Smarter Balanced Mathematics Claims Distribution Overview

In the spring of 2015, Washington state students in grades 3 to 8 and 11 took the Smarter Balanced Comprehensive Assessments for mathematics. The results of these assessments were reported to the U.S. Department of Education for purposes of determining adequate yearly progress. A *cut-score for each assessment* indicating progress toward college and career readiness was determined by the Smarter Balanced Assessment Consortium.

This Claim Distribution document contains information on the *Mathematics K–12 Learning Standards*, also referred to as "the standards," that are eligible to be assessed on the mathematics exams in high school. This is the same information found in the *Smarter Balanced Item Specification documents*. This claim distribution, however, does not represent the emphasis of content on the Smarter Balanced summative assessment. *The summative assessment blueprint* provides information on the emphasis of content and claim on the assessment.

In this document, the mathematical content is listed by conceptual category, domain, cluster, and standard as written in the standards. Standards or clusters are considered priority assessment content unless labeled as supporting assessment content in the list below. Refer to the *Smarter Balanced Mathematics Content Specifications* for additional information regarding priority and supporting targets.

Smarter Balanced developed four "Mathematical Claims" that state what students should know and be able to do in the domain of mathematics, and on which the Smarter Balanced assessment system will provide data. This document shows how the standards will be assessed across these same claims. The letters in the Claim 1 column match the target letters used in the Smarter Balanced Claim 1 Item Specification documents. All conceptual categories and subsequent standards are eligible for assessment in Claims 2 to 4, but the standards and clusters with an assigned target letter make up the majority of the items for that claim. Standards that are not addressed by grade 10 have been removed from the claim distribution.

The outline on the next page shows how the Standards for Mathematical Practice support each of the four claims.

Standards for Mathematical Practice:

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.

Smarter Balanced Assessment Claims

Claim 1: Concepts & Procedures

- Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.*
- This claim addresses procedural skills and the conceptual understanding on which developing skills depend. It is important to assess student understanding of how concepts link together and why mathematical procedures work the way they do. This relates to the structural nature of mathematics.
- Practice Standard: 5, 6, 7, 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.*
- Assessment items and tasks focused on Claim 2 include problems in pure mathematics and problems set in context. Problems are presented as items and tasks that are well-posed (that is, problem formulation is not necessary) and for which a solution path is not immediately obvious. These problems require students to construct their own solution pathway rather than follow a provided one. Such problems will therefore be unstructured, and students will need to select appropriate conceptual and physical tools to use.
- Practice Standard: 1, 5, 7, 8

Claim 3: Communicating Reasoning

- Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.*
- Claim 3 refers to a recurring theme in the content and practice standards—the ability to construct and present a clear, logical, convincing argument. For older students, this may take the form of a rigorous, deductive proof based on clearly stated axioms. For younger students, this will involve more informal justifications. Assessment tasks that address this claim will typically present a claim and ask students to provide, for example, a justification or counterexample.
- Practice Standard: 3, 6

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.*
- Modeling links classroom mathematics and statistics to everyday life, work and decision-making. Students use modeling and data analysis to choose and use appropriate mathematics and statistics to analyze and understand situations, to make predictions, find

solutions and improve decision making based on results from the model. The standards feature modeling as both a mathematical practice at all grades and a content focus in high school.

- Practice Standard: 2, 4, 5

Smarter Balanced Content Specifications

High School Claim Distribution by Conceptual Category, Domain, Cluster, and Standard

Conceptual Category: Number and Quantity

Domain: The Real Number System

- Cluster: N-RN.A Extend the properties of exponents to rational exponents. *(Supporting Cluster)*
  - Standard: N-RN.A.1
    - Assessed in Claim 1 Target A and Claim 3
  - Standard: N-RN.A.2
    - Assessed in Claim 1 Target A and Claim 3
- Cluster: N-RN.B Use properties of rational and irrational numbers. *(Supporting Cluster)*
  - Standard: N-RN.8.3
    - Assessed in Claim 1 Target B and Claim 3

