

MATHEMATICS

KINDERGARTEN

Problem solving is applied to all mathematics topics as students solve problems in different ways and share solution methods.

Number Sense and Operations

- Add up to 10, using objects
- Subtract up to 10, using objects
- Count to 100 Rote (by memory)
- Count to 20 Rational with objects
- Print numerals 0-10
- Identify numerals 0-12

Patterns, Relations, and Algebra

- Identify and extend patterns

Geometry

- Identify basic two-dimensional shapes

Measurement

- Recognize and compare lengths and weights

Data Analysis, Statistics, and Probability

- Construct and discuss class graphs

GRADE 1

Mathematical Processes

- Apply problem-solving strategies
- Communicate mathematical reasoning effectively

Number Sense and Operations

- Add whole numbers
- Subtract whole numbers
- Know addition facts for doubles and sums of ten
- Name numerals 1-100
- Write numerals 1-100

Patterns, Relations, and Algebra

- Identify and extend patterns to solve problems
- Name numbers in many ways (for example, 10 equals ten, X, $5+5$, $12-2$)

Geometry

- Identify attributes of shapes

Measurement

- Tell time to the nearest half hour
- Identify and represent an amount of money to \$1.00 using appropriate notation (dollar sign, decimal point)

Data Analysis, Statistics, and Probability

- Collect, summarize, and interpret data

GRADE 2

Mathematical Processes

- Apply problem-solving strategies
- Communicate mathematical reasoning effectively

Number Sense and Operations

- Know fact families for addition and subtraction
- Add whole numbers using various methods
- Subtract whole numbers using various methods
- Represent place value through 100

Patterns, Relations, and Algebra

- Identify and extend patterns to solve problems
- Name numbers in many ways (for example, 25 equals $5+5+5+5+5$, XXV, twenty-five, $50 - 25$)

Geometry

- Identify the defining attributes of two-dimensional shapes (for example, number of sides, angles)

Measurement

- Tell time in 5 minute intervals
- Represent an amount of money to \$5.00 using appropriate notation (dollar sign and decimal point)
- Identify and uses a ruler, tape measure, and meter/yardstick correctly
- Demonstrate calendar concepts and skills

Data Analysis, Statistics, and Probability

- Identify information in graphs and tables to solve problems

GRADE 3

Mathematical Processes

- Apply problem-solving strategies
- Communicate mathematical reasoning effectively

Number Sense and Operations

- Know basic math facts including addition, subtraction, and multiplication
- Apply computation strategies
- Determine equivalent fractions and decimals

Patterns, Relations, and Algebra

- Identify, extend, and use patterns to solve problems

Geometry

- Identify polygons based on properties

Measurement

- Identify, measure, and construct various angles, triangles, quadrilaterals, lines, and rays
- Find perimeter, area, and volume
- Determine time using analog and digital clocks

Data Analysis, Statistics, and Probability

- Describe data sets using median, mean, mode, maximum, minimum, and range
- Construct and interpret graphs and tables

GRADE 4

Mathematical Processes

- Apply problem-solving strategies
- Communicate mathematical reasoning effectively

Number Sense and Operations

- Know basic math facts including addition, subtraction, multiplication, and division
- Apply computation strategies in addition and subtraction
- Apply computation strategies in multiplication and division
- Understand and represents place value through 100,000
- Identify, compare, and represent fractions, decimals, and percents

Patterns, Relations, and Algebra

- Identify, extend, and use patterns to solve problems

Geometry

- Identify and compare attributes of two- and three-dimensional shapes (for example, number of sides, angles, and faces)

Measurement

- Identify and use tools appropriately for time, linear measure, area, perimeter, and angles (ruler, tape measure, yardstick, meter stick)

Data Analysis, Statistics, and Probability

- Construct and interpret graphs and tables
- Make predictions and determine outcomes of simple experiments

GRADE 5

Mathematical Processes

- Apply problem-solving strategies
- Communicate mathematical reasoning effectively

Number Sense and Operations

- Apply computation strategies
- Identify the relationship between equivalent fractions, decimals, and percents

Geometry

- Identify polygons based on properties
- Graph points on a coordinate graph

Measurement

- Identify, measure, and construct various angles, triangles, and quadrilaterals
- Find perimeter, area, and volume

Patterns, Relations, and Algebra

- Identify the roles of variables within an equation
- Evaluates and solves simple algebraic expressions

Data Analysis, Statistics, and Probability

- Identify median, mean, mode, maximum, minimum, and range of data sets
- Construct and interpret graphs and tables

GRADE 6

Mathematical Processes

- Apply problem-solving strategies
- Communicate mathematical reasoning effectively

Number Sense and Operations

- Apply computation strategies
- Identify the relationship among equivalent fractions, mixed numbers, decimals, and percents

Patterns, Relations, and Algebra

- Analyze and determine rules for extending patterns and progressions
- Replace variables with numbers and solves simple algebraic expressions
- Represent real situations and mathematical relationships in words and with symbols using concrete models, tables, and graph

Geometry

- Graph and identify points on all four quadrants of the coordinate plane
- Identify polygons based on their properties, including types of interior angles, perpendicular or parallel sides, and congruence of sides

Measurement

- Apply formulas to find perimeter, area, and volume of 2-D and 3-D shapes
- Identify, measure, and describe circles and the relationship of radius, diameter, circumference, and area

