Computer-Based Sample Test Scoring Guide
Grade 8 Math

Updated September 2019

Prepared by the Arizona Department of Education
About the Sample Test Scoring Guide

The AzM2 Sample Test Scoring Guides provide details about the items, student response types, correct responses, and related scoring considerations for AzM2 Sample Test items.

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

- Item number
- Cluster
- Content Standard
- Depth of Knowledge (DOK)
- Static presentation of the item
- Static presentation of student response field (when appropriate)
- Answer key, rubric or exemplar
- Applicable score point(s) for each item

The items included in this guide are representative of the kinds of items that students can expect to experience when taking the computer-based test for AzM2 Grade 8 Math.
Grade 8 Math Sample Test

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Cluster</th>
<th>Content Standard</th>
<th>DOK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8.EE.C</td>
<td>8.EE.C.8</td>
<td>2</td>
</tr>
</tbody>
</table>

A system of equations is shown.

\[2x - y = 15\]
\[y = 9\]

What is the value of \(x\) in the solution to this system?

\[12\]

(1 Point) Student entered 12 or any equivalent value.
Kelly is running home from the park. The function shown gives her distance, \( d \), in miles, from home after \( t \) minutes.

\[ d = -0.15t + 2.3 \]

What does \(-0.15\) represent in this function?

- the number of minutes Kelly has been running
- the total distance from home after each minute
- the total distance from home when Kelly began running
- the rate at which the distance from home changes each minute

(1 Point) Student selected the correct option.
Two cylinders, A and B, are created.
• Cylinder A has volume $V$.
• Cylinder B has the same height as cylinder A.
• Cylinder B has half the diameter of cylinder A.

Create an expression that represents the volume of cylinder B in terms of $V$.

$$\left(\frac{1}{4}\right)V$$

(1 Point) Student entered $\left(\frac{1}{4}\right)V$ or any equivalent expression.
A system of linear equations has no solutions. One of the equations of the system is shown.

\[ y = 2x - 1 \]

Which equation could be the other equation of the system?

- \( y = -\frac{1}{2}x + 1 \)
- \( y = -2x - 1 \)
- \( y = \frac{1}{2}x + 2 \)
- \( y = 2x + 2 \)

(1 Point) Student selected the correct option.
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Point R has coordinates \((a, b)\). The point is reflected across the \(x\)-axis and then translated 5 points to the right to create point \(S\).

Create an expression that represents the \(y\)-coordinate of \(S\).

\(-b\)

(1 point) Student entered \(-b\) or any equivalent expression.
### Item Number 6

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Cluster</th>
<th>Content Standard</th>
<th>DOK</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>8.G.A</td>
<td>8.G.A.4</td>
<td>1</td>
</tr>
</tbody>
</table>

Parallelograms $ABCD$ and $WXYZ$ are shown.

Karen wants to show that the two parallelograms are similar using transformations.

What transformation must Karen use?

- dilation
- reflection
- rotation
- translation

**1 point** Student selected the correct option.
Select all of the equations that represent linear functions.

- $y = x$  ✔
- $y = 2x$  ✔
- $y = x^2$  
- $y = \frac{2}{x}$  
- $y = \frac{x}{2}$  ✔

(1 Point) Student selected the three correct equations.
A linear function contains the three ordered pairs shown in the table.

<table>
<thead>
<tr>
<th>n</th>
<th>g</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

Create an equation for a different linear function that has twice the rate of change and the same initial value as the one represented by the table.

\[ g = n + \left( \frac{7}{2} \right) \]

(1 point) Student entered a correct equation \( g = n + \left( \frac{7}{2} \right) \) or any equivalent equation.
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(1 point) Student selected the correct option.
A farm has two cylindrical silos for storing grain as shown.

![Diagram of two cylindrical silos](image)

How much greater is the volume, in cubic feet, of the larger silo than the smaller silo?

\[ \text{Volume}_\text{large} - \text{Volume}_\text{small} = 2160\pi \]

(1 Point) Student entered \(2160\pi\); any value from 6782 to 6789, inclusive.
The cost of a product, $C$, remains constant over time, $t$.

Use the Add Arrow tool to create a graph that could represent this situation.

(1 point) Student created a correct graph.
The table shows the average distance from the sun for each of three planets, rounded to three significant figures.

<table>
<thead>
<tr>
<th>Planet</th>
<th>Average Distance from Sun (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earth</td>
<td>$9.30 \times 10^7$</td>
</tr>
<tr>
<td>Mars</td>
<td>$1.42 \times 10^8$</td>
</tr>
<tr>
<td>Jupiter</td>
<td>$4.84 \times 10^8$</td>
</tr>
</tbody>
</table>

The average distance from Earth to the sun is defined as 1 astronomical unit.

What is the distance, in astronomical units, from Mars to Jupiter? Round your answer to the nearest hundredth.

(1 point) Student entered 3.68; any value between 3.67 and 3.68, inclusive.
Mark recorded the diameter of the same tree trunk every year for 10 years. He modeled the data with the equation shown, where \( d \) is the diameter, in inches, of the tree trunk after \( y \) years.

\[ d = 0.47y + 0.25 \]

According to the model, which statement about the tree trunk is true?

