Kansas Assessment Program Item Specifications

The Kansas College and Career Ready Standards for Mathematics is a set of specific, rigorous expectations that build students' conceptual understanding, mathematical language, and ability to apply processes and procedures across grades. The Standards are designed to establish a focused, deep understanding of Mathematics, and develop a logical progression of mathematical fluency and application, moving students toward college and career readiness.

The Kansas College and Career Ready Standards for Mathematics are organized into Domains, Clusters, and Standards. Standards are the most specific level and define what students should understand and be able to do. A common criticism of academic achievement tests is that they focus on the level of the Standard, which in many cases is a very discrete part of mathematical understanding. Parsing Mathematics out in this way for assessment may not be the most accurate model for assessing student achievement, as this is usually neither how students learn nor how teachers teach. For example, students will incorporate concepts from multiple Domains in order to solve real-world problems, such as determining which products to use in order to meet material, sizing, and budget constraints in a construction scenario.

Test development for the Kansas Summative Assessment is instead focusing item development at the level of the Cluster, which is the **bold** text in the content Standards. Clusters are groups of related content Standards. Clusters are reflected in this document, the Item Specifications, as Assessment Targets, or just Targets.

For the purposes of reporting meaningful results, the Targets are organized into larger Claims about student learning and mastery. There are four Claims in Mathematics. Each Target in Claim 1 is followed by evidence statements, which are used to guide item writers in creating test questions that give students the opportunity to demonstrate mastery of that Target. The Standards from which the evidence statements are derived are listed below each Claim 1 Target as well. For Claims 2, 3, and 4, focus Clusters or Standards are indicated, and a majority of the content will be based on these Clusters or Standards. Approximately 60-70% of the test will be from Claim 1. The remaining 30-40% will be from Claims 2, 3, and 4. Claims 2, 3, and 4 focus on deeper problem-solving strategies and mathematical practices.

Although the Standards and Clusters are listed with the Targets and Claims, the test blueprint cannot be derived by counting up the number of times a particular Standard or Cluster is listed. There are cases where part of a Standard is in one Target, and another part of the Standard is in another Target. While not all Targets will be equally emphasized in the test, all of the content described by the Clusters is important. Some of the content in a Target may also be reflected in another Target, or the content in a Target in the current grade may be a critical foundation skill for success in subsequent grades. Thus, attempts to pattern instruction on the perceived or actual numbers of items in a test may not adequately serve students' needs.

How to Read This Document

This document is organized by grade. Within each grade, the Claim statement is introduced, followed by each Target. The Target descriptions include evidence statements and the corresponding Kansas Standards. The outline below shows the organization of the Item Specifications. *Italics* are used to further describe the content of each part of the test.

Claim #: Short Title *indicates the main topic of the Claim. Explanatory text describes in greater detail the expectation of what students will have mastered to make this Claim about student learning.*

Target X	*Targets in Mathematics correspond to the Clusters (the **bold** text) in the Kansas College and Career Ready Standards. Targets describe an overall theme of a group of related Standards.*
Evidence Required	*1. One or more statements describe the types of things a student could do to demonstrate mastery of the skills that contribute to the Target.* *2. Items may address one or more than one evidence statement.*
Standards	*Numbered Standards indicate how the Target is connected to the Kansas College and Career Ready Standards.*

Glossary/Alignment of Terms

Kansas College and Career Ready Standards for Mathematics: KCCRS; the collection of mathematical content that defines what students should understand and be able to do in their study of Mathematics at each grade level, from Kindergarten through college and career readiness.	**Kansas Summative Assessment**: The computer-delivered assessment that is aligned to the KCCRS for Mathematics.
Domain: A large group of coherently related Standards in the KCCRS. Domains are underlined in the Standards document.	**Claim**: A "big picture" goal for describing student mastery of a skill, area, or topic within the content Standards.
Cluster: Groups of related Standards in the KCCRS. Clusters are **bolded** in the Standards document.	**Target**: Smaller goals for student mastery that combine to make a Claim about student achievement. In Mathematics, Targets are similar to the Clusters in the Standards document.
Standard: Specific statements from the KCCRS that define what students should understand and be able to do at each grade level. Standards are numbered in the Standards document. (e.g., 3.OA.1 is the first third-grade Standard in the Operations and Algebraic Thinking Domain.)	
	Evidence: Observable, measurable descriptions of what a student could do to demonstrate mastery within a Target.

Grade 3

Claim 1: Concepts and Procedures. Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.

Target A	Represent and solve problems involving multiplication and division.
Evidence Required	1. The student uses multiplication and division **within** 100 to solve straightforward one-step word problems in situations involving equal groups, arrays, and measurement quantities such as length, liquid volume and masses of objects. 2. The student determines an unknown whole number in a multiplication or division equation relating three whole numbers with single-digit factors **within** 100.
Standards	3.OA.1, 3.OA.2, 3.OA.3, 3.OA.4

Target B	Understand properties of multiplication and the relationship between multiplication and division.
Evidence Required	1. The student uses the properties of operations (Commutative Property of Multiplication, Associative Property of Multiplication, and Distributive Property) as strategies to multiply and divide. 2. The student will represent division as an unknown-factor problem.
Standards	3.OA.5, 3.OA.6

Target C	Multiply and divide within 100.
Evidence Required	1. The student accurately multiplies single-digit factors within 100. 2. The student accurately divides within 100 using single-digit divisors and single digit quotients. 3. The student connects multiplication and division to target fluencies.
Standards	3.OA.7

Target D	Solve problems involving the four operations, and identify and explain patterns in arithmetic.
Evidence Required	1. The student identifies arithmetic patterns including input/output models, number lines, addition tables, and multiplication tables.
Standards	3.OA.8, 3.OA.9

Target E	Use place value understanding and properties of operations to perform multi-digit arithmetic.
Evidence Required	1. The student solves non-contextual problems using place value understanding to round whole numbers to the nearest 10 or 100.
	2. The student solves non-contextual problems by adding and/or subtracting within 1000, using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
	3. The student solves non-contextual computation problems by multiplying one-digit whole numbers by multiples of 10 in the range 10–90 using strategies based on place value and properties of operations.
Standards	3.NBT.1, 3.NBT.2, 3.NBT.3

