# The Standard of Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

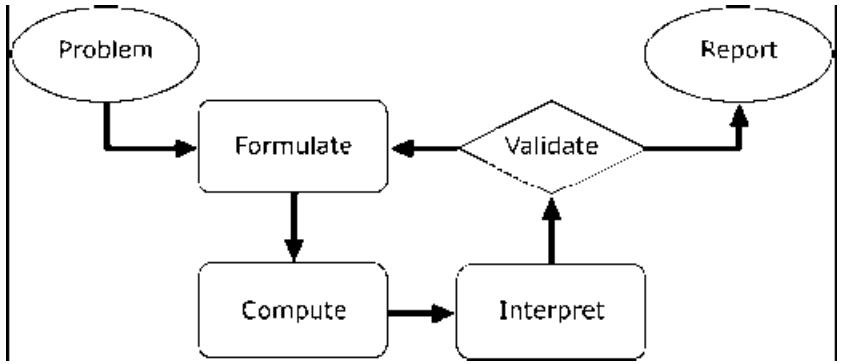
Below is are Grade Level tables showing the Common Core Domains and Cluster Headings with a hyperlink to the grade level overview and Standards

| Domain | Grade K (CCSS Overview) | Grade 1 (CCSS Overview) | Grade 2 (CCSS Overview) |
|---|---|---|---|
| Counting and Cardinality | • Know number names and the count sequence.<br>• Count to tell the number of objects.<br>• Compare numbers.<br>• (K.CC) | • | • |
| Operations and Algebraic Thinking | • Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.<br>• (K.OAT) | • Represent and solve problems involving addition and subtraction.<br>• Understand and apply properties of operations and the relationship between addition and subtraction.<br>• Add and subtract within 20.<br>• Work with addition and subtraction equations.<br>• (1.OAT) | • Represent and solve problems involving addition and subtraction.<br>• Add and subtract within 20.<br>• Work with equal groups of objects to gain foundations for multiplication.<br>• (2.OAT) |
| Number and Operations in Base Ten | • Work with numbers 11-19 to gain foundations for place value.<br>• (K.NO) | • Extend the counting sequence.<br>• Understand place value.<br>• Use place value understanding and properties of operations to add and subtract.<br>• (1.NO) | • Understand place value.<br>• Use place value understanding and properties of operations to add and subtract.<br>• (2.NO) |
| Number and Operations—Fractions | | | |
| Measurement and Data | • Describe and compare measurable attributes.<br>• Classify objects and count the number of objects in each category<br>• (K.MD) | • Measure lengths indirectly and by iterating length units.<br>• Tell and write time.<br>• Represent and interpret data.<br>• (1.MD) | • Measure and estimate lengths in standard units.<br>• Relate addition and subtraction to length.<br>• Work with time and money.<br>• Represent and interpret data.<br>• (2.MD) |
| Ratios and Proportional Relationships | | | |
| The Number System | | | |
| Expressions and Equations | | | |
| Functions | | | |
| Geometry | • Identify and describe shapes.<br>• Analyze, compare, create, and compose shapes.<br>• (K.G) | • Reason with shapes and their attributes.<br>• (1.G) | • Reason with shapes and their attributes.<br>• (2.G) |
| Statistics and Probability | | | |

