

**Grade: 9-12**Course: Advanced Algebra and Trigonometry

- 1** **Topic:** Problem Solving, Reasoning, Estimation
Standard: Solves problems throughout this course that involve: -selecting appropriate approaches and tools, -using estimating strategies to predict computational results, and -judging reasonableness of results.
- 2** **Topic:** Problem Solving, Reasoning, Estimation
Standard: Solves problems that relate concepts to practical applications and to other concepts using appropriate tools.
- 3** **Topic:** Functions
Standard: Graphs relations and functions using domain, range, rule of a function, symmetry, asymptotes, and periodicity and end behavior.
- 4** **Topic:** Functions
Standard: Determines the composite of two functions and its domain and range.
- 5** **Topic:** Functions
Standard: Determines the inverse of a function, its domain and range, and states whether it the inverse is a function.
- 6** **Topic:** Functions
Standard: Defines and graphs the following functions: identity, constant, absolute value, step, greatest integer, polynomial (including linear and quadratic), square root, and piecewise.
- 7** **Topic:** Functions
Standard: Construct an equation or graph that results from transformations (translation, dilation, reflection) using a parent equation or graph.
- 8** **Topic:** Functions
Standard: Solves polynomial equations over the field of complex numbers using the following theorems: Remainder, Factor, Rational Root, and Fundamental Theorem of Algebra.
- 9** **Topic:** Functions
Standard: Graphs polynomial, rational, and algebraic functions, using appropriate techniques and tools.
- 10** **Topic:** Exponential and Logarithmic Functions
Standard: Defines, graphs, and shows the inverse relationship between logarithmic and exponential functions.
- 11** **Topic:** Exponential and Logarithmic Functions
Standard: Solves logarithmic and exponential equations and problems.
- 12** **Topic:** Exponential and Logarithmic Functions
Standard: Solves problems involving application of exponential and logarithmic functions using appropriate techniques and tools. -Makes predictions from collected data using regression techniques.
- 13** **Topic:** Trigonometry
Standard: Converts measures of angles between radians and degrees.
- 14** **Topic:** Trigonometry
Standard: Sketches an angle in standard position and determines the reference and coterminal angles.

- 15** **Topic:** Trigonometry
Standard: Defines the six trigonometric functions as both circular functions and as ratios of sides of right triangles, and shows relationships between these functions.
- 16** **Topic:** Trigonometry
Standard: Evaluates and graphs trigonometric functions using period, phase shift, amplitude, and vertical shift.
- 17** **Topic:** Trigonometry
Standard: Simplifies trigonometric expressions and solve trigonometric equations using trigonometric identities.
- 18** **Topic:** Trigonometry
Standard: Uses Laws of Sines and Cosines and right triangle ratios to solve problems.
- 19** **Topic:** Trigonometry
Standard: Determines the area of any triangle using an appropriate formula.
- 20** **Topic:** Trigonometry
Standard: Evaluates and graphs inverse trigonometric functions and solves equations involving these functions.
- 21** **Topic:** Complex Numbers
Standard: Defines and applies the basic operations and properties of complex numbers.
- 22** **Topic:** Complex Numbers
Standard: Uses appropriate theorems and definitions to find powers, roots, and absolute values of complex numbers.
- 23** **Topic:** Complex Numbers
Standard: Graphs and expresses complex numbers in both rectangular and polar forms.
- 24** **Topic:** Matrices
Standard: Evaluates the results of matrix operations (such as addition, multiplication, and scalar operations) when defined.
- 25** **Topic:** Matrices
Standard: Evaluates the determinants of 2×2 and 3×3 matrices using appropriate methods.
- 26** **Topic:** Matrices
Standard: Finds the inverse of a square matrix, if it exists, for 2×2 and 3×3 matrices.
- 27** **Topic:** Matrices
Standard: Solves systems of equations with two and three unknowns using a variety of methods, including technology.
- 28** **Topic:** Matrices
Standard: Applies matrices to practical situations.
- 29** **Topic:** Analytical Geometry: Conic Sections
Standard: Identifies each conic section, including the degenerates, as the intersection of a conical surface and a plane.
- 30** **Topic:** Analytical Geometry: Conic Sections
Standard: Recognizes, writes, and graphs equations of conic sections, using properties such as symmetry, intercepts, asymptotes, and eccentricity when appropriate.
- 31** **Topic:** Analytical Geometry: Conic Sections
Standard: Identifies and sketches the graphs for the parabola, circle, ellipse and hyperbola, with and without center at the origin.
- 32** **Topic:** Analytical Geometry: Conic Sections
Standard: Solves systems of equations involving conics and other types of equations.
- 33** **Topic:** Sequences and Series
Standard: Uses appropriate sigma notation to represent series; defines and discriminates between arithmetic and geometric series.

- 34** **Topic:** Sequences and Series
Standard: Determines terms of sequences: - describes sequences in terms of recurrence formulas, - relates to linear and exponential functions, and - finds determines sums of the first n terms of arithmetic and geometric series.
- 35** **Topic:** Sequences and Series
Standard: Evaluates the limit of an infinite series, defines converging and diverging series, and finds the sum of an infinite series if it exists.
- 36** **Topic:** Sequences and Series
Standard: Determines the arithmetic, geometric, and harmonic means.
- 37** **Topic:** Sequences and Series
Standard: Uses the Binomial Theorem to expand and simplify binomial expressions.
- 38** **Topic:** Probability and Statistics
Standard: Defines probability in terms of sample spaces, outcomes, and events.
- 39** **Topic:** Probability and Statistics
Standard: Determines probability of independent, dependent, and conditional events.
- 40** **Topic:** Probability and Statistics
Standard: Discriminates between and determines the number of combinations and permutations of n things taken r at a time.
- 41** **Topic:** Probability and Statistics
Standard: Organizes, displays, and interprets data in tables, charts, and graphs.
- 42** **Topic:** Probability and Statistics
Standard: Analyzes data by using correctly the mean, median, mode, variance, and standard deviation, and identifies common misuses of statistics.
- 43** **Topic:** Probability and Statistics
Standard: Identifies common statistical distributions such as the normal distribution.
- 44** **Topic:** Probability and Statistics
Standard: Analyzes data and predicts results by fitting a curve to the data.

Course: Algebra I

- 1** **Topic:** Problem Solving, Reasoning
Standard: Solve problems throughout this course that involve: -selecting appropriate approaches and tools, -using estimating strategies to predict computational results, and -judging reasonableness of results.
- 2** **Topic:** Problem Solving, Connections
Standard: Solves problems that link concepts to one another and to practical applications using tools such as scientific or graphing calculators, computers, and manipulatives.
- 3** **Topic:** Communication
Standard: Communicates mathematical ideas by using language and symbolism: -reflects upon and clarifies thinking about mathematical ideas and relationships. -formulates mathematical definitions and expresses generalizations discovered throughout investigations. -expresses mathematical ideas both orally and in writing. -interprets written presentations of mathematics, and asks clarifying and extending questions related to mathematics about which they have read or heard.
- 4** **Topic:** Language of Algebra: Numbers and Variables
Standard: Reviews the following algebraic topics: - expresses rational numbers in equivalent forms, - simplifies numerical and algebraic expressions, - evaluates simple algebraic expressions and formulas, - translates words into algebraic expressions and equations, - represents problem situations with algebraic expressions and equations, - identifies subsets of the real numbers, such as whole numbers, integers, rational, and irrational numbers, - graphs real numbers on a number line, and - adds, subtracts, multiplies, and divides rational numbers, and determines their absolute value.

- 5 **Topic:** Connections, Patterns, and Functions
Standard: Connects patterns to the concept of function and uses patterns, relations, and functions to solve problems.
- 6 **Topic:** Patterns and Functions
Standard: Distinguishes between relations and functions, and identifies the domain and range.
- 7 **Topic:** Real Number System
Standard: Identifies and applies properties of the real number system.
- 8 **Topic:** Solving Equations
Standard: Solves linear equations using a variety of methods such as manipulatives and technology.
- 9 **Topic:** Solving Equations
Standard: Solves problems involving linear equations.
- 10 **Topic:** Polynomials
Standard: Identifies polynomial expressions and determines the degree, leading coefficients, constant, and number of terms of a polynomial.
- 11 **Topic:** Polynomials
Standard: Adds, subtracts, and multiplies polynomials.
- 12 **Topic:** Polynomials
Standard: Simplifies expressions containing integral exponents using the laws of exponents.
- 13 **Topic:** Factorization
Standard: Determines monomial factors of polynomials and divides a polynomial by a monomial.
- 14 **Topic:** Factorization
Standard: Factors simple quadratic expressions such as trinomials, perfect trinomials, difference of two squares, and polynomials with common factors.
- 15 **Topic:** Factorization, Quadratic Equations, and Functions
Standard: Solves quadratic equations using factoring.
- 16 **Topic:** Linear Equations in Two Variables
Standard: Graphs points (ordered pairs of numbers) in the coordinate plane and identifies the coordinates of given points in the plane.
- 17 **Topic:** Linear Equations in Two Variables
Standard: Defines slope as rate of change and calculates the slope given the change of the two variables.
- 18 **Topic:** Linear Equations in Two Variables, Data Analysis, Patterns and Functions
Standard: Interprets and makes predictions from data displayed in line graphs or scatter plots, by examining patterns and recognizing algebraic concepts such as rate of change (slope), intercepts, range, and domain.
- 19 **Topic:** Linear Equations in Two Variables
Standard: Identifies the slope and intercepts of a linear equation.
- 20 **Topic:** Linear Equations in Two Variables
Standard: Sketches the graph of a linear equation in two variables given appropriate information, such as slope, x-intercept, y-intercept, two points, and the linear equation.
- 21 **Topic:** Linear Equations in Two Variables
Standard: Graphs linear equations in two variables and identifies graphs of lines, including special cases such as vertical, horizontal, parallel, and perpendicular lines.
- 22 **Topic:** Linear Equations in Two Variables
Standard: Writes the equation of a line given appropriate information such as slope, x-intercept, y-intercept, two points, and the graph.
- 23 **Topic:** Linear Equations in Two Variables
Standard: Solves a system of linear equations by a variety of methods including graphing.

- 24 **Topic:** Linear Equations in Two Variables
Standard: Solves problems using systems of linear equations.
- 25 **Topic:** Inequalities
Standard: Solves simple and compound inequalities in one variable and graphs the solution set on the number line.
- 26 **Topic:** Linear Inequalities
Standard: Solves problems involving linear inequalities and graphs the solution on a coordinate plane.
- 27 **Topic:** Rational Expressions: Algebraic Fractions
Standard: Simplifies simple algebraic fractions.
- 28 **Topic:** Rational Expressions: Algebraic Fractions
Standard: Solves simple rational equations.
- 29 **Topic:** Variation
Standard: Solves problems involving direct and inverse variation.
- 30 **Topic:** Rational Expressions: Algebraic Fractions
Standard: Solves problems involving ratios, proportions, and percents.
- 31 **Topic:** Rational and Irrational Numbers and Radical Expressions
Standard: Finds the square roots of rational numbers and decimal approximations of irrational numbers, by simplifying radicals and by using a calculator.
- 32 **Topic:** Rational and Irrational Numbers and Radical Expressions
Standard: Multiplies, divides, adds, and subtracts radicals with index of two.
- 33 **Topic:** Rational and Irrational Numbers and Radical Expressions
Standard: Applies the Pythagorean Theorem and its converse in problem-solving situations.
- 34 **Topic:** Rational and Irrational Numbers and Radical Expressions
Standard: Solves simple radical equations and solves problems involving simple radical equations.
- 35 **Topic:** Statistics
Standard: Summarizes data in various ways, including mean, median, mode, and range.
- 36 **Topic:** Probability
Standard: Identifies possible outcomes of simple experiments and predicts or describes the probability of a given event expressed as a rational number from 0 through 1.
- 37 **Topic:** Probability
Standard: Conducts and interprets a compound probability experiment.

Course: Algebra II

- 1 **Topic:** Problem Solving, Reasoning
Standard: Solves problems throughout this course that involve: -selecting appropriate approaches and tools, -using estimating strategies to predict computational results, and -judging reasonableness of results.
- 2 **Topic:** Problem Solving, Reasoning
Standard: Solves problems that relate concepts to other concepts and to practical applications using tools such as scientific or graphing calculators and computers.
- 3 **Topic:** Algebraic Expressions, Properties of Real Number System
Standard: Identifies and lists the properties of the real number system in algebraic proofs.
- 4 **Topic:** Linear Equations and Inequalities
Standard: Solves formulas for one variable.

- 5** **Topic:** Linear Equations and Inequalities, Absolute Value Equations and Inequalities
Standard: Solves and graphs linear inequalities in one variable, including compound inequalities and absolute value equations and inequalities.
- 6** **Topic:** Relations, Functions, and Graphs
Standard: - Identifies and graphs linear equations in two variables, including vertical and horizontal lines, - Writes equations for lines using various combinations of required information (such as slope, intercepts, points on the line.)
- 7** **Topic:** Relations, Functions, and Graphs
Standard: Identifies, defines, and graphs relations, and states their domain and range.
- 8** **Topic:** Relations, Functions, and Graphs
Standard: Identifies relations that are functions. -Names functions by using multiple representations. -Defines functions, draws their graphs, and evaluates $f(x)$ for given values of x , including the absolute value function.
- 9** **Topic:** Relations, Functions, and Graphs
Standard: Determines the composition of two functions, using multiple representations, such as $f(g(x))$ or $(f \circ g)(x)$.
- 10** **Topic:** Relations, Functions, and Graphs
Standard: Identifies inverse of relations and determines if the inverse relation is a function. (Algebraically and graphically.)
- 11** **Topic:** Systems of Linear Equations and Inequalities
Standard: Determines the number of solutions for a system of linear equations; recognizes the system as consistent (dependent or independent) or inconsistent.
- 12** **Topic:** Systems of Linear Equations and Inequalities
Standard: Solves systems of linear equations in two and three variables using a variety of methods.
- 13** **Topic:** Systems of Linear Equations and Inequalities
Standard: Graphs systems of linear inequalities in two variables and determines the solution region.
- 14** **Topic:** Rational Expressions
Standard: Simplifies expressions containing integral exponents using the laws of exponents.
- 15** **Topic:** Rational Expressions
Standard: Simplifies, multiplies, divides, adds, and subtracts rational expressions, including dividing polynomials.
- 16** **Topic:** Rational Expressions
Standard: Solves rational equations.
- 17** **Topic:** Rational Expressions
Standard: Solves problems using rational equations, including proportions, rate, and variation (direct, inverse, or joint) problems.
- 18** **Topic:** Irrational and Complex Numbers
Standard: Determines real or imaginary n th roots of real numbers.
- 19** **Topic:** Irrational and Complex Numbers
Standard: Simplifies radical expressions and their products, quotients, sums and differences, including rationalizing denominators by using properties of radicals.
- 20** **Topic:** Irrational and Complex Numbers
Standard: Evaluates expressions with fractional exponents, and uses fractional exponents to simplify radical expressions.
- 21** **Topic:** Irrational and Complex Numbers
Standard: Solves radical equations with one or two radical terms.
- 22** **Topic:** Irrational and Complex Numbers
Standard: Defines a complex number and its additive inverse, conjugate, and absolute value.

