Grade 7

NUMBERS AND OPERATIONS

Describe situations in which opposite quantities combine to make 0.	
Apply properties of operations as strategies to add and subtract rational numbers.	
Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.	
Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.	
Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.	
Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.	
Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real-world contexts.	

Recognize, read, and write numbers to twelve digits.	m	_____
Recognize, read, and write integers.	D	_____
Recognize, read, and write rational numbers.	M	_____
Identify least common denominators, greatest common factor of two or more numbers.	m	_____
Recognize, read, and write decimals to thousandths and beyond.	m	_____
Identify equivalent decimals and inequalities.	m	_____
Rename decimals as fractions and fractions as decimals.	m	_____
Round numbers to nearest billionth, round repeating decimals.	m	_____
Recognize, read, and write Roman numerals.	D	_____
Recognize, read, and write Irrational numbers.	D	_____
Recongize, read, and write Real Numbers.	M	_____
Identify prime and composite numbers.	m	_____

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Identify opposites of any number.	M	_____
Identify a "Set."	D	_____
Use signs of equality and inequality, =, ≠ ,< , > .	M	_____
Use signs of equality and inequality ≤, ≥ .	I	_____
Compare and order decimals, fractions, combinations of decimals and fractions, percentages.	m	_____
In terms of set notation, identify elements.	M	_____
In terms of set notation: identify subsets, domain and range.	I	_____
Recognize, read, and write place value to the right of the decimal place through six digits and beyond.	m	_____
Round numbers to the nearest cent.	m	_____
Perform operations using whole numbers and integers: estimating addition, subtraction, multiplication,	m	_____
Add: Compute with regrouping: negative numbers.	M	_____
Add: Compute with regrouping: using mental math.	D	_____
Subtract: Compute with regrouping: with negative numbers and using mental math.	D	_____
Multiply: check by division with negative numbers.	I	_____
Multiply: check by division with associative property, and product of prime numbers.	m	_____
Multiply: check by division with distributive property.	M	_____
Multiply: check by division with mental math.	D	_____
Divide: check by multiplication with dollars and cents.	m	_____
Divide: check by multiplication with negative numbers.	I	_____
Divide: check by multiplication using mental math.	D	_____
Calculate using exponents/roots.	D	_____
Recognize, read, and write numbers using expanded notation.	m	_____
Fractions, decimals, percents: calculate equal parts of a whole, equivalent fractions, simplest form, mixed numbers, proper and improper fractions, ratios, inequalities, reciprocals, least common denominator, and greatest common factor.	m	_____
Fractions, decimals, percents: addition by estimation, unlike denominators, mixed numbers, improper/proper fractions, decimal alignment.	m	_____
Add fractions, decimals, percents by combining fractions, decimals and/or whole numbers.	M	_____
Add,subtract, multiply, divide fractions, decimals, percents with negative numbers.	I	_____
Add, subtract, multiply, divide fractions, decimals, percents using mental math.	D	_____
Subtract fractions, decimals, percents using estimation, unlike denominators, mixed numbers,	m	_____
Multiply fractions, decimals, percents: using estimation, with fractions: fraction times fraction, whole	m	_____
Multiply: decimal placement, decimal times decimal.	M	_____
Multiply: combinations of fractions, decimals and/or whole numbers.	M	_____
Divide fractions, decimals, percents: estimation, with dollars and cents, with fractions (fraction/fraction),	m	_____

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Recognize division by zero as impossible.	I
Divide: combination of fractions, decimals, and/or whole numbers.	M
Apply the correct order of operations.	M
Solve problems involving: percent less than, greater than 100%.	M
Solve problems involving percent of increase or decrease.	D
Solve problems involving simple interest.	M
Solve problems involving compound interest.	I
Solve problems involving mark up/down, commission/profit.	M
Solve problems involving unit pricing.	m

ALGEBRA

Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
Represent proportional relationships by equations.
Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1,r) where r is the unit rate.

EXPRESSIONS AND EQUATIONS

Use properties of operations to generate equivalent expressions.
Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

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Solve word problems leading to equations of the form px + q= r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.

Solve word problems leading to inequalities of the form px +q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.

Skill	Level
Rename numbers using Base Conversion.	I
Recognize, read, calculate, and write ratios and proportions.	M
Identify and apply symbols of inclusion parentheses ( ) during computation.	m
Identify and apply symbols of inclusion brackets [ ], braces { }, insertion of symbols during computing.	M
Apply opposite and multiple signs to numbers, within and outside of grouping symbols.	I
Recognize, read, write, and calculate using exponential notation.	M
Recognize, read, write, and calculate using negative exponents.	I
Recognize the result of an exponent of "0".	M
Multiply exponential expressions.	I
Calculate exponents with negative bases.	M
Calculate Roots: square roots-rational.	D
Recognize irrational square roots: estimate, other roots (cubed root, fourth root, etc.), products of Square Root Theorem, signed roots.	I
Estimate irrational square roots: with calculator.	M
Recognize, read, and write numbers using Scientific notation.	M
Perform operations with scientific notation.	D
Identify like terms and polynomials.	I
Identify unknown quantities, algebraic phrases and patterns.	D
Evaluate algebraic expressions using order of operations with integers, rational numbers, irrational numbers, with zero exponents and in function form.	I
Evaluate algebraic expressions using order of operations with positive exponents.	D
Simplify expressions: combine like terms, use distributive property, with exponents.	I
Simplify rational expressions, radical expressions, and polynomials.	I
Solve simple equations using a variable as a place holder.	m
Solve simple equations using a variable as a changing quantity.	D
Solve more complicated equations with: fractional parts, mixed numbers, decimal part, percentage; using substitution; with variables in the denominator; using systems of equations involving graphic solutions with and without technology.	I

