

8th Grade Math
Claim, Target, Standard Matrix (31 CAT & 6 PT Items)
Compiled by Sandy Sanford 2-10-15

This Matrix Covers ALL Claims, Targets, & Standards taught in 8th Gd Math that are shown as “Tested” on Smarter Balanced Item Specifications (2-4-14) & the Blueprint (4-21-14)
The 8th Grade Summative Assessment has 31 CAT & 6 PT Items

Background: Smarter Balanced publishes mountains of specification information regarding Summative Assessment (SA) Claims, Targets, Standards, DOK, & Item Types/Numbers. The problem is that no published document welds together all this information in a format friendly to educators. The CTS Matrix solves that problem by populating the rows and columns in a table that emulates the design configuration of the SA.

Matrix Guide: Use the Matrix as a resource document to acquire greater understanding of the organization and composition of the Summative Assessment (SA), which is more complicated in design than previous high-stakes assessments. The four Claims are general descriptions regarding learning expectations for each grade level. In the Matrix, each Claim is displayed in a separate table with a description in the top row followed by multiple Targets underneath the parent Claim. The Targets are more specific with regard to expected learning and usually vary in description at each grade level. The SA will report results overall and for each of the four Claims.

For any Claim/Target combination, cells to the right show the tested standards, the assessed DOK level(s), the number of items tested (both Computer Adaptive Test (CAT) & Performance Task (PT), and the Item Types that may be used. Note that each Target will normally involve testing multiple standards, and any particular standard may be tested in multiple Claims and/or Targets. A section titled “Valuable Facts” follows the conclusion of the Matrix with additional pertinent information about the SA. The final pages of this document contain examples of the different Item Types.

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I have tried hard to make this Matrix as accurate as possible, but I'm not infallible and the information is complicated and constantly changing. I will continuously review the available sources and make corrections/updates as required and distribute the corrected Matrices with new dates. If you notice errors, please report them to me at sandy@youasksandy.com.

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6th Grade Math Standards Domain Abbreviations

Ratios & Proportional Relationships = RP

Number System = NS

Expressions & Equations = EE

Geometry = G

Statistics & Probability = SP

Item Response Type Abbreviations

(Many examples of each Item Response Type are included in the Item Specifications)

MC = multiple-choice, single correct response

MS = multiple-choice, multiple choice responses

EQ = equation/numeric

TM = matching tables

TI = fill-in table

DD = drag & drop

HS = hot spot

GR = graphing

ST = short text

PT = performance task

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Claim 1: CONCEPTS and PROCEDURES—Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency (20 CAT Items)				
Claim 1 PRIORITY CLUSTER Targets (15 CAT Items)	Standards Addressed	DOK	CAT Items	Item Types
Target C—Understand the connections between proportional relationships, lines, and linear equations.	8.EE.5, 6	1, 2	6	MC, EQ, GR
Target D—Analyze and solve linear equations and pairs of simultaneous linear equations.	8.EE.7, 8	1, 2		MC, MS, DD, EQ, GR
Target B— Work with radicals and integer exponents	8.EE.1, 2, 3, 4	1, 2	6	MC, MS, EQ
Target E— Define, evaluate, and compare functions.	8.F.1, 2, 3	1, 2		MC, MS, EQ, TM
Target G—Understand congruence and similarity using physical models, transparencies, or geometry software	8.G.1, 2, 3, 4, 5	1, 2		TM, EQ, HS, GR
Target F—Use functions to model relationships between quantities	8.F.4, 5	1, 2	3	EQ, TM, MC, GR
Target H—Understand and apply the Pythagorean Theorem	8.G.6, 7, 8	1, 2		EQ, MC
Claim 1 Supporting CLUSTER Targets (5 CAT Items)	Standards Addressed	DOK	CAT Items	Item Types
Target A— Know that there are numbers that are not rational, and approximate them by rational numbers	8.NS.1, 2	1, 2	5	MC, MS, TM, EQ, DD, GR
Target I— Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	8.G.9	1, 2		EQ, MC
Target J— Investigate patterns of association in bivariate data	SP.1, 2, 3, 4	1, 2		TM, EQ, TF