- 23** **Topic:** Irrational and Complex Numbers
Standard: Adds, subtracts, multiplies, and divides complex numbers.
- 24** **Topic:** Quadratic Equations and Functions
Standard: Solves quadratic equations using various methods including factoring, completing the square, the quadratic formula, and graphing tools.
- 25** **Topic:** Quadratic Equations and Functions
Standard: Analyzes the nature of the roots of quadratic equations by using the discriminant and the relationship between roots and coefficients.
- 26** **Topic:** Quadratic Equations and Functions
Standard: Graphs quadratic functions and determines their maximum or minimum values, the number of zeros, and whether the zeros are real or imaginary.
- 27** **Topic:** Quadratic Equations and Functions
Standard: Solves problems using quadratics, such as problems involving motion and maximum/minimum values. - Makes predictions from collected data using regression techniques.
- 28** **Topic:** Polynomial Functions
Standard: Determines quotients of polynomials using appropriate techniques (monomial divisor, long or synthetic division) or graphing tools.
- 29** **Topic:** Polynomial Functions
Standard: Applies the following theorems to polynomial equations: Remainder, Factor, Rational Root, and the Fundamental Theorem of Algebra.
- 30** **Topic:** Polynomial Functions
Standard: Approximates real roots of polynomial equations by using calculators or computers.
- 31** **Topic:** Analytical Geometry
Standard: Recognizes and sketches the graphs of and the relationships among conic sections.
- 32** **Topic:** Analytical Geometry
Standard: Recognizes the graph of an inverse variation as a hyperbola and solves problems involving both direct and inverse variation.
- 33** **Topic:** Exponential and Logarithmic Functions
Standard: Applies the definition and properties of logarithms to evaluate logarithms.
- 34** **Topic:** Exponential and Logarithmic Functions
Standard: Recognizes and applies the inverse relationship of logarithms and exponential functions and graphs each function.
- 35** **Topic:** Exponential and Logarithmic Functions
Standard: Determines values of common and natural logarithms and antilogarithms using a calculator. -Applies the change of base rule.
- 36** **Topic:** Exponential and Logarithmic Functions
Standard: Solves exponential and logarithmic equations.
- 37** **Topic:** Exponential and Logarithmic Functions
Standard: Solves problems that use exponential and logarithmic equations, such as those involving growth, decay, and compound interest. -Makes predictions from collected data using regression techniques.

Course: Algebra III

- 1** **Topic:** Problem Solving, Reasoning, Estimation
Standard: Solves problems throughout this course that involve: -selecting appropriate approaches and tools. -using estimating strategies to predict computational results. -judging reasonableness of results.

- 2** **Topic:** Problem Solving, Reasoning, Estimation
Standard: Uses approximate numbers appropriately in calculator computations and recognizes error introduced by the use of approximate numbers.
- 3** **Topic:** Problem Solving
Standard: Finds solutions to problems accurate to a given number of decimal places, and recognizes situations such as measurement where approximations are appropriate.
- 4** **Topic:** Problem Solving Reasoning Estimation
Standard: Solves problems that relate concepts to practical applications and to other concepts using appropriate tools.
- 5** **Topic:** Sequences and Series
Standard: Identifies arithmetic and geometric sequences, finds specified terms of such sequences, and determines the sequence given the first term and either the common difference or the common ratio.
- 6** **Topic:** Sequences and Series
Standard: Finds the sums of the first n terms of an arithmetic or geometric series. - Finds the sum of an infinite series.
- 7** **Topic:** Sequences and Series
Standard: Determines the arithmetic and geometric means.
- 8** **Topic:** Sequences and Series
Standard: Uses the Binomial Theorem to expand and simplify binomial expressions.
- 9** **Topic:** Matrices
Standard: Evaluates the results of matrix operations (such as addition, multiplication, and scalar operations) when defined.
- 10** **Topic:** Matrices
Standard: Evaluates the determinants of 2×2 and 3×3 matrices using appropriate methods.
- 11** **Topic:** Matrices
Standard: Finds the inverse of a square matrix, if it exists, for 2×2 and 3×3 matrices.
- 12** **Topic:** Systems of Equations
Standard: Solves systems of equations with two and three unknowns using a variety of methods, including technology.
- 13** **Topic:** Matrices
Standard: Identifies uses and applications of matrices in practical situations, such as use of arrays to organize data in computer programming or transformations.
- 14** **Topic:** Systems of Inequalities
Standard: Applies linear programming strategies to solve systems of inequalities. (Use feasible regions and critical points.)
- 15** **Topic:** Complex Numbers
Standard: Defines and applies the basic operations and properties of complex numbers.
- 16** **Topic:** Quadratic Equations and Their Graphs
Standard: Solves quadratic equations which have real and imaginary roots by using methods such as completing the square, factoring, and the quadratic formula; uses calculators or computers to approximate and check solutions.
- 17** **Topic:** Functions and Graphs
Standard: Defines and graphs the following functions: identity, constant, absolute value, step, greatest integer, polynomial (including linear and quadratic), square root, and piecewise.
- 18** **Topic:** Functions and Graphs
Standard: Constructs an equation or graph that results from transformations (translation, dilation, reflection) using a parent equation or graph.
- 19** **Topic:** Functions and Graphs
Standard: Applies the concepts of relation, function, domain, and range both graphically and algebraically.

- 20** **Topic:** Functions and Graphs
Standard: Evaluates and determines the composition of two functions.
- 21** **Topic:** Functions and Graphs
Standard: Finds the inverse of a function, its domain and range, and states whether the inverse is a function.
- 22** **Topic:** Functions and Graphs
Standard: Uses appropriate tools to determine special relationships between functions and their inverses.
- 23** **Topic:** Polynomial Functions and Their Graphs
Standard: Uses symmetry, intercepts, and asymptotes to graph and interpret graphs of quadratic functions, higher degree polynomial functions, and rational functions using appropriate techniques and tools.
- 24** **Topic:** Conic Sections Graphing
Standard: Identifies and sketches the graphs for the parabola, circle, ellipse, and hyperbola, with and without center at the origin.
- 25** **Topic:** Conic Sections Graphing
Standard: Identifies each conic section, including the degenerates, as the intersection of a conical surface and a plane.
- 26** **Topic:** Conic Sections and Graphing
Standard: Solves systems of equations involving conics and other types of equations.
- 27** **Topic:** Exponential and Logarithmic Functions
Standard: Simplifies algebraic expressions involving rational exponents using appropriate tools.
- 28** **Topic:** Exponential and Logarithmic Functions
Standard: Defines, graphs, and shows the inverse relationship between logarithmic and exponential functions.
- 29** **Topic:** Exponential and Logarithmic Functions
Standard: Determines values of common and natural logarithms and antilogs using a calculator.
- 30** **Topic:** Exponential and Logarithmic Functions
Standard: Solves logarithmic and exponential equations and problems.
- 31** **Topic:** Exponential and Logarithmic Functions
Standard: Solves problems involving application of exponential and logarithmic functions, using appropriate techniques and tools. -Makes predictions from collected data using regression techniques.
- 32** **Topic:** Trigonometry
Standard: Defines the six trigonometric functions as ratios of sides of right triangles.
- 33** **Topic:** Trigonometry
Standard: Converts measures of angles between radians and degrees.
- 34** **Topic:** Trigonometry
Standard: Defines the six trigonometric functions as both circular functions and ratios of sides of right triangles, and shows relationships between these functions.
- 35** **Topic:** Trigonometry
Standard: Sketches an angle in standard position and determines the reference and coterminal angles.
- 36** **Topic:** Trigonometry
Standard: Uses the calculator to evaluate trigonometric ratios for a given angle in either degrees or radians and to find an angle when a trigonometric ratio is known.
- 37** **Topic:** Trigonometry
Standard: Solves problems involving applications of right triangle ratios.
- 38** **Topic:** Trigonometry
Standard: Finds the trigonometric ratios for angles defined by a point (x,y) .

- 39** **Topic:** Trigonometry
Standard: Graphs trigonometric functions using a calculator.
- 40** **Topic:** Trigonometry
Standard: Evaluates and graphs trigonometric functions using period, phase shift and amplitude, and vertical shift.
- 41** **Topic:** Statistics
Standard: Organizes, summarizes, characterizes, and interprets data from practical situations using relevant data sets by constructing tables, graphs, and charts including frequency distributions, histograms, line plots, stem-and-leaf plots, box plots, and scatter plots for bivariate data.
- 42** **Topic:** Statistics
Standard: Summarizes data using measures of central tendency (median, mean, and mode), and measures of variability (range, interquartile range, and standard deviation).
- 43** **Topic:** Statistics
Standard: Uses statistical reasoning techniques appropriately and recognizes common misuses of statistics.
- 44** **Topic:** Statistics
Standard: Identifies common statistical distributions such as the normal distribution.
- 45** **Topic:** Probability
Standard: Finds the probability of an event by determining the sample space of all possible outcomes and the number of successful outcomes.
- 46** **Topic:** Probability
Standard: Finds the probability of mutually-exclusive events occurring.
- 47** **Topic:** Probability
Standard: Applies fundamental counting principles.
- 48** **Topic:** Probability
Standard: Identifies and discriminates between permutations and combinations.
- 49** **Topic:** Probability
Standard: Finds the number of permutations and number of combinations of n things taken r at a time.
- 50** **Topic:** Probability
Standard: Distinguishes between odds, probabilities, and chance and finds the odds associated with given events.

Course: Analysis

- 0** **Standard:** Analysis, when taught in Georgia schools, is either an advanced or honors version of Advanced Algebra and Trigonometry. Students completing Analysis should have studied all topics and objectives detailed in Advanced Algebra and Trigonometry, plus the following objectives:
- 1** **Topic:** Problem Solving, Reasoning, Estimation
Standard: Solves problems throughout this course that involve: -selecting appropriate approaches and tools. -using estimating strategies to predict computational results. -judging reasonableness of results.
- 2** **Topic:** Problem Solving, Reasoning, Estimation
Standard: Solves problems that relate concepts to practical applications and to other concepts using appropriate tools.
- 3** **Topic:** Relations and Functions
Standard: Determines the image, preimage, or inverse of a given mapping, and the composite of two mappings.
- 4** **Topic:** Relations and Functions
Standard: Discusses given functions in terms of symmetry, continuity, asymptotes, basic shape, rates of change, intercepts, maximum, minimum, boundedness, end behavior, exclusions from the domain, and intervals in which zeros occur.

- 5 **Topic:** Relations and Functions
Standard: Identifies equivalence relations.
- 6 **Topic:** Trigonometry
Standard: Solves and graphs equations written in polar form.
- 7 **Topic:** Trigonometry
Standard: Applies DeMoivre's Theorem.
- 8 **Topic:** Vectors
Standard: Identifies and graphs vectors in a plane as directed distances, ordered pairs of numbers, and polar forms.
- 9 **Topic:** Vectors
Standard: Finds sums, differences, multiples, and absolute values of vectors.
- 10 **Topic:** Vectors
Standard: Finds the dot product of two vectors and determines whether vectors are parallel or perpendicular.
- 11 **Topic:** Vectors
Standard: Applies vectors to solving simple problems such as velocity and force problems.
- 12 **Topic:** Analytical Geometry
Standard: Represents graphically, by coordinates or vectors, the locus of points determined by given conditions.
- 13 **Topic:** Set Theory and Logic
Standard: Defines, uses notation of, and pictorially represents set theory concepts.
- 14 **Topic:** Set Theory and Logic
Standard: Constructs direct and indirect proofs.
- 15 **Topic:** Set Theory and Logic
Standard: Determines equivalence between sentences involving conjunctions, disjunctions, negations, and conditionals.
- 16 **Topic:** Set Theory and Logic
Standard: Determines truth tables for sentences and uses Venn diagrams to illustrate the relationships represented by these truth tables.
- 17 **Topic:** Set Theory and Logic
Standard: Represents sentences in symbolic form and uses the tools of truth tables and symbolic logic in assessing equivalence and validity.
- 18 **Topic:** Sequences and Series
Standard: Uses mathematical induction to prove statements.

Course: Applied Algebra

- 1 **Topic:** Measurement
Standard: Distinguishes between counting and measuring and between precision and accuracy.
- 2 **Topic:** Measurement
Standard: Reads and writes measurements to show precision and tolerance, and compares measurements to specified tolerances.
- 3 **Topic:** Measurement
Standard: Uses precision tools to measure, and uses significant digits to indicate the accuracy of a measurement.
- 4 **Topic:** Measurement
Standard: Uses precise measurements to calculate thickness of pipe and area, volume, and surface area of objects.

- 5** **Topic:** Number
Standard: Reads and writes numbers expressed as powers or roots, and finds powers and roots of numbers using a calculator. (Correlated to Algebra I standards 4, 12, 31)
- 6** **Topic:** Number
Standard: Solves problems that involve numbers written as powers. (Correlated to Algebra I standards 4 and 12)
- 7** **Topic:** Algebraic Formulas
Standard: Reads and writes formulas to model real-life problems. (Correlated to Algebra I standard 4)
- 8** **Topic:** Algebraic Formulas
Standard: Evaluates formulas. (Correlated to Algebra I standard 4)
- 9** **Topic:** Algebraic Formulas, Problem Solving
Standard: Uses formulas to solve problems. (Correlated to Algebra I standard 1)
- 10** **Topic:** Linear Equations, Problem Solving
Standard: Solves and checks linear equations. (Correlated to Algebra I standard 8)
- 11** **Topic:** Linear Equations, Problem Solving
Standard: Solves and checks problems involving linear equations. (Correlated to Algebra I standard 9)
- 12** **Topic:** Nonlinear Equations
Standard: Recognizes nonlinear equations and graphs of quadratics, square roots of the variable, and reciprocals of the variable.
- 13** **Topic:** Nonlinear Equations
Standard: Solves and graphs simple nonlinear equations.
- 14** **Topic:** Linear Equations in Two Variables
Standard: Graphs data as points on a coordinate system. (Correlated to Algebra I standard 16)
- 15** **Topic:** Linear Equations in Two Variables
Standard: Sketches the graph of a linear equation in two variables given information, such as slope, x-intercept, y-intercept, two points, and the linear equation. Include special cases such as vertical, horizontal, parallel, and perpendicular lines. (Correlated to Algebra I standards 20 and 21)
- 16** **Topic:** Linear Equations in Two Variables
Standard: Defines slope as rate of change and calculates the slope given the change of the two variables. (Correlated to Algebra I standard 17)
- 17** **Topic:** Linear Equations in Two Variables, Data Analysis, Patterns and Functions
Standard: Interprets and makes predictions from data displayed in line graphs or scatter plots by examining patterns and recognizing algebraic concepts such as rate of change (slope), intercepts, range, and domain. (Correlated to Algebra I standard 18)
- 18** **Topic:** Linear Equations in Two Variables
Standard: Identifies the slope and intercepts of a linear equation. (Correlated to Algebra I standard 19)
- 19** **Topic:** Linear Equations in Two Variables
Standard: Writes the equation of a line given information such as slope, x-intercept, y-intercept, two points, and the graph. (Correlated to Algebra I standard 22)
- 20** **Topic:** Statistics
Standard: Distinguishes between mean, mode, and median as measures of central tendency, and determines the mean, mode, and median for a set of data. (Correlated to Algebra I standard 35)
- 21** **Topic:** Statistics
Standard: Distinguishes between range, trend, and standard deviation as measures of variability, and determines the range and standard deviation that describes a set of data. (Correlated to Algebra I standard 35)
- 22** **Topic:** Statistics
Standard: Draws a histogram to represent the frequency distribution of data.