Data Analysis, Statistics, and Probability

- Construct and interprets stem-and-leaf plots, line plots, and circle graphs
- Predict by using models such as tree diagrams, lists, tables and represents as ratios, the probability of outcomes of chance events or simple experiments

GRADE 7

Fractions, Decimals and Percents (Ratio and Proportion)

- Add, subtract, multiply, and divide fractions and decimals
- Solve ratio and proportion problems with practical applications

Integers and Equations

- Explain the meaning of integers and absolute value
- Perform operations with integers
- Solve one and two-step equations containing unknowns

Number Theory

- Apply properties and relationships of numbers with respect to divisibility, exponents, factors, greatest common factors, multiples, lowest common multiple, and prime and composite numbers

Geometry

- Define points, segments, rays, lines, and planes
- Use formulas to determine circumference, diameter, area, perimeter, and volume
- Measure and identify types of angles
- Identify and classify polygons

Graphing

- Plot ordered pairs, find the x, y intercept and slope
- Graph linear equations
- Graph inequalities

Central Tendency

- Find common measures of central tendency (mean, median, mode)
- Choose appropriate methods to display data

Probability

- Calculate the probabilities of dependent and independent events
- Create and interpret functional relationships

Math Plus

Math Plus is a year-long program of mathematics review, reteaching and practice for students needing extra work in math. (Math Plus students do not take a foreign language.) The course reinforces the work of the math teacher on the student's team.

GRADE 8

Fractions, Decimals, and Percents (Ratio and Proportion)

- Express rational numbers in different forms
- Apply ratios and proportions to the solutions of problems
- Use proportions to model and solve indirect measurement problems

Integers and Equations

- Perform operations with integers and absolute value
- Solve one and two-step equations and check the solutions

Number Theory

- Factor integers by finding the greatest common factor, by prime factorization, and by factoring simple polynomials

Geometry

- Solve problems using formulas to determine circumference, diameter, area, and perimeter
- Solve problems involving quadrilaterals, parallelograms, rhombuses, rectangles, squares, trapezoids, and isosceles trapezoids

Graphing

- Identify the slope of a line as a constant rate of change from its table of values, equations, inequalities and graph
- Use the concept of slope in the solution of problems

Central Tendency

- Choose and apply measures of central tendency (mean, median, mode) to represent a set of data

Probability

- Calculate probabilities of dependent and independent events
- Create and interpret functional relationships

Math Plus

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- Develop strategies for understanding math from multiple perspectives
- Build skills in operations, concepts, and problem solving

GRADES 9 - 12

Algebra I

- Evaluate symbols and associate symbols with words and figures
- Interpret number patterns and perform algebraic operations
- Solve linear equations using pen and pencil, validating the answer with a calculator
- Read tables, graphs, and diagrams
- Interpret and relate algebraic expressions to real-life situations
- Solve, graph, and interpret inequalities
- Solve systems of linear equations

Geometry

- Analyze and apply characteristics of points, lines, planes, and variations thereof (for example, angles, parallel and perpendicular lines, distance, and midpoints)
- Construct congruent and similar figures using geometric tools including a compass, straight edge ruler, and protractor
- Use characteristics of circles to solve problems relating to chords, arcs, radii, secants, tangents, and angles
- Use proofs, calculations, or compare and contrast statements to establish relationships between congruent or similar triangles or non-regular figures in two or three dimensions
- Relate geometric concepts to real-life situations by means of demonstrations and projects

Algebra II

- Simplify algebraic expressions, such as polynomials, absolute value, exponents, radicals, rational, complex, and logarithmic
- Solve linear, quadratic, and absolute value equations, inequalities, and systems
- Interpret linear and quadratic functions and their relationships to each other
- Relate algebraic expressions to real-life situations by means of demonstration
- Use computer software, calculators, and other technology and manipulatives to solve problems

Trigonometry

- Recognize and analyze a sinusoidal graph and use it to make predictions and hypotheses
- Use Texas Instruments graphing calculators to study movements that can be modeled by sine or cosine curves illustrating simple harmonic motion
- Make a triangle from any three points in the x/y plane and compute any three components of the triangle when the other three are known
- Collect data in cooperative groups to demonstrate applications of trigonometry
- Prove trigonometric identities using the fundamental identities
- Graph complex numbers and their powers and roots
- Convert rectangular form into polar form and graph the results

Precalculus

- Plot complex numbers using both rectangular and polar coordinates systems
- Use mathematical induction to prove theorems and verify summation formulas
- Relate the number of roots of a polynomial to its degree.
- Solve quadratic equations with complex coefficients
- Translate between geometric, algebraic, and parametric representations of curves. Apply to the solution of problems
- Identify and discuss features of conic sections: axes, foci, asymptotes, and tangents.
- Convert between different algebraic representations of conic sections
- Relate the slope of a tangent line at a specific point on a curve to the instantaneous rate of change.
- Explain the significance of a horizontal tangent line. Apply these concepts to the solution of problems

Calculus

- Learn how to evaluate limits, particularly as they apply to the definition of the derivative
- Relate the slope of a tangent line at a specific point on a curve to the instantaneous rate of change
- Explain the significance of a horizontal tangent line. Apply these concepts to the solution of problems
- Relate derivatives to extreme values and real world problems involving optimization and business applications
- Relate the area under the curve to the concept of anti-differentiation
- Use technology to solve problems, experiment, interpret results, and verify conclusions
- Determine the reasonableness of solutions