

Kindergarten

Numbers and Operations

Counting and Comparing	<ul style="list-style-type: none">• Count, recognize, represent, name, and order whole numbers to 30.• Understand that a set of objects has the same number of objects in different situations regardless of position or arrangement.• Identify whole numbers up to 30 on a number line.
Estimation and Rounding	<ul style="list-style-type: none">• Make reasonable estimates.
Operations with whole numbers and integers	<ul style="list-style-type: none">• Add and subtract numbers less than 10 using concrete objects.

Measurement and Geometry

Time	<ul style="list-style-type: none">• Identify days of the week.• Tell time to the nearest hour.
Measurement	<ul style="list-style-type: none">• Make direct comparisons of objects in length, weight, and capacity.
Geometry	<ul style="list-style-type: none">• Identify and describe common geometric objects.

Statistics, Data Analysis, and Probability

Probability and Statistics	<ul style="list-style-type: none">• Identify, describe, and extend simple patterns by referring to shape, size, and color.• Collect data and record results using objects, pictures, and picture graphs.
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Algebra, Functions, and Graphing

Algebraic Concepts	<ul style="list-style-type: none">• Identify, sort, and classify objects by attribute, identifying objects that do not belong to a particular group.• Introduce the symbols +, -, and =.• Extend a simple linear pattern using manipulatives and drawings.
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Kindergarten

Reasoning and Proof

Reasoning	<ul style="list-style-type: none">• Use concrete objects, manipulatives, and pictorial representations to model problems.• Begin to make precise calculations and check validity.• Begin to strategize which approach to use to solve a problem.
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First Grade

Numbers and Operations

Counting and Comparing	<ul style="list-style-type: none">• Read, write, count, order, and compare whole numbers to 100.• Begin to use less than, greater than, and equal to symbols.• Count by 2's, 5's, and 10's.• Use expanded forms to represent numbers up to 100.• Identify whole numbers to 100 on a number line.
Place Value	<ul style="list-style-type: none">• Recognize the place value of whole numbers through the tens digit.
Estimation and Rounding	<ul style="list-style-type: none">• Make reasonable estimates.
Operations with whole numbers and integers	<ul style="list-style-type: none">• Memorize addition facts with sums to 10 and corresponding subtraction facts.• Find the sum of 3 one-digit numbers.• Add and subtract two-digit numbers without regrouping (sums to 99).
Money and Decimals	<ul style="list-style-type: none">• Recognize coins and their value.• Use various coin combinations to make equivalent amounts up to 25 cents.

Measurement and Geometry

Time	<ul style="list-style-type: none">• Identify months of the year.• Tell time to the nearest half hour.
Measurement	<ul style="list-style-type: none">• Measure objects in length, weight, and volume through direct comparison and non-standard units.• Arrange and describe objects in space by proximity and direction.
Geometry	<ul style="list-style-type: none">• Describe and compare common geometric objects.• Classify familiar plane and solid objects by common attributes.

First Grade

Statistics, Data Analysis, and Probability

Probability and Statistics	<ul style="list-style-type: none">• Organize, represent, and compare data by category on simple graphs and charts.• Describe, extend, and explain ways to get to the next element in a simple repeating pattern.
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Algebra, Functions, and Graphing

Algebraic Concepts	<ul style="list-style-type: none">• Relate problem situations to number sentences involving addition and subtraction.• Understand the meaning of the symbols $+$, $-$, and $=$.• Extend more complex linear patterns by using manipulatives and drawings; verbalize rule.• Begin to use a blank line or a box to stand for any number in a simple equation using addition or subtraction.
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Reasoning and Proof

Reasoning	<ul style="list-style-type: none">• Use the inverse relationship between addition and subtraction to solve problems.• Begin to note in writing, orally, or through the use of pictures and diagrams similarities and differences between problems.
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Second Grade