- 23** **Topic:** Statistics
Standard: Interprets the characteristics of a normal curve.
- 24** **Topic:** Probability
Standard: Counts the number of ways an event can happen.
- 25** **Topic:** Probability
Standard: Determines the probability of simple events. (Correlated to Algebra I standard 36)
- 26** **Topic:** Polynomials
Standard: Identifies polynomial expressions and determines the degree, leading coefficients, constant, and number of terms of a polynomial. (Correlated to Algebra I standard 10)
- 27** **Topic:** Polynomials
Standard: Adds, subtracts, and multiplies polynomials. (Correlated to Algebra I standard 11)
- 28** **Topic:** Polynomials
Standard: Simplifies expressions containing integral exponents using the laws of exponents. (Correlated to Algebra I standard 12)
- 29** **Topic:** Factorization
Standard: Determines monomial factors. (Correlated to Algebra I standard 13)
- 30** **Topic:** Polynomials
Standard: Combines algebraic expressions by multiplying two binomials, squaring a binomial, and finding the product of the sum and difference of two terms. (Correlated to Algebra I standard 11)
- 31** **Topic:** Factorization
Standard: Factors simple quadratic expressions such as trinomials, square trinomials, difference of two squares, and polynomials with common factors. (Correlated to Algebra I standard 14)
- 32** **Topic:** Factorization, Problem Solving
Standard: Use factoring to solve equations and problems. (Correlated to Algebra I standard 15)
- 33** **Topic:** Algebraic Fractions
Standard: Simplifies simple algebraic fractions. (Correlated to Algebra I standard 27)
- 34** **Topic:** Algebraic Fractions
Standard: Solves simple rational equations. (Correlated to Algebra I standard 28)
- 35** **Topic:** Patterns and Functions, Problem Solving
Standard: Decodes and extends patterns. (Correlated to Algebra I standard 5)
- 36** **Topic:** Patterns and Functions
Standard: Represents mathematical relationships as tables of data, ordered pairs, graphs, equations, and word sentences.
- 37** **Topic:** Patterns and Functions
Standard: Distinguishes between relations and functions, and identifies domain and range. (Correlated to Algebra I standard 6)
- 38** **Topic:** Patterns and Functions, Problem Solving
Standard: Uses patterns, relations, and functions to solve problems. (Correlated to Algebra I standard 5)
- 39** **Topic:** Rational and Irrational Numbers and Radicals
Standard: Multiplies, divides, adds, and subtracts radicals with index of two. (Correlated to Algebra I standard 32)
- 40** **Topic:** Rational and Irrational Numbers and Radical Expressions
Standard: Solves simple radical equations and solves problems involving simple radical equations. (Correlated to Algebra I standard 34)
- 41** **Topic:** Quadratic Equations
Standard: Solves quadratic equations by graphing, factoring, the quadratic formula, and compare the solutions. (Correlated to Algebra I standard 15)
- 42** **Topic:** Quadratic Equations, Problem Solving
Standard: Solves problems using quadratic equations.

- 43** **Topic:** Systems of Linear Equations in Two Variables
Standard: Solves systems of linear equations by graphing, substitution, elimination, and Cramer's Rule. (Correlated to Algebra I standard 23)
- 44** **Topic:** Systems of Linear Equations in Two Variables, Problem Solving
Standard: Translates a problem into a system of linear equations. (Correlated to Algebra I standard 24)
- 45** **Topic:** Systems of Linear Equations in Two Variables, Problem Solving
Standard: Solves problems involving systems of linear equations. (Correlated to Algebra I standard 24)
- 46** **Topic:** Linear Inequalities
Standard: Orders numbers using symbols such as $<$, $>$, $=$, \leq , and \geq . (Correlated to Algebra I standards 1 and 4)
- 47** **Topic:** Linear Inequalities
Standard: Solves linear inequalities in one variable, including compound inequalities and absolute value inequalities, and graphs their solutions. (Correlated to Algebra I standard 25)
- 48** **Topic:** Linear Inequalities
Standard: Graphs linear inequalities in two variables on a coordinate plane. (Correlated to Algebra I standard 26)
- 49** **Topic:** Linear Inequalities, Problem Solving
Standard: Solves practical problems involving inequalities, including linear programming problems. (Correlated to Algebra I standard 26)

Course: Applied Geometry

- 1** **Topic:** Trigonometry
Standard: Identifies the parts of a right triangle. G 24
- 2** **Topic:** Trigonometry
Standard: Uses the Pythagorean Theorem to find lengths of sides of a right triangle. G 24
- 3** **Topic:** Trigonometry, Problem Solving
Standard: Uses the characteristics of 3:4:5, 45-45, and 30-60 right triangles to solve practical problems, using a calculator. G 25
- 4** **Topic:** Trigonometry, Problem Solving
Standard: Uses the ratios for the sine, cosine, and tangent of an angle to solve problems involving triangles using a calculator. G 26,27
- 5** **Topic:** Trigonometry
Standard: Uses a calculator to find sine and cosine values. G 26
- 6** **Topic:** Trigonometry
Standard: Graphs sine and cosine functions. G 26
- 7** **Topic:** Trigonometry
Standard: Finds the amplitude, wavelength, period, and frequency of sine functions, and finds the phase shift between two sine functions.
- 8** **Topic:** Plane and Solid Geometric Figures, Problem Solving
Standard: Solves problems involving the areas of rectangles, triangles, trapezoids, circles, and sectors of circles; and the volumes and surface areas of cylinders, cubes, spheres, cones, and frustums of cones. G 28,29,30,32,37
- 9** **Topic:** Plane and Solid Geometric Figures, Problem Solving
Standard: Solves problems involving tangent lines, perpendicular lines, and bisecting lines or angles of right triangles. G 9,28,29
- 10** **Topic:** Plane and Solid Geometric Figures
Standard: Recognizes parallel lines and planes, skew lines, and pairs of angles formed by a transversal. G 11
- 11** **Topic:** Points, Lines, and Planes
Standard: States and applies the triangle sum, exterior angle sum, and polygon angle sum theorems.

- 12** **Topic:** Trigonometry
Standard: Relates sides and angles of right triangles and finds their measures by using the Pythagorean Theorem and the sine, cosine, and tangent functions. G 24,27
- 13** **Topic:** Trigonometry, Problem Solving
Standard: Solves for an unknown dimension or unknown angles, drawing diagrams as needed to help. G 27
- 14** **Topic:** Plane and Solid Geometric Figures, Problem Solving
Standard: Solves plane or solid geometry problems that require a series of calculations. G 34,35
- 15** **Topic:** Solid Geometric Figures, Problem Solving
Standard: Applies principles of solid geometry to solving practical workplace problems. G 34,35
- 16** **Topic:** Computer Spreadsheets
Standard: Describes a computer spreadsheet, tells how it is used, and defines and uses proper spreadsheet terminology.
- 17** **Topic:** Computer Spreadsheets, Problem Solving
Standard: Loads data into a computer and uses simple spreadsheet templates to solve practical problems.
- 18** **Topic:** Computer Graphics
Standard: Describes a computer graphics program and its uses.
- 19** **Topic:** Computer Graphics, Statistics
Standard: Using a prepared template, enters data to produce bar, circle, and line graphs; and enters parameters to graph linear and quadratic functions.
- 20** **Topic:** Computer Graphics, Statistics
Standard: Uses a computer graphics program to create bar, circle, and line graphs.
- 21** **Topic:** Computer Graphics, Statistics, Problem Solving
Standard: Solves practical problems by using the graphs created by a computer graphics program.
- 22** **Topic:** Quality Assurance and Process Control: Statistics
Standard: Distinguishes between a manufacturing process and its product, and makes process charts.
- 23** **Topic:** Quality Assurance and Process Control: Statistics
Standard: Constructs histograms, run charts, scatter diagrams and normal distribution curves from data obtained by counting or measuring.
- 24** **Topic:** Quality Assurance and Process Control: Statistics
Standard: Uses measures of central tendency and dispersion to describe data shown on bell-shaped curves.
- 25** **Topic:** Quality Assurance and Process Control: Statistics
Standard: Calculates process capability and tolerance band, and compares data for process capability and tolerance band on normal distribution curves to determine production quality.
- 26** **Topic:** Quality Assurance and Process Control: Statistics
Standard: Uses a measurement control chart for the mean and range, or an attribute control chart for the fraction defective, to keep a process in control.
- 27** **Topic:** Quality Assurance and Process Control: Statistics
Standard: Designs control charts for the mean and range for a process.
- 28** **Topic:** Quality Assurance and Process Control: Statistics
Standard: Interprets control charts to detect an out-of-control process.
- 29** **Topic:** Quality Assurance and Process Control: Statistics
Standard: Uses single, double, and multiple sampling plans from MIL-STD-105E, and develops single sampling plans using MIL-STD-105E.
- 30** **Topic:** Spatial Visualization
Standard: Determines point, line, and plane symmetry of geometric figures. G 19

- 31** **Topic:** Spatial Visualization
Standard: Uses orthographic drawing techniques to draw two-dimensional projections of objects. G 3
- 32** **Topic:** Spatial Visualization
Standard: Draws basic geometric views using isometric and one- and two-point perspective drawing techniques. G 3
- 33** **Topic:** Coordinate Geometry
Standard: Determines the locus of points meeting given conditions. G 3,9
- 34** **Topic:** Coordinate Geometry
Standard: Determines if lines are perpendicular or parallel. G 8,9 12
- 35** **Topic:** Coordinate Geometry
Standard: Finds the lengths and midpoints of line segments. G 9,43
- 36** **Topic:** Coordinate Geometry
Standard: Uses an equation to represent a circle in a coordinate plane. G 43
- 37** **Topic:** Coordinate Geometry, Vector Geometry
Standard: Adds vectors in a coordinate plane.
- 38** **Topic:** Coordinate Geometry
Standard: Interprets and depicts simple basic objects in a three-dimensional coordinate system. G 3
- 39** **Topic:** Logic
Standard: Compares and contrasts inductive and deductive reasoning. G 4
- 40** **Topic:** Logic, Problem Solving
Standard: Applies the language and symbols of logic to occupational situations and determines appropriate conclusions. G 5,6
- 41** **Topic:** Logic, Plane Geometric Figures
Standard: Performs geometric constructions. G 15
- 42** **Topic:** Logic, Plane Geometric Figures
Standard: Uses postulates and theorems to build geometric proofs involving lines, triangles, and quadrilaterals. G 6,8,12,16
- 43** **Topic:** Coordinate Geometry
Standard: Use coordinate methods to explore, make conjectures, or prove properties of geometric figures using tools such as algebra, graphing, and appropriate technology. G 46
- 44** **Topic:** Logic, Problem Solving
Standard: Solves problems using logical reasoning and geometric theorems. G 6,16
- 45** **Topic:** Transformations
Standard: Constructs congruent geometric figures using reflections, translations, and rotations. G 14,15,38
- 46** **Topic:** Transformations
Standard: Constructs similar geometric figures using dilations. G 15,20,39
- 47** **Topic:** Transformations
Standard: Illustrates congruence and similarity transformations in the coordinate plane. G 14,20,41
- 48** **Topic:** Transformations
Standard: Applied basic properties of line reflections, translations, rotations, dilations, and their composition. G 40

Course: Applied Problem Solving

- 1** **Topic:** Problem Solving
Standard: Uses specific problem-solving strategies such as guess and check; drawing a diagram or other representations of the problem; using tables, charts or graphs; working backwards; using problem reduction (converting to a related problem that is easier to solve); breaking the problem into manageable pieces and solving the separate parts individually; and uses estimation and approximation when appropriate. (Correlated to Algebra I standard 1)
- 2** **Topic:** Problem Solving
Standard: Selects an appropriate problem-solving strategy for a given laboratory investigation. (Correlated to Algebra I standard 1)
- 3** **Topic:** Problem Solving
Standard: Recognizes and applies the problem-solving process: - Identifies and formulates a problem based on a practical or laboratory situation. - Proposes and evaluates information needed to solve problems based on practical or laboratory situations. - Reaches a valid and supportable conclusion. - Judges the reasonableness of a proposed solution.
- 4** **Topic:** Problem Solving
Standard: Applies the problem-solving process to a wide variety of problems taken from the various technology/career preparatory areas. (Correlated to Algebra I standard 2)
- 5** **Topic:** Real Number System
Standard: Identifies and applies properties of the real number system. (Correlated to Algebra I standard 7)
- 6** **Topic:** Number Operations: Using a Scientific Calculator
Standard: Using a calculator, represents whole numbers, fractions, decimals, percents, and mixed numbers taken from practical data, and converts between the various representations. (Correlated to Algebra I standard 4)
- 7** **Topic:** Number Operations: Using a Scientific Calculator
Standard: Using a calculator, appropriately represents and interprets extremely large and small numbers requiring scientific notation.
- 8** **Topic:** Number Operations: Using a Scientific Calculator
Standard: Using a calculator, solves problems requiring the use of the four basic operations, memory, and exponentiation with both positive and negative integral exponents. (Correlated to Algebra I standard 4)
- 9** **Topic:** Estimation
Standard: Estimates answers by various techniques and compares calculator results with estimates to determine reasonableness. (Correlated to Algebra I standard 1)
- 10** **Topic:** Estimation
Standard: Recognizes appropriate, practical situations in which to use and to expect results with exact and approximate numbers. (Correlated to Algebra I standard 1)
- 11** **Topic:** Measurement and Geometry
Standard: Applies techniques of rounding.
- 12** **Topic:** Measurement and Geometry
Standard: Measures objects using appropriate tools involving both metric and customary units to find length, weight/mass, area, and capacity/volume.
- 13** **Topic:** Measurement and Geometry
Standard: Measures quantities such as temperature, time, pressure, voltage, current, and resistance using appropriate tools and units of measure.
- 14** **Topic:** Measurement and Geometry
Standard: Solves applied problems involving measurements.
- 15** **Topic:** Measurement and Geometry
Standard: Identifies items from real life that are commonly measured in metric, customary, or both systems of measurement, and recognizes the appropriately-sized units to use.

