About the Practice Test Scoring Guides

The Smarter Balanced Mathematics Practice Test Scoring Guides provide details about the items, student response types, correct responses, and related scoring considerations for the Smarter Balanced Practice Test items. The items selected for the Practice Test are designed to reflect

- a broad coverage of claims and targets that closely mirror the summative blueprint.
- a range of student response types.
- a breadth of difficulty levels across the items, ranging from easier to more difficult items.
- a sample of performance tasks with open-ended response types that allow students to demonstrate knowledge related to critical thinking and application.

It is important to note that all student response types are not fully represented on every practice test, but a distribution can be observed across all the practice tests. The items presented are reflective of refinements and adjustments to language based on pilot test results and expert recommendations from both content and accessibility perspectives.

Within this guide, each item is presented with the following information¹:

- Claim
- Domain
- Target²
- Depth of Knowledge (DOK)
- Common Core State Standards for Mathematical Content (CONTENT)
- Common Core State Standards for Mathematical Practice (MP)
- Answer key or exemplar
- Static presentation of the item
- Static presentation of student response field(s)
- Rubric and applicable score points for each item

The following items are representative of the kinds of items that students can expect to experience when taking the Computer Adaptive Test (CAT) portion of the summative assessment for Grade 8. A separate document is available that provides a Grade 8 sample performance task and scoring guide.

¹ Most of these terms (Claim, Domain, Target, DOK, etc.) are defined in various other Smarter Balanced documents, as well as the Common Core State Standards for Mathematics. Refer to the Content Specifications for the Summative Assessment of the Common Core State Standards for Mathematics for more information.

² When more than one target is presented, the first one listed is considered the primary target for the item.
### 1860

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

**Exemplar:** (shown at right)
- \( \frac{3}{10} \) at 0.3
- \( \sqrt{\frac{4}{5}} \) at 0.4
- \( \frac{\pi}{5} \) just to the right of 0.6

**Rubric:**
(2 points) Student places all three values at the correct positions on the number line.

(1 point) Student places two of the three values at the correct positions on the number line.

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<table>
<thead>
<tr>
<th>Item</th>
<th>Claim</th>
<th>Domain</th>
<th>Target</th>
<th>DOK</th>
<th>CONTENT</th>
<th>MP</th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>1</td>
<td>NS</td>
<td>A</td>
<td>2</td>
<td>8.NS.A.2</td>
<td>6</td>
<td>See exemplar</td>
</tr>
</tbody>
</table>
For each number, indicate whether it is rational or irrational.

<table>
<thead>
<tr>
<th>Rational</th>
<th>Irrational</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{4}{7}$</td>
<td></td>
</tr>
<tr>
<td>$\sqrt{30}$</td>
<td></td>
</tr>
<tr>
<td>$\frac{21}{\sqrt{4}}$</td>
<td></td>
</tr>
<tr>
<td>$\pi$</td>
<td></td>
</tr>
<tr>
<td>$-27$</td>
<td></td>
</tr>
</tbody>
</table>

**Exemplar:** (shown at right)

**Rubric:** (1 point) Student correctly classifies each number as rational or irrational (R,I,R,I,R).
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?

**Key:** 18

**Rubric:** (1 point) Student enters the correct side length.
Approximately $7.5 \times 10^5$ gallons of water flow over a waterfall each second. There are $8.6 \times 10^4$ seconds in 1 day. Select the approximate number of gallons of water that flow over the waterfall in 1 day.

- **A** $6.45 \times 10^{21}$
- **B** $6.45 \times 10^{20}$
- **C** $6.45 \times 10^{10}$
- **D** $6.45 \times 10^9$

**Key:** C

**Rubric:** (1 point) Student selects the correct expression for the number of gallons of water that flow over the waterfall in 1 day.
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.

**Exemplar:** (shown at right)

**Rubric:** (1 point) Student correctly graphs all three line segments.
1870

Use the Connect Line tool to draw the image of the figure after the following transformations:

- a reflection over the x-axis
- a horizontal translation 7 units to the left

Exemplar: (shown at right)

Rubric:
(2 points) Student correctly reflects and translates all points.

(1 point) Figure is reflected over the x-axis correctly; no translation. OR
Figure is translated but not rotated.
Consider this graph of a line.

Enter an equation for the line.

Key: \( y = -\frac{1}{3}x \) or its equivalent.

Rubric: (1 point) Student enters a correct equation.
Coffee costs $2.00 per pound at a coffee shop.

Use the Add Arrow tool to draw a ray that shows the proportional relationship between the number of pounds of coffee purchased and the total cost.

**Exemplar:** (shown at right)

**Rubric:** (1 point) Student graphs a ray with a vertex at the origin and a slope of 2.
<table>
<thead>
<tr>
<th>Item</th>
<th>Claim</th>
<th>Domain</th>
<th>Target</th>
<th>DOK</th>
<th>CONTENT</th>
<th>MP</th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1</td>
<td>G</td>
<td>H</td>
<td>2</td>
<td>8.G.B.7</td>
<td>N/A</td>
<td>12</td>
</tr>
</tbody>
</table>

1816

A 13-foot ladder is leaning on a tree. The bottom of the ladder is on the ground at a distance of 5 feet from the base of the tree. The base of the tree and the ground form a right angle as shown.

