MATHEMATICS TEST DIRECTIONS

On the following pages are the mathematics questions.

- You may not use a calculator for questions 1–2. You may use a calculator for all other questions on this test.

Directions for Multiple-Choice Questions

Some questions will ask you to select an answer from among four choices.

For the multiple-choice questions:

- First solve the problem on scratch paper.
- Choose the correct answer and record your choice in the answer booklet.
- If none of the choices matches your answer, go back and check your work for possible errors.
- Only one of the answers provided is the correct response.

Directions for Open-Ended Questions

Some questions will require you to write your response.

For the open-ended questions:

- These questions have more than one part. Be sure to read the directions carefully.
- You cannot receive the highest score for an open-ended question without completing all tasks in the question. For example, if the question asks you to show your work or explain your reasoning, be sure to show your work or explain your reasoning in the space provided.
- If the question does **not** ask you to show your work or explain your reasoning, you may use the space provided, but only those parts of your response that the question specifically asks for will be scored.
- Write your response in the appropriate location within the response box in the answer booklet. Some answers may require graphing, plotting, labeling, drawing, or shading. If you use scratch paper, be sure to transfer your final response and any needed work or reasoning to the answer booklet.

Question 1 in this sampler is to be solved without the use of a calculator.

MULTIPLE-CHOICE ITEMS

1. What is $\sqrt[3]{8}$?

A. 2
B. 3
C. 4
D. 5

Item Information	
Alignment	B-E.1.1.2
Answer Key	A
Depth of Knowledge	1
p-value A	55% (correct answer)
p-value B	15%
p-value C	18%
p-value D	12%
Option Annotations	A. Correct: recognizes that $8 = 2 \bullet 2 \bullet 2 = 2^3$ B. selects the degree of the root C. either selects a factor of 8 OR divides 8 by 2 D. computes as $8 - 3$

Question 2 in this sampler is to be solved without the use of a calculator.

2. A national park covers approximately 3×10^5 acres of land. A state park covers approximately 5×10^3 acres of land. The land area of the national park is approximately how many times as many acres as the land area of the state park?

A. 6

B. 17

C. 60

D. 167

Item Information	
Alignment	B-E.1.1.3
Answer Key	C
Depth of Knowledge	2
p-value A	18%
p-value B	14%
p-value C	53% (correct answer)
p-value D	15%
Option Annotations	A. divides 3 by 5 but then multiplies the quotient (0.6) by 10 rather than by 10^2 B. divides 5 by 3 and then multiplies the quotient $\left(\frac{5}{3}\right)$ by 10 rather than by 10^2 C. Correct: recognizes 3×10^5 as the larger value, divides the coefficients as $\frac{3}{5} = 0.6$ and the powers of 10 as $\frac{10^5}{10^3} = 10^{5-3} = 10^2$, and then solves $0.6 \times 10^2 = 60$ D. divides 5 by 3 and then multiplies the quotient $\left(\frac{5}{3}\right)$ by 10^2

A calculator is permitted for use in solving questions 3–16 in this sampler.

3. Brian claims that the product of a rational number and an irrational number is always irrational. Which counterexample proves that Brian's claim is **not** true?

A. multiplying 0 by $\frac{2}{3}$

B. multiplying 0 by $\sqrt{2}$

C. multiplying $\frac{1}{2}$ by $\sqrt{2}$

D. multiplying $\sqrt{2}$ by $\sqrt{2}$

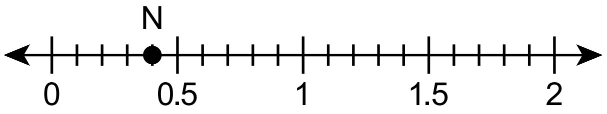
Item Information	
Alignment	A-N.1.1.1
Answer Key	B
Depth of Knowledge	2
p-value A	18%
p-value B	32% (correct answer)
p-value C	28%
p-value D	22%
Option Annotations	A. selects two rational numbers with a rational product B. Correct: recognizes that 0 is a rational number, $\sqrt{2}$ is an irrational number, and their product ($0 \bullet \sqrt{2} = 0$) is a rational number C. selects a rational number and irrational number whose product is irrational rather than rational D. selects two irrational numbers with a rational product