- 16** **Topic:** Measurement and Geometry
Standard: Identifies lines, angles, circles, polygons, cylinders, cones, rectangular solids, and spheres in everyday objects.
- 17** **Topic:** Measurement and Geometry
Standard: Measures angles with a protractor and other tools for career/technology areas.
- 18** **Topic:** Points, Lines, Planes
Standard: Classifies triangles as acute, right, or obtuse and equilateral, isosceles, or scalene; and polygons as regular, convex, or congruent.
- 19** **Topic:** Measurement and Geometry
Standard: Applies geometric properties, such as the sum of the angles of a polygon, percent of area of a circle determined by the central angle measure in a pie chart, parallel sides and angle relations for parallelograms, to practical drawings.
- 20** **Topic:** Measurement and Geometry
Standard: Calculates perimeter and area of plane figures.
- 21** **Topic:** Measurement and Geometry
Standard: Calculates volume, lateral area and surface area for cylinders, rectangular solids, pyramids, cones, and spheres.
- 22** **Topic:** Measurement and Geometry
Standard: Applies vector methods to represent direction and magnitude of given physical quantities and to solve applied problems.
- 23** **Topic:** Measurement and Geometry
Standard: Applies the Pythagorean Theorem and its converse in problem solving situations. (Correlated to Algebra I standard 33)
- 24** **Topic:** Ratio and Proportion
Standard: Identifies ratios and proportions as they appear in applied situations and solves proportions. (Correlated to Algebra I standard 30)
- 25** **Topic:** Ratio and Proportion
Standard: Applies ratios to similar geometric figures, as in scale drawings, as well as with mixtures and compound applications. (Correlated to Algebra I standard 30)
- 26** **Topic:** Ratio and Proportion
Standard: Applies knowledge of ratio and proportion to draw scale representations in applied situations.
- 27** **Topic:** Ratio and Proportion
Standard: Identifies and applies mathematics to practical problems requiring direct and inverse proportions.
- 28** **Topic:** Representing and Analyzing Data
Standard: Collects and organizes data appropriate to an applied problem.
- 29** **Topic:** Representing and Analyzing Data
Standard: Organizes information using tables, charts, and a variety of graph types with appropriate labels and scales.
- 30** **Topic:** Representing and Analyzing Data
Standard: Recognizes a wide variety of occupational situations in which information is gathered and displayed using tables, charts, and graphs.
- 31** **Topic:** Representing and Analyzing Data
Standard: Analyzes tables, charts, and graphs from occupational and media services.

Course: Basic Math I

- Standard:** This course is designed for students who have not been successful on the mathematics portion of the Georgia High School Graduation Test (GHSGT). This is not intended to be a specific mathematics course content, but, should emphasize the mastering of the mathematics objectives on the GHSGT. The course should be individualized for each student based upon their test performance data with the areas of weaknesses determining the mathematical skills and concepts that need to be addressed. This course may be used for the Remedial Education Program (REP) provided the REP guidelines are followed.

Course: Basic Math II

- Standard:** This course is an extension of the Basic Math I course with additional remediation for students who have still not mastered the mathematics objectives on the Georgia High School Graduation Test. This course may be used for the Remedial Education Program (REP) provided the REP guidelines are followed.

Course: Calculus (non-AP)

- Topic:** Problem Solving, Reasoning, Estimation
Standard: Solves problems including: - Selecting appropriate approaches and tools. - Using estimating strategies to predict computational results. - Judging reasonableness of results
- Topic:** Problem Solving, Reasoning, Estimation
Standard: Solves problems that relate concepts to practical applications and to other concepts using appropriate tools.
- Topic:** Functions
Standard: Identifies the characteristics of functions and relations with respect to domain, range, intercepts, symmetries (including odd and even functions), asymptotes, and zeros. - Graphs functions and relations with respect to these characteristics and identifies these characteristics from graphs.
- Topic:** Functions
Standard: Applies the algebra of functions by finding sum, product, quotient, composition, and inverse where they exist.
- Topic:** Functions
Standard: Identifies and applies properties of algebraic, trigonometric, exponential, and logarithmic functions. Includes the following: polynomial (existence, number, and location of zeros), trigonometric (fundamental identities, addition formulas, graphs, amplitude, periodicity), exponential, logarithmic (properties, graphs, inverse, the number e as a limit), absolute value ($f(|x|)$, $|f(x)|$), and bounded/ unbounded behavior.
- Topic:** Limits and Continuity
Standard: Evaluates limits of functions and applies properties of limits, including one-sided limits.
- Topic:** Limits and Continuity
Standard: Estimates limits from graphs or tables of data.
- Topic:** Limits and Continuity
Standard: Describes asymptotic behavior in terms of limits involving infinity.
- Topic:** Limits and Continuity
Standard: Applies the definition of continuity to a function at a point. Determines if a function is continuous over an interval.
- Topic:** Derivatives
Standard: Defines the derivative of a function in various ways: -The limit of the difference quotient. -The slope of the tangent line at a point. -Instantaneous rate of change. -The limit of the average rate of change.
- Topic:** Derivatives
Standard: Determines if a function is differentiable over an interval. -Determine points where the derivative of a function fails to exist.

- 12** **Topic:** Derivatives
Standard: Applies the rules of differentiation to algebraic and transcendental functions.
- 13** **Topic:** Derivatives
Standard: Applies the chain rule to composite functions, implicitly defined functions, and related-rates of change.
- 14** **Topic:** Derivatives
Standard: Approximates the rate of change at a point, given the graph of a function or a table of values.
- 15** **Topic:** Derivatives
Standard: Differentiates the inverse of a function, including inverse trigonometric functions.
- 16** **Topic:** Derivatives
Standard: Determines successive derivatives of functions and applies them to problems, such as speed, velocity, and acceleration.
- 17** **Topic:** Derivatives
Standard: Applies Rolle's Theorem and the Mean Value Theorem.
- 18** **Topic:** Derivatives
Standard: Applies L'Hopital's Rule when appropriate.
- 19** **Topic:** Applications of the Derivative
Standard: Applies the derivative to determine: -the slope of a curve at a point, -the equation of the tangent line to a curve at a point, and -the equation of the normal line to a curve at a point.
- 20** **Topic:** Applications of the Derivative
Standard: Uses the relationships between $f(x)$, $f'(x)$, $f''(x)$ to: -Determine the increasing/decreasing behavior of $f(x)$. - Determine critical point(s) of $f(x)$. -Determine the concavity of $f(x)$ over an interval. -Determine the point(s) of inflection of $f(x)$. -Sketch the graphs of $f'(x)$ and $f''(x)$, given $f(x)$. -Sketch the graph of $f(x)$, given $f'(x)$.
- 21** **Topic:** Applications of the Derivative
Standard: Applies the extreme value theorem to problem situations.
- 22** **Topic:** Applications of the Derivative
Standard: Solves optimization problems. (Remaining parts covered in previous standards.)
- 23** **Topic:** Integrals
Standard: Defines the antiderivative and applies its properties to problems such as distance and velocity from acceleration with initial conditions, growth, and decay.
- 24** **Topic:** Integrals
Standard: Approximates areas by using inscribed rectangles, circumscribed rectangles, trapezoids, and other appropriate methods.
- 25** **Topic:** Integrals
Standard: Calculates areas by evaluating sums using sigma notation.
- 26** **Topic:** Integrals
Standard: Relates the definite integral to the concept of the area under a curve. -Defines and applies the properties of the definite integral.
- 27** **Topic:** Integrals
Standard: Identifies and uses the Fundamental Theorem of Calculus in evaluating definite integrals.
- 28** **Topic:** Integrals
Standard: Integrates by substitution, by using identities, by changing variables, and by parts.
- 29** **Topic:** Application of the Integral
Standard: Applies the integral to the average or mean value of a function on an interval.
- 30** **Topic:** Application of the Integral
Standard: Determines the area between curves using integration formulas.

- 31** **Topic:** Application of the Integral
 Standard: Determines the volume of a solid of revolution using various methods.
- 32** **Topic:** Application of the Integral
 Standard: Interprets $\ln x$ as the area under the curve of $f(x) = 1/x$.

Course: Concepts of Algebra

- 1** **Topic:** Problem Solving
Standard: Applies the following problem-solving process in challenging activities: - Identifies and formulates problems based on applied or laboratory situations. - Proposes and evaluates information needed to solve problems based on applied or laboratory situations. - Reaches a valid and supportable conclusion. - Judges the reasonableness of a proposed solution. (Correlated to Algebra I standard 1)
- 2** **Topic:** Communication
Standard: Communicates mathematical ideas by using language and symbolism: - Reflects upon and clarifies thinking about mathematical ideas and relationships. - Formulates mathematical definitions and expresses generalizations discovered through investigation. - Expresses mathematical ideas both orally and in writing. - Interprets written presentations of mathematics. - Asks clarifying and extending questions related to mathematics about which they have read or heard. (Correlated to Algebra I standard 3)
- 3** **Topic:** Reasoning
Standard: Develops logical reasoning skills through numerous and varied experiences: - Makes and tests conjectures. - Formulates counter examples. - Follows logical arguments. - Judges the validity for arguments. - Constructs simple arguments.
- 4** **Topic:** Connections
Standard: Investigates connections within mathematics, and connections between various mathematical topics and their applications: - Views mathematics as an integrated whole rather than as an isolated set of topics. - Acknowledges the relevance and usefulness of mathematics both in and out of school. (Correlated to Algebra I standard 2)
- 5** **Topic:** Real Number System
Standard: Reviews the following algebraic topics: -Expresses rational numbers in equivalent forms. -Identifies and applies the properties of real numbers. -Simplifies numerical expressions. -Simplifies and evaluates simple algebraic expressions and formulas. -Translates words into algebraic expressions and equations. -Represents problem situations by algebraic expressions and equations -Identifies subsets of the real numbers, such as whole numbers, integers, rational, and irrational numbers. -Graphs real numbers on a number line. -Adds, subtracts, multiplies, and divides integers and other rational numbers and determines their absolute value. (Correlated to Algebra I standard 4)
- 6** **Topic:** Data Analysis
Standard: Collects, organizes, and records (i.e., tables, charts, tallies, line plots, and stem-and-leaf plots) data obtained through investigation and experimentation.
- 7** **Topic:** Data Analysis
Standard: Analyzes and represents data (including bivariate data) using tables, charts, and variety of graphs (i.e., line graphs, scatter plots, bar graphs, picture graphs, and box plots). (Correlated to Algebra I standard 18)
- 8** **Topic:** Linear Equations in Two Variables
Standard: Graphs points (ordered pairs of numbers) in the coordinate plane, and identifies the coordinates of given points in the plane. (Correlated to Algebra I standard 16)
- 9** **Topic:** Data Analysis
Standard: Interprets graphical representations of data by formulating and answering questions, summarizing data (i.e., mean, median, mode, and range), drawing conclusions, and making predictions. (Correlated to Algebra I standard 35)
- 10** **Topic:** Data Analysis, Linear Equations in Two Variables
Standard: Interprets and makes predictions from data displayed in line graphs or scatter plots, by examining patterns and recognizing algebraic concepts such as slope (i.e., rate of change), intercepts, range, and domain. (Correlated to Algebra I standard 18)
- 11** **Topic:** Patterns and Functions
Standard: Distinguishes between relations and functions, and identifies the domain and range. (Correlated to Algebra I standard 6)

- 12** **Topic:** Solving Equations
Standard: Solves linear equations using a variety of methods such as manipulatives and technology. (Correlated to Algebra I standard 8)
- 13** **Topic:** Solving Equations
Standard: Solves problems involving linear equations. (Correlated to Algebra I standard 9)
- 14** **Topic:** Linear Equations in Two Variables
Standard: Graphs linear equations in two variables and identifies graphs of lines, including special cases such as vertical, horizontal, parallel, and perpendicular lines. (Correlated to Algebra I standard 21)
- 15** **Topic:** Linear Equations in Two Variables
Standard: Writes the equation of a line given information such as slope, x-intercept, y-intercept, two points, and the graph. (Correlated to Algebra I standard 22)
- 16** **Topic:** Linear Equations in Two Variables
Standard: Solves a system of linear equations by a variety of methods including graphing. (Correlated to Algebra I standard 23)
- 17** **Topic:** Problem Solving, Linear Equations in Two Variables
Standard: Explores applied problems involving systems of linear equations by analyzing graphical representations, using matrices or spreadsheets, and tools such as graphing calculators or computers. (Correlated to Algebra I standard 24)
- 18** **Topic:** Linear Inequalities
Standard: Solve problems involving linear inequalities, and graphs the solution on a coordinate plane. (Correlated to Algebra I standard 26)
- 19** **Topic:** Problem Solving, Linear Inequalities
Standard: Explores applied problems involving linear inequalities in one or two variables by analyzing graphical representations, using tools such as graphing calculators or computers. (Correlated to Algebra I standard 26)
- 20** **Topic:** Rational Expressions: Algebraic Fractions
Standard: Recognizes and simplifies simple algebraic fractions. (Correlated to Algebra I standard 27)
- 21** **Topic:** Rational Expressions: Algebraic Fractions
Standard: Solves simple rational equations, including fractional equations and equations with fractional coefficients. (Correlated to Algebra I standard 28)
- 22** **Topic:** Rational Expressions: Algebraic Fractions
Standard: Solves problems involving ratios, proportions, and percents. (Correlated to Algebra I standard 30)
- 23** **Topic:** Rational and Irrational Numbers and Radical Expressions
Standard: Finds square roots of rational numbers and decimal approximations of irrational numbers by using a calculator. (Correlated to Algebra I standard 31)
- 24** **Topic:** Rational and Irrational Numbers and Radical Expressions
Standard: Multiplies, divides, adds, and subtracts square root radicals. (Correlated to Algebra I standard 32)
- 25** **Topic:** Radical Equations
Standard: Solves simple radical equations and problems. (Correlated to Algebra I standard 34)
- 26** **Topic:** Problem Solving, Pythagorean Theorem
Standard: Applies the Pythagorean Theorem and its converse in problem-solving situations. (Correlated to Algebra I standard 33)
- 27** **Topic:** Rational and Irrational Numbers and Radical Expressions
Standard: Uses the quadratic formula and a calculator to solve quadratic equations. (Correlated to Algebra I standard 15)
- 28** **Topic:** Polynomials
Standard: Simplifies expressions containing integral exponents using the laws of exponents. (Correlated to Algebra I standard 12)
- 29** **Topic:** Polynomials
Standard: Identifies polynomial expressions and determines the degree, leading coefficients, constant, and number of terms of a polynomial. (Correlated to Algebra I standard 10)

- 30** **Topic:** Polynomials
Standard: Adds and subtracts polynomials. (Correlated to Algebra I standard 11)
- 31** **Topic:** Polynomials
Standard: Multiplies polynomials (two monomials, a monomial and a polynomial, two binomials, two polynomials). (Correlated to Algebra I standard 11)
- 32** **Topic:** Factorization
Standard: Finds monomial factors of polynomials and divides a polynomial by a monomial. (Correlated to Algebra I standard 13)
- 33** **Topic:** Factorization
Standard: Factors simple quadratic expressions such as trinomials, perfect square trinomials, difference of two squares, and polynomials with common factors, by looking at patterns. (Correlated to Algebra I standard 14)
- 34** **Topic:** Quadratic, Exponential, Logarithmic, and Rational Equations
Standard: Explores quadratic, exponential, and rational equations by analyzing graphical representations and graphing with appropriate tools such as graphing calculators or computers.

