

North Dakota Priority Standards and Proficiency Scales

MATHEMATICS
Priority Standards

KINDERGARTEN

Domain	Code	Standard Description	Essential Vocabulary
Counting and Cardinality	K.CC.1	Count to 100 by ones and by tens. Count backward from 20 by ones	count, number words (0-100)
	K.CC.3	Write numbers sequentially from 0 to 20. Write a given number from 0 to 20.	number words (0-20)
	K.CC.4	Understand the relationship between numbers and quantities up to 20; connect counting to cardinality. a) Use one to one correspondence when counting objects. b) Understand that the last number name said tells the number of objects counted, regardless of their arrangement or order in which they were counted. c) Understand that each successive number name refers to a quantity that is one more	number words (0-20)
	K.CC.5	Count to answer “how many?” questions. a) Tell how many objects up to 20 are in an arranged pattern (e.g., a line or an array) or up to 10 objects in a scattered configuration. b) Represent a number of objects up to 20 with a written numeral. c) Given a number from 1-20, count out that many objects.	count, number words (0-20)
	K.CC.6	Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, using groups of up to 10 objects.	greater than, less than, equal to, more, less, same, bigger, smaller
	K.CC.7	Compare two numbers between 1 and 10 presented as written numerals.	greater than, less than, equal to, more, less, same, bigger, smaller
	Operations and Algebraic Thinking	K.OA.1	Represent addition and subtraction in a variety of ways.
K.OA.2		Use an appropriate strategy to solve word problems that involve adding and subtracting within 10.	join, put together, add, separate, take away, take apart, take from, subtract, plus, minus, less, total, in all, altogether, how many are left
K.OA.4		Find the number that makes 10 when added to a given number from 1 to 9. Record with a drawing or equation.	how many more
K.OA.5		Fluently add and subtract within 5.	+, -, =
Geometry	K.G.2	Correctly name shapes and solids (squares, circles, triangles, rectangles, cubes, and spheres) regardless of their orientations or overall size.	square, circle, triangle, rectangle, cube, sphere



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GRADE 1

Domain	Code	Standard Description	Essential Vocabulary
Operations and Algebraic Thinking	1.OA.1	Use strategies to add and subtract within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions.	add to, take from, put together, take apart, compare, missing
	1.OA.5	Relate counting to addition and subtraction	add, subtract, addition, subtraction
	1.OA.6	Use strategies to add and subtract within 20. Fluently add and subtract within 10.	add, subtract, plus, minus, sum, difference, equals
Number and Operations in Base Ten	1.NBT.1	Count forward and backward within 120, starting at any given number. Read and write numerals within 120. Represent a number of objects up to 120 with a written numeral	number names (0-120)
	1.NBT.2	Demonstrate understanding that the two digits of a two-digit number represent amounts of tens and ones, including: a) 10 can be thought of as a bundle of ten ones — called a “ten.” b) The numbers from 11 to 19 are composed of a ten and additional ones. c) Multiples of 10 up to 90 represent a number of tens and 0 ones.	tens, ones, bundles
	1.NBT.3	Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, and $<$.	tens, ones, $<$, $=$, $>$
	1.NBT.4	Demonstrate understanding of place value when adding two-digit numbers within 100. a) Add a two-digit number and a one-digit number. b) Add a two-digit number and a multiple of 10. Use concrete models or drawing strategies based on place value, properties of operations, and/or the relationship between addition and subtraction to add and subtract within 100. Relate the strategy to a written method and explain the reasoning used.	tens, ones



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Measurement and Data	1.MD.3	Tell and write time to the hour and half-hour (including o'clock and half past) using analog and digital clocks	hour, half-hour, o'clock, half past, ___-thirty, analog, digital, minutes
	1.MD.4	Organize, represent, and interpret data with up to three categories. Ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another	more, most, less, least, same, category, title, total
	1.MD.5	Identify and tell the value of a dollar bill, quarter, dime, nickel, and penny	dollar bill, coin, quarter, dime, nickel, penny, cents, worth
Geometry	1.G.3	Partition circles and rectangles into two equal shares. Describe the shares using the word halves and use the phrase half of. Describe the whole as two of the shares	equal shares, halves, half of, half, divide