4. One number in the list below is a rational number.

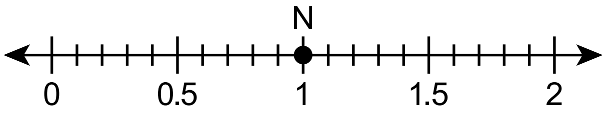
$$\frac{\sqrt{2}}{2} \qquad \frac{\sqrt{6}}{2} \qquad \frac{\sqrt{27}}{15} \qquad \frac{\sqrt{36}}{15}$$

Which number line shows point N located at the value of the rational number?

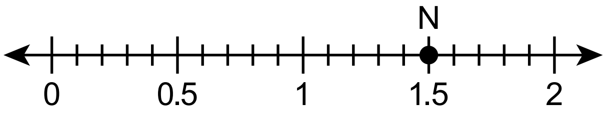
A.



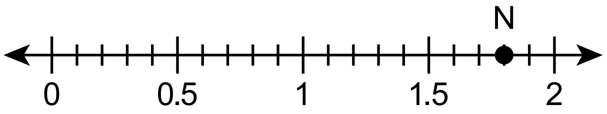
B.



C.



D.



Item Information	
Alignment	A-N.1.1.5 A-N.1.1.1
Answer Key	A
Depth of Knowledge	2
p-value A	39% (correct answer)
p-value B	34%
p-value C	14%
p-value D	13%
Option Annotations	A. Correct: recognizes that $\frac{\sqrt{36}}{15}$ is equal to $\frac{6}{15}$, which is equivalent to 0.4 B. evaluates $\frac{\sqrt{2}}{2}$ as $\sqrt{\frac{2}{2}} = \sqrt{1} = 1$ C. evaluates $\frac{\sqrt{6}}{2}$ as $\frac{6 \div 2}{2} = \frac{3}{2} = 1.5$ (i.e., considers the square root symbol to mean "divide by 2") D. evaluates $\frac{\sqrt{27}}{15}$ as $\frac{27}{15} = 1.8$ (i.e., does not consider the square root symbol)

5. Solve for x: $7^2 = x^2 - 3^2$

A. $\sqrt{10}$

B. $\sqrt{20}$

C. $\sqrt{42}$

D. $\sqrt{58}$

Item Information	
Alignment	B-E.1.1
Answer Key	D
Depth of Knowledge	1
p-value A	18%
p-value B	15%
p-value C	21%
p-value D	46% (correct answer)
Option Annotations	A. calculates $\sqrt{7 + 3}$ B. uses $7^2 = 14$ and $3^2 = 6$ to calculate $\sqrt{14 + 6}$ C. calculates $\sqrt{7 \bullet 3 \bullet 2}$ D. Correct: solves as $7^2 = x^2 - 3^2 \rightarrow 49 = x^2 - 9 \rightarrow 58 = x^2 \rightarrow \sqrt{58} = x$

6. Kevin writes the population of his city in the form $a \times 10^5$. He also writes the average income of the people in his city in the form $b \times 10^4$. To find the total income for all the people in his city, he multiplies his two values. Kevin says his product will be of the form $c \times 10^9$ when written in scientific notation. Which statement explains whether Kevin is correct?

A. Kevin is correct only if $ab < 10$.

B. Kevin is correct only if $a + b < 10$.

C. Kevin is not correct because the exponents are subtracted when multiplying powers with the same base, and $5 - 4 = 1$.

D. Kevin is not correct because the exponents are multiplied when multiplying powers with the same base, and $5 \times 4 = 20$.