Domain: Quantities

- Cluster: N-Q.A Reason quantitatively and use units to solve problems. *(Supporting Cluster)*
  - Standard: N-Q.A.1
    - Assessed in Claim 1 Target C, Claim 2, and Claim 4
  - Standard: N-Q.A.2
    - Assessed in Claims 2 and 4
  - Standard: N-Q.A.3
    - Assessed in Claims 2 and 4

Conceptual Category: Algebra

Domain: Seeing Structure in Expressions

- Cluster: A-SSE.A Interpret the structure of expressions.
  - Standard: A-SSE.A.1
    - Assessed in Claim 2
  - Standard: A-SSE.A.1a
    - Assessed in Claim 2
  - Standard A-SSE.A.1b

        - Assessed in Claim 2
    - Standard A-SSE.A.2
        - Assessed in Claim 1 Target D, Claim 2, and Claim 3
- Cluster: A-SSE.B Write expressions in equivalent forms to solve problems.
    - Standard: A-SSE.B.3
        - Assessed in Claim 1 Target E, Claim 2, and Claim 4
    - Standard: A-SSE.B.3a
        - Assessed in Claim 1 Target E, Claim 2, and Claim 4
    - Standard: A-SSE.B.3b
        - Assessed in Claim 1 Target E, Claim 2, and Claim 4
    - Standard: A-SSE.B.3c
        - Assessed in Claim 1 Target E, Claim 2, and Claim 4

Domain: Arithmetic with Polynomials and Rational Expressions

- Cluster: A-APR.A Perform arithmetic operations on polynomials.
    - Standard: A-APR.A.1
        - Assessed in Claim 1 Target F and Claim 3

Domain: Creating Equations

- Cluster: A-CED.A Create equations that describe numbers or relationships.
    - Standard: A-CED.A.1
        - Assessed in Claim 1 Target G, Claim 2, and Claim 4
    - Standard: A-CED.A.2
        - Assessed in Claim 1 Target G, Claim 2, and Claim 4
    - Standard: A-CED.A.3
        - Assessed in Claims 2 and 4
    - Standard: A-CED.A.4
        - Assessed in Claims 2 and 4

Domain: Reasoning with Equations and Inequalities

- Cluster: A-REI.A Understand solving equations as a process of reasoning and explain the reasoning.
    - Standard: A-REI.A.1
        - Assessed in Claims 3 and 4
    - Standard: A.REI.A.2
        - Assessed in Claim 1 Target H and Claims 2, 3, and 4
- Cluster: A-REI.B Solve equations and inequalities in one variable.
    - Standard: A.REI.B.3
        - Assessed in Claim 1 Target I, Claim 2, and Claim 4
    - Standard: A.REI.B.4a
        - Assessed in Claim 1 Target I, Claim 2, and Claim 4

    - Standard: A.REI.B.4b
        - Assessed in Claim 1 Target I, Claim 2, and Claim 4
- Cluster: A-REI.C Solve systems of equations.
    - Standard: A-REI.C.5
        - Assessed in Claims 2, 3, and 4
    - Standard: A-REI.C.6
        - Assessed in Claims 2, 3, and 4
    - Standard: A-REI.C.7
        - Assessed in Claims 2, 3, and 4
- Cluster: A-REI.D Represent and solve equations and inequalities graphically.
    - Standard: A-REI.D.10
        - Assessed in Claim 1 Target J, Claim 2, and Claim 3
    - Standard: A-REI.D.11
        - Assessed in Claim 1 Target J, Claim 2, and Claim 3
    - Standard: A-REI.D.12
        - Assessed in Claim 1 Target J and Claim 2