Target F	Develop understanding of fractions as numbers.
Evidence Required	1. The student identifies a fraction 1/*b* as 1 part of a whole that is partitioned into *b* equal parts, and a fraction *a/b* as the quantity formed by *a* parts of size 1/*b* using a model. For this evidence statement, *a/b* may be greater than, less than, or equal to 1.
	2. The student identifies and represents fractions on a number line using the interval 0-1 as the whole with or without partitioning.
	3. The student identifies two fractions as equal if they are the same size or the same point on a number line.
	4. The student generates simple equal fractions using a visual fraction model.
	5. The student expresses whole numbers as fractions and recognizes fractions equal to whole numbers.
	6. The student compares two fractions with the same numerator or the same denominator using the symbols <, =, >.
Standards	3.NF.1, 3.NF.2, 3.NF.3

Target G	Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
Evidence Required	1. The student tells and writes time to the nearest minute.
	2. The student solves one-step word problems with addition and subtraction including time intervals in minutes.
	3. The student solves one-step word problems involving liquid volume (liters) and mass (grams, kilograms) using the four operations.
Standards	3.MD.1, 3.MD.2

Target H	Represent and interpret data.
Evidence Required	1. The student creates a scaled picture graph and a scaled bar graph to represent a data set with up to four categories.
	2. The student solves one-and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.
	3. The student generates measurement data by measuring lengths using rulers marked with halves and fourths of an inch and makes a line plot with fractional measurement values.
Standards	3.MD.3, 3.MD.4

Target I	Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
Evidence Required	1. The student measures areas by counting unit squares.
	2. The student finds areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts.
	3. The student finds the area of a rectangle with whole-number side lengths by tiling it, and shows that the area is the same as would be found by multiplying the side lengths.
Standards	3.MD.5, 3.MD.6, 3.MD.7

Target J	Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.
Evidence Required	1. The student solves real-world and mathematical problems involving finding the perimeter of a polygon given the side lengths.
	2. The student distinguishes between area and perimeter of a rectangle.
Standards	3.MD.8

Target K	Reason with shapes and their attributes.
Evidence Required	1. The student identifies, draws, and classifies shapes (e.g., rhombuses, rectangles, and others) according to their attributes (e.g., having four sides), and recognizes that shared attributes can define a classification category.
	2. The student partitions shapes into parts with equal areas and can express the area of each part as a unit fraction of the whole.
Standards	3.G.1, 3.G.2

Claim 2: Problem Solving. Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies.

Target A	Apply mathematics to solve well-posed problems in pure mathematics and arising in everyday life, society, and the workplace.
Target B	Select and use appropriate tools strategically.
Target C	Interpret results in the context of a situation.
Target D	Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Focus Clusters	3.OA.A, 3.OA.D, 3.NBT.A, 3.MD.A, 3.MD.B*, 3.MD.C, 3.MD.D* *denotes minor Clusters

Claim 3: Communicating Reasoning. Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.

Target A	Test propositions or conjectures with specific examples.
Target B	Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures.
Target C	State logical assumptions being used.
Target D	Use the technique of breaking an argument into cases.
Target E	Distinguish correct logic or reasoning from that which is flawed and—if there is a flaw in the argument— explain what it is.
Target F	Base arguments on concrete referents such as objects, drawings, diagrams, and actions.
Focus Clusters/ Standards	3.OA.B, 3.NF.A, 3.NF.2, 3.NF.3, 3.MD.A, 3.MD.7

Claim 4: Modeling and Data Analysis. Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

Target A	Apply mathematics to solve problems arising in everyday life, society, and the workplace.
Target B	Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem.
Target C	State logical assumptions being used.
Target D	Interpret results in the context of a situation.
Target E	Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.
Target F	Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Target G[PT]	Identify, analyze, and synthesize relevant external resources to pose or solve problems. [PT]performance tasks only
Focus Clusters	3.OA.A, 3.OA.D, 3.MD.A, 3.MD.C, 3.MD.D* *denotes minor Clusters

Grade 4

Claim 1: Concepts and Procedures. Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.

Target A	Use the four operations with whole numbers to solve problems.
Evidence Required	1. The student solves contextual problems involving multiplicative comparisons, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. 2. The student solves straightforward, contextual problems using the four operations.
Standards	4.OA.1, 4.OA.2, 4.OA.3

Target B	Gain familiarity with factors and multiples.
Evidence Required	1. The student determines one or more factors or factor pairs for a given whole number (from 1 to 100). 2. The student recognizes that a whole number (from 1 to 100) is a multiple of each of its factors. 3. The student determines if a whole number (from 1 to 100) is a multiple of a given one-digit number. 4. The student determines if a whole number (from 1 to 100) is prime or composite.
Standards	4.OA.4

Target C	Generate and analyze patterns.
Evidence Required	1. The student generates number patterns. 2. The student generates shape patterns. 3. The student analyzes a number pattern or shape pattern, showing understanding of the pattern rule and features other than the pattern rule.
Standards	4.OA.5

Target D	Generalize place value understanding for multi-digit whole numbers.
Evidence Required	1. The student compares two multi-digit whole numbers in the same form using >, <, and = symbols. 2. The student rounds multi-digit whole numbers to any place. 3. The student identifies multi-digit whole numbers that, when rounded to a given place value, will be closest to a given number. 4. The student compares two multi-digit whole numbers in different forms. 5. The student explains the difference between the values of a numeral in the tens and the ones place, the hundreds place and the tens place, or the thousands place and the hundreds place in mathematical situations.
Standards	4.NBT.1, 4.NBT.2, 4.NBT.3

Target E	Use place value understanding and properties of operations to perform multi-digit arithmetic.
Evidence Required	1. The student adds or subtracts multi-digit whole numbers in non-contextual mathematics problems. 2. The student multiplies whole numbers (up to four digits by one digit or two digits by two digits) using strategies based on place value and the properties of operations. 3. The student finds whole numbers quotients and remainders (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.
Standards	4.NBT.4, 4.NBT.5, 4.NBT.6

Target F	Extend understanding of fraction equivalence and ordering.
Evidence Required	1. The student recognizes when two or more fractions are equivalent. 2. The student generates equivalent fractions given an initial fraction or fraction model. 3. The student uses the symbols <, >, and = to compare fractions with different numerators and different denominators.
Standards	4.NF.1, 4.NF.2

Target G	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
Evidence Required	1. The student adds and subtracts fractions with like denominators by joining and separating parts referring to the same whole. 2. The student expresses an equivalent form of a fraction or mixed number by considering each as a sum of fractions with the same denominator. 3. The student solves contextual problems involving addition and subtraction of fractions referring to the same whole and having like denominators by using visual fraction models and equations to represent the problem. 4. The student represents a fraction a/b as a multiple of $1/b$. 5. The student multiplies a fraction by a whole number. 6. The student solves contextual problems involving the multiplication of a fraction by a whole number by using visual fraction models and equations to represent the problem.
Standards	4.NF.3, 4.NF.4