Numbers and Operations

Counting and Comparing	<ul style="list-style-type: none">• Read, write, count, order, and compare numbers to 999 using less than, greater than, and equal to symbols.• Use expanded forms to represent numbers up to 999.• Identify whole numbers up to 999 on a number line.
Place Value	<ul style="list-style-type: none">• Recognize the place value of whole numbers through the hundreds digit.
Estimation and Rounding	<ul style="list-style-type: none">• Recognize when an estimate is reasonable in measurements to the nearest inch.• Begin rounding numbers up to 999.
Operations with whole numbers and integers	<ul style="list-style-type: none">• Memorize addition facts with sums to 20 and the corresponding subtraction facts.• Find the sum or difference of two whole numbers up to three digits long without regrouping.• Begin to find the sum or difference of two whole numbers up to three digits long with regrouping.• Use repeated addition and repeated subtraction to begin multiplying and dividing.
Fractions	<ul style="list-style-type: none">• Use physical or visual representations to demonstrate that fractions are part of a whole.
Money and Decimals	<ul style="list-style-type: none">• Solve problems using coins and bills.• Know decimal notation and dollar signs.• Make change for currency up to \$1.

Measurement and Geometry

Time	<ul style="list-style-type: none">• Tell time to the nearest quarter hour.• Understand relations of time (e.g. weeks in a year, minutes in an hour).
Measurement	<ul style="list-style-type: none">• Measure using standard (nearest inch and centimeter) and non-standard units.
Geometry	<ul style="list-style-type: none">• Describe and classify common geometric objects according to the number and shape of faces, edges, and vertices.• Put shapes together and take them apart to form other shapes.

Second Grade

Statistics, Data Analysis, and Probability

Probability and Statistics	<ul style="list-style-type: none">• Collect numerical data and record, organize, display, and interpret it in systematic ways (bar graphs, charts, tallies).• Begin working with number patterns.• Determine next term in a linear pattern.• Identify range and mode.• Represent same data in more than one way.• Ask/answer simple questions about data.
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Algebra, Functions, and Graphing

Algebraic Concepts	<ul style="list-style-type: none">• Use the communicative and associative rules to simplify mental calculations and to check results.• Solve addition and subtraction problems by using data from simple charts, picture graphs, and number sentences.• Create, write, and solve number sentences from problem situations that express relationships involving addition and subtraction.• Begin to work with inequalities ($<$, $>$) and equalities ($=$).• Begin to recognize simple numerical linear patterns and identify rules.• Use a blank line or a box to stand for any number in simple equations using addition or subtraction.
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Reasoning and Proof

Reasoning	<ul style="list-style-type: none">• Use the inverse relationship between addition and subtraction to solve problems and to check solutions.• Set up a problem, justify procedures, and check validity.
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Third Grade

Numbers and Operations

Counting and Comparing	<ul style="list-style-type: none">• Read, write, count, order, and compare numbers to ten thousand.• Use expanded forms to represent numbers up to 10,000.• Identify whole numbers up to 10,000 on a number line.
Place Value	<ul style="list-style-type: none">• Recognize the place value of whole numbers through the ten thousands digit.
Estimation and Rounding	<ul style="list-style-type: none">• Begin rounding numbers up to 10,000.• Estimate area and volume of solid objects.
Operations with whole numbers and integers	<ul style="list-style-type: none">• Find the sum or difference of whole numbers up to five digits with re-grouping.• Memorize multiplication/division facts 0-12.• Begin to divide multi-digit numbers that are evenly divisible by one-digit.• Understand the special properties of 0 and 1 in multiplication and division.
Fractions	<ul style="list-style-type: none">• Compare fractions.• Add and subtract fractions using drawings or concrete objects and then go on to show equivalency of simple fractions.• Introduce mixed numbers.
Money and Decimals	<ul style="list-style-type: none">• Add and subtract simple money amounts in decimal notation.• Begin to multiply and divide money amounts in decimal notation by using whole number multipliers and divisors.• Make change for currency up to \$20.
Decimals	<ul style="list-style-type: none">• Know and understand that fractions and decimals are two different representations of the same concept.

Third Grade

Measurement and Geometry

Time	<ul style="list-style-type: none">• Tell time to the nearest 5 minutes.• Compute elapsed time to the nearest hour.
Measurement	<ul style="list-style-type: none">• Measure to the nearest $\frac{1}{2}$ inch.• Determine area and volume using manipulatives.• Find the perimeter of a polygon.• Begin to estimate length, liquid volume, and weight/mass.• Carry out simple unit conversions within a system of measurement.
Geometry	<ul style="list-style-type: none">• Identify, describe, and classify polygons and common geometric solids including those that make up more complex solid objects.• Begin to identify and compare angles.

