

# Mathematics Summative Assessment Blueprint

As of 02/13/15

Blueprint Table Mathematics Grade 9 Estimated Total Testing Time: 4:00 (with Classroom Activity) <sup>1</sup>						
Claim/Score Reporting Category	Content Category <sup>2</sup>	Stimuli		Items		Total Items by Claim <sup>3</sup>
		CAT	PT	CAT <sup>4</sup>	PT <sup>5</sup>	
1. Concepts and Procedures	Priority Cluster	0	0	15		20
	Supporting Cluster	0		5		
2. Problem Solving 4. Modeling and Data Analysis <sup>5</sup>	Problem Solving	0	1	6	2-4	8-10
	Modeling and Data Analysis	0				
3. Communicating Reasoning	Communicating Reasoning	0			8	1-2

<sup>1</sup> All times are estimates. Actual times may vary.

<sup>2</sup> For more information on content categories, see the Content Specifications document at <http://www.smarterbalanced.org/smarter-balanced-assessments/>.

<sup>3</sup> While the range for the total items by Claim for Problem Solving/Modeling and Data Analysis and Communicating Reasoning indicates 8-10 items in each reporting category, the total number of items across these two reporting categories for any individual test event is 18-20.

<sup>4</sup> In grades 9 & 10, up to one CAT item per student may require hand-scoring (from either Claim 3 or Claim 4), which may be AI-scored with an application that yields comparable results by meeting or exceeding reliability and validity criteria for hand-scoring.

<sup>5</sup> Each PT contains 4-6 total items. Up to six PT items may require hand-scoring.

<sup>6</sup> Claim 2 (Problem Solving) and Claim 4 (Modeling and Data Analysis) have been combined, because of content similarity and to provide flexibility for item development. There are still four claims, but only three claim scores will be reported with the overall math score.

# Mathematics Summative Assessment Blueprint

As of 02/13/15

Blueprint Table Mathematics Grade 10 Estimated Total Testing Time: 4:00 (with Classroom Activity) <sup>1</sup>						
Claim/Score Reporting Category	Content Category <sup>2</sup>	Stimuli		Items		Total Items by Claim <sup>3</sup>
		CAT	PT	CAT <sup>4</sup>	PT <sup>5</sup>	
1. Concepts and Procedures	Priority Cluster	0	0	13	0	20
	Supporting Cluster	0		7		
2. Problem Solving 4. Modeling and Data Analysis <sup>5</sup>	Problem Solving	0	1	6	2-4	8-10
	Modeling and Data Analysis	0		6		
3. Communicating Reasoning	Communicating Reasoning	0			6	1-2

<sup>1</sup> All times are estimates. Actual times may vary.

<sup>2</sup> For more information on content categories, see the Content Specifications document at <http://www.smarterbalanced.org/smarter-balanced-assessments/>.

<sup>3</sup> While the range for the total items by Claim for Problem Solving/Modeling and Data Analysis and Communicating Reasoning indicates 8-10 items in each reporting category, the total number of items across these two reporting categories for any individual test event is 18-20.

<sup>4</sup> In grades 9 & 10, up to one CAT item per student may require hand-scoring (from either Claim 3 or Claim 4), which may be AI-scored with an application that yields comparable results by meeting or exceeding reliability and validity criteria for hand-scoring.

<sup>5</sup> Each PT contains 4-6 total items. Up to six PT items may require hand-scoring.

<sup>6</sup> Claim 2 (Problem Solving) and Claim 4 (Modeling and Data Analysis) have been combined, because of content similarity and to provide flexibility for item development. There are still four claims, but only three claim scores will be reported with the overall math score.

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As of 02/13/15

Mathematics Grade 9						
Claim	Content Category	Assessment Targets	DOK	Items		Total Test
				CAT	PT	
1. Concepts and Procedures	Priority Cluster	D. Interpret the structure of expressions.	1, 2		0	15
		E. Write expressions in equivalent forms to solve problems.	1, 2			
		F. Perform arithmetic operations on polynomials.	2			
		G. Create equations that describe numbers or relationships.	1, 2	15	0	15
		H. Understand solving equations as a process of reasoning and explain the reasoning.	1, 2			
		I. Solve equations and inequalities in one variable.	1, 2			
		J. Represent and solve equations and inequalities graphically.	1, 2			
		K. Understand the concept of a function and use function notation.	1, 2			
		L. Interpret functions that arise in applications in terms of a context.	1, 2			
		M. Analyze functions using different representations.	1, 2, 3			
	N. Build a function that models a relationship between two quantities.	2				
	Supporting Cluster	O. Define trigonometric ratios and solve problems involving right triangles.	1, 2	5	0	5
		P. Summarize, represent, and interpret data on a single count or measurement variable.	2			
		A. Extend the properties of exponents to rational exponents.	1, 2			
		B. Use properties of rational and irrational numbers.	1, 2			
C. Reason quantitatively and use units to solve problems.		1, 2				