Course: Concepts of Probability and Statistics

- 1** **Topic:** Problem Solving
Standard: Applies the following problem-solving process in challenging activities: - Identifies and formulates problems based on applied or laboratory situations. - Proposes and evaluates information needed to solve problems based on applied or laboratory situations. - Reaches a valid and supportable conclusion. - Judges the reasonableness of a proposed solution.
- 2** **Topic:** Communication
Standard: Communicates mathematical ideas by using language and symbolism: - Reflects upon and clarifies thinking about mathematical ideas and relationships. - Formulates mathematical definitions and expresses generalizations discovered through investigation. - Expresses mathematical ideas both orally and in writing. - Interprets written presentations of mathematics. - Asks clarifying and extending questions related to mathematics about which they have read or heard.
- 3** **Topic:** Reasoning
Standard: Develops logical reasoning skills through numerous and varied experiences: - Makes and tests conjectures. - Formulates counterexamples. - Follows logical arguments. - Judges the validity for arguments. - Constructs simple arguments.
- 4** **Topic:** Connections
Standard: Investigates connections within mathematics, and connections between various mathematical topics and their applications: - Views mathematics as an integrated whole rather than as an isolated set of topics. - Acknowledges the relevance and usefulness of mathematics both in and out of school.
- 5** **Topic:** Gathering, Exploring, and Interpreting Data
Standard: Conducts data collection activities and discusses and interprets results.
- 6** **Topic:** Gathering, Exploring, and Interpreting Data
Standard: Constructs and interprets graphical representations of data including circle graphs, line graphs, pictographs, bar graphs, histograms, stem-and-leaf plots, and box-and-whisker plots. Compares several data sets using back-to-back stem-and-leaf plots or multiple box plots.
- 7** **Topic:** Gathering, Exploring, and Interpreting Data
Standard: Organizes, summarizes, and characterizes data from own environment using tables and descriptive measures including the median, mean, mode, quartiles, percentiles, the range and the interquartile range.
- 8** **Topic:** Gathering, Exploring, and Interpreting Data
Standard: Identifies possible trends in data including patterns, clusters, and outliers.
- 9** **Topic:** Gathering, Exploring, and Interpreting Data
Standard: Constructs and interprets a scatter plot of bivariate data and makes predictions by using the median-fit line.

- 10** **Topic:** Gathering, Exploring, and Interpreting Data
Standard: Understands the concept of correlation as a measure of the linear association between two variables.
- 11** **Topic:** Gathering, Exploring, and Interpreting Data
Standard: Constructs and interprets a plot of data over time and uses medians to smooth times series data.
- 12** **Topic:** Probability and Simulation
Standard: Uses manipulatives and devices that generate random outcomes, data sets produced from student observation and collection of real data, and computer-generated data to determine experimental probabilities.
- 13** **Topic:** Probability and Simulation
Standard: Builds models for simulating a given practical problem and uses devices, random number tables or generators, calculators, and computers to provide an approximation to the solution of the problem.
- 14** **Topic:** Probability and Simulation
Standard: Applies the results obtained from Standards1-14 to illustrate the Law of Large Numbers and to develop the concept of theoretical probability.
- 15** **Topic:** Probability and Simulation
Standard: Assigns theoretical probabilities to equally likely events.
- 16** **Topic:** Probability and Simulation
Standard: Recognizes and assigns probabilities to complementary events, evaluates the probability of a compound event, and distinguishes between independent and dependent events.
- 17** **Topic:** Probability and Simulation
Standard: Computes expected values for simple experimental situations.
- 18** **Topic:** Probability and Simulation
Standard: Performs simulations for practical problems where the probability of success is $\frac{1}{2}$ and other than $\frac{1}{2}$, and for situations with an unknown number of key components.
- 19** **Topic:** Statistical Inference
Standard: Plots experimental data and discusses possible interpretations.
- 20** **Topic:** Statistical Inference
Standard: Constructs sampling distributions using student investigations and simulations.
- 21** **Topic:** Statistical Inference
Standard: Constructs and interprets 90% box plots for various size samples and uses the box plots to summarize the sampling distribution.
- 22** **Topic:** Statistical Inference
Standard: Constructs confidence intervals by comparing box plots and uses confidence interval estimates to interpret experimental data.
- 23** **Topic:** Statistical Inference
Standard: Applies the capture-recapture model to generate a confidence interval.
- 24** **Topic:** Statistical Inference
Standard: Formulates and tests hypotheses informally through confidence interval arguments.
- 25** **Topic:** Statistics in Society
Standard: Plans and conducts experiments (investigations) and recognizes the aspects of an investigation that have impact on the results, such as sample size and bias.
- 26** **Topic:** Statistics in Society
Standard: Distinguishes among sampling schemes and understands the concept of randomness.
- 27** **Topic:** Statistics in Society
Standard: Interprets the outcomes of the analysis of data analysis from an investigation and communicates the results.

- 28** **Topic:** Statistics in Society
Standard: Interprets results of polls and surveys discussed in the media including important surveys such as public opinion polls, the Nielsen ratings, the U.S. Census, and surveys that determine the consumer price indices.
- 29** **Topic:** Statistics in Society
Standard: Finds examples of the use of statistics in such areas as business, medicine, agriculture, engineering, and industry.
- 30** **Topic:** Statistics in Society
Standard: Uses the media to identify examples that use statistics correctly and to identify and correct misuses of statistics.

Course: Concepts of Problem Solving

- 1** **Topic:** Problem Solving
Standard: Applies the following problem-solving process in challenging activities: - Identifies and formulates problems based on applied or laboratory situations. - Proposes and evaluates information needed to solve problems based on applied or laboratory situations. - Reaches a valid and supportable conclusion. - Judges the reasonableness of a proposed solution. (Correlated to Algebra I standards 1 and 2)
- 2** **Topic:** Communication
Standard: Communicates mathematical ideas by using language and symbolism: - Reflects upon and clarifies thinking about mathematical ideas and relationships. - Formulates mathematical definitions and expresses generalizations discovered through investigation. - Expresses mathematical ideas both orally and in writing. - Interprets written presentations of mathematics. - Asks clarifying and extending questions related to mathematics about which they have read or heard. (Correlated to Algebra I standard 3)
- 3** **Topic:** Reasoning
Standard: Develops logical reasoning skills through numerous and varied experiences: - Makes and tests conjectures. - Formulates counter examples. - Follows logical arguments. - Judges the validity for arguments. - Constructs simple arguments.
- 4** **Topic:** Connections
Standard: Investigates connections within mathematics and connections between various mathematical topics and their applications: - Views mathematics as an integrated whole rather than as an isolated set of topics. - Acknowledges the relevance and usefulness of mathematics both in and out of school.
- 5** **Topic:** Real Numbers
Standard: Identifies subsets of real numbers, such as whole numbers, integers, rational, and irrational numbers. (Correlated to Algebra I standard 4)
- 6** **Topic:** Real Numbers
Standard: Graphs real numbers on a number line. (Correlated to Algebra I standard 4)
- 7** **Topic:** Number and Computation
Standard: Expresses numbers in equivalent and approximate forms and orders these forms using appropriate tools such as calculators and computers (includes fractions, decimals, percent; scientific notation; square and cube roots and second and third powers of whole numbers; and approximations of fractions, decimals, and percents). (Correlated to Algebra I standard 4)
- 8** **Topic:** Addition Patterns and Models
Standard: Investigates the modeling concept of addition (i.e., putting together or sliding) by using physical materials and pictorial, graphic, and algebraic representation. (Correlated to Algebra I standard 4)
- 9** **Topic:** Subtraction Patterns and Models
Standard: Investigates the modeling concept of subtraction (i.e., taking apart, comparing, or sliding) by using physical materials and pictorial, graphic, and algebraic representation. (Correlated to Algebra I standard 4)
- 10** **Topic:** Multiplication Patterns and Models
Standard: Investigates the modeling concept of multiplication (i.e., area, volume, array, size change, rate factor, and repeated addition) by using physical materials and pictorial, graphic, and algebraic representation. (Correlated to Algebra I standard 4)

- 11** **Topic:** Division Patterns and Models
Standard: Investigates the modeling concept of division (i.e., rate, ratio comparison, and missing factors) by using physical materials and pictorial, graphic, and algebraic representation. (Correlated to Algebra I standard 4)
- 12** **Topic:** Number and Computation
Standard: Identifies and applies order of operations and absolute value. (Correlated to Algebra I standard 4)
- 13** **Topic:** Computation and Estimation
Standard: Selects and uses appropriate and efficient methods of computing exact and approximate numbers, including mental computation, calculator, computer, and pencil and paper techniques. (Correlated to Algebra I standards 1 and 2)
- 14** **Topic:** Real Numbers
Standard: Identifies and applies properties of real numbers. (Correlated to Algebra I standard 7)
- 15** **Topic:** Language of Algebra: Numbers and Variables
Standard: Associates the concepts of variable, expression, and equation with applied and laboratory situations. (Correlated to Algebra I standard 4)
- 16** **Topic:** Language of Algebra: Numbers and Variables
Standard: Represents applied situations that involve numerical and variable quantities using algebraic expressions. (Correlated to Algebra I standard 4)
- 17** **Topic:** Language of Algebra: Numbers and Variables
Standard: Represents applied situations that involve numerical and variable quantities using algebraic equations and inequalities. (Correlated to Algebra I standard 4)
- 18** **Topic:** Language of Algebra: Numbers and Variables
Standard: Evaluates numerical and algebraic expressions by selecting and using appropriate models and tools, including calculators. (Correlated to Algebra I standard 4)
- 19** **Topic:** Language of Algebra: Numbers and Variables
Standard: Evaluates formulas, including perimeter and area of simple plane figures and surface area and volume of solids, by selecting and using appropriate models and tools, including calculators. (Correlated to Algebra I standard 4)
- 20** **Topic:** Language of Algebra: Numbers and Variables
Standard: Translates word phrases and statements into algebraic expressions and equations respectively, and vice versa. (Correlated to Algebra I standard 4)
- 21** **Topic:** Problem Solving, Linear Equations
Standard: Solves problems involving linear equations using a variety of methods including physical models (i.e., algebraic tiles, balance scales, and two-color counters) as well as calculators and/or computers. (Correlated to Algebra I standards 8 and 9)
- 22** **Topic:** Problem Solving, Linear Inequalities
Standard: Graphs and analyzes inequalities in one variable. (Correlated to Algebra I standard 25)
- 23** **Topic:** Problem Solving, Proportional Reasoning, Ratio, Proportion, and Percent
Standard: Solves applied problems involving ratios and proportions including percent problems, scale drawings, and geometric figures. (Correlated to Algebra I standard 30)
- 24** **Topic:** Linear Equations
Standard: Graphs linear equations in two variables and finds the slope and intercept(s). (Correlated to Algebra I standards 19, 20, and 21)
- 25** **Topic:** Problem Solving, Linear Equations
Standard: Solves problems that involve systems of two linear equations in two variables. (Correlated to Algebra I standards 23 and 24)
- 26** **Topic:** Measurement
Standard: Estimates measurements and solves problems in both customary and metric systems.
- 27** **Topic:** Geometry
Standard: Identifies and differentiates between similar and congruent figures and identifies figures that have been transformed by rotation, reflection, and translation.

- 28** **Topic:** Geometry
Standard: Identifies lines, angles, circles, polygons, cylinders, cones, rectangular solids, and spheres in everyday objects.
- 29** **Topic:** Geometry
Standard: Applies geometric properties to practical drawings: - Percent of area of a circle determined by the central angle measure in a pie chart. - Parallel sides and angle relations for parallelograms.
- 30** **Topic:** Geometry
Standard: Draws, measures, and classifies angles and triangles.
- 31** **Topic:** Geometry
Standard: Determines the number of degrees in the interior angles of geometric figures.
- 32** **Topic:** Geometry
Standard: Solves for missing sides and angles of a triangle.
- 33** **Topic:** Geometry
Standard: Uses the Pythagorean Theorem to solve problems. (Correlated to Algebra I standard 33)

Course: Discrete Mathematics

- 1** **Topic:** Problem Solving, Reasoning, Estimation
Standard: Solves problems involving selecting appropriate approaches and tools, estimating, and judging the reasonableness of results throughout this course.
- 2** **Topic:** Problem Solving, Reasoning, Estimation
Standard: Solves problems that relate concepts to other concepts and to practical applications using tools such as calculators and computers.
- 3** **Topic:** Communication
Standard: Reflects upon and clarifies mathematical ideas and relationships.
- 4** **Topic:** Communication
Standard: Formulates mathematical definitions and expresses generalizations discovered through investigations.
- 5** **Topic:** Communication
Standard: Expresses mathematical ideas by written and spoken word, and reads written presentations of mathematics with understanding.
- 6** **Topic:** Communication
Standard: Asks clarifying and extending questions related to mathematical concepts.
- 7** **Topic:** Communication
Standard: Uses mathematical notation appropriately, and recognizes its economy, power, and elegance (scientific exactness and precision) and its role in the development of mathematical ideas.
- 8** **Topic:** Reasoning
Standard: Makes and tests conjectures, and formulates counter examples.
- 9** **Topic:** Reasoning
Standard: Follows logical arguments, and judges the validity of arguments.
- 10** **Topic:** Reasoning
Standard: Constructs simple, valid arguments, including direct and indirect proofs and proofs by mathematical induction.
- 11** **Topic:** Connections
Standard: Recognizes and uses connections among mathematical topics, and connections between mathematics and other disciplines.