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Claim 2: PROBLEM SOLVING—Students can solve a range of well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies. 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. CLAIMS 2 & 4 are combined for reporting purposes (5 CAT & 4 PT Items)					
Claim 2: PROBLEM SOLVING (2 CAT & 1-2 PT Items)	Standards Addressed ¹	DOK	CAT Items	PT Items	Item Types
Target A—Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace.	8.EE.5, 6, 7, 8 8.F.1, 2, 3, 4, 5 8.G.1, 2, 3, 4, 5, 6, 7, 8, 9	2, 3	1	1-2	MC, MS, EQ, DD, HS, GR, TM, TI ST (PT only)
Target B—Select and use appropriate tools strategically		1, 2, 3	1		
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, flow charts, or formulas).					
Claim 4: MODELING AND DATA ANALYSIS (3 CAT & 2-3 PT Items)	Standards Addressed ¹	DOK	CAT Items	PT Items	Item Types
Target A—Apply mathematics to solve problems arising in everyday life, society, and the workplace.	8.EE.3, 4, 5, 7, 8 8.G. 6, 7, 8, 9 8.F.4, 5 8.SP.1, 2, 3, 4	2, 3	1	2-3	MC, MS, EQ, DD, HS, GR, TM, TI ST (PT & Tgt B only)
Target D—Interpret results in the context of a situation		2, 3, 4	1		
Target B— Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem.					
Target E—Analyze the adequacy of, and make improvements to, an existing model or develop a mathematical model of a real phenomenon.					
Target C—State logical assumptions being used					
Target F—Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).					
Target G—Identify, analyze and synthesize relevant external resources to pose or solve problems. (PT ONLY)	3, 4	0			

NOTE 1: The standards that are designated “Primary Emphasis” are bolded

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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: COMMUNICATING REASONING (6 CAT & 2 PT Items)	Standards Addressed²	DOK	CAT Items	PT Items	Item Types
Target A—Test propositions or conjectures with specific examples Target D—Use the technique of breaking an argument into cases	8.EE.1, 5. 6. 7a. 8a 8.F.1, 2, 3 8.G.1, 2, 4, 5, 6, 8	2,3	2-3	2	MC, MS, EQ, DD, HS, GR, TM, TI ST (PT & Tgt B only)
Target B— Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. 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.		2, 3, 4	1-2		
Target C—State logical assumptions being used 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.)		2, 3, 4	2-3		

NOTE 2: Claim 3 does not designate standards for primary emphasis, as do Claims 2 & 4

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Valuable Facts

(From SBAC Blueprint dtd 4-21-14)

1. Number of items per Claim is not necessarily proportional to Claim weight for scoring
2. In grades 6-8 on the CAT, 1 item per student (from either Claim 3 Target B or Claim 4 Target B) is designed for hand-scoring, i.e., a Short Text (ST) item type.
3. Claim 2 (Problem Solving) and Claim 4 (Modeling & Data Analysis) have been combined for reporting purposes
4. On the **CAT** portion of the test...
 - For Claim 1, each student will receive at least 7 CAT items at DOK 2 or higher.
 - For combined Claims 2 & 4, each student will receive at least 2 CAT items at DOK 3 or higher
 - For Claim 3, a student will receive a least 2 CAT items at DOK 3 or higher

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All Example Items are from 8th grade Smarter Balanced Practice Test (unless otherwise noted)

MC (Multiple Choice Item)

Approximately 7.5×10^5 gallons of water flow over a waterfall each second. There are 8.6×10^4 seconds in 1 day. Select the approximate number of gallons of water that flow over the waterfall in 1 day.

- Ⓐ 6.45×10^{21}
- Ⓑ 6.45×10^{20}
- Ⓒ 6.45×10^{10}
- Ⓓ 6.45×10^9

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MS (Multiple Select Item)

A sequence of transformations is applied to a polygon.

Select **all** statements which indicate a sequence of transformations where the resulting polygon has an area greater than the original polygon.

- Reflect over the x -axis, dilate about the origin by a scale factor of $\frac{1}{2}$, translate up 5 units.
- Rotate 90° counterclockwise around the origin, dilate about the origin by a scale factor of $\frac{3}{2}$.
- Dilate about the origin by a scale factor of $\frac{2}{3}$, rotate 180° clockwise around the origin, translate down 2 units.
- Dilate about the origin by a scale factor of 2, reflect over the y -axis, dilate about the origin by a scale factor of $\frac{2}{3}$.