| Domain | Grade 3 (CCSS Overview) | Grade 4 (CCSS Overview) | Grade 5 (CCSS Overview) |
|---|---|---|---|
| Counting and Cardinality | | | |
| Operations and Algebraic Thinking | • Represent and solve problems involving multiplication and division.<br>• Understand properties of multiplication and the relationship between multiplication and division.<br>• Multiply and divide within 100.<br>• Solve problems involving the four operations, and identify and explain patterns in arithmetic.<br>• (3.OA) | • Use the four operations with whole numbers to solve problems.<br>• Gain familiarity with factors and multiples.<br>• Generate and analyze patterns.<br>• (4.OA) | • Write and interpret numerical expressions.<br>• Analyze patterns and relationships.<br>• (5.OA) |
| Number and Operations in Base Ten | • Use place value understanding and properties of operations to perform multi-digit arithmetic.<br>• (3.NOBT) | • Generalize place value understanding for multi-digit whole numbers.<br>• Use place value understanding and properties of operations to perform multi-digit arithmetic.<br>• (4.NOBT) | • Understand the place value system.<br>• Perform operations with multi-digit whole numbers and with decimals to hundredths.<br>• (5.NOBT) |
| Number and Operations—Fractions | • Develop understanding of fractions as numbers.<br>• (3.NOF) | • Extend understanding of fraction equivalence and ordering.<br>• Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.<br>• Understand decimal notation for fractions, and compare decimal fractions.<br>• (4.NOF) | • Use equivalent fractions as a strategy to add and subtract fractions.<br>• Apply and extend previous understandings of multiplication and division to multiply and divide fractions.<br>• (5.NOF) |
| Measurement and Data | • Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.<br>• Represent and interpret data.<br>• Geometric measurement: understand concepts of area and relate area to multiplication and to addition.<br>• Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.<br>• (3.MD) | • Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.<br>• Represent and interpret data.<br>• Geometric measurement: understand concepts of angle and measure angles.<br>• (4.MD) | • Convert like measurement units within a given measurement system.<br>• Represent and interpret data.<br>• Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.<br>• (5.MD) |
| Ratios and Proportional Relationships | | | |
| The Number System | | | |
| Expressions and Equations | | | |
| Functions | | | |
| Geometry | • Reason with shapes and their attributes.<br>• (3.G) | • Draw and identify lines and angles, and classify shapes by properties of their lines and angles.<br>• (4.G) | • Graph points on the coordinate plane to solve real world and mathematical problems.<br>• Classify two-dimensional figures into categories based on their properties.<br>• (5.G) |
| Statistics and Probability | | | |

| Domain | Grade 6 (CCSS Overview) | Grade 7 (CCSS Overview) | Grade 8 (CCSS Overview) |
|---|---|---|---|
| Counting and Cardinality | | | |
| Operations and Algebraic Thinking | | | |
| Number and Operations in Base Ten | | | |
| Number and Operations—Fractions | | | |
| Measurement and Data | | | |
| Ratios and Proportional Relationships | • Understand ratio concepts and use ratio reasoning to solve problems.<br>• (6.RP) | • Analyze proportional relationships and use them to solve real-world and mathematical problems.<br>• (7.RP) | |
| The Number System | • Apply and extend previous understandings of multiplication and division to divide fractions by fractions.<br>• Apply and extend previous understandings of numbers to the system of rational numbers.<br>• (6.NS) | • Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.<br>• (7.NS) | • Know that there are numbers that are not rational, and approximate them by rational numbers.<br>• (8.NS) |
| Expressions and Equations | • Apply and extend previous understandings of arithmetic to algebraic expressions.<br>• Reason about and solve one-variable equations and inequalities.<br>• Represent and analyze quantitative relationships between dependent and independent variables.<br>• (6.EE) | • Use properties of operations to generate equivalent expressions.<br>• Solve real-life and mathematical problems using numerical and algebraic expressions and equations.<br>• (7.EE) | • Work with radicals and integer exponents.<br>• Understand the connections between proportional relationships, lines, and linear equations.<br>• Analyze and solve linear equations and pairs of simultaneous linear equations.<br>• (8.EE) |
| Functions | | | • Define, evaluate, and compare functions.<br>• Use functions to model relationships between quantities.<br>• (8.F) |
| Geometry | • Solve real-world and mathematical problems involving area, surface area, and volume.<br>• (6.G) | • Draw, construct and describe geometrical figures and describe the relationships between them.<br>• Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.<br>• (7.G) | • Understand congruence and similarity using physical models, transparencies, or geometry software.<br>• Understand and apply the Pythagorean Theorem.<br>• Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.<br>• (8.G) |
| Statistics and Probability | • Develop understanding of statistical variability.<br>• Summarize and describe distribution.<br>• (6.SP) | • Use random sampling to draw inferences about a population<br>• Draw informal comparative inferences about two populations.<br>• Investigate chance processes and develop, use, and evaluate probability models.<br>• (7.SP) | • Investigate patterns of association in bivariate data.<br>• (8.SP) |

