PARCC Model Content Framework for Mathematics for Algebra I

Algebra I Overview

Numerals in parentheses designate individual content standards that are eligible for assessment in whole or in part. Underlined numerals (e.g., 1) indicate standards eligible for assessment on two or more end-of-course assessments. For more information, see Tables 1 and 2. Course emphases are indicated by: ■ Major Content; ◘ Supporting Content; ○ Additional Content. Not all CCSSM content standards in a listed domain or cluster are assessed.

The Real Number System (N-RN)

- ○ B. Use properties of rational and irrational numbers (3)

Quantities★(N-Q)

- ◘ A. Reason quantitatively and use units to solve problems (1, 2, 3)

Seeing Structure in Expressions (A-SSE)

- ■ A. Interpret the structure of expressions (1, 2)
- ◘ B. Write expressions in equivalent forms to solve problems (3)

Arithmetic with Polynomials and Rational Expressions (A-APR)

- ■ A. Perform arithmetic operations on polynomials (1)
- ◘ B. Understand the relationship between zeros and factors of polynomials (3)

Creating Equations★ (A-CED)

- ■ A. Create equations that describe numbers or relationships (1, 2, 3, 4)

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.

Reasoning with Equations and Inequalities (A-REI)

- ■ A. Understand solving equations as a process of reasoning and explain the reasoning (1)
- ■ B. Solve equations and inequalities in one variable (3, 4)
- ○ C. Solve systems of equations (5, 6)
- ■ D. Represent and solve equations and inequalities graphically (10, 11, 12)

Interpreting Functions (F-IF)

- ■ A. Understand the concept of a function and use function notation (1, 2, 3)
- ■ B. Interpret functions that arise in applications in terms of the context (4, 5, 6)
- ◘ C. Analyze functions using different representations (7, 8, 9)

Building Functions (F-BF)

- ◘ A. Build a function that models a relationship between two quantities (1)
- ○ B. Build new functions from existing functions (3)

Linear, Quadratic, and Exponential Models★ (F-LE)

- ◘ A. Construct and compare linear, quadratic, and exponential models and solve problems (1, 2, 3)
- ◘ B. Interpret expressions for functions in terms of the situation they model (5)

Interpreting categorical and quantitative data (S-ID)

- ○ A. Summarize, represent, and interpret data on a single count or measurement variable (1, 2, 3)
- ◘ B. Summarize, represent, and interpret data on two categorical and quantitative variables (5, 6)
- ■ C. Interpret linear models (7, 8, 9)

Geometry Overview

Numerals in parentheses designate individual content standards that are eligible for assessment in whole or in part. Underlined numerals (e.g., 1) indicate standards eligible for assessment on two or more end-of-course assessments. For more information, see Tables 1 and 2. Course emphases are indicated by: ■ Major Content; ▣ Supporting Content; ○ Additional Content. Not all CCSSM content standards in a listed domain or cluster are assessed.

Congruence (G-CO)

- ▣ A. Experiment with transformations in the plane (1, 2, 3, 4, 5)
- ■ B. Understand congruence in terms of rigid motions (6, 7, 8)
- ■ C. Prove geometric theorems (9, 10, 11)
- ▣ D. Make geometric constructions (12, 13)

Similarity, Right Triangles, and Trigonometry (G-SRT)

- ■ A. Understand similarity in terms of similarity transformations (1, 2, 3)
- ■ B. Prove theorems involving similarity (4, 5)
- ■ C. Define trigonometric ratios and solve problems involving right triangles (6, 7, 8)

Circles (G-C)

- ○ A. Understand and apply theorems about circles (1, 2, 3)
- ○ B. Find arc lengths and areas of sectors of circles (5)

Expressing Geometric Properties with Equations (G-GPE)

- ○ A. Translate between the geometric description and the equation for a conic section (1)
- ■ B. Use coordinates to prove simple geometric theorems algebraically (4, 5, 6, 7)

Geometric measurement and dimension (G-GMD)

- ○ A. Explain volume formulas and use them to solve problems (1, 3)
- ○ B. Visualize relationships between two-dimensional and three-dimensional objects (4)

Modeling with Geometry (G-MG)

- ■ A. Apply geometric concepts in modeling situations (1, 2, 3)

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.

Algebra II Overview

Numerals in parentheses designate individual content standards that are eligible for assessment in whole or in part. Underlined numerals (e.g., 1) indicate standards eligible for assessment on two or more end-of-course assessments. For more information, see Tables 1 and 2. Course emphases are indicated by: ■ Major Content; ◘ Supporting Content; ○ Additional Content. Not all CCSSM content standards in a listed domain or cluster are assessed.