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Read, write, and solve algebraic word problems.	I
Solve inequalities using: additive property of inequality; multiplicative property of inequality, absolute value of inequality.	I
Factor polynomials using greatest common factor.	I
Explore linear relationships with and without technology by identifying coordinates and graphing.	M
Solve problems by graphing three points or identifying the slope intercept.	I
Explore linear relationships symbolically by using the distance formula.	I
Discuss/analyze change by measuring and comparing quantities; using tables and graphs; using equations with constant rate of change and nonlinear relationships	D

MEASUREMENT & DATA

Use manipulatives materials to model concepts of measurement.	D
Compare and/or order objects using appropriate units of U.S. customary system with length: 1/8, 1/16.	m
Make conversions within U.S. customary system.	m
Compare and/or order objects using appropriate units of the metric system: millimeter, centimeter, decimeter, meter; dekameter, hectometer; kilometer; milliliter, liter, kiloleter; gram, kilogram; conversions within system; temperature in Celsius.	M
Recognize, read, and write time schedules.	D
Recognize, read, and write time zones.	m

GEOMETRY

Draw construct, and describe geometrical figures and describe the relationships between them.
Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

Define, compare, demonstrate, and calculate: perimeter, area (of square, rectangle, triangle, parallelogram, trapezoid), circumference, volume.	m
Calculate the area of a circle.	M
Calculate the surface area of a prism.	D
Explain and construct scale drawings.	m
Investigate and predict the result of slide and turn.	M
Investigate and predict the result of flip.	D

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Describe, model, draw and classify lines that are straight, intersecting, parallel, perpendicular; rays and segments; angle vertex; acute, obtuse, straight and congruent angles.	m
Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	M
Identify corresponding, alternate interior/exterior, vertical and bisector angles.	I
Identify triangles: isosceles, scalene, acute, obtuse, equilateral and right.	M
Identify right Triangle parts: hypotenuse and leg, Pythagorean Theorem, 30-60-90, 45-45-90.	I
Identify triangles: base/height (altitude).	m
Identify quadrilaterals: parallelograms, rhombuses, trapezoids; pentagons, hexagons, octagons.	m
Identify quadrilaterals: heptagons, nine-sided and beyond convex, concave.	D
Identify parts of circles: center, chord, diameter, Pi, radius.	m
Identify degrees, arc of a circle, inscribed circles.	M
Identify irregular shapes.	M
Identify solid figures: prisms (triangular, rectangular); pyramid; symmetry, congruencey.	m
Identify complex prisms (with multi-sided bases).	D
Construct convincing arguments and proofs to solve problems using geometric figures and patterns using diagrams.	m
Draw logical conclusions and communicate reasoning: using technology; formulate, develop, and communicate logical arguments; develop and solve problems using geometric relationships, using models and using technology.	D

STATISTICS AND PROBABILITY

Collect and describe data using random samplings*.	D
Organize and construct data by identifying, drawing, labeling and analyzing tables.	D
Analyze data via circle graph.	M
Analyze and create Venn diagram.	D
Identify and label dependent and independent variables.	m
Read, calculate, and interpret data: mean, median, mode, range.	m
Read, calculate, and interpret data: quartiles.	I
Calculate probability: single event; permutations, combinations.	D
Calculate probability: independent events, dependent events.	I
Format questions: Conduct experiments/surveys.	D
Demonstrate data collection methods.	D
Design data collection methods.	D
Make inferences: draw conclusions, communicate results, make predictions.	D

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PROBLEM SOLVING

Analyze and plan a problem determining the appropriate strategy by: drawing pictures, creating original problems, determining if information is sufficient to solve, relating to an easier problem, using tables, charts, graphs, and diagrams, trial and error, working backwards, sorting classifying and using patterns, estimation, choosing correct operation.	D
Solve fraction and decimal word problems, word problems with two statements of equality, distance=rate X time.	D
Check reasonableness of solution.	*D*
Understand patterns and relationships by observing, comparing and creating; sorting and classifying by characteristics; predicting what comes next and identifying the missing element; distinguishing between growing and repeating patterns; representing information numerically, graphically, and verbally; discussing analyzing change.	D