| **High School—Number and Quantity (Overview)** | | **High School—Algebra (Overview)** | |
|---|---|---|---|
| The Real Number System | • Extend the properties of exponents to rational exponents<br>• Classify numbers as rational or irrational<br>• (N.RN) | Seeing Structure in Expressions | • Interpret the structure of expressions<br>• Write expressions in equivalent forms to solve problems<br>• (A-SSE) |
| Quantities | • Reason quantitatively and use units to solve problems<br>• (N.Q) | Arithmetic with Polynomials and Rational Functions | • Perform arithmetic operations on polynomials<br>• Understand the relationship between zeros and factors of polynomials<br>• Use polynomial identities to solve problems<br>• Rewrite and graph rational functions<br>• (A-APR) |
| The Complex Number System | • Perform arithmetic operations with complex numbers<br>• Represent complex numbers and their operations on the complex plane<br>• Use complex numbers in polynomial identities and equations<br>(N-CN) | Creating Equations | • Create equations that describe numbers or relationships<br>• (A-CED) |
| Vector and Matrix Quantities | • Represent and model with vector quantities<br>• Perform operations on vectors<br>• Perform operations on matrices and use matrices in applications<br>• (N-VM) | Reasoning with Equations and Inequalities | • Understand solving equations as a process of reasoning and explain the reasoning<br>• Solve equations and inequalities in one variable<br>• Solve systems of equations<br>• Represent and solve equations and inequalities graphically<br>• (A-REI) |

| **High School—Functions (Overview)** | | **High School—Modeling (Overview)** |
|---|---|---|
| Interpreting Functions | • Understand the concept of a function and use function notation<br>• Interpret functions that arise in applications in terms of the context<br>• Analyze functions using different representations<br>• (F-IF) | Modeling Standards<br><br>*Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol (⋆). (page 55)*<br><br>  <br> |
| Building Functions | • Build a function that models a relationship between two quantities<br>• Build new functions from existing functions<br>• (F-BF) | |
| Linear, Quadratic, and Exponential Models | • Construct and compare linear and exponential models and solve problems<br>• Interpret expressions for functions in terms of the situation they model<br>• (F-LE) | |
| Trigonometric Functions | • Extend the domain of trigonometric<br>• functions using the unit circle<br>• Model periodic phenomena with trigonometric functions<br>• Prove and apply trigonometric identities<br>• (F-TF) | |

| **High School—Geometry (Overview)** | | **High School—Statistics and Probability (Overview)** | |
|---|---|---|---|
| Congruence | • Experiment with transformations in the plane<br>• Understand congruence in terms of rigid motions<br>• Prove geometric theorems<br>• Make geometric constructions<br>• (G-CO) | Interpreting Categorical and Quantitative Data | • Summarize, represent, and interpret data on a single count or measurement variable<br>• Summarize, represent, and interpret data on two categorical and quantitative variables<br>• Interpret linear models<br>• (S-ID) |
| Similarity, Right Triangles, and Trigonometry | • Understand similarity in terms of similarity transformations<br>• Prove theorems involving similarity<br>• Define trigonometric ratios and solve problems involving right triangles<br>• Apply trigonometry to general triangles<br>• (G-SRT) | Making Inferences and Justifying Conclusions | • Understand and evaluate random processes underlying statistical experiments<br>• Make inferences and justify conclusions from sample surveys, experiments and observational studies<br>• (S-IC) |
| Circles | • Understand and apply theorems about circles<br>• Find arc lengths and areas of sectors of circles<br>• (G-C) | Conditional Probability and the Rules of Probability | • Use the concepts of independence and conditional probability to interpret data<br>• Use the rules of probability to compute probabilities of compound events in a uniform probability model<br>• (S-CP) |
| Expressing Geometric Properties with Equations | • Translate between the geometric description and the equation for a conic section<br>• Use coordinates to prove simple geometric theorems algebraically<br>• (G-GPE) | Using Probability to Make Decisions | • Calculate expected values and use them to solve problems<br>• Use probability to evaluate outcomes of decisions<br>• (S-MD) |
| Geometric Measurement and Dimension | • Explain volume formulas and use them to solve problems<br>• Visualize relationships between two-dimensional and three-dimensional objects<br>• (G-GMD) | | |
| Modeling with Geometry | • Apply geometric concepts in modeling situations<br>• (G-MG) | | |