Target H	Understand decimal notation for fractions, and compare decimal fractions.
Evidence Required	1. The student expresses a fraction with denominator 10 as an equivalent fraction with denominator 100. 2. The student adds two fractions with respective denominators 10 and 100. 3. The student uses decimal notation to represent fractions with denominators 10 or 100. 4. The student locates decimal numbers to the hundredths place on a number line. 5. The student compares two decimals to the hundredths place by reasoning about their size, using the symbols <, >, or =.
Standards	4.NF.5, 4.NF.6, 4.NF.7

Target I	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit, and involving time.
Evidence Required	1. The student converts measurements from larger units to smaller units **within** a single system of units. 2. The student records measurement equivalents in a two-column table. 3. The student identifies measurement quantities from diagrams, such as number line diagrams that feature a measurement scale, and uses the information to solve word problems. 4. The student applies the area and perimeter formulas for rectangles to solve mathematical and real-world problems.
Standards	4.MD.1, 4.MD.2, 4.MD.3

Target J	Represent and interpret data.
Evidence Required	1. The student completes a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). 2. The student solves problems involving addition and subtraction of fractions with like denominators by using information presented in line plots.
Standards	4.MD.4

Target K	Geometric measurement: understand concepts of angle and measure angles.
Evidence Required	1. The student relates the concept of an angle to the fraction of a circular arc between two points on a circle. 2. The student uses a protractor to measure angles (composed of one-degree angles) and construct angles to whole-number degrees. 3. The student decomposes an angle into smaller non-overlapping parts and adds the measures of these smaller parts to find the measure of the whole angle. 4. The student solves addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems.
Standards	4.MD.5, 4.MD.6, 4.MD.7

Target L	Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
Evidence Required	1. The student draws points, lines, line segments, rays, and angles and identifies these in two-dimensional figures. 2. The student classifies two-dimensional figures based on the presence or absence of parallel/perpendicular line segments and angles of a specified size, including identifying right triangles. 3. The student identifies and draws lines of symmetry in line-symmetric figures, and distinguishes line-symmetric figures from line-asymmetric figures.
Standards	4.G.1, 4.G.2, 4.G.3

Claim 2: Problem Solving. Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies.

Target A	Apply mathematics to solve well-posed problems in pure mathematics and arising in everyday life, society, and the workplace.
Target B	Select and use appropriate tools strategically.
Target C	Interpret results in the context of a situation.
Target D	Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Focus Clusters	4.OA.A, 4.NBT.B, 4.NF.A, 4.NF.B, 4.NF.C, 4.MD.A*, 4.MD.C* *denotes minor Clusters

Claim 3: Communicating Reasoning. Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.

Target A	Test propositions or conjectures with specific examples.
Target B	Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures.
Target C	State logical assumptions being used.
Target D	Use the technique of breaking an argument into cases.
Target E	Distinguish correct logic or reasoning from that which is flawed and—if there is a flaw in the argument— explain what it is.
Target F	Base arguments on concrete referents such as objects, drawings, diagrams, and actions.
Focus Clusters/ Standards	4.OA.3, 4.NBT.A, 4.NBT.5, 4.NBT.6, 4.NF.A, 4.NF.1, 4.NF.2, 4.NF.3a, 4.NF.3b, 4.NF.3c, 4.NF.4a, 4.NF.4b, 4.NF.C, 4.NF.7

Claim 4: Modeling and Data Analysis. Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

Target A	Apply mathematics to solve problems arising in everyday life, society, and the workplace.
Target B	Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem.
Target C	State logical assumptions being used.
Target D	Interpret results in the context of a situation.
Target E	Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.
Target F	Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Target G[PT]	Identify, analyze, and synthesize relevant external resources to pose or solve problems. [PT]performance tasks only
Focus Clusters	4.OA.A, 4.NF.B, 4.MD.A*, 4.MD.B*, 4.MD.C* *denotes minor Clusters

Grade 5

Claim 1: Concepts and Procedures. Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.

Target A	Write and interpret numerical expressions.
Evidence Required	1. The student writes or identifies a numerical expression that records a calculation represented with words. 2. The student interprets numerical expressions in words without evaluating them. 3. The student evaluates numerical expressions with grouping symbols.
Standards	5.OA.1, 5.OA.2

Target B	Analyze patterns and relationships.
Evidence Required	1. Given two rules, the student identifies and explains apparent relationships between corresponding terms of two related numerical patterns. 2. Given two rules, the student represents corresponding terms from two related numerical patterns as ordered pairs and plots them on a coordinate plane.
Standards	5.OA.3

Target C	Understand the place value system.
Evidence Required	1. The student represents powers of 10 by using whole-number exponents. 2. The student reads and writes decimals to the thousandths using base-ten numerals, number names, and expanded form. 3. The student compares two decimals to the thousandths by using >, =, and < symbols. 4. The student rounds decimals to the nearest whole number, tenth, hundredth, or thousandth.
Standards	5.NBT.1, 5.NBT.2, 5.NBT.3, 5.NBT.4

Target D	Perform operations with multi-digit whole numbers and with decimals to hundredths.
Evidence Required	1. The student multiplies multi-digit whole numbers. 2. The student determines whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. 3. The student adds, subtracts, multiplies, and divides decimals to the hundredths using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
Standards	5.NBT.5, 5.NBT.6, 5.NBT.7

Target E	Use equivalent fractions as a strategy to add and subtract fractions.
Evidence Required	1. The student adds or subtracts fractions with unlike denominators (including mixed numbers) by using visual fraction models or equations to represent the problem. 2. The student identifies and explains the use of equivalent fractions when adding or subtracting fractions with unlike denominators (including mixed numbers).
Standards	5.NF.1, 5.NF.2

Target F	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
Evidence Required	1. The student interprets a fraction as division of the numerator by the denominator. 2. The student solves problems involving division of whole numbers leading to quotients in the form of fractions or mixed numbers, with or without fraction models. 3. The student multiplies a fraction or whole number by a fraction. 4. The student multiplies fractional side lengths to find areas of rectangles. 5. The student compares the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. 6. The student solves real-world problems involving multiplication of fractions and mixed numbers, with or without visual fraction models. 7. The student solves real-problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, with or without visual fraction models.
Standards	5.NF.3, 5.NF.4, 5.NF.5, 5.NF.6, 5.NF.7