Conceptual Category: Functions

Domain: Interpreting Functions

- Cluster: F-IF.A Understand the concept of a function and use function notation.
    - Standard: F-IF.A.1
        - Assessed in Claim 1 Target K, Claim 2, and Claim 3
    - Standard: F-IF.A.2
        - Assessed in Claim 2
    - Standard: F-IF.A.3
        - Assessed in Claim 1 Target K and Claim 2
- Cluster: F-IF.B Interpret functions that arise in applications in terms of the context.
    - Standard: F-IF.B.4
        - Assessed in Claim 1 Target L, Claim 2, and Claim 4
    - Standard: F-IF.B.5
        - Assessed in Claim 1 Target L and Claims 2, 3, and 4
- Cluster: F-IF.C Analyze functions using different representations.
    - Standard: F-IF.C.7
        - Assessed in Claim 1 Target M, Claim 2, and Claim 4
    - Standard: F-IF.C.7a
        - Assessed in Claim 1 Target M, Claim 2, and Claim 4
    - Standard: F-IF.C.7e
        - Assessed in Claim 1 Target M, Claim 2, and Claim 4
    - Standard: F-IF.C.8
        - Assessed in Claim 1 Target M, Claim 2, and Claim 4

    - Standard: F-IF.C.8a
        - Assessed in Claim 1 Target M, Claim 2, and Claim 4
    - Standard: F-IF.C.8b
        - Assessed in Claim 1 Target M, Claim 2, and Claim 4
    - Standard: F-IF.C.9
        - Assessed in Claim 1 Target M, and Claims 2, 3, and 4

Domain: Building Functions

- Cluster: F-BF.A Build a function that models a relationship between two quantities.
    - Standard: F-BF.A.1
        - Assessed in Claim 1 Target N, Claim 2, and Claim 4
    - Standard: F-BF.A.1a
        - Assessed in Claim 1 Target N, Claim 2, and Claim 4
    - Standard: F-BF.A.1b
        - Assessed in Claim 2 and Claim 4
- Cluster: F-BF.B Build new functions from existing functions.
    - Standard: F-BF.B.3
        - Assessed in Claim 3

Domain: Linear, Quadratic, and Exponential Models

- Cluster: F-LE.A Construct and compare linear, quadratic, and exponential models and solve problems.
    - Standard: F-LE.A.1
        - Assessed in Claim 4
    - Standard: F-LE.A.1a
        - Assessed in Claim 4
    - Standard: F-LE.A.1b
        - Assessed in Claim 4
    - Standard: F-LE.A.1c
        - Assessed in Claim 4
    - Standard: F-LE.A.2
        - Assessed in Claim 4
    - Standard: F-LE.A.3
        - Assessed in Claim 4
- Cluster: F-LE.B Interpret expressions for functions.
    - Standard: F-LE.B.5
        - Assessed in Claim 4

Conceptual Category: Geometry

Domain: Congruence

- Cluster: G-CO.A Experiment with transformations in the plane.

        - Standard: G-CO.A.1
            - Assessed in Claim 3
        - Standard: G-CO.A.2
            - Assessed in Claim 3
        - Standard: G-CO.A.3
            - Assessed in Claim 3
        - Standard: G-CO.A.4
            - Assessed in Claim 3
        - Standard: G-CO.A.5
            - Assessed in Claim 3
    - Cluster: G-CO.B Understand congruence in terms of rigid motions.
        - Standard: G-CO.B.6
            - Assessed in Claim 3
        - Standard: G-CO.B.7
            - Assessed in Claim 3
        - Standard: G-CO.B.8
            - Assessed in Claim 3
    - Cluster: G-CO.C Prove geometric theorems.
        - Standard: G-CO.C.9
            - Assessed in Claim 3
        - Standard: G-CO.C.10
            - Assessed in Claim 3
        - Standard: G-CO.C.11
            - Assessed in Claim 3
    - Cluster: G-CO.D Make geometric constructions.
        - Standard: G-CO.C.12
            - Eligible in Claims 2 through 4
        - Standard: G-CO.C.13
            - Eligible in Claims 2 through 4