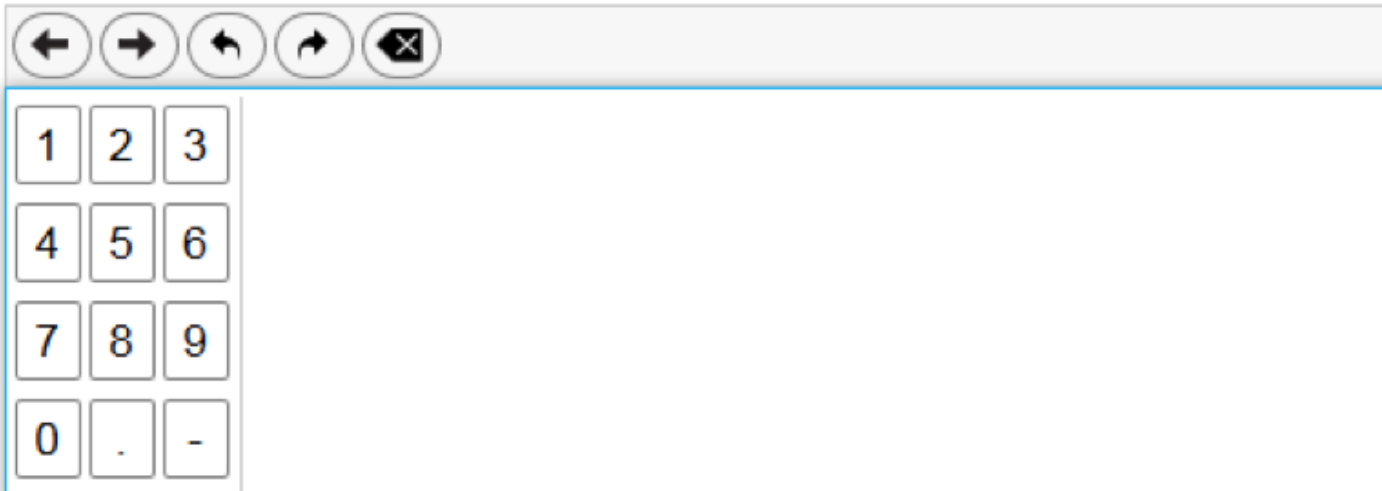
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EQ (Equation-Numeric) requiring a “Numeric” response

A square with side length s has an area of 324 square centimeters. This equation shows the area of the square.

$$s^2 = 324$$

What is the side length of the square in centimeters?

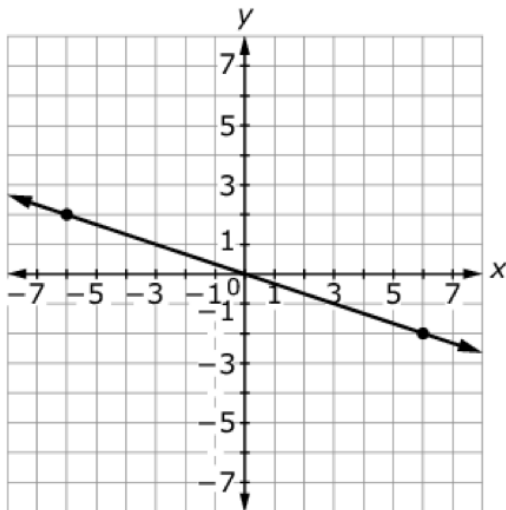


The calculator interface includes a grid of buttons for digits 1-9, 0, a decimal point, and a negative sign. Above the grid are navigation buttons: left arrow, right arrow, undo, redo, and a delete/clear button.

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EQ (Equation-Numeric) requiring an “Equation” response

Consider this graph of a line.



Enter an equation for the line.

← → ↶ ↷ ✖

1	2	3	x	y					
4	5	6	+	-	×	÷			
7	8	9	<	≤	=	≥	>		
0	.	-	$\frac{\square}{\square}$	\square^\square	()		$\sqrt{\square}$	$\sqrt[n]{\square}$	π