Statistics, Data Analysis, and Probability

Probability and Statistics	<ul style="list-style-type: none">• Conduct simple probability experiments, recording and displaying the results using a bar graph or line plot.• Identify the probability of an event occurring and use the results to predict future events.• Identify range and mode.
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Third Grade

Algebra, Functions, and Graphing

Algebraic Concepts	<ul style="list-style-type: none">• Represent relationships of quantities in the form of mathematical expressions, equations, or inequalities.• Solve problems involving numeric equations or inequalities.• Select appropriate operational and relational symbols to make an expression true (e.g. $4 _ 3 = 12$).• Recognize and use the communicative property of multiplication.• Work with associative property.• Solve simple problems involving a functional relationship between two quantities (e.g. find total cost of multiple items given cost per unit).• Extend and represent a numerical linear pattern by its rules.• Use a blank line or a box to stand for any number in simple equations using addition, subtraction, multiplication, and division.
Graphing	<ul style="list-style-type: none">• Begin to identify and plot ordered pairs in the first quadrant.

Reasoning and Proof

Reasoning	<ul style="list-style-type: none">• Use the inverse relationship between multiplication and division to solve problems and to check solutions.• Solve multi-step problems.• Begin to distinguish relevant from irrelevant information.• Sequence and prioritize information.• Observe patterns.• Start to break problems into simpler parts.• Begin to use estimation to verify results.• Express solutions and methods used in verbal and written language.• Develop generalizations and apply them to other circumstances.• Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.
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Fourth Grade

Numbers and Operations

Counting and Comparing	<ul style="list-style-type: none">• Read, write, count, order, and compare whole numbers to millions and decimals to the hundredths.• Identify positive and negative integers on a number line and a thermometer.
Place Value	<ul style="list-style-type: none">• Recognize the place value of whole numbers through the millions and decimals through the hundredths place.
Estimation and Rounding	<ul style="list-style-type: none">• Estimate the sum or difference of whole numbers and positive decimals to two decimals.• Round two place decimal numbers to one decimal or whole number.
Operations with whole numbers and integers	<ul style="list-style-type: none">• Show proficiency of multiplication/division facts through 12.• Find the sum or differences of two whole numbers through millions with regrouping.• Multiply multi-digit numbers by two digits and divide a multi-digit number by a one-digit number with a remainder.• Determine the multiples of numbers through 50.• Explore prime and composite numbers.• Begin to factor composite numbers in multiple ways.
Fractions	<ul style="list-style-type: none">• Describe, compare, add, and subtract like fractions and mixed numbers.• Recognize equivalent fractions and use drawings to represent fractional parts.• Know fractional and decimal equivalents for $\frac{1}{2}$'s and $\frac{1}{4}$'s.
Money and Decimals	<ul style="list-style-type: none">• Show proficiency in all types of money problems, including finding unit cost.
Decimals	<ul style="list-style-type: none">• Read, write, order, and compare tenths and hundredths.• Add and subtract numbers with two decimal places.• Know fractional and decimal equivalents for $\frac{1}{2}$'s and $\frac{1}{4}$'s.• Order fractions, decimals, and mixed numbers on a number line.

Fourth Grade

Measurement and Geometry

Time	<ul style="list-style-type: none">• Tell time to the nearest minute.• Compute elapsed time to the nearest quarter hour.
Measurement	<ul style="list-style-type: none">• Measure to the nearest $\frac{1}{4}$ inch.• Find the area of a rectangle using the English and metric systems.• Estimate and measure length, liquid volume and weight/mass.• Begin to use appropriate tools and units in the English and metric systems.• Carry out unit conversions within a system of measurement.
Geometry	<ul style="list-style-type: none">• Describe, identify, define, and make models of the building blocks of geometry [solid and plane figures, parallel and perpendicular lines, types of angles (right, obtuse, acute), types of triangles, types of quadrilaterals, congruence and symmetry, radius and diameters of circles, etc.]• Use formulas to find the perimeter and area of rectangles and squares.• Be able to demonstrate that two figures with equal areas can have different perimeters and vice versa.• Relate $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and full turns with their respective angle measurements.