Target G	Convert like measurement units within a given measurement system and solve problems involving time.
Evidence Required	1. The student converts units of linear measure within a single measurement system. 2. The student converts units of weight/mass measure within a single measurement system. 3. The student converts units of liquid volume measure within a single measurement system. 4. The student converts units of time measure within a single measurement system.
Standards	5.MD.1

Target H	Represent and interpret data.
Evidence Required	1. The student completes or identifies line plot with fractional units to display a data set. 2. The student uses operations on fractions to solve problems involving information presented in line plots.
Standards	5.MD.2

Target I	Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.
Evidence Required	1. The student determines the volume of a right rectangular prism with whole-number side lengths by counting or packing unit cubes. 2. The student applies the formulas $V = l \times w \times h$ and $V = b \times h$ to solve real world and mathematical problems involving volumes of right rectangular prisms.
Standards	5.MD.3, 5.MD.4, 5.MD.5

Target J	Graph points on the coordinate plane to solve real-world and mathematical problems.
Evidence Required	1. The student interprets coordinate values of points graphed on a coordinate plane, or in the context of a given situation. 2. The student graphs points on the coordinate plane representing real world or mathematical problems.
Standards	5.G.1, 5.G.2

Target K	Classify two-dimensional figures into categories based on their properties.
Evidence Required	1. The student classifies two-dimensional figures into categories and/or subcategories based on attributes and properties.
Standards	5.G.3, 5.G.4

Claim 2: Problem Solving. Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies.

Target A	Apply mathematics to solve well-posed problems in pure mathematics and arising in everyday life, society, and the workplace.
Target B	Select and use appropriate tools strategically.
Target C	Interpret results in the context of a situation.
Target D	Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Focus Clusters	5.NBT.B, 5.NF.A, 5.NF.B, 5.MD.A*, 5.MD.C, 5.G.A* *denotes minor clusters

Claim 3: Communicating Reasoning. Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.

Target A	Test propositions or conjectures with specific examples.
Target B	Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures.
Target C	State logical assumptions being used.
Target D	Use the technique of breaking an argument into cases.
Target E	Distinguish correct logic or reasoning from that which is flawed and—if there is a flaw in the argument— explain what it is.
Target F	Base arguments on concrete referents such as objects, drawings, diagrams, and actions.
Focus Clusters/ Standards	5.NBT.2, 5.NBT.6, 5.NBT.7, 5.NF.1, 5.NF.2, 5.NF.B, 5.NF.3, 5.NF.4, 5.NF.7a, 5.NF.7b, 5.MD.C, 5.MD.5a, 5.MD.5b, 5.G.B*, 5.G.4* *denotes minor Clusters

Claim 4: Modeling and Data Analysis. Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

Target A	Apply mathematics to solve problems arising in everyday life, society, and the workplace.
Target B	Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem.
Target C	State logical assumptions being used.
Target D	Interpret results in the context of a situation.
Target E	Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.
Target F	Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Target G[PT]	Identify, analyze, and synthesize relevant external resources to pose or solve problems. [PT]performance tasks only
Focus Clusters	5.NBT.B, 5.NF.A, 5.NF.B, 5.MD.A* 5.MD.B* 5.MD.C, 5.G.A* *denotes minor Clusters

Grade 6

Claim 1: Concepts and Procedures. Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.

Target A	Understand ratio concepts and use ratio reasoning to solve problems.
Evidence Required	1. The student uses ratio language to describe a ratio relationship.
	2. The student determines the unit rate associated with a real-world ratio.
	3. The student finds missing values in tables of equivalent ratios.
	4. The student plots coordinate pairs to represent equivalent ratios.
	5. The student makes tables of equivalent ratios relating quantities with whole-number measurements.
	6. The student solves real-world problems involving unit rate.
	7. The student solves mathematical problems involving finding the whole, given a part and the percent.
	8. The student solves real-world and mathematical problems involving finding a percent of a quantity as a rate per 100.
	9. The student uses ratio reasoning to convert measurement units.
	10. The student uses ratio reasoning to manipulate and transform units appropriately when multiplying or dividing quantities.
Standards	6.RP.1, 6.RP.2, 6.RP.3

Target B	Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
Evidence Required	1. The student interprets quotients of fractions using visual fraction models, equations, and the relationship between multiplication and division. 2. The student solves real-world and mathematical one-step problems involving division of fractions by fractions.
Standards	6.NS.1

Target C	Compute fluently with multi-digit numbers and find common factors and multiples.
Evidence Required	1. The student divides multi-digit numbers.
	2. The student adds, subtracts, multiplies, and divides multi-digit decimals.
	3. The student determines the greatest common factor of two whole numbers.
	4. The student determines the least common multiple of two whole numbers.
	5. The student uses the distributive property to express a sum of two whole numbers with a common factor as a multiple of a sum of two whole numbers with no common factor.
Standards	6.NS.2, 6.NS.3, 6.NS.4

Target D	Apply and extend previous understandings of numbers to the system of rational numbers.
Evidence Required	1. The student uses positive and negative numbers to represent quantities in real-world contexts. 2. The student can identify the location of ordered pairs on the coordinate plane based on the signs of the numbers in an ordered pair. 3. The student locates and positions integers and other rational numbers on a number line. 4. The student positions ordered pairs of integers and other rational numbers on a coordinate plane. 5. The student interprets statements about inequalities as relative position on a number line. 6. The student writes and interprets statements about the order of rational numbers in real-world contexts. 7. The student represents the absolute value of a rational number as the distance from zero on a number line. 8. The student can make comparisons of absolute value from statements about order. 9. The student solves real-world and mathematical problems by graphing ordered pairs on a coordinate plane and using coordinates and absolute value to find the distances between points with same first coordinate or same second coordinate.
Standards	6.NS.5, 6.NS.6, 6.NS.7, 6.NS.8

Target E	Apply and extend previous understandings of arithmetic to algebraic expressions.
Evidence Required	1. The student evaluates numerical expressions involving whole-number exponents. 2. The student writes numerical expressions involving whole-number exponents, algebraic expressions, and expressions from formulas in real-world problems. 3. The student uses mathematical terms to describe expressions. 4. The student evaluates algebraic expressions and expressions from formulas in real-world problems. 5. The student creates equivalent expressions by applying properties of operations. 6. The student identifies when expressions are equivalent by utilizing properties of operations.
Standards	6.EE.1, 6.EE.2, 6.EE.3, 6.EE.4