- 12** **Topic:** Decision Making
Standard: Uses fair-division algorithms (e.g., cut-and-choose methods or inspection methods) to solve problems.
- 13** **Topic:** Decision Making
Standard: Determines election results by using procedures such as setting up preference schedules for plurality, Borda, Condorcet, or other ranking methods.
- 14** **Topic:** Decision Making
Standard: Identifies paradoxes, and uses weighted voting and power indexes along with Arrow's fairness criteria to determine what is meant by Arrow's Impossibility Theorem.
- 15** **Topic:** Decision Making
Standard: Identifies methods of apportionment, apportionment paradoxes, and is familiar with Balinski and Young Impossibility Theorem.
- 16** **Topic:** Graph Theory
Standard: Examines the structure of a graph, and constructs and uses different representations such as diagrams, adjacency matrix, and adjacency lists.
- 17** **Topic:** Graph Theory
Standard: Applies graph theory to activity analysis (e.g., PERT or CPM).
- 18** **Topic:** Graph Theory
Standard: Applies algorithms such as those of Kruskal to find minimal spanning trees and of Dijkstra to find shortest paths in weighted graphs.
- 19** **Topic:** Graph Theory
Standard: Analyzes networks such as systems of roads, pipelines, and airline routes using graphs as models.
- 20** **Topic:** Graph Theory
Standard: Solves problems involving the notions of connectedness, completeness, bipartiteness, planarity, and graph colorings.
- 21** **Topic:** Graph Theory
Standard: Identifies properties of graphs having Eulerian or Hamiltonian circuits and/or paths.
- 22** **Topic:** Graph Theory
Standard: Knows several definitions of a tree.
- 23** **Topic:** Graph Theory
Standard: Finds the minimal spanning trees for a given graph.
- 24** **Topic:** Combinatorics
Standard: Applies the Fundamental Principle of Counting (product rule) and basic permutation and combination formulas.
- 25** **Topic:** Combinatorics
Standard: Identifies and is able to prove simple basic combinatorial identities using combinatorial reasoning.
- 26** **Topic:** Combinatorics
Standard: Applies the Binomial Theorem and relates it to Pascal's Triangle.
- 27** **Topic:** Combinatorics
Standard: Applies the pigeon-hole principle.
- 28** **Topic:** Combinatorics
Standard: States and applies the inclusion-exclusion principle.
- 29** **Topic:** Discrete Probability
Standard: Solves discrete probability problems using the addition and multiplication rules, independent events, conditional probabilities, and expected value.

- 30** **Topic:** Recurrence Relations
Standard: Iterates first-order recurrence relations, and finds the closed form of a first-order linear recurrence relation.
- 31** **Topic:** Recurrence Relations
Standard: Applies process of iteration in different situations (e.g., arithmetic and geometric sequences, exponential growth, finance, or population dynamics).
- 32** **Topic:** Recurrence Relations
Standard: Analyzes searching and sorting algorithms.
- 33** **Topic:** Recurrence Relations
Standard: (Optional) Solves second-order linear recurrence relations.
- 34** **Topic:** Matrix Algebra
Standard: Performs matrix operations (addition, subtraction, multiplication, and multiplication by a constant) and identifies and applies their properties.
- 35** **Topic:** Matrix Algebra
Standard: Recognizes the representation of graphs in matrix form, and constructs matrices to represent graphs.
- 36** **Topic:** Matrix Algebra
Standard: Solves a system of linear equations, if a solution exists.
- 37** **Topic:** Matrix Algebra
Standard: Uses powers of adjacency matrices to study connectivity properties of graphs and diagraphs.
- 38** **Topic:** Matrix Algebra
Standard: Solves probability problems using tree analysis by applying Markov's algorithm.
- 39** **Topic:** Matrix Algebra
Standard: Solves population growth and control problems using the Leslie model.
- 40** **Topic:** Matrix Algebra
Standard: Uses the Leontief input-output model of an economy.
- 41** **Topic:** Sets
Standard: Describes sets using an appropriate notation, including set-builder notation, and identifies finite and infinite sets.
- 42** **Topic:** Sets
Standard: Identifies simple relations between sets and makes proper use of such terms as subset, proper subset, superset, equality, universe, and empty set using Venn diagrams.
- 43** **Topic:** Sets
Standard: Performs operations on sets: intersection, union, complement, difference, and symmetric difference.
- 44** **Topic:** Sets
Standard: Defines, recognizes, illustrates, and applies commutative laws, associative laws, distributive laws, and DeMorgan's laws, and constructs simple proofs using Venn diagrams.
- 45** **Topic:** Sets
Standard: Determines power sets and Cartesian products of sets.
- 46** **Topic:** The Real Number System
Standard: Examines the real number system: - Defines positive integers (P), natural numbers (N), integers (Z), rational numbers (Q), irrational numbers, and real numbers (R). - Uses interval notation. - Applies the division algorithm and divisibility properties. - Finds the prime factorization of a number. - Determines greatest common divisor and least common multiple.
- 47** **Topic:** The Real Number System
Standard: Constructs simple proofs about even and odd numbers.

- 48** **Topic:** The Real Number System
Standard: Writes an integer given in base 10 as a numeral in any base with emphasis on base 2, and conversely.
- 49** **Topic:** Functions and Relations
Standard: Defines function and relation, and defines, recognizes, and illustrates domain, codomain, image, range, into, onto, and one-to-one.
- 50** **Topic:** Functions and Relations
Standard: Defines, recognizes, and illustrates properties of relations: reflexive, transitive, symmetric, and antisymmetric.
- 51** **Topic:** Functions and Relations
Standard: Identifies equivalence relations and order relations.
- 52** **Topic:** Functions and Relations
Standard: Composes functions and determines the inverse of relations and, in particular, of functions.
- 53** **Topic:** Functions and Relations
Standard: Recognizes recursive definitions of functions with some emphasis on recurrence relations and recursion.
- 54** **Topic:** Formal Logic
Standard: Identifies the hypothesis and the conclusion in sentences of various English constructions.
- 55** **Topic:** Formal Logic
Standard: Defines, recognizes, and illustrates a proposition, its converse, and its contrapositive.
- 56** **Topic:** Formal Logic
Standard: Illustrates the use of simple counter examples.
- 57** **Topic:** Formal Logic
Standard: Constructs elementary proofs using simple examples from arithmetic.
- 58** **Topic:** Formal Logic
Standard: Writes sentences for logical expressions and vice versa.
- 59** **Topic:** Formal Logic
Standard: Completes truth tables for standard logical connectives, and writes truth values of simple propositions.
- 60** **Topic:** Formal Logic
Standard: States and illustrates the definitions of tautology and contradiction.
- 61** **Topic:** Formal Logic
Standard: Negates logical expressions.
- 62** **Topic:** Formal Logic
Standard: Sketches logic circuits with AND, OR, NOT gates.
- 63** **Topic:** Formal Logic
Standard: Identifies and applies NAND and NOR.
- 64** **Topic:** Algebraic Structures
Standard: Defines and recognizes binary operations.
- 65** **Topic:** Algebraic Structures and Sets
Standard: Distinguishes whether sets are closed with respect to a given operation.
- 66** **Topic:** Algebraic Structures and Sets
Standard: Is familiar with a wide variety of operations on a variety of sets: arithmetic operations on the set of real numbers and its subsets; set operations on $P(S)$; logical operations on propositions; and matrix operations on 2×2 matrices.
- 67** **Topic:** Algebraic Structures and Sets
Standard: Determines properties of an operation defined on a set.

- 68** **Topic:** Algebraic Structures and Sets
Standard: For given sets and operations, decides which of the following group properties hold: commutative, associative, existence of identity, and existence of inverses.
- 69** **Topic:** Algebraic Structures
Standard: Apply Boolean axioms to express logic circuits in an algebraic structure.
- 70** **Topic:** Algebraic Structures
Standard: Proves equivalence relations between logic circuits using Boolean Algebra.

Course: Euclidean Geometry

- 1** **Topic:** Problem Solving, Visualizing, Reasoning
Standard: Solves problems and practical applications using appropriate approaches and tools (including calculators and computers) and judges the reasonableness of results.
- 2** **Topic:** Problem Solving, Visualizing, Reasoning
Standard: Uses algebraic skills and concepts to solve geometric problems throughout geometry.
- 3** **Topic:** Problem Solving, Visualizing, Reasoning
Standard: Uses visualization skills to explore and interpret both two- and three-dimensional geometric figures using such topics as projections, cross sections, and locus problems.
- 4** **Topic:** Problem Solving, Visualizing, Reasoning
Standard: Uses inductive and deductive reasoning to reach conclusions, identifies conjectures and counterexamples, and describes the nature of a deductive mathematical system.
- 5** **Topic:** Problem Solving, Visualizing, Reasoning
Standard: Recognizes valid deductive reasoning; constructs and uses if-then, converse, inverse, and contrapositive statements.
- 6** **Topic:** Problem Solving, Visualizing, Reasoning
Standard: Uses formal and/or informal logical reasoning processes.
- 7** **Topic:** Reasoning
Standard: Uses inductive and deductive reasoning to prove conjectures in written form such as paragraph, two-column, or flow chart.
- 8** **Topic:** Points, Lines, and Planes
Standard: Identifies, describes, and contrasts points, lines, planes, segments, and rays.
- 9** **Topic:** Points, Lines, and Planes
Standard: Identifies, defines, estimates, and measures segments and angles (acute, obtuse, right, straight, complementary, supplementary, adjacent, vertical, congruent, and linear pair).
- 10** **Topic:** Points, Lines, and Planes
Standard: Identifies and defines or describes properties associated with points (distance, between, collinear, coplanar), segments (midpoint, congruence, bisector), angles (bisector, congruence, interior, exterior), and lines and planes (perpendicular, parallel, intersecting).
- 11** **Topic:** Points, Lines, and Planes
Standard: Classifies triangles as acute, right, obtuse, equilateral, isosceles, scalene; and classifies polygons as regular, convex, congruent.
- 12** **Topic:** Points, Lines, and Planes
Standard: Recognizes parallel lines and planes, skew lines, and pairs of angles formed when two lines are cut by a transversal (alternate and same side, interior and exterior, corresponding).
- 13** **Topic:** Points, Lines, and Planes
Standard: Applies basic facts about points, lines and planes, and about perpendicular and parallel lines and planes.

- 14** **Topic:** Points, Lines, and Planes
Standard: States and applies the triangle sum, exterior angles, and polygon angle sum theorems.
- 15** **Topic:** Congruence
Standard: Identifies congruent figures and recognizes congruence in practical applications.
- 16** **Topic:** Congruence
Standard: Uses tools such as compass and straightedge, paper folding, tracing paper, mira, or computer to construct congruent segments, angles, triangles, and circles; an angle bisector; a perpendicular bisector; a perpendicular line from a point on a line; parallel lines; proportional segments; tangents; and inscribed and circumscribed polygons.
- 17** **Topic:** Congruence
Standard: Identifies congruent triangles and right triangles using basic congruence postulates and theorems.
- 18** **Topic:** Congruence
Standard: Uses properties of congruence to test conjectures involving triangles.
- 19** **Topic:** Congruence
Standard: States and applies properties of triangles and quadrilaterals such as parallelograms, rectangles, rhombi, squares, and trapezoids.
- 20** **Topic:** Inequalities
Standard: Recognizes and applies the properties of inequalities to the measures of segments and angles in triangles.
- 21** **Topic:** Similarity
Standard: Uses properties of quadrilaterals to establish and test relationships involving diagonals, angles, and lines of symmetry.
- 22** **Topic:** Similarity
Standard: Identifies similar figures in practical applications; identifies similar triangles and other similar polygons by using their properties.
- 23** **Topic:** Similarity
Standard: Recognizes and applies properties of similar polygons using ratio and proportion.
- 24** **Topic:** Similarity
Standard: Applies properties dealing with parallel lines and proportion.
- 25** **Topic:** Similarity
Standard: Solves problems involving similar polygons.
- 26** **Topic:** Right Triangles
Standard: States and applies the Pythagorean Theorem and its converse.
- 27** **Topic:** Right Triangles
Standard: States and applies properties of special right triangles, such as 45-45-90 and 30-60-90 triangles.
- 28** **Topic:** Right Triangles
Standard: Identifies and evaluates tangent, sine, and cosine ratios for an acute angle of a right triangle; uses a table, calculator, or computer to find the ratio for a given angle or find the angle for a given ratio.
- 29** **Topic:** Right Triangles
Standard: Uses the tangent, sine, and cosine ratios for right triangles to solve application problems such as indirect-measurement problems.
- 30** **Topic:** Circles
Standard: Identifies and defines circles and their parts (center, arc, interior, exterior); segments and lines associated with circles (chord, diameter, radius, tangent, secant); properties of circles (congruent, concentric, tangent); relationship of polygons and circles (inscribed, circumscribed); angles (central; inscribed; formed by tangents, chords, and secants).
- 31** **Topic:** Circles
Standard: Applies geometric relationships to solving problems, such as relationships between lines and segments associated with circles, the angles they form, and the arcs they subtend; and the measures of these arcs, angles, and segments.

- 32** **Topic:** Perimeter, Area, and Volume
Standard: Defines and differentiates among perimeter, area, and volume, and the appropriate units for each.
- 33** **Topic:** Perimeter, Area, and Volume
Standard: Finds the perimeter of polygons, the circumference of circles, and arc lengths.
- 34** **Topic:** Perimeter, Area, and Volume
Standard: Finds the area of triangles, parallelograms, rectangles, squares, trapezoids, regular polygons, circles, and sectors.
- 35** **Topic:** Perimeter, Area, and Volume
Standard: Identifies polyhedrons, including prisms, pyramids, cubes, and tetrahedrons; cylinders; cones; spheres; faces; edges; vertices; bases; and lateral edges.
- 36** **Topic:** Perimeter, Area, and Volume
Standard: Finds the lateral and total areas of right prisms, regular pyramids, right circular cylinders, and cones; and finds the surface area of spheres.
- 37** **Topic:** Perimeter, Area, and Volume
Standard: Finds the volume of solids composed of prisms, pyramids, cylinders, cones, or spheres.
- 38** **Topic:** Perimeter, Area, and Volume
Standard: Compares the areas of similar polygons and the volumes of similar solids.
- 39** **Topic:** Perimeter, Area, and Volume
Standard: Solves problems involving perimeter, area, and volume.
- 40** **Topic:** Transformational Geometry
Standard: Finds the images of geometric figures under distance-preserving transformations such as line reflections, translations, and rotations.
- 41** **Topic:** Transformational Geometry
Standard: Finds the image of figures under dilations.
- 42** **Topic:** Transformational Geometry
Standard: Examines and applies basic properties of line reflections, translations, rotations, dilations, and their compositions.
- 43** **Topic:** Transformational Geometry
Standard: Uses transformations to examine symmetry, similarity, and congruence of geometric figures.
- 44** **Topic:** Coordinate Geometry
Standard: Identifies and graphs ordered pairs of numbers in the coordinate plane.
- 45** **Topic:** Coordinate Geometry
Standard: Applies the distance and midpoint formulas.
- 46** **Topic:** Coordinate Geometry
Standard: Finds the slope of a line, writes an equation of a line, and graphs equations of lines.
- 47** **Topic:** Coordinate Geometry
Standard: Finds the coordinates of the point of intersection of two lines, using algebra, graphing, and appropriate technology.
- 48** **Topic:** Coordinate Geometry
Standard: Uses coordinate methods to explore, make conjectures, or prove properties of geometric figures, using tools such as algebra, graphing, and appropriate technology.