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GRADE 2

Domain	Code	Standard Description	Essential Vocabulary
Operations and Algebraic Thinking	2.OA.1	Use strategies to add and subtract within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions.	add, subtract, add to, take from, put together, take apart, compare, missing
	2.OA.2	Use mental strategies to fluently add and subtract within 20.	add, subtract, plus, minus, equals
	2.OA.4	Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns. Write an equation to express the total as a sum of equal addends.	array, rows, columns, total, sum, equal, addends
Number and Operations in Base Ten	2.NBT.1	Demonstrate understanding that the three digits of a three-digit number represent amounts of hundreds, tens, and ones, including: a) 100 can be thought of as a bundle of ten tens called a “hundred”. b) Multiples of 100 represent a number of hundreds, 0 tens, and 0 ones.	hundreds, tens, ones, digit, number names (0-1000), place value
	2.NBT.2	Count forward and backward from any given number within 1000. Skip-count by 5s, 10s, and 100s.	skip-count, count, number names (0-1000)
	2.NBT.3	Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	standard form, word form, expanded form, number names (1-1000), number words (1-1000)
	2.NBT.5	Use strategies based on place value, properties of operations, and/or the relationship between addition and subtraction to fluently add and subtract within 100.	add, subtract, addition, subtraction, tens, ones, place value
	2.NBT.7	Demonstrate understanding of place value within 1000 when adding and subtracting three-digit numbers. Use concrete models or drawings and strategies based on place value, properties of operation, and/or the relationship between addition and subtraction to add and subtract within 1000. Use a written method to explain the strategy.	place value, addition, subtraction, hundreds, tens, ones
Measurement and Data	2.MD.7	Tell and write time to the nearest five minutes (including quarter after and quarter to) with a.m. and p.m. using analog and digital clocks	minutes, quarter after, quarter to, a.m., p.m., analog, digital, minute hand, hour hand
	2.MD.8	Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately	dollar bills, quarters, dimes, nickels, pennies, \$, (cent sign), decimal point



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Geometry	2.G.3	<p>Partition circles and rectangles into two, three, or four equal shares. Describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that identical wholes can be equally divided in different ways. Demonstrate understanding that partitioning shapes into more equal shares creates smaller shares.</p>	equal shares, halves, thirds, fourths, whole, divide
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GRADE 3

Domain	Code	Standard Description	Essential Vocabulary
Operations and Algebraic Thinking	3.OA.3	Using drawings and equations with a symbol for an unknown number, solve multiplication and division word problems within 100 in situations involving equal groups, arrays, and measurement quantities.	equation, unknown number, array
	3.OA.5	Apply properties of operations as strategies to multiply and divide (without the use of formal terms).	Score 5
	3.OA.7	Using mental strategies, fluently multiply and divide within 100.	
	3.OA.8	Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies.	variable, reasonableness, estimation
Number and Operations Base Ten	3.NBT.1	Use place value understanding to round whole numbers to the nearest 10 or 100.	Score 5
	3.NBT.2	Using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction, fluently add and subtract within 1000.	place value, order of operation, fluency
Number and Operations - Fractions	3.NF.1	Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts. Understand a fraction a/b as the quantity formed by “ a ” parts of size $1/b$.	fraction
	3.NF.2	Understand a fraction as a number on the number line; represent fractions on a number line diagram. a) Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size $1/b$ and that the endpoint of the part based at 0 locates the number $1/b$ on the number line. b) Represent a fraction a/b on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.	number line



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	<p>3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.</p> <ul style="list-style-type: none"> a) Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. Recognize and generate simple equivalent fractions. b) Explain why the fractions are equivalent using a visual fraction model. c) Recognize fractions, $a/1$ or a/a, that are equivalent to whole numbers. Express whole numbers as fractions, $a/1$ or a/a. d) Compare two fractions with the same numerator or the same denominator by reasoning about their size. e) Recognize that comparisons are valid only when the two fractions refer to the same whole. f) Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions by using a visual fraction model. 	<p>equivalent, compare, numerator, denominator</p>
<p>Measurement and Data</p>	<p>3.MD.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve elapsed time word problems on the hour and the half hour, using a variety of strategies.</p>	<p>minute, hour, elapsed time, interval</p>
	<p>3.MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked in appropriate units—whole numbers, halves, or quarters.</p>	<p>halves, fourths, quarters, line plot, horizontal</p>
	<p>3.MD.7 Relate area to the operations of multiplication and addition.</p> <ul style="list-style-type: none"> a) Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. b) Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. c) Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning. d) Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems 	<p>area, products</p>