Item Information	
Alignment	B-E.1.1.4
Answer Key	A
Depth of Knowledge	2
p-value A	34% (correct answer)
p-value B	30%
p-value C	17%
p-value D	19%
Option Annotations	A. Correct: multiplies the coefficients as *ab* and the powers as $10^5 \bullet 10^4 = 10^{5+4} = 10^9$, resulting in the product $ab \times 10^9$, and then recognizes that the form $c \times 10^9$ is in scientific notation only when *c* (which represents the product *ab*) is less than 10 [Note: since *a* and *b* are both at least 1 and less than 10, the product *ab* would also be at least 1 but less than 100] B. adds the coefficients rather than multiplying the coefficients C. subtracts the exponents D. multiplies the exponents

Item Information	
Alignment	B-E.2.1
Answer Key	C
Depth of Knowledge	2
p-value A	15%
p-value B	18%
p-value C	59% (correct answer)
p-value D	8%
Option Annotations	A. determines the rate of change in cups of sugar for every $\frac{1}{3}$ cup of butter B. determines the amount of change in cups of sugar from $\frac{1}{3}$ to 1 cup of butter C. Correct: either recognizes that $\frac{3}{4}$ cup of sugar is used for every $\frac{1}{3}$ cup of butter used, divides $\frac{3}{4}$ by $\frac{1}{3}$ to determine that $\frac{9}{4}$ cups of sugar would be used for 1 cup of butter, and then rewrites $\frac{9}{4}$ as $2\frac{1}{4}$ OR starting at the origin, recognizes that the pattern is "up 3, right 2" and extends this pattern from the point at $\left(\frac{2}{3}, 1\frac{1}{2}\right)$ to arrive at the ordered pair $\left(1, 2\frac{1}{4}\right)$, identifying the *y*-coordinate $\left(2\frac{1}{4}\right)$ as the number of cups of sugar for 1 cup of butter (the *x*-coordinate) D. sees that the amount of butter doubles from the first plotted point to the second plotted point, so doubles the *y*-coordinate $\left(1\frac{1}{2}\right)$ to locate the next point, thinking that the *x*-coordinate for that ordered pair will be 1 (i.e., does not consider that both coordinates should double)

Item Information	
Alignment	B-E.2.1.1
Answer Key	D
Depth of Knowledge	2
p-value A	13%
p-value B	7%
p-value C	9%
p-value D	71% (correct answer)
Option Annotations	A. determines the unit rate is $\frac{4}{9}$ (i.e., inverts the rate of change) B. determines the unit rate is 5 since 9 – 4 = 5 C. determines the unit rate is 4 since Kara uses 4 red lights D. Correct: either determines the unit rate is $\frac{9}{4}$ (purple lights over red lights) and identifies the graph that has a slope of $\frac{9}{4}$ OR recognizes that the ordered pairs should be (number of red lights, number of purple lights) and identifies the graph with a line that starts at (0, 0) and passes through (4, 9)

Item Information	
Alignment	B-E.2.1.2
Answer Key	D
Depth of Knowledge	2
p-value A	12%
p-value B	21%
p-value C	19%
p-value D	48% (correct answer)
Option Annotations	A. either determines the change in *x*-coordinates from right to left rather than from left to right OR calculates the slope using the change in *x*-coordinates divided by the change in *y*-coordinates (i.e., uses “run over rise” rather than “rise over run”) and uses this ratio as the ratio between the side lengths of the similar triangles B. recognizes that the side lengths of triangle B are twice the side lengths of triangle A, but calculates the slope using the change in *x*-coordinates divided by the change in *y*-coordinates (i.e., uses “run over rise” instead of “rise over run”) C. calculates the slope using the change in *y*-coordinates divided by the change in *x*-coordinates (i.e., uses “rise over run”), resulting in $\frac{-2}{3}$, but then uses the ratio between the lengths of the sides within similar triangles as the ratio (i.e., one leg in triangle B is $\frac{3}{2}$ the length of the other leg) D. Correct: calculates the slope of the line using the change in *y*-coordinates divided by the change in *x*-coordinates (i.e., uses “rise over run”), resulting in a slope of $\frac{-2}{3}$, and recognizes that the side lengths of triangle B are twice the lengths of the corresponding sides in triangle A