Course: Informal Geometry

- 1** **Topic:** Problem Solving, Visualizing, Reasoning
Standard: Solves problems and practical applications using appropriate approaches and tools (including calculators and computers) and judges the reasonableness of results.
- 2** **Topic:** Problem Solving, Visualizing, Reasoning
Standard: Uses algebraic skills and concepts to solve geometric problems throughout geometry.
- 3** **Topic:** Problem Solving, Visualizing, Reasoning
Standard: Uses visualization skills to explore and interpret both two- and three-dimensional geometric figures using such topics as projections, cross sections, and locus problems.
- 4** **Topic:** Problem Solving, Visualizing, Reasoning
Standard: Uses inductive and deductive reasoning to reach conclusions, identifies conjectures and counterexamples, and describes the nature of a deductive mathematical system.
- 5** **Topic:** Problem Solving, Visualizing, Reasoning
Standard: Recognizes valid deductive reasoning; constructs and uses if-then, converse, inverse, and contrapositive statements.
- 6** **Topic:** Problem Solving, Visualizing, Reasoning
Standard: Uses formal and/or informal logical reasoning processes.
- 7** **Topic:** Reasoning
Standard: Uses inductive and deductive reasoning to prove conjectures in written form such as paragraph, two-column, or flow chart.
- 8** **Topic:** Points, Lines, and Planes
Standard: Identifies, describes, and contrasts points, lines, planes, segments, and rays.
- 9** **Topic:** Points, Lines, and Planes
Standard: Identifies, defines, estimates, and measures segments and angles (acute, obtuse, right, straight, complementary, supplementary, adjacent, vertical, congruent, and linear pair).
- 10** **Topic:** Points, Lines, and Planes
Standard: Identifies and defines or describes properties associated with points (distance, between, collinear, coplanar), segments (midpoint, congruence, bisector), angles (bisector, congruence, interior, exterior), and lines and planes (perpendicular, parallel, intersecting).
- 11** **Topic:** Points, Lines, and Planes
Standard: Classifies triangles as acute, right, obtuse, equilateral, isosceles, scalene; and classifies polygons as regular, convex, congruent.
- 12** **Topic:** Points, Lines, and Planes
Standard: Recognizes parallel lines and planes, skew lines, and pairs of angles formed when two lines are cut by a transversal (alternate and same side, interior and exterior, corresponding).
- 13** **Topic:** Points, Lines, and Planes
Standard: Applies basic facts about points, lines and planes, and about perpendicular and parallel lines and planes.
- 14** **Topic:** Points, Lines, and Planes
Standard: States and applies the triangle sum, exterior angles, and polygon angle sum theorems.
- 15** **Topic:** Congruence
Standard: Identifies congruent figures and recognizes congruence in practical applications.
- 16** **Topic:** Congruence
Standard: Uses tools such as compass and straightedge, paper folding, tracing paper, mira, or computer to construct congruent segments, angles, triangles, and circles; an angle bisector; a perpendicular bisector; a perpendicular line from a point on a line; parallel lines; proportional segments; tangents; and inscribed and circumscribed polygons.

- 17** **Topic:** Congruence
Standard: Identifies congruent triangles and right triangles using basic congruence postulates and theorems.
- 18** **Topic:** Congruence
Standard: Uses properties of congruence to test conjectures involving triangles.
- 19** **Topic:** Congruence
Standard: States and applies properties of triangles and quadrilaterals such as parallelograms, rectangles, rhombi, squares, and trapezoids.
- 20** **Topic:** Inequalities
Standard: Recognizes and applies the properties of inequalities to the measures of segments and angles in triangles.
- 21** **Topic:** Similarity
Standard: Uses properties of quadrilaterals to establish and test relationships involving diagonals, angles, and lines of symmetry.
- 22** **Topic:** Similarity
Standard: Identifies similar figures in practical applications; identifies similar triangles and other similar polygons by using their properties.
- 23** **Topic:** Similarity
Standard: Recognizes and applies properties of similar polygons using ratio and proportion.
- 24** **Topic:** Similarity
Standard: Applies properties dealing with parallel lines and proportion.
- 25** **Topic:** Similarity
Standard: Solves problems involving similar polygons.
- 26** **Topic:** Right Triangles
Standard: States and applies the Pythagorean Theorem and its converse.
- 27** **Topic:** Right Triangles
Standard: States and applies properties of special right triangles, such as 45-45-90 and 30-60-90 triangles.
- 28** **Topic:** Right Triangles
Standard: Identifies and evaluates tangent, sine, and cosine ratios for an acute angle of a right triangle; uses a table, calculator, or computer to find the ratio for a given angle or find the angle for a given ratio.
- 29** **Topic:** Right Triangles
Standard: Uses the tangent, sine, and cosine ratios for right triangles to solve application problems such as indirect-measurement problems.
- 30** **Topic:** Circles
Standard: Identifies and defines circles and their parts (center, arc, interior, exterior); segments and lines associated with circles (chord, diameter, radius, tangent, secant); properties of circles (congruent, concentric, tangent); relationship of polygons and circles (inscribed, circumscribed); angles (central; inscribed; formed by tangents, chords, and secants).
- 31** **Topic:** Circles
Standard: Applies geometric relationships to solving problems, such as relationships between lines and segments associated with circles, the angles they form, and the arcs they subtend; and the measures of these arcs, angles, and segments.
- 32** **Topic:** Perimeter, Area, and Volume
Standard: Defines and differentiates among perimeter, area, and volume, and the appropriate units for each.
- 33** **Topic:** Perimeter, Area, and Volume
Standard: Finds the perimeter of polygons, the circumference of circles, and arc lengths.
- 34** **Topic:** Perimeter, Area, and Volume
Standard: Finds the area of triangles, parallelograms, rectangles, squares, trapezoids, regular polygons, circles, and sectors.

- 35** **Topic:** Perimeter, Area, and Volume
Standard: Identifies polyhedrons, including prisms, pyramids, cubes, and tetrahedrons; cylinders; cones; spheres; faces; edges; vertices; bases; and lateral edges.
- 36** **Topic:** Perimeter, Area, and Volume
Standard: Finds the lateral and total areas of right prisms, regular pyramids, right circular cylinders, and cones; and finds the surface area of spheres.
- 37** **Topic:** Perimeter, Area, and Volume
Standard: Finds the volume of solids composed of prisms, pyramids, cylinders, cones, or spheres.
- 38** **Topic:** Perimeter, Area, and Volume
Standard: Compares the areas of similar polygons and the volumes of similar solids.
- 39** **Topic:** Perimeter, Area, and Volume
Standard: Solves problems involving perimeter, area, and volume.
- 40** **Topic:** Transformational Geometry
Standard: Finds the images of geometric figures under distance-preserving transformations such as line reflections, translations, and rotations.
- 41** **Topic:** Transformational Geometry
Standard: Finds the image of figures under dilations.
- 42** **Topic:** Transformational Geometry
Standard: Examines and applies basic properties of line reflections, translations, rotations, dilations, and their compositions.
- 43** **Topic:** Transformational Geometry
Standard: Uses transformations to examine symmetry, similarity, and congruence of geometric figures.
- 44** **Topic:** Coordinate Geometry
Standard: Identifies and graphs ordered pairs of numbers in the coordinate plane.
- 45** **Topic:** Coordinate Geometry
Standard: Applies the distance and midpoint formulas.
- 46** **Topic:** Coordinate Geometry
Standard: Finds the slope of a line, writes an equation of a line, and graphs equations of lines.
- 47** **Topic:** Coordinate Geometry
Standard: Finds the coordinates of the point of intersection of two lines, using algebra, graphing, and appropriate technology.
- 48** **Topic:** Coordinate Geometry
Standard: Uses coordinate methods to explore, make conjectures, or prove properties of geometric figures, using tools such as algebra, graphing, and appropriate technology.

Course: Mathematical Money Management

- 1** **Topic:** Earning Money
Standard: Calculates total time worked from a timecard.
- 2** **Topic:** Earning Money
Standard: Calculates regular time and overtime pay, total pay for piecework, gross pay based on hourly wages plus tips, salary, straight commission, and salary plus commission.
- 3** **Topic:** Earning Money
Standard: Computes net pay, taking into account federal, state, and local taxes, social security, and any miscellaneous deductions.

- 4** **Topic:** Budgeting
Standard: Prepares a budget for a given income on a weekly, monthly, and annual basis.
- 5** **Topic:** Budgeting
Standard: Identifies and compares various pay periods.
- 6** **Topic:** Budgeting
Standard: Explores and compares various methods of personal record keeping.
- 7** **Topic:** Budgeting
Standard: Demonstrates an awareness of how income and personal goals affect financial planning and decisions.
- 8** **Topic:** Banking
Standard: Compares various banking institutions (banks, credit unions, and savings and loans) and services provided by each.
- 9** **Topic:** Budgeting
Standard: Describes process of opening a checking and/or savings account, making deposits, and withdrawals.
- 10** **Topic:** Budgeting
Standard: Reconciles a checking account, given a sample bank statement and a check register.
- 11** **Topic:** Housing
Standard: Determines the percentage of income available for monthly rent or mortgage payment.
- 12** **Topic:** Housing
Standard: Investigates costs associated with renting, such as deposits required and renter's insurance premium.
- 13** **Topic:** Housing
Standard: Computes the amount of down payment required to purchase a house/condominium and the price that can be afforded for a given income.
- 14** **Topic:** Housing
Standard: Calculates monthly mortgage payment and monthly escrow amount.
- 15** **Topic:** Housing
Standard: Calculates total interest paid on the loan.
- 16** **Topic:** Housing
Standard: Estimates the closing costs associated with buying a house.
- 17** **Topic:** Housing
Standard: Computes utility costs.
- 18** **Topic:** Housing
Standard: Compares and contrasts efficiency ratings for large and small appliances.
- 19** **Topic:** Housing
Standard: Determines services provided by the local telephone companies and related costs.
- 20** **Topic:** Housing
Standard: Compares services available from long distance telephone providers.
- 21** **Topic:** Housing
Standard: Compares services and related costs of cable and Internet companies.
- 22** **Topic:** Housing
Standard: Identifies advantages and disadvantages of property ownership.
- 23** **Topic:** Taxes
Standard: Solves problems related to taxes by computing state, federal, and local income taxes, property taxes, social security tax, and estate and inheritance taxes.

- 24** **Topic:** Taxes
Standard: Discusses different types of taxes and how the funds are used.
- 25** **Topic:** Taxes
Standard: Completes federal (1040EZ and 1040A) and state income tax forms for given data.
- 26** **Topic:** Purchasing
Standard: Identifies various means used to sell products and services, such as advertising and promotions.
- 27** **Topic:** Purchasing
Standard: Explores instances of deceptive advertising, deceptive packaging, hard-sell tactics, and masked credit practices (rent-to-own, deferred interest).
- 28** **Topic:** Purchasing
Standard: Computes sales tax, total purchase price, and change received in a cash purchase.
- 29** **Topic:** Purchasing
Standard: Examines advantages and disadvantages of extended warranties.
- 30** **Topic:** Purchasing
Standard: Calculates discount, successive discounts, and sale price of an item.
- 31** **Topic:** Purchasing
Standard: Compares unit-price to do comparison-shopping and determine the better buy.
- 32** **Topic:** Purchasing
Standard: Fills out a catalog order form and calculates the total cost.
- 33** **Topic:** Purchasing
Standard: Compares various credit plans (including layaway) to determine best choice for the specific need.
- 34** **Topic:** Purchasing
Standard: Computes the finance charge for a charge account/credit card by unpaid balance method and average daily balance method.
- 35** **Topic:** Purchasing
Standard: Calculates the finance charge and monthly payment on an installment plan.
- 36** **Topic:** Purchasing
Standard: Explains advantages and disadvantages of using a credit card.
- 37** **Topic:** Purchasing
Standard: Calculates costs related to buying and owning a car, including various types of insurance.
- 38** **Topic:** Purchasing
Standard: Explains advantages and disadvantages of owning or leasing a vehicle.
- 39** **Topic:** Savings and Investments
Standard: Compares and contrasts savings accounts, money market accounts, certificates of deposit, savings bonds, stocks, and IRAs.
- 40** **Topic:** Savings and Investments
Standard: Identifies sources of retirement income and map out a sample plan for retirement income.
- 41** **Topic:** Savings and Investments
Standard: Solves problems related to the purchase of, deposits made to, and withdrawals from any of the topics discussed in #39.
- 42** **Topic:** Savings and Investments
Standard: Calculates simple and compound interest.

- 43 **Topic:** Insurance
Standard: Compares different kinds of life insurance and calculates premiums.
- 44 **Topic:** Insurance
Standard: Computes health insurance premiums and expenses incurred when a claim is filed.
- 45 **Topic:** Insurance
Standard: Computes monthly retirement benefits from social security.
- 46 **Topic:** Insurance
Standard: Computes annual pension from a retirement plan.
- 47 **Topic:** Insurance
Standard: Investigates other forms of insurance, such as dental, disability, automobile, and accidental death.
- 48 **Topic:** Borrowing
Standard: Compares different lending institutions with respect to services, costs, and types of loans.
- 49 **Topic:** Borrowing
Standard: Computes interest and service charge for various types of loans.
- 50 **Topic:** Borrowing
Standard: Explains how a person's credit rating is established and how it affects your ability to obtain loans.
- 51 **Topic:** Consumer Rights and Responsibilities
Standard: Identifies resources and procedures in the event of financial difficulty.
- 52 **Topic:** Consumer Rights and Responsibilities
Standard: Interprets rights and responsibilities involved with leases, warranties, guarantees, and sales contracts.
- 53 **Topic:** Consumer Rights and Responsibilities
Standard: Identifies agencies that deal with consumer problems.
- 54 **Topic:** Travel, Recreation, and Vacations
Standard: Compares costs of various forms of transportation and lodging.
- 55 **Topic:** Travel, Recreation, and Vacations
Standard: Selects a leisure-time activity and investigates related expenses.
- 56 **Topic:** Travel, Recreation, and Vacations
Standard: Plans a vacation using a given amount of money.