The Real Number System (N-RN)

■ A. Extend the properties of exponents to rational exponents (1, 2)

Quantities★ (N-Q)

◘ A. Reason quantitatively and use units to solve problems (2)

The Complex Number System (N-CN)

○ A. Perform arithmetic operations with complex numbers (1, 2)

○ C. Use complex numbers in polynomial identities and equations (7)

Seeing Structure in Expressions (A-SSE)

■ A. Interpret the structure of expressions (2)

■ B. Write expressions in equivalent forms to solve problems (3, 4)

Arithmetic with Polynomials and Rational Expressions (A-APR)

■ B. Understand the relationship between zeros and factors of polynomials (2, 3)

○ C. Use polynomial identities to solve problems (4)

◘ D. Rewrite rational expressions (6)

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.

Creating Equations★ (A-CED)

◘ A. Create equations that describe numbers or relationships (1)

Reasoning with Equations and Inequalities (A-REI)

■ A. Understand solving equations as a process of reasoning and explain the reasoning (1, 2)

◘ B. Solve equations and inequalities in one variable (4)

○ C. Solve systems of equations (6, 7)

■ D. Represent and solve equations and inequalities graphically (11)

Interpreting Functions (F-IF)

◘ A. Understand the concept of a function and use function notation (3)

■ B. Interpret functions that arise in applications in terms of the context (4, 6)

◘ C. Analyze functions using different representations (7, 8, 9)

Building Functions (F-BF)

■ A. Build a function that models a relationship between two quantities (1, 2)

○ B. Build new functions from existing functions (3, 4a)

Linear, Quadratic, and Exponential Models★ (F-LE)

- A. Construct and compare linear, quadratic, and exponential models and solve problems (2, 4)
- B. Interpret expressions for functions in terms of the situation they model (5)

Trigonometric Functions (F-TF)

- A. Extend the domain of trigonometric functions using the unit circle (1, 2)
- B. Model periodic phenomena with trigonometric functions (5)
- C. Prove and apply trigonometric identities (8)

Expressing Geometric Properties with Equations (G-GPE)

- A. Translate between the geometric description and the equation for a conic section (2)

Interpreting categorical and quantitative data (S-ID)

- A. Summarize, represent, and interpret data on a single count or measurement variable (4)
- B. Summarize, represent, and interpret data on two categorical and quantitative variables (6)

Making Inferences and Justifying Conclusions (S-IC)

- A. Understand and evaluate random processes underlying statistical experiments (1, 2)
- B. Make inferences and justify conclusions from sample surveys, experiments and observational studies (3, 4, 5, 6)

Conditional Probability and the Rules of Probability (S-CP)

- A. Understand independence and conditional probability and use them to interpret data (1, 2, 3, 4, 5)
- B. Use the rules of probability to compute probabilities of compound events in a uniform probability model (6, 7)

Examples of Key Advances from Previous Grades or Courses

- In Algebra I, students added, subtracted, and multiplied polynomials. In Algebra II, students divide polynomials with remainder, leading to the factor and remainder theorems. This is the underpinning for much of advanced algebra, including the algebra of rational expressions.

- Themes from middle school algebra continue and deepen during high school. As early as grade 6, students began thinking about solving equations as a process of reasoning (6.EE.B.5). This perspective continues throughout Algebra I and Algebra II (A-REI).[27] "Reasoned solving" plays a role in Algebra II because the equations students encounter can have extraneous solutions (A-REI.A.2).

- In Algebra II, they extend the real numbers to complex numbers, and one effect is that they now have a complete theory of quadratic equations: Every quadratic equation with complex coefficients has (counting multiplicities) two roots in the complex numbers.

- In grade 8, students learned the Pythagorean theorem and used it to determine distances in a coordinate system (8.G.B.6–8). In Geometry, students proved theorems using coordinates (G-GPE.B.4–7). In Algebra II, students will build on their understanding of distance in coordinate systems and draw on their growing command of algebra to connect equations and graphs of conic sections (e.g., G-GPE.A.1).

- In Geometry, students began trigonometry through a study of right triangles. In Algebra II, they extend the three basic functions to the entire unit circle.

[27] See, for example, "Reasoned Solving," in *Focus in High School Mathematics: Reasoning and Sense Making* (National Council of Teachers of Mathematics, 2009).