Grade 8 Math Curriculum

Foundations of Algebra/ Algebra 1

Rational Numbers

- Apply prime factorization to find the GCF and LCM of multiple numbers
- Apply the Density Property of Numbers to compare and order fractions and mixed numbers
- Identify properties of addition and multiplication of rational numbers
- Apply Order of Operations to simplify expressions containing rational numbers
- Add, subtract, multiply, and divide signed numbers, fractions, mixed numbers and decimals
- Solve two-step equations with fractions, mixed numbers and decimals
- Apply the Laws of Exponents for Multiplication and Division to simplify expressions

Real Numbers

- Write, order, and compare numbers in scientific notation
- Multiply and divide in scientific notation
- Identify rational and irrational numbers
- Find perfect squares and square roots
- Apply Product Property of Square Roots and the Quotient Property of Square Roots to simplify radicals
- Apply Properties of Real Numbers to simplify expressions and determine closure
- Use matrices to organize data and perform operations on matrices
- Apply set operations of intersection and union
- Use roster and set-builder notation to list elements in a set
- Write square root expressions in simplest form
- Add and subtract radical expressions
- Multiply and divide expressions and express results in simplest form
- Solve radical equations
- Apply the Pythagorean Theorem to identify attributes of a right triangle and evaluate expressions containing squares and square roots

Expressions and Equations

- Write, simplify and evaluate numerical and algebraic expressions
- Applying Properties of Equality to solve addition, subtraction, multiplication and division equations
- Solve equations by substitution given replacement sets
- Model and solve two-step equations
- Solve multistep and absolute-value equations
- Rename repeating decimals as fractions
- Solve literal equations for a specified value

Inequalities

- Use math symbols to express word sentences as an inequality
- Write and graph inequalities on a number line
- Solve inequalities using the Addition, Subtraction, Multiplication and Division Properties of Inequality
- Solve multistep, compound, and absolute inequalities
- Write the solution set of an inequality in both set-builder and interval notation
- Graph the solution sets of inequalities on a number line
- Connect verbal, numeric, symbolic, and graphic representations of inequalities

Polynomials and Factoring

- Classify ,model, evaluate and write polynomials in standard form
- Addition and subtraction of polynomials
- Multiplication and division of polynomials
- Multiplication and division of monomials
- Multiplication of two binomials using the tabular, vertical, distributive or FOIL methods
- Square binomials and multiply binomials in the form of (ax+b)(ax-b)
- Multiplication and division of polynomials by monomials
- Factor a polynomial using the GCF of its terms
- Factor quadratic trinomials
- Identify and factor perfect square trinomials
- Identify and factor binomials that are the difference of two squares

Ratio and Proportion

- Identify and compare ratios and rates
- Identify and solve proportions
- Rename metric and customary units of measure using conversion factors
- Applying dimensional or unit analysis is to solve problems
- Identify and work with direct, inverse and partitive proportions
- Solve problems involving scale drawing and models, similarity and indirect measurement

Relations and Linear Functions

- Identify relations and linear functions
- Represent relations with tables, mapping diagrams, graphs or equations
- Identify the domain and range of a function
- Evaluate a function using function notation
- Given a table, write a function rule to graph the solutions of that function
- Find the slope of a linear function by relating a constant rate of change
- Identify, interpret, write, and graph direct variation
- Find and graph the x- and y- intercepts of a line given its equation
- Determine the x- and y- intercepts of a line from a graph
- Identify the slope and y-intercept from an equation to a line using the Standard Form and the Slope-Intercept Form of a Linear Equation
- Write the equation of a line using the Point-Slope Form of a Linear Equation
- Determine if two lines are parallel or perpendicular using slope
- Solve systems of equations by graphing, ,substitution and elimination
- Determine whether an ordered pair is a solution to a linear inequality or to a system of inequalities
- Graph linear inequalities and absolute functions
- Construct and interpret scatter plots
- Recognize trends in correlated data

Percent Applications

- Write fractions, decimals, and ratios as percents
- Find percentage, a percent and an original number (base)
- Write fractions and decimals greater than 1 or less that 0.01 as a percent
- Calculate percent increase and decrease
- Calculate sales tax, tips, discounts, mark-up, profit, loss, sale prices and commission
- Calculate simple and compound interest
- Apply problem-solving strategies for consumer math problems

Two-Dimensional/ Three Dimensional Geometry

- Algebraically solve problems involving angle pairs, parallel lines and polygons
- Identify and classify polygons
- Identify tangents, secants, chords, arcs, and sectors of a circle
- Interpret and construct circle graphs
- Construct congruent line segments, angels, triangles, parallel, and perpendicular lines
- Recognize and make tessellations using regular and nonregular polygons
- Apply concepts of elevation and angle depression to geometric measurement problems
- Classify three-dimensional figures as polyhedrons and nonpolyhedrons
- Apply Euler's' Formula to find number of faces, edges, and vertices of any polyhedron
- Construct and deconstruct complex three-dimensional figures
- Find volumes and surface areas of three-dimensional figures
- Explore properties of three-dimensional figures

Geometric Measures and Coordinate Geometry

- Determine precision in measurement
- Find perimeters, areas, and missing dimensions of polygons
- Derive and apply formulas for the area of triangles, parallelograms, trapezoids
- Find circumference, area and arc lengths of a circle and its sectors
- Find the area of complex figures involving polygons and circles
- Find the perimeter and area of polygons on a coordinate plane
- Transform plane figures using reflections, translations, and rotations
- Identify and create dilations of plane figures
- Relate reflections and rotations to symmetry

Patterns and Nonlinear Functions

- Describe and extend patterns in visual and numeric sequences
- Find a specific term in an arithmetic or geometric sequence
- Evaluate functions given in function notation for various values of the variable
- Identify graphs of nonlinear functions such as quadratic, step, absolute-value, and exponential functions
- Recognize inverse variation and graph with a hyperbola

Data Analysis and Statistics

- Collect, organize, and interpret data in frequency table, line plots, stem-and- leaf-plots, bar graphs, histograms
- Use surveys to sample populations
- Distinguish between biased and unbiased samples
- Interpret and compare data presented in graphs
- Recognize misleading statistic and graphs

Probability and Logic

- Use tree diagrams to find the number of possible outcomes in a sample space
- Use the Fundamental Counting Principle or factorials to find the size of a sample space
- Find the theoretical or experimental probability of an event
- Compute odds in favor or against an event
- Compute probability of independent and dependant events
- Apply Pascal's Triangle to compute probability
- Determine the number of permutations or combinations
- Use connectives to form compound logic statements
- State the converse, inverse, and contra positive of a conditional statement
- Distinguish between inductive and deductive reasoning

Problem- Solving Strategies

- Work-Backward
- Guess and Test
- Organize Data/Information
- Find a Pattern
- Reason Logically
- Make a Drawing
- Understanding Distracters
- Show All Your Work
- Answer All Parts
- Apply Mathematical Reasoning
- Account For All Possibilities
- Adopt a Different Point of View
- Consider Extreme Cases