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	3.MD.8	Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths. Find an unknown side length. Exhibit rectangles with the same perimeter and different area or with the same area and different perimeters	perimeters, polygons
Geometry	3.G.1	Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals. Draw examples of quadrilaterals that do not belong to any of these subcategories	attributes, rhombus, rectangle, square, quadrilateral
	3.G.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.	Score 5 equal parts, unit fraction



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Domain	Code	Standard Description	Essential Vocabulary
Operations and Algebraic Thinking	4.OA.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity (variable). Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	variable, remainder, unknown, estimation, rounding
Number and Operations in Base Ten	4.NBT.3	Use place value and/or understanding of numbers to round multi-digit whole numbers to any place.	rounding
	4.NBT.4	Fluently add and subtract multi-digit whole numbers to the one millions place using strategies flexibly, including the standard algorithm.	
	4.NBT.5	Using strategies based on place value and the properties of operations, multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models	equations, rectangular array, area model
	4.NBT.6	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	dividend, divisor, quotient, rectangular array, area model



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Number and Operations – Fractions	4.NF.2	By creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$, compare two fractions with different numerators and different denominators. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.	common denominator/numerator, benchmark fraction
	4.NF.3	Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of unit fractions $\frac{1}{b}$. <ol style="list-style-type: none"> Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition with an equation. Justify decompositions by using a visual fraction model or other strategies. Add and subtract mixed numbers with like denominators. Using visual fraction models and equations, solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators. 	decompose, mixed number
	4.NF.4	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. <ol style="list-style-type: none"> Understand a fraction $\frac{a}{b}$ as a multiple of $\frac{1}{b}$. Understand a multiple of $\frac{a}{b}$ as a multiple of $\frac{1}{b}$, and use this understanding to multiply a fraction by a whole number. Using visual fraction models and equations, solve word problems involving multiplication of a fraction by a whole number. 	multiple
Measurement and Data	4.MD.1	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb., oz.; l, ml; hr., min., sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.	measurement systems: US customary/metric, conversion table
	4.MD.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Using diagrams such as number line diagrams that feature a measurement scale, to represent measurement quantities.	measurement scale



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Geometry	4.G.2	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of specified size. Recognize right triangles as a category, and identify right triangles	two-dimensional, parallel, perpendicular, angle, right triangle
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Domain	Code	Standard Description	Essential Vocabulary
Options and Algebraic Thinking	5.OA.2	Write simple expressions that record calculations with numbers. Interpret numerical expressions without evaluating them.	expression, evaluate
	5.OA.4	Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.	factor, prime, composite, multiple
Number and Operations in Base Ten	5.NBT.2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10. Explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.	exponents, powers of 10
	5.NBT.3	Read, write, and compare decimals to thousandths. a) Read and write decimals to thousandths using base-ten numerals, word form, and expanded form. b) Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.	word/expanded/standard form
	5.NBT.5	Fluently multiply multi-digit whole numbers using strategies flexibly, including the standard algorithm.	
	5.NBT.6	Using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division, find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	dividend, divisor, quotient
	5.NBT.7	Using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction, add, subtract, multiply, and divide decimals to hundredths. Relate the strategy to a written method and explain the reasoning used.	written method



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Number and Operations - Fractions	5.NF.1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators	unlike denominator, mixed number, equivalent fractions
	5.NF.2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, by using visual fraction models and equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.	unlike denominator, benchmark fractions
	5.NF.3	Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers by using visual fraction models and equations to represent the problem	numerator, denominator, mixed number
	5.NF.4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a) Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. b) Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles. Represent fraction products as rectangular areas.	product
	5.NF.7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. a) Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. b) Interpret division of a whole number by a unit fraction, and compute such quotients. c) Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions using visual fraction models and equations to represent the problem.	