Course: Prealgebra

- 1 **Topic:** Problem Solving, Reasoning, Estimation
Standard: Solves problems, reasons, and estimates throughout mathematics: - Selects and uses problem-solving strategies such as reading the problem, drawing a picture or diagram, using trial and error, making a table or chart, looking for patterns, making a simpler problem and then generalizing, and working backwards, etc. - Selects and uses appropriate tools (such as mental computation, calculators, manipulative materials, paper and pencil, computer) in solving problems. - Uses estimation to check the reasonableness of results. - Solves nonroutine problems for which the answer is not obvious. - Relates concepts and skills to practical applications.
- 2 **Topic:** Mental Computation and Estimation
Standard: Selects and uses appropriate estimation strategies, such as rounding, truncating, front-end, adjusting, compensation, compatible numbers, clustering, and reference point, and recognizes situations in which estimates are more appropriate than exact numbers.
- 3 **Topic:** Mental Computation
Standard: Selects and uses appropriate mental computational strategies such as multiples of ten, multiples of one tenth, and powers of ten.

- 4** **Topic:** Special Uses of Rational Numbers, Number and Number Relationships
Standard: Expresses, orders, and categorizes rational numbers in various forms, such as fractions, decimals, percent, and scientific notation using tools such as calculators and number lines.
- 5** **Topic:** Number and Number Relationships
Standard: Recalls from memory decimal and percent equivalents of common fractions (halves, thirds, fourths, fifths, sixths, eighths, and tenths).
- 6** **Topic:** Special Uses of Rational Numbers, Problem Solving
Standard: Uses the appropriate equivalent forms of rational numbers to solve problems involving fractions, decimals, or percent.
- 7** **Topic:** Measurement
Standard: Selects appropriate units to measure length (including perimeter and circumference), area, volume/capacity, weight/mass, time, and temperature in both the customary and metric systems.
- 8** **Topic:** Measurement, Estimation, Problem Solving
Standard: Estimates, measures, and solves problems using both customary and metric systems.
- 9** **Topic:** Measurement, Geometry
Standard: Selects appropriate measuring instruments and measures accurately length, volume/capacity, weight/mass, time, temperature, and angles.
- 10** **Topic:** Measurement, Geometry
Standard: Measures and classifies angles as right, acute, or obtuse.
- 11** **Topic:** Measurement, Geometry
Standard: Classifies triangles as right, acute, or obtuse by their angle measures and as scalene, isosceles, or equilateral by their side measures.
- 12** **Topic:** Measurement, Geometry
Standard: Uses square units to determine the area of two-dimensional geometric figures without using formulas.
- 13** **Topic:** Measurement, Geometry
Standard: Uses cubic units to determine the volume of three-dimensional figures without using formulas.
- 14** **Topic:** Measurement
Standard: Changes from one unit of measurement to another within the same measurement system.
- 15** **Topic:** Algebra, Computation, Number Systems and Number Theory
Standard: Uses order of operations (with and without grouping symbols) to find the value of a numerical expression, selecting and using appropriate tools such as mental computation and calculators.
- 16** **Topic:** Introduction to Variables, Algebra
Standard: Translates words into simple numerical and algebraic expressions and equations, and translates expressions and equations into words.
- 17** **Topic:** Introduction to Variables, Algebra
Standard: Evaluates expressions involving variables.
- 18** **Topic:** Introduction to Variables, Algebra, Problem Solving
Standard: Substitutes known values in formulas, with and without grouping symbols, and solves problems involving formulas.
- 19** **Topic:** Introduction to Variables, Algebra, Geometry
Standard: Graphs simple and compound inequalities on a number line.
- 20** **Topic:** Geometry
Standard: Identifies physical and symbolic representations of geometric figures, such as points, lines, planes, line segments, polygons, vertices, rays, sides, angles, and diagonals.

- 21** **Topic:** Addition Patterns, Algebra, Geometry, Measurement, Computation, Number Systems and Number Theory
Standard: Models the concept of addition (as putting together and shifting or sliding) using physical materials and pictorial and algebraic representations, including rational numbers on the number line, angles and line segments and their measures, and rotations of geometric figures.
- 22** **Topic:** Addition Patterns, Geometry, Measurement, Number and Number Relationships
Standard: Relates rational numbers on the number line to the concept of absolute value and the perimeter of a polygon.
- 23** **Topic:** Computation
Standard: Adds, subtracts, multiplies, and divides rational numbers.
- 24** **Topic:** Number Systems and Number Theory
Standard: Recognizes, describes, and applies certain properties for addition, such as commutative, associative, identity and inverse properties, and the addition property of equality.
- 25** **Topic:** Algebra, Problem Solving
Standard: Solves equations and applied problems using the form $x + a = b$, $x - a = b$, and $a - x = b$.
- 26** **Topic:** Subtraction Patterns, Algebra, Geometry, Measurement, Computation, Number Systems and Number Theory
Standard: Models the concept of subtraction (as taking apart, shifting or sliding, and comparing) using physical materials and pictorial and algebraic representations, including rational numbers on the number line, and angles and line segments and their measures.
- 27** **Topic:** Geometry, Problem Solving
Standard: Identifies physical and symbolic representations of vertical, supplementary, complementary, and straight angles; parallel and perpendicular lines; transversals; and special quadrilaterals (parallelogram, rectangle, rhombus, square); and uses these geometric figures, properties, and relations to solve problems.
- 28** **Topic:** Geometry, Measurement
Standard: Solves problems using the property that the sum of the measures of the angles in a triangle is 180 degrees.
- 29** **Topic:** Graphing Models, Patterns, Statistics
Standard: Collects and organizes information or data by classifying or identifying patterns, and organizes data into tables, charts, and graphs.
- 30** **Topic:** Graphing Models, Algebra, Geometry, Problem Solving
Standard: Graphs points in the coordinate plane, identifies coordinates of points, graphs linear equations, and solves problems using these concepts.
- 31** **Topic:** Graphing Models, Statistics
Standard: Reads and interprets tables, charts, graphs (bar, circle, line, and coordinate), and diagrams.
- 32** **Topic:** Graphing Models, Geometry
Standard: Identifies congruent figures (images and preimages) formed by translating, rotating, or reflecting geometric figures.
- 33** **Topic:** Graphing Models, Geometry
Standard: Identifies line and rotational symmetries.
- 34** **Topic:** Multiplication Patterns, Algebra, Geometry, Computation, Measurement, Number Systems and Number Theory
Standard: Models the concept of multiplication (as area/volume, array, size change, rate factor, and repeated addition) using physical models and pictorial and algebraic representations.
- 35** **Topic:** Algebra, Number Systems and Number Theory
Standard: Recognizes, describes, and applies certain properties of multiplication such as commutative, associative, identity, and inverse properties; the property of zero; and the multiplication property of equality.
- 36** **Topic:** Geometry, Measurement, Computation
Standard: Uses multiplication to determine area of rectangles, surface area, and volume of rectangular solids, and similarity of geometric figures in a coordinate plane.
- 37** **Topic:** Algebra, Problem Solving
Standard: Solves equations and applied problems of the form $ax = b$, $ax + b = c$, $ax + b = cx + d$, $x/a = b$ and $x/a + b = c$.

- 38** **Topic:** Algebra, Number Systems and Number Theory
Standard: Applies the distributive property of multiplication over addition of the form $a(b+c)=ab+ac$ and $ab+ac=a(b+c)$.
- 39** **Topic:** Division Patterns, Algebra, Number Systems and Number Theory
Standard: Models the concept of division (as rate, ratio comparison, and missing factors) using physical models and pictorial and algebraic representations.
- 40** **Topic:** Number and Number Relationships
Standard: Solves proportions, including using the means-extremes property.
- 41** **Topic:** Geometry, Probability, Problem Solving, Number and Number Relationships
Standard: Writes and solves problems involving rate, ratio, and proportion, such as situations involving corresponding sides of similar figures, scale drawings, unit cost, distance-rate-time, relative frequency, and simple probability.
- 42** **Topic:** Measurement, Formulas, Geometry
Standard: Calculates the area of polygons and solves problems involving such areas.
- 43** **Topic:** Estimation, Number and Number Relationships
Standard: Estimates and determines exact or approximate values of the square root of a number.
- 44** **Topic:** Measurement, Formulas, Geometry, Problem Solving
Standard: Applies the Pythagorean Theorem and its converse in problem-solving situations.
- 45** **Topic:** Measurement, Formulas, Geometry, Problem Solving
Standard: Calculates the area and circumference of a given circle and solves problems involving area or circumference.
- 46** **Topic:** Measurement, Formulas, Geometry, Problem Solving
Standard: Calculates the volume and surface area of pyramids, cylinders, cones, and spheres and solves problems involving volume and surface area.
- 47** **Topic:** Statistics, Problem Solving
Standard: Summarizes data in various ways, including mean, median, mode, and range.
- 48** **Topic:** Probability
Standard: Identifies possible outcomes of simple experiments and predicts or describes the probability of a given event expressed as a rational number from 0 through 1.
- 49** **Topic:** Probability
Standard: Differentiates between odds and probability and determines the odds of an event.
- 50** **Topic:** Probability
Standard: Conducts and interprets a compound probability experiment.
- 51** **Topic:** Commission, Discount, Sales Tax, Sales Price, Percent
Standard: Solves practical problems using percents (e.g., sales tax, sales price and commission, discounts).

Course: Statistics

- 1** **Topic:** Data Exploration, Analysis, and Prediction
Standard: Organizes, summarizes, characterizes, and interprets data from practical situations using relevant data sets by constructing tables, graphs, and charts including frequency distributions, histograms, line plots, stem-and-leaf plots, box plots, and scatter plots for bivariate data.
- 2** **Topic:** Data Exploration, Analysis, and Prediction
Standard: Summarizes data using measures of central tendency (median, mean, and mode), and measures of spread (range, interquartile range, variance, and standard deviation.)
- 3** **Topic:** Data Exploration, Analysis, and Prediction
Standard: Identifies trends in data represented graphically, including patterns, clusters, and outliers.
- 4** **Topic:** Data Exploration, Analysis, and Prediction
Standard: Analyzes bivariate data represented graphically and predicts results by fitting a line to the data, using methods such as median fit and least squares and tools such as computers and calculators.

- 5** **Topic:** Data Exploration, Analysis, and Prediction
Standard: For a given bivariate scatter plot or data set, characterizes the correlation, calculates the correlation coefficient, and determines if a linear relationship exists. -Investigates nonlinear relationships between the variables using a grapher and compares their correlation coefficients.
- 6** **Topic:** Data Exploration, Analysis, and Prediction
Standard: Understands the effect that linear transformations have on the analysis and exploration of data.
- 7** **Topic:** Data Exploration, Analysis, and Prediction
Standard: Identifies sound examples of applying statistics in decision making and corrects misuses of statistics.
- 8** **Topic:** Sampling, Surveys, and Experimental Design
Standard: Distinguishes between samples and populations, identifies characteristics of representative samples to minimize bias and error, and recognizes the variability among repeated samples drawn from the same population.
- 9** **Topic:** Sampling, Surveys, and Experimental Design
Standard: Understands the concept of randomness as applied to sample selection and identifies other sampling techniques appropriate to given situations.
- 10** **Topic:** Sampling, Surveys, and Experimental Design
Standard: Designs a survey or an opinion poll, or chooses other methods of data collection to solve problems.
- 11** **Topic:** Sampling, Surveys, and Experimental Design
Standard: Collects and analyzes data using experimental models and random number tables and generators.
- 12** **Topic:** Sampling, Surveys, and Experimental Design
Standard: Interprets the outcomes of the data analysis and communicates the results.
- 13** **Topic:** Probability and Simulation
Standard: Uses student-generated data sets, games of chance, manipulatives, and historic data to estimate probabilities with the empirical approach. Applies the results obtained from active experiments to illustrate the Law of Large Numbers and to develop the concept of theoretical probability.
- 14** **Topic:** Probability and Simulation
Standard: Uses the eight-step process to build a model for simulating a given practical problem situation and uses manipulative materials, random number generators, calculators, and computers to perform the simulation to provide an approximation to the solution of the problem.
- 15** **Topic:** Probability and Simulation
Standard: Performs simulations for problems where the probability of success is known or unknown and performs simulations for situations with several key components.
- 16** **Topic:** Probability and Simulation
Standard: Applies counting techniques and calculates the probability of the union and the intersection of two events, the probability of the complement, and conditional probability.
- 17** **Topic:** Probability and Simulation
Standard: Distinguishes between odds and probabilities and finds the odds associated with given events.
- 18** **Topic:** Probability and Simulation
Standard: Assigns probabilities to the outcomes of a random variable and calculates expected value.
- 19** **Topic:** Probability and Simulation
Standard: Distinguishes between discrete and continuous distributions and solves problems using probability distributions, including binomial, normal, Poisson, and chi square.
- 20** **Topic:** Sampling Distributions and Inference
Standard: Constructs sampling distributions from binomial populations using student experiments, random number tables, and computer simulations.
- 21** **Topic:** Sampling Distributions and Inference
Standard: Constructs and interprets 90% and 95% box plots for various size samples, and uses the box plots to summarize the sampling distribution.

- 22** **Topic:** Sampling Distributions and Inference
Standard: Develops the concept of estimating population parameters using confidence intervals produced from comparisons of box plots, and applies the capture-recapture model to generate a confidence interval for the population.
- 23** **Topic:** Sampling Distributions and Inference
Standard: Applies the Central Limit Theorem and its corollary and understands its impact on the distribution of the sample mean, including the effect of sample size.
- 24** **Topic:** Sampling Distributions and Inference
Standard: Develops estimates (both point and interval) for parameters (such as the mean, standard deviation, and proportion of successes) and tests hypotheses concerning these parameters using appropriate statistical models.
- 25** **Topic:** Enrichment Activities and Optional Topics: Nonparametric Distribution
Standard: Uses distribution-free or nonparametric methods as alternatives to statistical analyses that make assumptions about the populations sampled. (Applications from practical problems can be presented using such measures as the sign test, the Mann-Whitney U test, and Spearman's rank correlation test.)
- 26** **Topic:** Enrichment Activities and Optional Topics: Geometric Probability
Standard: Uses geometric probability to develop problem-solving skills through experiments whose outcomes can be represented by points in a geometric region.
- 27** **Topic:** Enrichment Activities and Optional Topics: Proof Techniques
Standard: Uses mathematical induction, the derivation of certain formulas, the verification of appropriate properties, proofs of equivalence, and deductive reasoning.
- 28** **Topic:** Enrichment Activities and Optional Topics: Analysis of Variance
Standard: Analyzes the source(s) of variation, and interprets and draws conclusions when solving applied problems. (Sources may include the difference between samples and populations, sampling variability, the application of probability to make generalizations and predictions about populations based on the analysis of samples, the concept of random or chance variation, and analysis of variance.)