Target F	Reason about and solve one-variable equations and inequalities.
Evidence Required	1. The student uses substitution in one-variable equations and inequalities. 2. The student writes one-variable equations and inequalities and solves one-variable equations in real-world and mathematical problems. 3. The student represents solutions of inequalities in real-world and mathematical problems on a number line.
Standards	6.EE.5, 6.EE.6, 6.EE.7, 6.EE.8

Target G	Represent and analyze quantitative relationships between dependent and independent variables.
Evidence Required	1. The student writes an equation to express one quantity versus another quantity using dependent and independent variables. 2. The student identifies the relationship between dependent and independent variables from graphs and tables and relates them to equations.
Standards	6.EE.9

Target H	Solve real-world and mathematical problems involving area, surface area, and volume.
Evidence Required	1. The student determines the area of triangles, special quadrilaterals, and polygons using composition and decomposition in solving real-world and mathematical problems. 2. The student determines the volume of right rectangular prisms with fractional edge lengths in solving real-world and mathematical problems. 3. The student draws polygons in the coordinate plane, given coordinates for the vertices in the context of solving real-world and mathematical problems. 4. The student determines the length of a side of a polygon in the coordinate plane, given coordinates for the vertices in the context of solving real-world and mathematical problems. 5. The student determines the surface area of three-dimensional figures formed by nets of polygons in the context of solving real-world and mathematical problems.
Standards	6.G.1, 6.G.2, 6.G.3, 6.G.4

Target I	Develop an understanding of statistics variability.
Evidence Required	1. The student recognizes a statistical question as one that anticipates variability.
	2. The student identifies statements that describe the center and/or spread, and/or overall shape of a set of data.
	3. The student recognizes that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
Standards	6.SP.1, 6.SP.2, 6.SP.3

Target J	Summarize and describe distributions.
Evidence Required	1. The student displays numerical data on line plots, dot plots, histograms, and box plots.
	2. The student summarizes numerical data sets by describing the nature of the attribute under investigation, including how it was measured, its units of measurement, and number of observations.
	3. The student summarizes numerical data sets by determining quantitative measures of center (median and/or mean) and variability (interquartile range, range, and/or mean absolute deviation).
	4. The student summarizes numerical data sets by describing any overall pattern and any striking deviations from the overall pattern in reference to the quantitative measures.
	5. The student summarizes numerical data sets by relating the choice of measures of center and variability to the shape of the data distribution or context data gathered.
Standards	6.SP.4, 6.SP.5

Claim 2: Problem Solving. Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies.

Target A	Apply mathematics to solve well-posed problems in pure mathematics and arising in everyday life, society, and the workplace.
Target B	Select and use appropriate tools strategically.
Target C	Interpret results in the context of a situation.
Target D	Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Focus Clusters	6.RP.A, 6.NS.A, 6.NS.C, 6.EE.A, 6.EE.B, 6.EE.C, 6.G.A* *denotes minor Clusters

Claim 3: Communicating Reasoning. Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.

Target A	Test propositions or conjectures with specific examples.
Target B	Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures.
Target C	State logical assumptions being used.
Target D	Use the technique of breaking an argument into cases.
Target E	Distinguish correct logic or reasoning from that which is flawed and—if there is a flaw in the argument— explain what it is.
Target F	Base arguments on concrete referents such as objects, drawings, diagrams, and actions.
Target G	At later grades, determine conditions under which an argument does and does not apply. (For example, area increases with perimeter for squares, but not for all plane figures.)
Focus Clusters/ Standards	6.RP.A, 6.RP.3, 6.NS.A, 6.NS.1, 6.NS.C, 6.NS.5, 6.NS.6, 6.NS.7, 6.EE.A, 6.EE.3, 6.EE.4, 6.EE.B, 6.EE.6, 6.EE.9

Claim 4: Modeling and Data Analysis. Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

Target A	Apply mathematics to solve problems arising in everyday life, society, and the workplace.
Target B	Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem.
Target C	State logical assumptions being used.
Target D	Interpret results in the context of a situation.
Target E	Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.
Target F	Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Target G[PT]	Identify, analyze, and synthesize relevant external resources to pose or solve problems. [PT]performance tasks only
Focus Clusters	6.RP.A, 6.NS.A, 6.NS.C, 6.EE.B, 6.EE.C, 6.G.A*, 6.SP.A*, 6.SP.B* *denotes minor Clusters

Grade 7

Claim 1: Concepts and Procedures. Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.

Target A	Analyze proportional relationships and use them to solve real-world and mathematical problems.
Evidence Required	1. The student computes unit rates and finds the constant of proportionality of proportional relationships in various forms. 2. The student determines whether two quantities, shown in various forms, are in a proportional relationship. 3. The student represents proportional relationships between quantities using equations. 4. The student interprets specific values from a proportional relationship in the context of a problem situation. 5. The student computes with percentages in context.
Standards	7.RP.1, 7.RP.2, 7.RP.3

Target B	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.
Evidence Required	1. The student interprets rational number values on a number line, including modeling addition and subtraction expressions. 2. The student applies properties of operations as strategies to add and subtract rational numbers. 3. The student applies properties of operations as strategies to multiply and divide rational numbers. 4. The student converts from a fractional form of rational numbers to a decimal form of rational numbers. 5. The student solves real-world and mathematical problems involving the four operations with rational numbers.
Standards	7.NS.1, 7.NS.2, 7.NS.3

Target C	Use properties of operations to generate equivalent expressions.
Evidence Required	1. The student adds and subtracts linear expressions with rational coefficients. 2. The student factors linear expressions with rational coefficients. 3. The student expands linear expressions with rational coefficients. 4. The student generates equivalent linear expressions using a combination of addition and subtraction, factoring, and expansion.
Standards	7.EE.1, 7.EE.2

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Target D	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
Evidence Required	1. The student identifies equivalency between two rational numbers.
	2. The student applies properties of operations to evaluate numeric expressions, including converting between different forms of rational numbers.
	3. The student solves 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.
	4. The student solves word problems leading to inequalities of the form $px + q > r$ and $px + q < r$, where p, q, and r are specific rational numbers.
	5. The student graphs the solution set of an inequality on a number line.
Standards	7.EE.3, 7.EE.4

Target E	Draw, construct, and describe geometrical figures and describe the relationships between them.
Evidence Required	1. The student creates scale drawings.
	2. The student solves problems involving scale drawings using proportional reasoning.
	3. The student draws, constructs, or describes geometric shapes given certain conditions.
	4. The student describes a two-dimensional figure resulting from slicing a three-dimensional figure by a plane.
Standards	7.G.1, 7.G.2, 7.G.3