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Measurement and Data	5.MD.5	<p>Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</p> <ul style="list-style-type: none">a) Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes. Show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base.b) Represent threefold whole-number products as volumes to represent the associative property of multiplication.c) Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.d) Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problem	volume, unit cube, additive, $V=LxWxH$
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GRADE 6

Domain	Code	Standard Description	Essential Vocabulary
Expressions and Equations	6.EE.1	Write and evaluate numerical expressions involving whole-number exponents	numerical expression, exponent
	6.EE.2	Write, read, and evaluate expressions in which letters stand for numbers. a) Write expressions that record operations with numbers and with letters standing for numbers. b) Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient, difference, quantity, etc.); view one or more parts of an expression as a single entity. c) Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).	coefficient, variable
	6.EE.4	Identify when two expressions are equivalent.	equivalent
	6.EE.5	Understand solving an equation or inequality as a process of answering a question: Which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.	substitution
Geometry	6.G.1	Based on prior knowledge of area of rectangles, decompose or compose triangles to find the area of a triangle. Using knowledge of area of triangles and rectangles, compose and/or decompose triangles, special quadrilaterals, and polygons to find their areas. Apply these techniques in the context of solving real world mathematical problems.	decompose, compose
	6.G.2	Using cubes of an appropriate size, pack a right rectangular prism having fractional edge lengths to find its volume. Then show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = \ell wh$ and $V = Bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real world and mathematical problems.	volume, prism



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The Number System	6.NS.1	Use visual fraction models and equations to interpret and compute quotients of fractions. Use models and equations to solve word problems involving division of fractions by fractions.	quotient, reciprocal
	6.NS.3	Fluently add, subtract, multiply, and divide multi-digit decimals using strategies flexibly, including the standard algorithm for each operation.	algorithm
Ratios and Proportional Relationships	6.RP.3 a, b, c,d	Use tables of equivalent ratios, tape diagrams, double number line diagrams, and equations to reason about ratios and rates in real world and mathematical problems. <ul style="list-style-type: none"> a) Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. b) Solve unit rate problems including those involving unit pricing and constant speed. c) Find a percent of a quantity as a rate per 100. Solve problems involving finding the whole, given a part and the percent. d) Use ratio reasoning to convert measurement units. Manipulate and transform units appropriately when multiplying or dividing quantities. 	equivalent ratio, double numberline, tape diagram, percent, unit rate, percent, rate
Statistics and Probability	6.SP.5	Summarize numerical data sets in relation to their context by: <ul style="list-style-type: none"> a) Reporting the number of observations. b) Describing the nature of the attribute being investigated, including how it was measured and its units of measurement. c) Calculating quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered. d) Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered. 	mean, median, mode, variability, deviation, quartile



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Domain	Code	Standard Description	Essential Vocabulary
Expressions and Equations	7.EE.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients with an emphasis on writing equivalent expressions.	equivalent expressions
	7.EE.3	Solve multi-step real-life and mathematical problems posed with rational numbers in any form (positive and negative, fractions, decimals, and integers), using tools strategically. Apply properties of operations to calculate with numbers in any form. Convert between forms as appropriate. Assess the reasonableness of answers using mental computation and estimation strategies.	convert
	7.EE.4	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. <ul style="list-style-type: none"> a) 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 the algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. b) 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. 	variables, inequalities
Geometry	7.G.1	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.	scale drawing
	7.G.4	Know the formulas for the area and circumference of a circle and use them to solve problems. Informally derive the relationship between the circumference and area of a circle.	area, circumference
	7.G.5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve equations for an unknown angle in a figure.	supplementary, complementary, adjacent, vertical