Enter the distance, in feet, between the ground and the top of the ladder.

**Key:** 12 or its equivalent

**Rubric:** (1 point) Student enters the correct distance.
The points show different locations in Joe's town. Each unit represents 1 mile.

**Places in Joe’s Town**

Enter the shortest distance, in miles, between Joe's home and the park. Round your answer to the nearest tenth.

**Key:** 3.6

**Rubric:** (1 point) Student enters the distance rounded to the nearest tenth of a mile.
A cone with radius 4 feet is shown. Its approximate volume is 165 cubic feet.

Enter the height of the cone, in feet. Round your answer to the nearest hundredth.

Key: 9.84 – 9.85

Rubric: (1 point) Student enters the correct height within the indicated range (to accommodate different acceptable values of pi).
Use the Add Arrow tool to graph a system of two equations that has a single solution of \((-2, -3)\).

**Exemplar:** (shown at right)
Other correct solutions are possible.

**Rubric:** (1 point) Student correctly graphs \(y = -5x - 5\) and \(y = x - 1\) OR any two lines that intersect only at \((-2, -3)\).
Joe solved this linear system correctly.

\[ 6x + 3y = 6 \]

\[ y = -2x + 2 \]

These are the last two steps of his work.

\[ 6x - 6x + 6 = 6 \]

\[ 6 = 6 \]

Which statement about this linear system must be true?

A. \( x \) must equal 6
B. \( y \) must equal 6
C. There is no solution to this system.
D. There are infinitely many solutions to this system.

**Key:** D

**Rubric:** (1 point) Student selects the correct statement.
Drag a number into each box to create an equation that has no solution.

Exemplar: (shown at right) Other correct solutions are possible.

Rubric: (1 point) Student creates an equation with no solutions.

Other correct responses:
- Any equation with a slope of 4 and an intercept that is not 2.

$$8x - 3x + 2 - x = \_\_x + \_\_$$
Segment $FG$ begins at point $F(-2, 4)$ and ends at point $G(-2, -3)$. The segment is translated by $<x - 3, y + 2>$ and then reflected across the $y$-axis to form segment $F'G'$.

How many units long is segment $F'G'$?

A 0
B 2
C 3
D 7

Key: D

Rubric: (1 point) Student selects the correct segment length.
Item: #16  
Claim: 3  
Domain: G  
Target: G  
DOK: 3  
CONTENT: 8.G.A.3  
MP: 2  
Key: See exemplar

1845

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 \( \frac{2}{3} \).

**Exemplar:** (shown at right)  
**Rubric:** (1 point) Student correctly selects the second and fourth statements.
Consider this graph of a line.

Which equation has a rate of change greater than the rate of change for the line shown?

A  \( y = 3x - 1 \)

B  \( y = \frac{x}{2} + 4 \)

C  \( y = 2x + 2 \)

D  \( y = \frac{x}{3} - 3 \)

Key: A

Rubric: (1 point) Student selects the correct equation.
2042

Consider this equation.

\[ c = ax - bx \]

Joseph claims that if \( a, b, \) and \( c \) are non-negative integers, then the equation has exactly one solution for \( x \).

Select all cases that show Joseph’s claim is incorrect.

- \( a - b = 1, c = 0 \)
- \( a = b, c \neq 0 \)
- \( a = b, c = 0 \)
- \( a - b = 1, c \neq 1 \)
- \( a \neq b, c = 0 \)

Exemplar: (shown at right)

Rubric: (1 point) Student correctly selects the second and third options.

- \( a - b = 1, c = 0 \)
- \( a = b, c \neq 0 \)
- \( a = b, c = 0 \)
- \( a - b = 1, c \neq 1 \)
- \( a \neq b, c = 0 \)
John and Kim wrote down two different functions that have the same rate of change.

John's function is represented by the table shown.

<table>
<thead>
<tr>
<th>$x$</th>
<th>$y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>-5</td>
</tr>
<tr>
<td>1</td>
<td>-1</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Use the Add Arrow tool to graph a function that could be Kim's function.

**Exemplar:** (shown at right)
Other correct graphs possible.

**Rubric:** (1 point) Student graphs the line $y = 2x$
*OR*
any line with a slope of 2 as long as the $y$-intercept is different than -3.
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.

**Exemplar 1:** 1st transformation is to reflect over the y-axis. 2nd transformation is to rotate 90° counter-clockwise about the origin. 3rd transformation is to translate right by 2 units.
Exemplar 2: 1st transformation is to reflect over the x-axis. 2nd transformation is to rotate 90° clockwise about the origin. 3rd transformation is to translate right by 2 units.

Other correct series of transformations are possible.

Rubric:
(2 points) Student describes three transformations with sufficient detail to prove that Figure A and Figure B are congruent.