Statistics, Data Analysis, and Probability

Probability and Statistics	<ul style="list-style-type: none">• Formulate survey questions, systematically collect, represent, and interpret numerical and categorical data, and clearly communicate findings.• Analyze one and two-variable data graphs to answer questions about a situation.• Express outcomes of experimental probability situations, verbally and numerically.• Represent all possible outcomes for simple probability in an organized way (e.g. tables, grids, tree diagrams).• Compute mean, mode, and range.
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Fourth Grade

Algebra, Functions, and Graphing

Algebraic Concepts	<ul style="list-style-type: none">• Use a letter to represent an unknown number in simple equations.• Begin to interpret and evaluate mathematical expressions that use parentheses.• Express simple unit conversions in symbolic form.• Begin to use and interpret formulas.• Know that if you add or multiply the same number on both sides of the equation, the equation remains equal.• Extend and represent a numerical linear pattern by rules involving multiple steps.• Use ratios to show comparisons and equivalencies by converting one unit of measurement to another (e.g. inches to feet, minutes to hours).
Graphing	<ul style="list-style-type: none">• Identify and plot ordered pairs in the first quadrant.

Reasoning and Proof

Reasoning	<ul style="list-style-type: none">• Use the inverse relationship between multiplication and division to solve problems and to check solutions.• Solve multi-step problems.• Continue to develop previously learned skills to solve more complex problems (e.g. distinguish relevant from irrelevant information; sequence and prioritize information; observe patterns; break problems into simpler parts; use estimation to verify results; express solution and method used in verbal and written language; develop generalizations and apply them to other circumstances; use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning).
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Fifth Grade

Numbers and Operations

Counting and Comparing	<ul style="list-style-type: none">• Read, write, count, order, and compare whole numbers to billions and decimals to the ten thousandths.• Identify and represent on a number line decimals, fractions, mixed numbers, and positive and negative integers.
Place Value	<ul style="list-style-type: none">• Recognize the place value of whole numbers through the billions and decimals through the ten-thousandths place.
Estimation and Rounding	<ul style="list-style-type: none">• Estimate, round, and manipulate very large (e.g. millions) and very small numbers (e.g. thousandths).
Operations with whole numbers and integers	<ul style="list-style-type: none">• Find the sum or differences of two whole numbers through billions with regrouping.• Demonstrate proficiency with multiplication and division using multi-digit numbers.• Identify prime factors of all numbers through 50 and write numbers as a product of their prime factors.• Determine the Least Common Multiple and Greatest Common Factors of whole numbers.• Use exponential notation for factorization of positive integers and evaluate exponential expressions.• Memorize and apply rules of divisibility.
Fractions	<ul style="list-style-type: none">• Multiply and divide fractions.• Add and subtract unlike fractions and mixed numbers.• Reduce fractions to simplest form.• Calculate equivalent fractions.• Convert common fractions to decimals and percents.
Money and Decimals	<ul style="list-style-type: none">• Calculate unit cost using two-digit divisors.
Decimals	<ul style="list-style-type: none">• Know fractional and decimal equivalents for all common fractions.• Add, subtract, multiply, and divide with decimals.• Convert decimals to fractions and percents.
Percents	<ul style="list-style-type: none">• Interpret percents as part of a hundred.• Convert percents to decimals and decimals to percents.

Fifth Grade

Measurement and Geometry

Time	<ul style="list-style-type: none">• Compute elapsed time to the nearest minute.
Measurement	<ul style="list-style-type: none">• Measure and compute the volume of solid objects using the English and metric systems.• Continue to estimate and measure length, liquid volume, and weight/mass using appropriate tools and units.• Begin to use appropriate tools and units in the English and metric systems.• Carry out unit conversions within a system of measurement.
Geometry	<ul style="list-style-type: none">• Measure, identify, and draw geometric shapes and objects using geometric tools.• Derive and use formulas to compute the area and perimeter of triangles, quadrilaterals, and irregular shapes, including problems that require conversion of units.• Use manipulatives to compute the volume and surface area of rectangular solids.• Construct a cube and rectangular box from 2-dimensional patterns.