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	<p>7.G.6 Solve real world and mathematical problems involving area of two-dimensional figures composed of polygons and/or circles, including composite figures. Use nets to solve real world and mathematical problems involving surface area of prisms and cylinders, including composite solids. Solve real world and mathematical problems involving volumes of right prisms, including composite solids.</p>	area, surface area, net, solid, composite solid
The Number System	<p>7.NS.1 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.</p> <ul style="list-style-type: none"> a) Describe situations in which opposite quantities combine to make 0. b) Understand $p + q$ as the number located a distance q from p on a number line, in the direction indicated by the sign of q. 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. c) 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. d) Apply properties of operations as strategies to fluently add and subtract rational numbers. 	additive inverses, integer, rational number
	<p>7.NS.2 Apply and extend previous understandings of multiplication, division, and fractions to multiply and divide rational numbers.</p> <ul style="list-style-type: none"> a) 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 rational numbers. Interpret products of rational numbers by describing real world contexts. b) 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 products of rational numbers by describing real world contexts. c) Apply properties of operations as strategies to fluently multiply and divide rational numbers. d) Convert a rational number to a decimal using long division. Know that the decimal form of a rational number terminates or eventually repeats. 	terminates, repeats



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	7.NS.3	Solve real world and mathematical problems involving the four operations with rational numbers.	
Ratios and Proportional Relationships	7.RP.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.	Used in 6th Grade
	7.RP.2	Recognize and represent proportional relationships between quantities. <ol style="list-style-type: none"> Decide whether two quantities are in a proportional relationship 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. 	proportions, equivalent ratio
	7.RP.3	Use proportional relationships to solve multi-step ratio and percent problems.	
Statistics and Probability	7.SP.5	Understand that the probability of a chance event is a number from 0 through 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	likelihood, unlikely, probability, chance, outcome
	7.SP.7	Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies. If there is a discrepancy, explain possible sources. <ol style="list-style-type: none"> Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. 	frequency, outcome



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7.SP.8	<p>Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.</p> <ul style="list-style-type: none">a) Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.b) Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (such as “rolling double sixes”), identify the outcomes in the sample space which compose the event.c) Design and use a simulation to generate frequencies for compound events.	compound, tree diagram, list, table, simulation
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GRADE 8

Domain	Code	Standard Description	Essential Vocabulary
Expressions and Equations	8.EE.1	Develop, know and apply the properties of integer exponents to generate equivalent numeric and algebraic expressions.	integer, algebraic expression
	8.EE.2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Classify radicals as rational or irrational.	square root, cube root, radical
	8.EE.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.	slope, proportional relationship
	8.EE.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane. Derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b .	similar triangles, distinct points, derive, intercepting, origin vertical axis
	8.EE.7	Solve linear equations in one variable. a) Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). b) Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	equivalent equations, coefficients, expanding expressions, like terms
Functions	8.F.2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, and/or by verbal descriptions).	mapping function, vertical line test
	8.F.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x,y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.	rate of change, linear function



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	8.F.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (may include where the function is increasing or decreasing, linear or nonlinear, etc.). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	functional relationship
Geometry	8.G.5	Use informal arguments to establish facts about: <ul style="list-style-type: none"> a) the angle sum and exterior angles of triangles b) the angles created when parallel lines are cut by a transversal c) the angle-angle criterion for similarity of triangles 	informal arguments, angle sum, exterior angles, transversal
	8.G.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real world and mathematical problems in two and three dimensions	Pythagorean theorem
	8.G.9	Know the formulas for the volume of cones, cylinders and spheres. Use the formulas to solve real world and mathematical problems.	cones, cylinders, spheres, volume formulas
The Number System	8.NS.2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (such as π^2).	rational, irrational
Statistics and Probability	8.SP.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association	scatterplot, bivariate measurement, bivariate data, clustering, outliers



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ALGEBRA I

Domain	Code	Standard Description	Essential Vocabulary
Arithmetic with Polynomials and Rational Expressions	HS-A.APR.1	Add, subtract, and multiply polynomials. Understand that polynomials form a system comparable to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication	polynomial, closure
Creating Equations and Inequalities	HS-A.CED.1	Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.	linear equations, quadratic equations, rational equations, exponential, equations, inequalities
	HS-A.CED.2	Create equations in two or more variables to represent relationships between quantities. Graph equations on coordinate axes with appropriate labels and scales.	coordinate plane, scale
	HS-A.CED.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.	linear programming, constraint, feasible region
Reasoning with Equations and Inequalities	HS-A.REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters	
	HS-A.REI.4b	Solve quadratic equations in one variable. a) Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. (+) Derive the quadratic formula from this form. b) Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.	completing the square, quadratic formula
	HS-A.REI.6	Solve systems of linear equations exactly and approximately, focusing on pairs of linear equations in two variables.	linear combination, elimination method, substitution method