A. Over the next year, the diameter of the tree trunk will grow exactly 0.25 inch.

B. Over the next year, the diameter of the tree trunk will grow exactly 0.47 inch.

C. Each year, on average, the diameter of the tree trunk increased by 0.25 inch.

D. Each year, on average, the diameter of the tree trunk increased by 0.47 inch.

(1 point) Student selected the correct option.
An inequality is shown, where $b$ is an integer.

$4.5 < \sqrt{b} < 4.9$

What is a possible value of $b$?

21

(1 point) Student entered 21, 22, 23, or 24.
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<tr>
<td>15</td>
<td>8.G.B</td>
<td>8.G.B.8</td>
<td>2</td>
</tr>
</tbody>
</table>

Point $A$ has an $x$-coordinate of $-6$ and is 10 units away from the origin.

Use the Add Point tool to plot a possible location for point $A$.

**1 point** Student created a correctly plotted point.
Select all the tables with data that represent a function.

- $x$ $y$
  - 5 5
  - 5 10
  - 10 15
  - 10 20

- $x$ $y$
  - 5 5
  - 15 5
  - 15 10
  - 20 10

- $x$ $y$
  - 1 3
  - 2 6
  - 3 9
  - 4 12

- $x$ $y$
  - 12 6
  - 18 9
  - 24 6
  - 24 4

(1 point) Student selected the two correct tables.
<table>
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<tr>
<td>17</td>
<td>8.EE.A</td>
<td>8.EE.A.1</td>
<td>3</td>
</tr>
</tbody>
</table>

An equation is shown.

\[(\frac{1}{6})^p = 36^3 \cdot 6^{18}\]

What is the value of \(p\)?

\[-24\]

(1 Point) Student entered -24 or any equivalent value.
A linear function is modeled in the table as shown.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>16</td>
<td>14</td>
</tr>
</tbody>
</table>

A second function has a greater slope and a larger y-intercept than the function modeled in the table.

Which equation could represent the second function?

- A \[ y = \frac{1}{4} x + 2 \]
- B \[ y = \frac{1}{2} x + 6 \]
- C \[ y = \frac{1}{5} x + 12 \]
- D \[ y = \frac{1}{2} x + 14 \]

(1 point) Student selected the correct option.
<table>
<thead>
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<tr>
<td>19</td>
<td>8.NS.A</td>
<td>8.NS.A.2</td>
<td>3</td>
</tr>
</tbody>
</table>

Consider the equation $a^b = b^a$, where $a$ and $b$ are two different whole numbers.

- What is the value of $a$?
- What is the value of $b$?

Enter each answer on a separate line.

2

4

(1 point) Student entered 2 or any equivalent value for $a$ and 4 or any equivalent value for $b$. 
What is $0.\overline{83}$ written as a fraction?

\[
\frac{5}{6}
\]

(1 point) Student entered $\frac{5}{6}$ or any equivalent fraction.
Charlie and Susan are planning a party for 10 people. Charlie finds a location that charges an initial fee of $20 plus $25 per person.

Susan finds a location whose rental fee is represented by the equation $y = 15x + 100$, where $x$ is the number of people in attendance and $y$ is the total cost.

Select all the statements that are true.

- Charlie’s location is a cheaper location.
- Susan’s location is cheaper for 10 people.
- The charge for each additional person is greater for Susan’s location.
- The charge for each additional person is greater for Charlie’s location.
- If the number of people at the party changes to 12, the total cost at each location is the same.

(1 Point) Student selected the two correct statements.
Select whether each equation has no solution, one solution, or infinitely many solutions.

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</thead>
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<td>22</td>
<td>8.EE.C</td>
<td>8.EE.C.7</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equation</th>
<th>No solution</th>
<th>One solution</th>
<th>Infinitely many solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>$7x + 10 = 7x + 10$</td>
<td>☐</td>
<td>☐</td>
<td>✔</td>
</tr>
<tr>
<td>$4x = 4x + 3$</td>
<td>✔</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>$5x + 3 = 2x - 3$</td>
<td>☐</td>
<td>✔</td>
<td>☐</td>
</tr>
<tr>
<td>$2x + 8 = 3 + 2x$</td>
<td>✔</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

(1 point) Student selected the correct option for each example.
An equation is shown.

\[ n^2 = 43 \]

Select all of the values that represent solutions to this equation.

- [ ] \(-43^2\)
- [x] \(-\sqrt{43}\)
- [x] \(\sqrt{43}\)
- [ ] \(\left(\frac{1}{2}\right)43\)
- [ ] \(43^2\)

*(1 point)* Student selected the two correct values.
The number of coffee sales during each hour after a bakery opens is shown on the graph.

Select a word or phrase for each blank box to correctly complete the sentence about the graph.

The graph shows a negative association because the coffee sales decrease as the number of hours after opening increases.

(1 point) Student selected “a negative” from first dropdown, and “decrease” from second dropdown.
Kierra conducts a survey in her neighborhood to find out how many males and females attend summer camp. Part of her survey results are shown.

Enter values in the blanks to complete the table for Kierra’s survey results.

<table>
<thead>
<tr>
<th>Attends</th>
<th>Does Not Attend</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Female</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>16</td>
</tr>
</tbody>
</table>

(1 point) Student enters the correct value in each blank box.