Statistics, Data Analysis, and Probability

Probability and Statistics	<ul style="list-style-type: none">• Identify ordered pairs of data from a graph and interpret the meaning of the data.• Write ordered pairs correctly.• Compute and compare mean, median, and mode.• Organize and display data, selecting appropriate graphs and representations.• Begin to use fractions and percentages to compare data sets of different sizes.• Master the use of tables, grids, and tree diagrams to represent all possible outcomes for simple probability.
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Fifth Grade

Algebra, Functions, and Graphing

Algebraic Concepts	<ul style="list-style-type: none">• Use a letter to represent an unknown number in multi-step equations.• Write and evaluate simple algebraic expressions in one variable by substitution.• Begin to use information taken from a graph or equation to answer questions about a problem situation.• Use the distributive property in equations and expressions with variables.• Use parentheses to indicate which operations to perform first when using multiple operations.• Extend and represent complex linear patterns by rules involving multiple steps.• Continue to use ratios through comparisons and equivalencies of measurement and fractions.• Use patterning and “guess and check” to develop a linear equation to solve a word problem.
Graphing	<ul style="list-style-type: none">• Begin to identify and graph ordered pairs in the four quadrants of the coordinate plane.• Begin to use information from a linear graph or equation to answer questions about a problem situation.

Reasoning and Proof

Reasoning	<ul style="list-style-type: none">• Begin to identify the properties used to evaluate expressions (associative and commutative).• Solve addition and subtraction problems with mixed units (e.g. 4ft. 8in. + 5ft. 7in.).• Continue to develop previously learned skills to solve more complex problems (e.g. distinguish relevant from irrelevant information; sequence and prioritize information; observe patterns; break problems into simpler parts; use estimation to verify results; express solution and method used in verbal and written language; develop generalizations and apply them to other circumstances; use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning).
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Sixth Grade

Numbers and Operations

Counting and Comparing	<ul style="list-style-type: none">• Order and compare signed integers on a number line, as well as decimals, fractions, and mixed numbers.
Estimation and Rounding	<ul style="list-style-type: none">• Use estimation to verify the reasonableness of a result.
Operations with whole numbers and integers	<ul style="list-style-type: none">• Show proficiency with the four basic arithmetic operations with whole numbers and integers.• Determine the Least Common Multiple and Greatest Common Factors of whole numbers using prime factors and exponents and use them to solve problems with fractions.
Fractions	<ul style="list-style-type: none">• Show proficiency with the four basic arithmetic operations with fractions.• Solve problems involving ratios and proportions, including using the means-extremes principle.• Convert all fractions and mixed numbers to decimals and percents.
Decimals	<ul style="list-style-type: none">• Show proficiency with the four basic arithmetic operations with decimals.• Convert decimals to fractions and percents.
Percents	<ul style="list-style-type: none">• Convert percents to fractions and decimals.• Solve problems using percentages (tax, tips, and interest).

Sixth Grade

Measurement and Geometry

Measurement	<ul style="list-style-type: none">• Compare and convert weights, capacities, geometric measures, time and temperatures within a measurement system.
Geometry	<ul style="list-style-type: none">• Understand the concept of constants such as π and use the formula for the circumference and area of a circle.• Use the properties of complementary and supplementary angles and the sum of the measures of the angles of a triangle to solve problems.• Know the properties of adjacent and vertical angles.• Know and use formulas to compute the volume and surface area of triangular prisms and cylinders.• Draw triangles and quadrilaterals from a given description.• Visualize, describe, and make models of geometric solids (e.g. prisms, pyramids) in terms of the number and shape of faces, edges, and vertices.• Interpret two-dimensional representations of three-dimensional objects.• Draw patterns (of faces) for a solid that, when cut and folded, will make a model of that solid.• Visualize and draw two-dimensional views of three-dimensional objects made from rectangular solids.