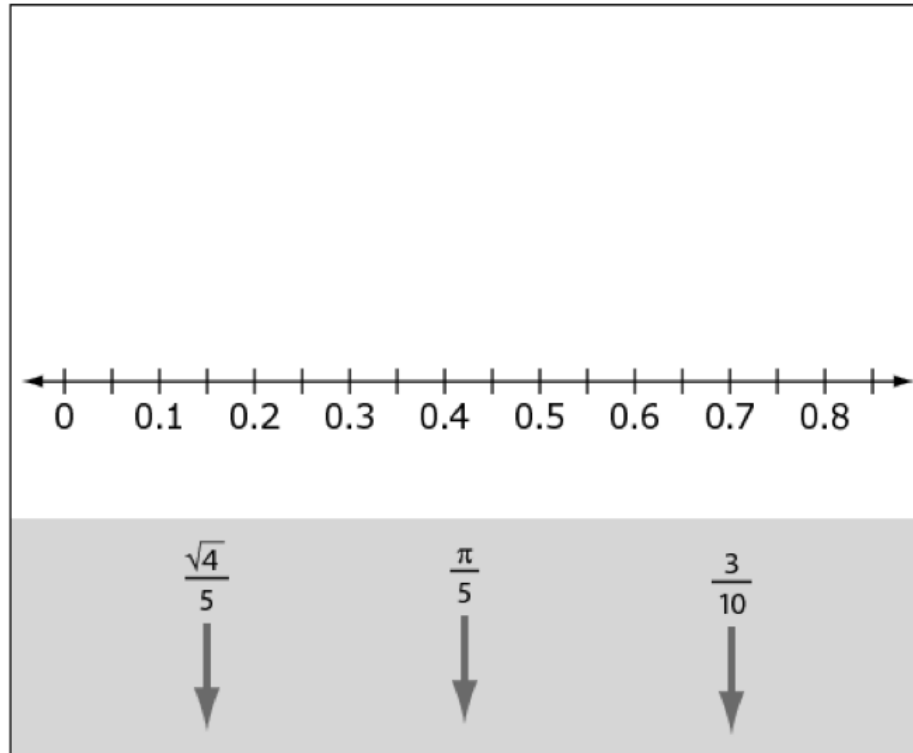
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DD (Drag & Drop)

1860



Drag each number to its correct position on the number line.



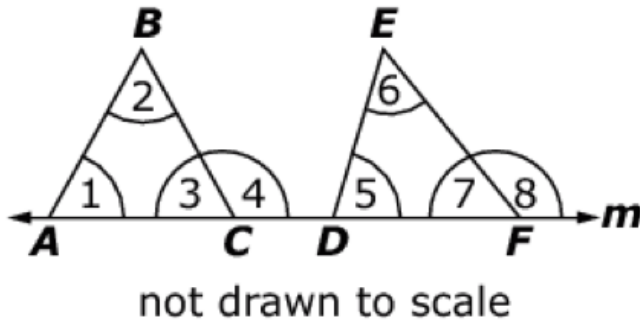
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HS (Hot Spot)

1843



The base of triangle ABC and the base of triangle DEF lie on line m , as shown in the diagram.



The measure of $\angle 4$ is less than the measure of $\angle 8$.

For each comparison, select the symbol ($<$, $>$, $=$) that makes the relationship between the first quantity and the second quantity true.

First Quantity	Comparison	Second Quantity
$m\angle 3$	<div style="border: 1px solid black; padding: 5px; width: 30px; margin: 0 auto;"> $<$ $=$ $>$ </div>	$m\angle 7$
$m\angle 1 + m\angle 2$	<div style="border: 1px solid black; padding: 5px; width: 30px; margin: 0 auto;"> $<$ $=$ $>$ </div>	$m\angle 5 + m\angle 6$

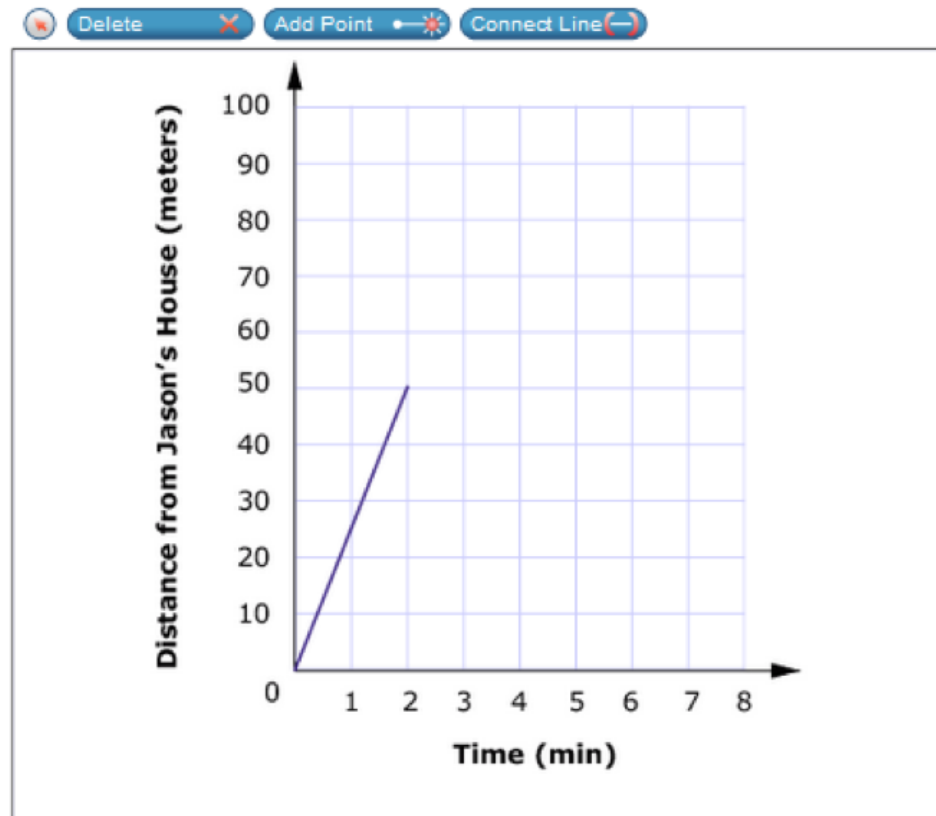
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GR (Graphing) 8th Grade Level**1869**