- DOK: Depth of Knowledge, consistent with the Smarter Balanced Content Specifications.
- The CAT algorithm will be configured to ensure that each student receives a variety of DOK levels for each claim.
- The CAT algorithm will be configured to ensure that each student receives items assessing at least 50% of the targets in each content category

# Mathematics Summative Assessment Blueprint

As of 02/13/15

2. Problem Solving 4. Modeling and Data Analysis	Problem Solving (drawn across content domains)	A. Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace.	2, 3	3	1-2	8-11
		B. Select and use appropriate tools strategically. C. Interpret results in the context of a situation. D. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3			
	Modeling and Data Analysis (drawn across content domains)	A. Apply mathematics to solve problems arising in everyday life, society, and the workplace. D. Interpret results in the context of a situation.	2, 3	3	1-3	
		B. Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem. E. Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.	2, 3, 4			
C. State logical assumptions being used. F. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).		1, 2				
3. Communicating Reasoning	Communicating Reasoning (drawn across content domains)	A. Test propositions or conjectures with specific examples. D. Use the technique of breaking an argument into cases. B. Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. E. Distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in the argument—explain what it is.	2	8	0-2	8-10
		C. State logical assumptions being used. F. Base arguments on concrete referents such as objects, drawings, diagrams, and actions. 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.)	2, 3, 4			

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# Mathematics Summative Assessment Blueprint

As of 02/13/15

Mathematics Grade 10					
Content Category	Assessment Targets	DOK	Items		Total Test
			CAT	PT	
Priority Cluster	D. Interpret the structure of expressions.	1, 2	13	0	13
	E. Write expressions in equivalent forms to solve problems.	1, 2			
	F. Perform arithmetic operations on polynomials.	2			
	G. Create equations that describe numbers or relationships.	1, 2			
	H. Understand solving equations as a process of reasoning and explain the reasoning.	1, 2			
	I. Solve equations and inequalities in one variable.	1, 2			
	J. Represent and solve equations and inequalities graphically.	1, 2			
	K. Understand the concept of a function and use function notation.	1, 2			
	L. Interpret functions that arise in applications in terms of a context.	1, 2			
	M. Analyze functions using different representations.	1, 2, 3			
	N. Build a function that models a relationship between two quantities.	2			
Supporting Cluster	O. Define trigonometric ratios and solve problems involving right triangles.	1, 2	7	0	7
	P. Summarize, represent, and interpret data on a single count or measurement variable.	2			
	A. Extend the properties of exponents to rational exponents.	1, 2			
	B. Use properties of rational and irrational numbers.	1, 2			
	C. Reason quantitatively and use units to solve problems.	1, 2			

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- The CAT algorithm will be configured to ensure that each student receives items assessing at least 50% of the targets in each content category

# Mathematics Summative Assessment Blueprint

As of 02/13/15

2. Problem Solving 4. Modeling and Data Analysis	Problem Solving (drawn across content domains)	A. Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace.	2, 3	3	1–2	8-11
		B. Select and use appropriate tools strategically. C. Interpret results in the context of a situation. D. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3			
		A. Apply mathematics to solve problems arising in everyday life, society, and the workplace. D. Interpret results in the context of a situation.	2, 3			
	Modeling and Data Analysis (drawn across content domains)	B. Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem. E. Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.	2, 3, 4	3	1–3	
		C. State logical assumptions being used. F. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3			
		G. Identify, analyze, and synthesize relevant external resources to pose or solve problems.	3, 4			
		A. Test propositions or conjectures with specific examples. D. Use the technique of breaking an argument into cases.	2, 3			
Communicating Reasoning (drawn across content domains)	B. Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. E. Distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in the argument—explain what it is.	2, 3, 4				
	C. State logical assumptions being used. F. Base arguments on concrete referents such as objects, drawings, diagrams, and actions. 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.)	2, 3				

- DOK: Depth of Knowledge, consistent with the Smarter Balanced Content Specifications.
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- The CAT algorithm will be configured to ensure that each student receives items assessing at least 50% of the targets in each content category