Sixth Grade

Statistics, Data Analysis, and Probability

Probability and Statistics	<ul style="list-style-type: none">• Compute range, mean, median, and mode of data sets and understand how additional data may affect these computations of measures of central tendency; understand how outliers affect these measures.• Know why a specific measure of central tendency provides the most useful information in a given context.• Use data samples of a population and describe the characteristics and limitations of the samples.• Determine theoretical and experimental probabilities and use these to make predictions about events.• Identify different ways of selecting a sample.• Analyze possible influence of bias.• Evaluate the validity of claims based on statistical data.• Represent probabilities as ratios, proportions, decimals, and percentages.• Verify the reasonableness of the probability.• Recognize that if P is the probability of an event occurring, then $1-P$ is the probability of it not occurring.
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Sixth Grade

Algebra, Functions, and Graphing

Algebraic Concepts	<ul style="list-style-type: none">• Write and solve one-step linear equations in one variable.• Begin to write and evaluate an algebraic expression for a given situation using up to three variables.• Solve problems using the algebraic order of operations and the communicative, associative, and distributive properties to evaluate expressions.• Begin to use a scientific calculator.• Demonstrate an understanding of rate and begin to solve problems involving rates, average speed, distance, and time.• Use variables in expressions describing geometric quantities.• Begin to express in symbolic form simple relationships arising from geometry.• Begin to solve problems involving linear functions with integer values and graph the resulting ordered pairs of integers on a grid.• Understand that in a two-variable equation, one variable is a function of the other.
Graphing	<ul style="list-style-type: none">• Understand that the length of a horizontal line segment equals the difference of the x-coordinates and that the length of a vertical line segment equals the difference of the y-coordinates.• Draw the points corresponding to linear relationships on graph paper.

Sixth Grade

Reasoning and Proof

Reasoning	<ul style="list-style-type: none">• Justify the steps used in evaluating expressions (including the distributive property) and begin to apply to the process of solving equations (properties of equality).• Formulate and justify mathematical conjectures based on past experience (e.g. “guess and check” strategy).• Estimate unknown quantities graphically and solve through logic and algebraic thinking.• Indicate relative advantages of exact and appropriate solutions.• Continue to develop previously learned skills to solve more complex problems (e.g. distinguish relevant from irrelevant information; sequence and prioritize information; observe patterns; break problems into simpler parts; use estimation to verify results; express solution and method used in verbal and written language; develop generalizations and apply them to other circumstances; use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning).
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Seventh Grade

Strand 1

Numbers and Operations

Estimation and Rounding	<ul style="list-style-type: none">• Show proficiency with the four arithmetic operations with whole numbers, integers, fractions, and decimals.• Reinforce proficiency with fractions and long division.• Use commutative, associative, and identity properties to simplify numerical expressions.• Use area models to represent distributive property.• Calculate the percent of a number and solve simple problems involving percent.• Convert numbers to scientific notation and multiply and divide in SN.• Estimate roots to the whole number.• Demonstrate and understanding of the inverse relationship between exponents and roots.
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Measurement and Geometry

Measurement and Geometry	<ul style="list-style-type: none">• Measure and compare weights, capacities, geometric measures, times, and temperatures in both the metric and customary systems.• Find the area of circles, parallelograms, and triangles and the volume of prisms and cylinders.• Identify the shapes of faces of a solid and then calculate its surface area.• Know and use the Pythagorean Theorem and its converse to solve for a missing side.• Identify and verify congruence between two figures.
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Seventh Grade

Strand 1

Statistics, Data Analysis, and Probability

Probability and Statistics	<ul style="list-style-type: none">• Display a data set in two variables as a line, bar, or circle graph based on the type of data used.• Display a single data set as a stem-and-leaf plot.• Distinguish between independent and dependent events.• Make predictions of events by comparing theoretical and experimental probabilities.• Recognize bias in data analysis.
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Reasoning and Proof

Reasoning	<ul style="list-style-type: none">• Reinforce solving one-step equations.• Write and solve two-step equations with integers.• Begin to solve equations using fractions and decimals as coefficients.• Evaluate expressions with multiple variables, and graph inequalities of one variable on a number line.• Add and subtract monomials by adding like terms.
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Eighth Grade

Strand 1

Reasoning and Proof

	<ul style="list-style-type: none">• Formulate and justify mathematical conjectures based on a general description of the mathematical question or problem posed. (Can you make a triangle with sides 4, 5, and 10? What happens when $1/x$ as x approaches zero and why?)• Use estimation to verify the reasonableness of calculated results.• Apply strategies and results from simpler problems to more complex problems.
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Numbers and Operations