Domain: Similarity, Right Triangles, and Trigonometry

- Cluster: G-SRT.A Understand similarity in terms of similarity transformations.
    - Standard: G-SRT.A.1
        - Assessed in Claim 3
    - Standard: G-SRT.A.1a
        - Assessed in Claim 3
    - Standard: G-SRT.A.1b
        - Assessed in Claim 3
    - Standard: G-SRT.A.2
        - Assessed in Claim 3

    - Standard: G-SRT.A.3
        - Assessed in Claim 3
- Cluster: G-SRT.B Prove theorems involving similarity.
    - Standard: G-SRT.B.4
        - Assessed in Claim 3
    - Standard: G-SRT.B.5
        - Assessed in Claim 3
- Cluster: G-SRT.C Define trigonometric ratios and solve problems involving right triangles. *(Supporting Cluster)*
    - Standard: G-SRT.C.6
        - Assessed in Claim 1 Target O and Claim 2
    - Standard: G-SRT.C.7
        - Assessed in Claim 1 Target O and Claim 2
    - Standard: G-SRT.C.8
        - Assessed in Claim 1 Target O and Claim 2

Domain: Circles

- Cluster: G-C.A Understand and apply theorems about circles.
    - Standard: G-C.A.1
        - Eligible in Claims 2 through 4
    - Standard: G-C.A.2
        - Eligible in Claims 2 through 4
    - Standard: G-C.A.3
        - Eligible in Claims 2 through 4

Domain: Expressing Geometric Properties with Equations

- Cluster: G-GPE.A Translate between geometric description and the equation for a conic section.
    - Standard: G-GPE.A.1
        - Eligible in Claims 2 through 4
- Cluster: G-GPE.B Use coordinates to prove simple geometric theorems algebraically.
    - Standard: G-GPE.B.4
        - Eligible in Claims 2 through 4
    - Standard: G-GPE.B.5
        - Eligible in Claims 2 through 4
    - Standard: G-GPE.B.6
        - Eligible in Claims 2 through 4
    - Standard: G-GPE.B.7
        - Eligible in Claims 2 through 4

Domain: Geometric Measurement & Dimension

- Cluster: G-GMD.A Explain volume formulas and use them to solve problems.
    - Standard: G-GMD.A.3
        - Assessed in Claim 4
- Cluster: G-GMD.B Visualize relationships between 2d and 3d objects.
    - Standard: G-GMD.B.4
        - Eligible in Claims 2 through 4

Domain: Modeling with Geometry

- Cluster: G-MG.A Apply geometric concepts in modeling situations.
    - Standard: G-MG.A.1
        - Assessed in Claim 4
    - Standard: G-MG.A.2
        - Assessed in Claim 4
    - Standard: G-MG.A.3
        - Assessed in Claim 4

Conceptual Category: Statistics and Probability

Domain: Interpreting Categorical and Quantitative Data

- Cluster: S-ID.A Summarize, represent, and interpret data on a single count or measurement variable. *(Supporting Cluster)*
    - Standard: S-ID.A.1
        - Assessed in Claim 1 Target P and Claim 4
    - Standard: S-ID.A.2
        - Assessed in Claim 1 Target P and Claim 4
    - Standard: S-ID.A.3
        - Assessed in Claim 1 Target P and Claim 4
- Cluster: S-ID.B Summarize, represent, and interpret data on two categorical and quantitative variables.
    - Standard: S-ID.B.5
        - Assessed in Claim 4
    - Standard: S-ID.B.6
        - Assessed in Claim 4
    - Standard: S-ID.B.6a
        - Assessed in Claim 4
    - Standard: S-ID.B.6c
        - Assessed in Claim 4
- Cluster: S-ID.C Interpret linear models.
    - Standard: S-ID.C.7
        - Assessed in Claim 2

Domain: Conditional Probability and the Rules of Probability

- Cluster: S-CP.A Understand independence and conditional probability and use them to interpret data.
    - Standard: S-CP.A.1
        - Assessed in Claim 2
    - Standard: S-CP.A.4
        - Assessed in Claim 2

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