Item Information	
Alignment	B-E.2.1.3
Answer Key	C
Depth of Knowledge	1
p-value A	24%
p-value B	14%
p-value C	52% (correct answer)
p-value D	10%
Option Annotations	A. inverts the slope B. inverts the slope and uses the value of the inverted slope as the *y*-intercept C. Correct: recognizes that a line starting at the origin should be in the form $y = mx$ and that the slope (m) is calculated by dividing the change in *y*-coordinates by the change in *x*-coordinates (i.e., “rise over run”), resulting in a slope of $\frac{3}{1} = 3$ for this line D. calculates the slope but uses the value of the slope as the *y*-intercept

11. Solve: $3x + 8 = 2(x - 5) + x$

A. $x = {}^{-}18$

B. $x = 18$

C. no solutions

D. infinitely many solutions

Item Information	
Alignment	B-E.3.1.1
Answer Key	C
Depth of Knowledge	1
p-value A	14%
p-value B	16%
p-value C	56% (correct answer)
p-value D	14%
Option Annotations	A. distributes the 2 to $(x - 5)$ but omits the "$+ x$" and then solves the equation $3x + 8 = 2x - 10$ B. distributes the 2 to $(x - 5)$ and to the "$+ x$" and then solves the equation $3x + 8 = 2x - 10 + 2x$ C. Correct: distributes the 2 to $(x - 5)$, resulting in $2x - 10 + x$; combines like terms to simplify the expression to $3x - 10$; solves the equation $3x + 8 = 3x - 10$ by subtracting $3x$ from each side, resulting in $8 = {}^{-}10$; recognizes that $8 = {}^{-}10$ is a false statement, which means that the equation has no solutions D. solves the equation, resulting in $8 = {}^{-}10$, recognizes that $8 = {}^{-}10$ is a false statement, but interprets the false statement to mean that the equation has infinitely many solutions rather than no solutions

Item Information	
Alignment	B-F.1.1.2
Answer Key	A
Depth of Knowledge	2
p-value A	45% (correct answer)
p-value B	18%
p-value C	25%
p-value D	12%
Option Annotations	A. Correct: calculates the rate of change for function 1 by using the change in *y*-coordinates divided by the change in *x*-coordinates (i.e., "rise over run"), resulting in $\frac{3}{2}$, calculates the rate of change for function 2 by using the change in *y*-coordinates divided by the change in *x*-coordinates, resulting in $\frac{2-0}{0-{}^{-}3}=\frac{2}{3}$, and then compares the two rates of change B. calculates the rate of change for both functions by using the change in *x*-coordinates divided by the change in *y*-coordinates rather than the change in *y*-coordinates divided by the change in *x*-coordinates (i.e., uses "run over rise" rather than "rise over run") C. uses the *y*-intercept of each function as the rate of change, comparing 3 to 2 D. uses the *x*-intercept of each function as the rate of change, comparing $^{-}2$ to $^{-}3$, and considers $^{-}3$ to be greater since it is farther from 0 (i.e., compares the absolute values of the *x*-intercepts)

13. The table below represents a function of x.

x	y
$^-5$	0
$^-3$	2
$^-1$	4
1	6
3	8

Which statement about the function is true?

A. The function is increasing, has a y-intercept of 5, and has a slope of 1.

B. The function is decreasing, has a y-intercept of 5, and has a slope of 1.

C. The function is increasing, has a y-intercept of $^-5$, and has a slope of $^-1$.

D. The function is decreasing, has a y-intercept of $^-5$, and has a slope of $^-1$.

Item Information	
Alignment	B-F.2.1.1
Answer Key	A
Depth of Knowledge	2
p-value A	51% (correct answer)
p-value B	10%
p-value C	27%
p-value D	12%
Option Annotations	A. Correct: determines that the function is increasing since the *y*-values increase as the *x*-values increase, calculates the slope using the change in *y*-coordinates divided by the change in *x*-coordinates, resulting in $\frac{8-6}{3-1} = \frac{2}{2} = 1$, and then uses the slope to determine that the line would pass through the point (0, 5), making the *y*-intercept 5 B. sees the negative *x*-values and thinks this means the function is decreasing C. uses the *x*-intercept as the *y*-intercept and switches either the *x*-values or the *y*-values when determining the slope D. sees the negative *x*-values and thinks this means the function is decreasing, uses the *x*-intercept as the *y*-intercept, and switches either the *x*-values or the *y*-values when determining the slope