Target F	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
Evidence Required	1. The student solves real-life and mathematical problems for the circumference and area of circles.
	2. The student solves real-life and mathematical problems involving angle measure including problems requiring writing and solving equations.
	3. The student solves real-life and mathematical problems for the area of two-dimensional objects composed of polygons.
	4. The student solves real-life and mathematical problems for the volume and surface area of three-dimensional objects composed of right prisms and cubes.
Standards	7.G.4, 7.G.5, 7.G.6

Target G	Use random sampling to draw inferences about a population.
Evidence Required	1. The student determines whether a sample is representative of a population.
	2. The student draws inferences about a population using data from a random sample.
Standards	7.SP.1, 7.SP.2

Target H	Draw informal comparative inferences about two populations.
Evidence Required	1. The student makes comparisons between two numerical data distributions.
	2. The student uses measures of center and measures of variability to make statements that form the basis for informal comparative inferences.
Standards	7.SP.3, 7.SP.4

Target I	Investigate chance processes and develop, use, and evaluate probability models.
Evidence Required	1. The student understands the likelihood of an event as a probability between 0 and 1.
	2. The student finds probabilities of simple events.
	3. The student compares predicted probabilities to observed frequencies.
	4. The student finds probabilities of compound events.
Standards	7.SP.5, 7.SP.6, 7.SP.7, 7.SP.8

Claim 2: Problem Solving. Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies.

Target A	Apply mathematics to solve well-posed problems in pure mathematics and arising in everyday life, society, and the workplace.
Target B	Select and use appropriate tools strategically.
Target C	Interpret results in the context of a situation.
Target D	Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Focus Clusters	7.RP.A, 7.NS.A, 7.EE.A, 7.EE.B, 7.G.A*, 7.G.B* *denotes minor Clusters

Claim 3: Communicating Reasoning. Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.

Target A	Test propositions or conjectures with specific examples.
Target B	Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures.
Target C	State logical assumptions being used.
Target D	Use the technique of breaking an argument into cases.
Target E	Distinguish correct logic or reasoning from that which is flawed and—if there is a flaw in the argument— explain what it is.
Target F	Base arguments on concrete referents such as objects, drawings, diagrams, and actions.
Target G	At later grades, determine conditions under which an argument does and does not apply. (For example, area increases with perimeter for squares, but not for all plane figures.)
Focus Clusters/ Standards	7.RP.2, 7.NS.A, 7.NS.1, 7.NS.2, 7.EE.1, 7.EE.2

Claim 4: Modeling and Data Analysis. Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

Target A	Apply mathematics to solve problems arising in everyday life, society, and the workplace.
Target B	Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem.
Target C	State logical assumptions being used.
Target D	Interpret results in the context of a situation.
Target E	Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.
Target F	Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Target G[PT]	Identify, analyze, and synthesize relevant external resources to pose or solve problems. [PT]performance tasks only
Focus Clusters	7.RP.A, 7.NS.A, 7.EE.B, 7.G.A*, 7.G.B*, 7.SP.A*, 7.SP.B*, 7.SP.C* *denotes minor Clusters

Grade 8

Claim 1: Concepts and Procedures. Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.

Target A	Know that there are numbers that are not rational, and approximate them by rational numbers.
Evidence Required	1. The student classifies real numbers as rational or irrational. 2. The student converts a repeating decimal into a fraction. 3. The student writes approximations of irrational numbers as rational numbers. 4. The student compares the sizes of irrational numbers by using rational approximations of irrational numbers. 5. The student approximates the locations of irrational numbers on the number line by using rational approximations of irrational numbers.
Standards	8.NS.1, 8.NS.2

Target B	Work with radicals and integer exponents.
Evidence Required	1. The student generates equivalent numerical expressions by applying the properties of integer exponents. 2. The student represents solutions to equations of the form $x^2 = p$ using square root symbols. 3. The student represents solutions to equations of the form $x^3 = p$ using cube root symbols. 4. The student states how many times as large or as small one number, written as a single digit times a power of 10, is than another, to estimate very large or very small quantities. 5. The student performs operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used.
Standards	8.EE.1, 8.EE.2, 8.EE.3, 8.EE.4

Target C	Understand the connections between proportional relationships, lines, and linear equations.
Evidence Required	1. The student graphs proportional relationships. 2. The student interprets the unit rate as the slope of the graph of a proportional relationship. 3. The student compares two different proportional relationships represented in different formats. 4. The student uses similar triangles to determine that the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane. 5. The student finds the equation $y = mx$ or $y = mx + b$ for a line.
Standards	8.EE.5, 8.EE.6

Target D	Analyze and solve linear equations and pairs of simultaneous linear equations.
Evidence Required	1. The student identifies and writes examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. 2. The student solves linear equations in in one variable with rational number coefficients, including equations with solutions that require expanding expressions using the distributive property and collecting like terms. 3. The student estimates solutions by graphing systems of two linear equations in two variables. 4. The student recognizes when a system of two linear equations in two variables has one solution, no solution, or infinitely many solutions. 5. The student solves a system of two linear equations in two variables algebraically, or solves real-world and mathematical problems leading to two linear equations in two variables.
Standards	8.EE.7, 8.EE.8

Target E	Define, evaluate, and compare functions.
Evidence Required	1. The student recognizes that a function is a rule that assigns to each input exactly one output. 2. The student identifies or produces input and output pairs for given functions. 3. The student recognizes the same function written in different functional forms (algebraic, graphic, tabular, or verbal). 4. The student compares properties of two functions, each represented in a different way (algebraic, graphic, tabular, or verbal). 5. The student interprets the equation $y = mx + b$ as defining a linear function with a graph that is a straight line. 6. The student recognizes and gives examples of functions that are not linear.
Standards	8.F.1, 8.F.2, 8.F.3

Target F	Use functions to model relationships between quantities.
Evidence Required	1. The student constructs a function to model a linear relationship between two quantities.
	2. The student determines the rate of change and initial value of a function, either from a description of a relationship or from two (*x*, *y*) values, including reading the rate of change and/or the value of the function from a table or a graph.
	3. The student interprets features of a linear function, such as rate of change and initial value, in terms of the situation it models, its graph, or a table of values.
	4. The student qualitatively describes the functional relationship between two quantities by analyzing a graph (e.g., whether the function is increasing or decreasing, or whether the graph is linear or nonlinear).
	5. The student draws a graph that exhibits the qualitative features of a function that has been described in writing.
Standards	8.F.4, 8.F.5