The school is 100 meters from Jason's house. The following describes his most recent trip:

- He walked 50 meters toward school in 2 minutes. He realized that he left a book at home.
- He turned around and walked home at the same speed.
- He spent 1 minute looking for his book.
- He walked all the way to school at twice his original speed.

Use the Connect Line tool to finish a graph that accurately represents Jason's trip.



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TM (Matching Tables)

For each number, indicate whether it is rational or irrational.

	Rational	Irrational
$\frac{4}{7}$	<input type="checkbox"/>	<input type="checkbox"/>
$\sqrt{30}$	<input type="checkbox"/>	<input type="checkbox"/>
$\frac{21}{\sqrt{4}}$	<input type="checkbox"/>	<input type="checkbox"/>
π	<input type="checkbox"/>	<input type="checkbox"/>
-27	<input type="checkbox"/>	<input type="checkbox"/>

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TI (Insert Table) High School Level

At a local fair, the price of admission includes the opportunity for a person to spin a wheel for free ride tickets.

- Each spin of the wheel is a random event.
- The result from each spin of the wheel is independent of the results of previous spins.
- Each spin of the wheel awards tickets according to the probabilities shown below.

Spin the Wheel

1 ticket	35%
2 tickets	25%
3 tickets	20%
5 tickets	15%
10 tickets	5%

Let X be the number of tickets a person wins based on 2 spins. There are 13 possible values for X .

Some values of X are more common than others. For example, winning only 2 tickets in 2 spins is a somewhat common occurrence with probability 0.1225. It means the person wins 1 ticket on the first spin and 1 ticket on the second spin ($0.35 \cdot 0.35$). A list of the possible values of X and the corresponding probabilities for most values of X is shown below.

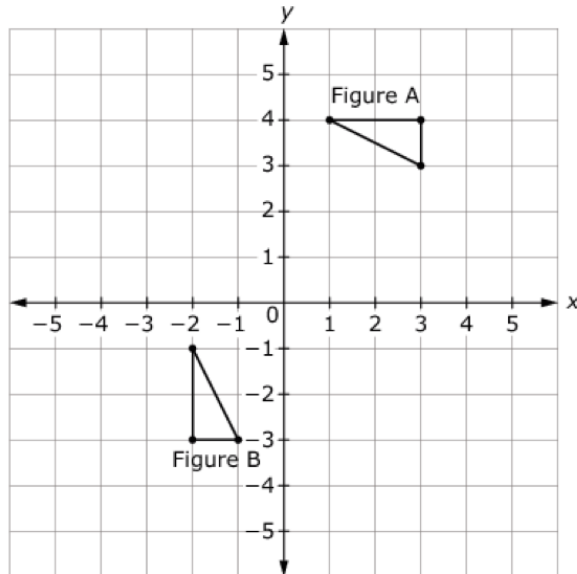
Fill in the three missing probability values in the table.

X	Probability
2	0.1225
3	0.1750
4	<input type="text"/>
5	0.1000
6	0.1450
7	0.0750
8	0.0600
10	<input type="text"/>
11	0.0350
12	0.0250
13	<input type="text"/>
15	0.0150
20	0.0025

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ST (Short Text)

Two figures are shown on the coordinate grid.



Show that Figure A and Figure B are congruent by describing a sequence of basic transformations that maps Figure A onto Figure B. In your response, be sure to identify the transformations in the order they are performed.