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	HS-A.REI.10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane	
	HS-A.REI.12	Graph the solutions to a linear inequality in two variables as a half-plane. Graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes	half-plane
Seeing Structure in Expressions	HS-A.SSE.3 a and c	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. <ul style="list-style-type: none"> a) Factor a quadratic expression to reveal the zeros of the function it defines. b) Complete the square in a quadratic expression to produce an equivalent expression. c) Use the properties of exponents to transform exponential expressions. 	equivalent form, quadratic function, zero of a function, complete the square, maximum, minimum, vertex, exponent, exponential, rate of growth or decay
Seeing Structure in Expressions	HS-F.IF.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	function notation
	HS-F.IF.7a	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. <ul style="list-style-type: none"> a) Graph linear and quadratic functions and show intercepts, maxima, and minima where appropriate. b) Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. c) Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. d) (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. e) Graph exponential and logarithmic functions, showing intercepts and end behavior. f) Graph $f(x) = \sin x$ and $f(x) = \cos x$ as representations of periodic phenomena. g) (+) Graph trigonometric functions, showing period, midline, phase shift and amplitude. 	Intercepts, maximum, minimum, end behavior
	HS-F.IF.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions)	



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Linear, Quadratic, and Exponential Models	HS-F.LE.2	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description, or two input-output pairs given their relationship.	
The Real Number System	HS-N.RN.4	Perform basic operations on radicals and simplify radicals to write equivalent expressions	radicals, rationalizing the denominator
Interpreting Categorical and Quantitative Data	HS-S.ID.7	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. Interpolate and extrapolate the linear model to predict values.	Interpolate, extrapolate



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ALEBRA II

Domain	Code	Standard Description	Essential Vocabulary
Arithmetic with Polynomials and Rational Expressions	HS-A.APR.3	Identify zeros of polynomials when suitable factorizations are available. Use the zeros to construct a rough graph of the function defined by the polynomial.	
	HS-A.APR.7	Add, subtract, multiply, and divide rational expressions. Understand that rational expressions form a system comparable to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression.	closure
Creating Equations and Inequalities	HS-A.CED.2	Create equations in two or more variables to represent relationships between quantities. Graph equations on coordinate axes with appropriate labels and scales.	coordinate plane, scale
Reasoning with Equations and Inequalities	HS-A.REI.2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	extraneous solutions
	HS-A.REI.4	Solve quadratic equations in one variable. a) Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. (+) Derive the quadratic formula from this form. b) Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b .	completing the square, quadratic formula
Seeing Structure in Expressions	HS-A.SSE.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a) Factor a quadratic expression to reveal the zeros of the function it defines. b) Complete the square in a quadratic expression to produce an equivalent expression. c) Use the properties of exponents to transform exponential expressions.	equivalent form, quadratic function, zero of a function, complete the square, maximum, minimum, vertex, exponent, exponential, rate of growth or decay



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Building Functions	HS-F.BF.1	Write a function that describes a relationship between two quantities. a) Determine an explicit expression, a recursive process, or steps for calculation from a context. b) Combine standard function types using arithmetic operations. c) Compose functions.	composition of functions
	HS-F.BF.2	Write arithmetic and geometric sequences both recursively and with an explicit formula and convert between the two forms. Use sequences to model situations.	Sequence, recursive, explicit, arithmetic sequences, geometric sequences
	HS-F.BF.3	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $f(x + k)$, $k f(x)$, and $f(kx)$, for specific values of k (both positive and negative); find the value of k given the graphs. Recognize even and odd functions from their graphs.	transformation, even functions, odd functions
	HS-F.BF.4	Find inverse functions. a) Write an equation for the inverse given a function has an inverse. b) Verify by composition that one function is the inverse of another. c) Read values of an inverse function from a graph or a table, given that the function has an inverse. d) Produce an invertible function from a non-invertible function by restricting the domain.	inverse function, independent variable, dependent variable, one-to-one function, invertible function
	HS-F.BF.5	Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.	logarithm