Target G	Understand congruence and similarity using physical models, transparencies, or geometry software.
Evidence Required	1. The student verifies that rigid transformations preserve distance and angle measures.
	2. The student describes sequences of rotations, reflections, translations, and dilations that can verify whether two dimensional figures are similar or congruent to each other.
	3. The student constructs a new figure after the original figure is dilated, rotated, reflected, or translated.
	4. The student describes the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
Standards	8.G.1, 8.G.2, 8.G.3, 8.G.4, 8.G.5

Target H	Understand and apply the Pythagorean Theorem.
Evidence Required	1. The student solves real–world and mathematical problems of right triangles in two and three dimensions by applying the Pythagorean Theorem and its converse.
	2. The student finds the distance between two points in a coordinate system by applying the Pythagorean Theorem.
Standards	8.G.6, 8.G.7, 8.G.8

Target I	Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.
Evidence Required	1. The student solves real-world problems by applying the formulas for the volumes of cylinders, cones, and spheres.
	2. The student solves mathematical problems by applying the formulas for the volumes of cylinders, cones, and spheres.
Standards	8.G.9

Target J	Investigate patterns of association in bivariate data.
Evidence Required	1. The student interprets patterns of association between two quantities in a scatter plot (clustering in reference to the line of best fit, positive or negative association, linear association, nonlinear association, and the effect of outliers) and interprets the slope and *y*-intercept in terms of the context.
	2. The student identifies the slope (rate of change) and intercept (initial value) of a line suggested by examining bivariate measurement data in a scatter plot.
	3. The student constructs and interprets a two-way table summarizing data on two categorical variables collected from the same subjects.
Standards	8.SP.1, 8.SP.2, 8.SP.3, 8.SP.4

Claim 2: Problem Solving. Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies.

Target A	Apply mathematics to solve well-posed problems in pure mathematics and arising in everyday life, society, and the workplace.
Target B	Select and use appropriate tools strategically.
Target C	Interpret results in the context of a situation.
Target D	Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Focus Clusters	8.EE.B, 8.EE.C, 8.F.A, 8.F.B*, 8.G.A, 8.G.B, 8.G.C* *denotes minor Clusters

Claim 3: Communicating Reasoning. Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.

Target A	Test propositions or conjectures with specific examples.
Target B	Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures.
Target C	State logical assumptions being used.
Target D	Use the technique of breaking an argument into cases.
Target E	Distinguish correct logic or reasoning from that which is flawed and—if there is a flaw in the argument— explain what it is.
Target F	Base arguments on concrete referents such as objects, drawings, diagrams, and actions.
Target G	At later grades, determine conditions under which an argument does and does not apply. (For example, area increases with perimeter for squares, but not for all plane figures.)
Focus Clusters/ Standards	8.EE.1, 8.EE.5, 8.EE.6, 8.EE.7a, 8.EE.7b, 8.EE.8a, 8.F.1, 8.F.2, 8.F.3, 8.G.1, 8.G.2, 8.G.4, 8.G.5, 8.G.6, 8.G.8

Claim 4: Modeling and Data Analysis. Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

Target A	Apply mathematics to solve problems arising in everyday life, society, and the workplace.
Target B	Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem.
Target C	State logical assumptions being used.
Target D	Interpret results in the context of a situation.
Target E	Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.
Target F	Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Target G[PT]	Identify, analyze, and synthesize relevant external resources to pose or solve problems. [PT]performance tasks only
Focus Clusters	8.EE.3, 8.EE.4, 8.EE.B, 8.EE.C, 8.F.B*, 8.G.B, 8.G.C*, 8.SP.A* *denotes minor Clusters

Grade 10

Claim 1: Concepts and Procedures. Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.

Target A	Extend the properties of exponents to rational exponents.
Evidence Required	1. The student rewrites expressions in radical form into an equivalent expression with rational exponents. 2. The student rewrites expressions with rational exponents into an equivalent expression in radical form. 3. The student uses the properties of exponents to write equivalent expressions involving radicals and rational exponents.
Standards	N-RN.2

Target C	Reason quantitatively and use units to solve problems.
Evidence Required	1. The student chooses units consistently in formulas. 2. The student chooses the scales for graphs and data displays.
Standards	N-Q.1

Target D	Interpret the structure of expressions.
Evidence Required	1. The student uses the structure of an expression to identify ways of rewriting it.
Standards	A-SSE.2

Target E	Write expressions in equivalent forms to solve problems.
Evidence Required	1. The student understands that the factored form of a quadratic expression reveals the zeros of the function it defines. 2. The student understands that completing the square for a quadratic expression reveals the maximum or minimum value of the function it defines. 3. The student uses the properties of exponents to transform exponential expressions.
Standards	A-SSE.3

Target F	Perform arithmetic operations on polynomials.
Evidence Required	1. The student adds or subtracts polynomials. 2. The student multiplies polynomials.
Standards	A-APR.1

Target G	Create equations that describe numbers or relationships.
Evidence Required	1. The student creates one variable equations arising from linear, quadratic, simple rational, and exponential functions in one variable.
	2. The student creates one variable inequalities arising from linear, quadratic, simple rational, and exponential functions in one variable.
	3. The student graphs equations or inequalities on coordinate axes with labels and scales to represent the solution to a contextual problem.
	4. The student creates equations in two or more variables to represent relationships between quantities.
Standards	A-CED.1, A-CED.2

Target H	Understand solving equations as a process of reasoning and explain the reasoning.
Evidence Required	1. The student solves radical and/or simple rational equations in one variable, including identifying the number and type of real solutions that might exist for the equation (e.g., one, two, infinite, or no real).
	2. The student evaluates proposed solutions to radical or simple rational equations, and recognizes where extraneous solution(s) might arise during the solving of the equation.
Standards	A-REI.2

Target I	Solve equations and inequalities in one variable.
Evidence Required	1. The student solves linear equations in one variable with numeric coefficients.
	2. The student solves linear inequalities in one variable with numeric coefficients.
	3. The student solves linear inequalities in one variable with letter coefficients or identifies appropriate value(s) of a letter coefficient given specific information about a variable in a linear equation or inequality.
	4. The student solves quadratic equations in one variable by taking square roots, completing the square, using the quadratic formula, or by factoring.
	5. The student recognizes when the quadratic formula gives complex solutions (no real solutions).
	6. The student writes complex solutions for the quadratic formula in the form $a \pm bi$ where a and b are real numbers.
Standards	A-REI.3, A-REI.4