(1 point) Student either describes all three transformations in general terms, without the degree of precision necessary to prove congruency (e.g., rotation, reflection, and translation) or correctly describes two out of three transformations and incorrectly describes the third (e.g., states the rotation is 180° instead of 90° or translates in the wrong direction or an incorrect number of units).
The base of triangle $ABC$ and the base of triangle $DEF$ lie on line $m$, as shown in the diagram.

Not drawn to scale

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.

**Exemplar:** (shown at right)

**Rubric:** (1 point) Student selects the correct symbols for both comparisons.
Line $a$ is shown on the graph. Use the Add Arrow tool to construct line $b$ on the graph so that:

- Line $a$ and line $b$ represent a system of linear equations with a solution of $(7, -2)$.
- The slope of line $b$ is greater than $-1$ and less than 0.
- The $y$-intercept of line $b$ is positive.

**Exemplar:** (shown at right) Other correct graphs are possible.

**Rubric:** (1 point) Student constructs a line that meets the stated requirements.
This table shows the linear relationship of the water level in a tank and time.

<table>
<thead>
<tr>
<th>Time (hr)</th>
<th>Water Level (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>20</td>
</tr>
</tbody>
</table>

Enter the rate of change of the water level, in feet per hour.

Key: –5 or its equivalent

Rubric: (1 point) Student enters a correct rate of change.
An empty corn silo in the shape of a cylinder is being filled with corn.

The silo is filled at a constant rate for a total of 10 hours. The table shows the amount of corn, in cubic feet, in the silo at the given number of hours after filling started.

<table>
<thead>
<tr>
<th>Number of Hours</th>
<th>Amount of Corn (cu ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>2475</td>
</tr>
<tr>
<td>5</td>
<td>4125</td>
</tr>
<tr>
<td>8</td>
<td>6600</td>
</tr>
</tbody>
</table>

Enter the percent of the silo that is filled with corn at 10 hours.
(Item #25 continued)

**Key:** 90.9 – 91

**Rubric:**
(2 points) Student enters a correct numerical value for the percent of volume that is filled at the end of 10 hours (accept values in the range 90.9 – 91).

(1 point) Student gives the amount filled after 10 hours (8250) but forgets to find the percentage of the filled amount to the volume OR student finds the volume of the silo only (9072.9 – 9073).
Kyle was given the following problem to solve.

A company sells baseball gloves and bats. The gloves regularly cost $30 and the bats regularly cost $90. The gloves are on sale for $4 off, and the bats are on sale for 10% off. The goal is to sell $1200 worth of bats and gloves each week. Last week, the store sold 14 gloves and 9 bats. Did the store meet its goal?

The steps Kyle used to solve the problem are shown. Select the first step that shows an error.

☐ **Step 1:**

\[
\begin{align*}
30 & \quad - \quad 4 \\
\hline
26 & \quad \text{Step 2:} \\
26 & \quad \times \quad 14 \\
\hline
364 & \quad \text{Step 3:} \\
90 & \quad \div \quad 0.9 \\
\hline
100 &
\end{align*}
\]

☐ **Step 4:**

\[
\begin{align*}
100 & \quad \times \quad 9 \\
\hline
900 & \quad \text{Step 5:} \\
900 & \quad + \quad 364 \\
\hline
1264 &
\end{align*}
\]

**Key:** Step 3

**Rubric:** (1 point) Student correctly selects the third step.

\[
\begin{align*}
90 & \quad \div \quad 0.9 \\
\hline
100 &
\end{align*}
\]
All 8th-grade students at a school answered Yes or No to the two survey questions shown.

- Do you have a cell phone?  Yes  No
- Do you have an MP3 player?  Yes  No

The same students responded to both questions. Complete the two-way frequency table to show the correct totals for the given data. You must complete all five cells of the table for a full credit response.

<table>
<thead>
<tr>
<th></th>
<th>MP3 Player</th>
<th>No MP3 Player</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell Phone</td>
<td>57</td>
<td>122</td>
<td></td>
</tr>
<tr>
<td>No Cell Phone</td>
<td>30</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Exemplar: (shown below)

<table>
<thead>
<tr>
<th></th>
<th>MP3 Player</th>
<th>No MP3 Player</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell Phone</td>
<td>57</td>
<td>122</td>
<td>179</td>
</tr>
<tr>
<td>No Cell Phone</td>
<td>30</td>
<td>65</td>
<td>95</td>
</tr>
<tr>
<td>Total</td>
<td>87</td>
<td>187</td>
<td>274</td>
</tr>
</tbody>
</table>

Rubric: (1 point) Student fills in the table for all five cells with correct totals.
This graph shows a proportional relationship between the amount of money in Jack's savings account and the number of weeks Jack has been saving money.

Select the statement that correctly reflects what is shown in the graph.

A. The slope of the line is \( \frac{6}{1} \) so Jack's savings rate is $6 every week.

B. The slope of the line is \( \frac{6}{1} \) so Jack's savings rate is $1 every 6 weeks.

C. The slope of the line is \( \frac{1}{6} \) so Jack's savings rate is $6 every week.

D. The slope of the line is \( \frac{1}{6} \) so Jack's savings rate is $1 every 6 weeks.

Key: A

Rubric: (1 point) Student selects the correct statement.