that a model is a best approximation and may be used for the purpose of prediction and estimation. Find a regression line for an experiment and interpret its slope and y-intercept. Identify distribution shapes and decide if distributions are symmetrical or skewed. Interpret variations in data. Make and interpret box-and-whisker plots. Identify and use percentiles and quartiles. Develop a qualitative understanding of data. Develop understanding of distribution of data, clusters, and outliers. Create frequency and relative frequency graphs.
Quadratics	Units 19 – 22, and 31 • Area of Rectangles • Solving Quadratics by Factoring • Generalized Quadratic Graphing • Vertical Motion • Linear and Quadratic Transformations	In addition to the skills developed in prior units, students will compare and contrast linear and quadratic functions. Define and identify a quadratic equation. Find roots or x-intercepts of a quadratic function. Employ factoring techniques. Use the quadratic formula. Model and solve problems involving quadratic functions. Find minimum or maximum values for quadratic functions. Define the vertex and line of symmetry. Explore non-constant rates of change.
Laws of Powers	Units 27 – 30 • Review Lessons A – D	In addition to the skills developed in prior units, students will attain competency in identifying and applying the laws of powers for products and quotients, and use appropriate vocabulary in reference to exponents.