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Seeing Structure in Expressions	HS-F.IF.4	Use tables, graphs, verbal descriptions, and equations to interpret and sketch the key features of a function modeling the relationship between two quantities	Intercepts, relative maximum, relative minimum, end behavior, periodicity, symmetry
	HS-F.IF.7 b, c, e, f	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. <ul style="list-style-type: none"> a) Graph linear and quadratic functions and show intercepts, maxima, and minima where appropriate. b) Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. c) Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. d) (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. e) Graph exponential and logarithmic functions, showing intercepts and end behavior. f) Graph $f(x) = \sin x$ and $f(x) = \cos x$ as representations of periodic phenomena. g) (+) Graph trigonometric functions, showing period, midline, phase shift and amplitude. 	square root function, cube root function, piecewise-defined function, step function, absolute value function, polynomial function, exponential function, logarithmic function, asymptote, period, midline, amplitude
	HS-F.IF.8	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. <ul style="list-style-type: none"> a) Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. b) Use the properties of exponents to interpret expressions for exponential functions. 	exponential growth, exponential decay, extreme values
	HS-F.IF.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions)	



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Trigonometric Functions	HS-F.TF.2	Extend right triangle trigonometry to the four quadrants. (+) Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle	reference triangle, radian
	HS-F.TF.3	Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$. (+) Use the unit circle to express the values of sine, cosine, and tangent for $\pi - x$, $\pi + x$, and $2\pi - x$, in terms of their values for x , where x is any real number.	special triangles, reference triangle
Expressing Geometric Properties with Equations	HS-G.GPE.3	Identify key features of conic sections given their equations. Apply properties of conic sections in real world situations. *	center, radius, vertex, focus, directrix, major axis, minor axis, asymptotes
The Real Number System	HS-N.RN.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents	root index, radicand, radical
The Complex Number System	HS-N.CN.3	Use conjugates to find quotients of complex numbers.	conjugate
	HS-N.CN.7	Solve quadratic equations with real coefficients that have complex solutions.	quadratic equation, complex solution



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Interpreting Categorical and Quantitative Data	HS-S.ID.4	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, or tables to estimate areas under the normal curve.	normal distribution
	HS-S.ID.6	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. <ul style="list-style-type: none"> a) Fit a function to the data (with or without technology). Use functions fitted to data to solve problems in the context of the data. b) (+) Informally assess the fit of a function by plotting and analyzing residuals. 	scatter plot, residual: the observed value minus the predicted value. It is the difference of the results obtained by observation, and by computation from a formula, residual plot



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GEOMETRY

Domain	Code	Standard Description	Essential Vocabulary
Circles	HS-G.C.5	Explain and use the formulas for arc length and area of sectors of circles.	sector, area, radian
Congruence	HS-G.CO.5	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	
	HS-G.CO.8	Prove two triangles are congruent using the congruence theorems such as ASA, SAS, and SSS.	ASA, SSS, SAS
	HS-G.CO.9	Prove and apply theorems about lines and angles.	transversal, alternate interior angles, corresponding angles, perpendicular bisector, equidistant, vertical angles
	HS-G.CO.10	Prove and apply theorems about triangle properties	isosceles triangle, base angles, midpoint, median
	HS-G.CO.11	Prove and apply theorems about parallelograms	parallelogram, diagonal, bisect, rectangle, rhombus, quadrilateral, square
Geometric Measurement and Dimension	HS-G.GMD		prism, cylinder, pyramid, cone, sphere
	HS-G.GMD.3	Know and apply volume formulas for prisms, cylinders, pyramids, cones, and spheres to solve problems.	
Expressing Geometric Properties with Equations	HS-G.GPE.5	Develop and verify the slope criteria for parallel and perpendicular lines. Apply the slope criteria for parallel and perpendicular lines to solve geometric problems using algebra.	
	HS-G.GPE.6	Use coordinates to find the midpoint or endpoint of a line segment. (+) Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	
	HS-G.GPE.7	Use coordinates to compute perimeters of polygons and areas of triangles, parallelograms, trapezoids and kites.	distance formula, perimeter, polygon, trapezoid, kite



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Similarity, Right Triangles, and Trigonometry	HS-G.SRT.5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	
	HS-G.SRT.8	Use special right triangles (30° - 60° - 90° and 45° - 45° - 90°), trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	special right triangles