Estimation and Rounding	<ul style="list-style-type: none">• Solve problems with proportions.• Calculate percent change and begin to solve problems that involve discounts, markups, commissions, profit, and simple and compound interest.• Simplify quotients and products with exponents and roots.• Understand that the absolute value is the distance from zero.• Begin to work with negative exponents and variables.• Demonstrate an understanding of the inverse relationship between exponents and roots.
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Eighth Grade

Strand 1

Measurement and Geometry

Measurement and Geometry	<ul style="list-style-type: none">• Compare weights, capacities, geometric measures, times, and temperatures within and between measurement systems.• Compare units expressed as rates (speed, density) and products (person-days, work).• Use dimensional analysis to check or find the correct unit.• Calculate the area of a parallelogram and trapezoid and the volume and surface area of any right solid.• Identify elements of solids (e.g. diagonals, radius).• Describe how two or more objects are related in space (e.g. skew, perpendicular, and parallel lines and planes).• Estimate and compute the area of more complex or irregular two- and three-dimensional figures by breaking the figures down into common figures.• Understand how perimeter, area, and volume are affected by changes of scale.• Understand that in the conversion of squared and cubed units the conversion factor must also be squared or cubed. (1 sq. ft. = 144 sq. in.)
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Statistics, Data Analysis, and Probability

Probability and Statistics	<ul style="list-style-type: none">• Find the minimum, lower quartile, median, the upper quartile, and the maximum of a data set.• Display a data set as a box-and-whisker plot.• Find the minimum, lower quartile, median, the upper quartile, and the maximum of a data set.• Graph two variables on scatterplot and describe any relationship (e.g. positive or negative correlation).• Understand that the sum of the probabilities of an event and its complement is one.
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Eighth Grade

Strand 1

Reasoning and Proof

Reasoning	<ul style="list-style-type: none">• Solve equations using rational numbers including fractions and decimals.• Solve inequalities and graph on a number line.• Evaluate variable expressions involving exponents and roots.• Multiply and divide monomials.• Solve multi-step problems involving rate, distance, and time or a direct variation.• Graph a linear function with slope and y-intercept.• Introduce the graphs of simple second and third order equations and use them to solve problems (vary the edge length of a cube and graph the volume).
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Seventh Grade

Strand 2

Numbers and Operations

	<ul style="list-style-type: none">• Identify and apply the properties of real numbers to compute with rational numbers.• Add, subtract, multiply, divide and use exponents; and convert between fractions, decimals, and percents including repeating decimals.• Differentiate between rational and irrational numbers.• Calculate percent change and begin to solve problems that involve discounts, markups, commissions, profit, and simple and compound interest.• Use fractions with exponents and roots.• Understand that the absolute value a number is the distance from zero.• Begin to work with negative exponents and multiply and divide exponential expressions with common bases.• Understand the inverse relationship between exponents and roots.• Estimate roots to the nearest whole number.
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Seventh Grade

Strand 2

Measurement and Geometry

	<ul style="list-style-type: none">• Compare weights, capacities, geometric measures, times, and temperatures within and between measurement systems.• Construct and read drawings and models made to scale.• Use measures expressed as rates and products to solve problems.• Use dimensional analysis to check or find the correct unit.• Calculate the area of a parallelogram and trapezoid and the volume and surface area of any right solid.• Estimate and compute the area of more complex or irregular two- and three-dimensional figures by breaking the figures down into common figures.• Understand how perimeter, area, and volume are affected by changes of scale.• Understand that in the conversion of squared and cubed units the conversion factor must also be squared or cubed. (1 sq. ft. = 144 sq. in.)• Know and use the Pythagorean Theorem and its converse to solve for a missing a side.• Identify and verify congruence between two figures.• Identify elements of solids (e.g. diagonals, radius).• Describe how two or more objects are related in space (e.g. skew, perpendicular, and parallel).• Identify and construct the basic elements of geometric figures.• Use coordinate graphs to plot simple figures, determine their length, area, and images under translations, reflections and rotations.• Construct two-dimensional patterns for three-dimensional models that can be folded to create a solid.
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Seventh Grade