Target J	Represent and solve equations and inequalities graphically.
Evidence Required	1. The student understands that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
	2. The student finds solutions (either exact or approximate as appropriate) to the equation $(x) = (x)$ using technology to graph functions, make tables of values, or find their successive approximations.
	3. The student graphs the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality).
	4. The student graphs the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.
Standards	A-REI.10, A-REI.11, A-REI.12

Target K	Understand the concept of a function and use function notation.
Evidence Required	1. The student understands that a function from one set (the domain) to another set (the range) assigns to each element of the domain exactly one element of the range (e.g., distinguish between functions and non-functions).
	2. The student recognizes any necessary restriction that needs to be placed on the domain in order for an equation to represent a function.
	3. The student understands that the graph of *f* is the graph of the equation $y = f(x)$.
	4. The student recognizes that sequences are functions whose domain is a subset of the integers.
Standards	F-IF.1, F-IF.3

Target L	Interpret functions that arise in applications in terms of the context.
Evidence Required	1. The student interprets key features of a graph or a table representing a function modeling a relationship between two quantities.
	2. The student sketches graphs showing key features given a verbal description of a relationship between two quantities that can be modeled with a function.
	3. The student relates the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
	4. The student calculates and interprets the average rate of change of a function presented symbolically or as a table and estimates the rate of change of a function from a graph.
Standards	F-IF.4, F-IF.5, F-IF.6

Target M	Analyze functions using different representations.
Evidence Required	1. Students graph functions expressed symbolically and show key features of the graph.
	2. Students write a quadratic function defined by an expression in equivalent factored form and completing the square form to reveal zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
	3. Students write an exponential function defined by an expression in an equivalent form using the properties of exponents to reveal and explain different properties of the function and to classify them as representing exponential growth or decay.
	4. Students compare properties of two functions each represented in a different way (e.g., as equations, functions, tables, graphs, or written descriptions).
Standards	F-IF.7, F-IF.8, F-IF.9

Target N	Build a function that models a relationship between two quantities.
Evidence Required	1. The student writes explicit or recursive functions to describe relationships between two quantities from a context.
	2. The student translates between explicit formulas and recursively defined functions.
	3. The student understands a function as a model of the relationship between two quantities.
Standards	F-BF.1, F-BF.2

Target O	Define trigonometric ratios and solve problems involving right triangles.
Evidence Required	1. The student uses the definitions of trigonometric ratios for acute angles in a right triangle.
	2. The student uses similar triangles to define and determine trigonometric ratios in right triangles.
	3. The student explains and uses the relationship between the sine and cosine of complementary angles.
	4. The student uses the Pythagorean Theorem and trigonometric ratios to solve problems involving right triangles in mathematical or real-world context.
Standards	G-SRT.6, G-SRT.7, G-SRT.8

Target P	Summarize, represent, and interpret data on a single count or measurement variable.
Evidence Required	1. The student will be able to represent data on the real number line with a dot plot, histogram, or box plot. 2. The student will be able to use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. 3. The student will be able to interpret the differences in shape, center, and spread in the context of the data sets. 4. The student will be able to interpret the effects of outliers on the shape, center, and spread of a data set.
Standards	S-ID.1, S-ID.2, S-ID.3

Target Q	Prove geometric theorems.
Evidence Required	1. The student explains proofs or reasoning related to theorems about lines and angles. Theorems include, but are not limited to: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints. 2. The student explains proofs or reasoning related to theorems about triangles. Theorems include, but are not limited to: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. 3. The student explains proofs or reasoning related to theorems about circles. Include proof that all circles are similar. 4. The student explains proofs or reasoning related to theorems about parallelograms. Theorems include, but are not limited to: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.
Standards	G-CO.9, G-CO.10, G-CO.11

Target R	Explain volume formulas and use them to solve problems.
Evidence Required	1. The student solves real-world problems by applying the formulas for the volume of cylinders, pyramids, cones, and spheres. 2. The student solves mathematical problems by applying the formulas for the volume of cylinders, pyramids, cones, and spheres.
Standards	G-GMD.1, G-GMD.3

Claim 2: Problem Solving. Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies.

Target A	Apply mathematics to solve well-posed problems in pure mathematics and arising in everyday life, society, and the workplace.
Target B	Select and use appropriate tools strategically.
Target C	Interpret results in the context of a situation.
Target D	Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Focus Clusters	N-Q.A, A-SSE.A, A-SSE.B, A-CED.A, A-REI.2, A-REI.B, A-REI.C, A-REI.D, F-IF.A, F-IF.B, F-IF.C, F-BF.A, G-SRT.C, S-ID.C, S-CP.A *denotes minor Clusters

Claim 3: Communicating Reasoning. Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.

Target A	Test propositions or conjectures with specific examples.
Target B	Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures.
Target C	State logical assumptions being used.
Target D	Use the technique of breaking an argument into cases.
Target E	Distinguish correct logic or reasoning from that which is flawed and—if there is a flaw in the argument— explain what it is.
Target F	Base arguments on concrete referents such as objects, drawings, diagrams, and actions.
Target G	At later grades, determine conditions under which an argument does and does not apply. (For example, area increases with perimeter for squares, but not for all plane figures.)
Focus Clusters/ Standards	N-RN.A, N-RN.B, N-RN.3, A-SSE.2, A-APR.1, A-APR.B, A-APR.4, A-APR.6, A-REI.A, A-REI.1, A-REI.2, A-REI.C, A-REI.10, A-REI.11, F-IF.1, F-IF.5, F-IF.9, F-BF.3, F-BF.4a, F-TF.1, F-TF.2, F-TF.8, G-CO.A, G-CO.B, G-CO.C, G-CO.9, G-CO.10, G-CO.11, G-SRT.A, G-SRT.B

Claim 4: Modeling and Data Analysis. Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

Target A	Apply mathematics to solve problems arising in everyday life, society, and the workplace.
Target B	Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem.
Target C	State logical assumptions being used.
Target D	Interpret results in the context of a situation.
Target E	Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.
Target F	Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Target G[PT]	Identify, analyze, and synthesize relevant external resources to pose or solve problems. [PT]performance tasks only
Focus Clusters	N-Q.A, A-SSE.B, A-CED.A, A-REI.A, A-REI.B, A-REI.C, F-IF.B, F-IF.C, F-BF.A, S-ID.A, S-ID.B, S-IC.1, S-IC.B, F-LE.A, F-LE.B, F-TF.5, G-GMD.3, G-MG *denotes minor Clusters