Strand 2

Statistics, Data Analysis, and Probability

	<ul style="list-style-type: none">• Find the minimum, lower quartile, median, the upper quartile, and the maximum of a data set.• Display and compare data sets using a stem-and-leaf plot or box-and-whisker plot.• Graph two variables on a scatterplot and describe any relationship (e.g. positive or negative correlation).
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Algebra, Functions, and Graphing

	<ul style="list-style-type: none">• Write and solve an equation or inequality with two variables.• Simplify expressions using properties of rational numbers and the order of operations and justify the process used (e.g. distributive, identity, and opposites).• Evaluate variable expressions involving exponents and roots.• Multiply and divide monomials.• Solve multi-step problems involving rate, distance, and time or a direct variation.• Graph a linear function with slope and a y-intercept.• Introduce the graphs of simple second and third order equations and use them to solve problems (vary the edge length of a cube and graph the volume).
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Algebra

Real Number Properties

	<ul style="list-style-type: none">• Identify and use the arithmetic properties of subsets of integers and rational, irrational, and real numbers, including closure properties for the four basic arithmetic operations where applicable.• Use properties of numbers to demonstrate whether assertions are true or false.• Understand and use such operations as taking the opposite, find the reciprocal, taking a root, and raising to a fractional power.• Use the rules of exponents. [e.g. Simplify $(x^3 y)^6$]
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Equations

	<ul style="list-style-type: none">• Solve equations and inequalities involving absolute values.• Simplify expressions before solving linear equations and inequalities in one variable, such as: $3(2x - 5) + 4(x - 2) = 12$• Solve multi-step problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.
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Algebra

Graphing

	<ul style="list-style-type: none">• Determine the slope of a linear equation, compute the x- and y- intercepts, and graph the equation (e.g. graph $2x + 6y = 4$).• Sketch the region defined by linear inequality. (e.g. Sketch the region defined by $2x + 6y < 4$).
	<ul style="list-style-type: none">• Verify that a point lies on a line, given an equation of the line and can derive linear equations by using the point –slope formula.• Understand the concepts of parallel lines and perpendicular lines and how their slopes are related.• Find the equation of a line perpendicular to a given line that passes through a given point.• Solve a system of two linear equations in two variables algebraically, sketch their solution sets, and interpret the answer graphically.

Polynomials and Factoring

	<ul style="list-style-type: none">• Add, subtract, multiply, and divide monomials and polynomials. Solve multi-step problems, including word problems, by using these techniques.• Apply basic factoring techniques to second- and simple third-degree polynomials. These techniques include finding a common factor for all terms in a polynomial, recognizing the difference of two squares, and recognizing perfect squares of binomials.• Simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to the lowest terms.• Add, subtract, multiply, and divide rational expressions and functions. Solve both computationally and conceptually challenging problems using these techniques.• Solve a quadratic equation by factoring or completing the square.• Apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.
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Algebra

Functions

	<ul style="list-style-type: none">• Understand the concepts of a relation and a function, determine whether a given relation defines a function, and give pertinent information about given relations and functions.• Determine the domain of independent variables and the range of dependent variables defined by a graph, a set of ordered pairs, or a symbolic expression.• Determine whether a relation defined by a graph, a set of ordered pairs, or a symbolic expression is a function and justify the conclusion.
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Quadratic Formula

	<ul style="list-style-type: none">• Know the quadratic formula and be familiar with its proof by completing the square.• Use the quadratic formula to find the roots of a second-degree polynomial and to solve quadratic equations.• Graph quadratic functions and know that their roots are the x-intercepts.• Use the quadratic formula or factoring techniques of both to determine whether the graph of a quadratic function will intersect the x-axis in zero, one, or two points.• Apply quadratic equations to physical problems, such as the motion of an object under the force of gravity.
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Logical Proofs and Reasoning

	<ul style="list-style-type: none">• Use and know simple aspects of a logical argument that includes inductive and deductive reasoning, identifying the hypothesis and conclusion in logical deduction.• Use properties of the number system to judge the validity of results, to justify each step of a procedure, and to prove and disprove statements.
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