Item Information	
Alignment	B-F.2.1.2
Answer Key	C
Depth of Knowledge	2
p-value A	5%
p-value B	6%
p-value C	68% (correct answer)
p-value D	21%
Option Annotations	A. selects the interval with the only increase (+ 6) after a decrease (– 2) B. selects an interval with no change C. Correct: recognizes that from the 6-hour mark to the 7-hour mark, the *y*-values increase from 16 to 26, which is the greatest increase on the graph D. selects a decreasing interval

Item Information	
Alignment	D-S.1.1.1
Answer Key	C
Depth of Knowledge	1
p-value A	9%
p-value B	18%
p-value C	60% (correct answer)
p-value D	13%
Option Annotations	A. considers the least or leftmost point to be an outlier B. defines a cluster as a set of data points for which more than 1 data point has the same *x*-coordinate C. Correct: recognizes that, in general, the *y*-values increase as the *x*-values increase, and identifies this type of pattern as a positive correlation D. considers the association to be nonlinear since the data points do not lie on a single line

Item-Specific Scoring Guideline

#16 Item Information

Alignment	C-G.1 C-G.2.1.3	**Depth of Knowledge**	2	**Mean Score**	1.38

Assessment Anchor this item will be reported under:

M08.C-G.1—Demonstrate an understanding of geometric transformations.

Specific Anchor Descriptor addressed by this item:

M08.C-G.1.1—Apply properties of geometric transformations to verify congruence or similarity.

Scoring Guide

Score	In this item, the student . . .
4	Demonstrates a thorough understanding of geometric transformations by correctly solving problems and clearly explaining procedures.
3	Demonstrates a general understanding of geometric transformations by correctly solving problems and clearly explaining procedures with only minor errors or omissions.
2	Demonstrates a partial understanding of geometric transformations by correctly performing a significant portion of the required task.
1	Demonstrates minimal understanding of geometric transformations.
0	The response has no correct answer and insufficient evidence to demonstrate any understanding of the mathematical concepts and procedures as required by the task. Response may show only information copied from the question.

Top-Scoring Student Response and Training Notes

Score	Description
4	Student earns 4 points.
3	Student earns 3.0–3.5 points.
2	Student earns 2.0–2.5 points.
1	Student earns 0.5–1.5 points. OR Student demonstrates minimal understanding of geometric transformations.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

Top-Scoring Response

Part A (1 point):

1 point for correct answer

OR $\frac{1}{2}$ point for using $\sqrt{10}$ or for rounding incorrectly

What?	Why?
3.16 (units) **OR equivalent**	

Part B (1 point):

1 point for correct answer

What?	Why?
Answers may vary. Responses may be either two reflections (order does not matter) such that the lines of reflection are perpendicular and intersect at the origin or two dilations (order does not matter) such that the product of the scale factors is $^{-}1$ [*Note: For the PSSA, students may use the informal term "flip" rather than "reflection"; also, the center of dilation is the origin (unless stated otherwise), so students are not required to include the center of dilation as part of their response.*]. **Sample Responses:** transformation 1: reflection across the *x*-axis transformation 2: reflection across the *y*-axis **OR** transformation 1: dilation of $^{-}2$ transformation 2: dilation of 0.5	

Part C (1 point):

1 point for correct and complete explanation

OR $\frac{1}{2}$ point for correct but incomplete explanation

What?	Why?
	Sample Explanations: Figure A is congruent to figure A' because the corresponding sides have equal lengths and the corresponding angles have equal measurement. **OR** Figure A is congruent to figure A' because congruency is preserved under reflections. **OR equivalent**

Part D (1 point):

1 point for correct and complete explanation

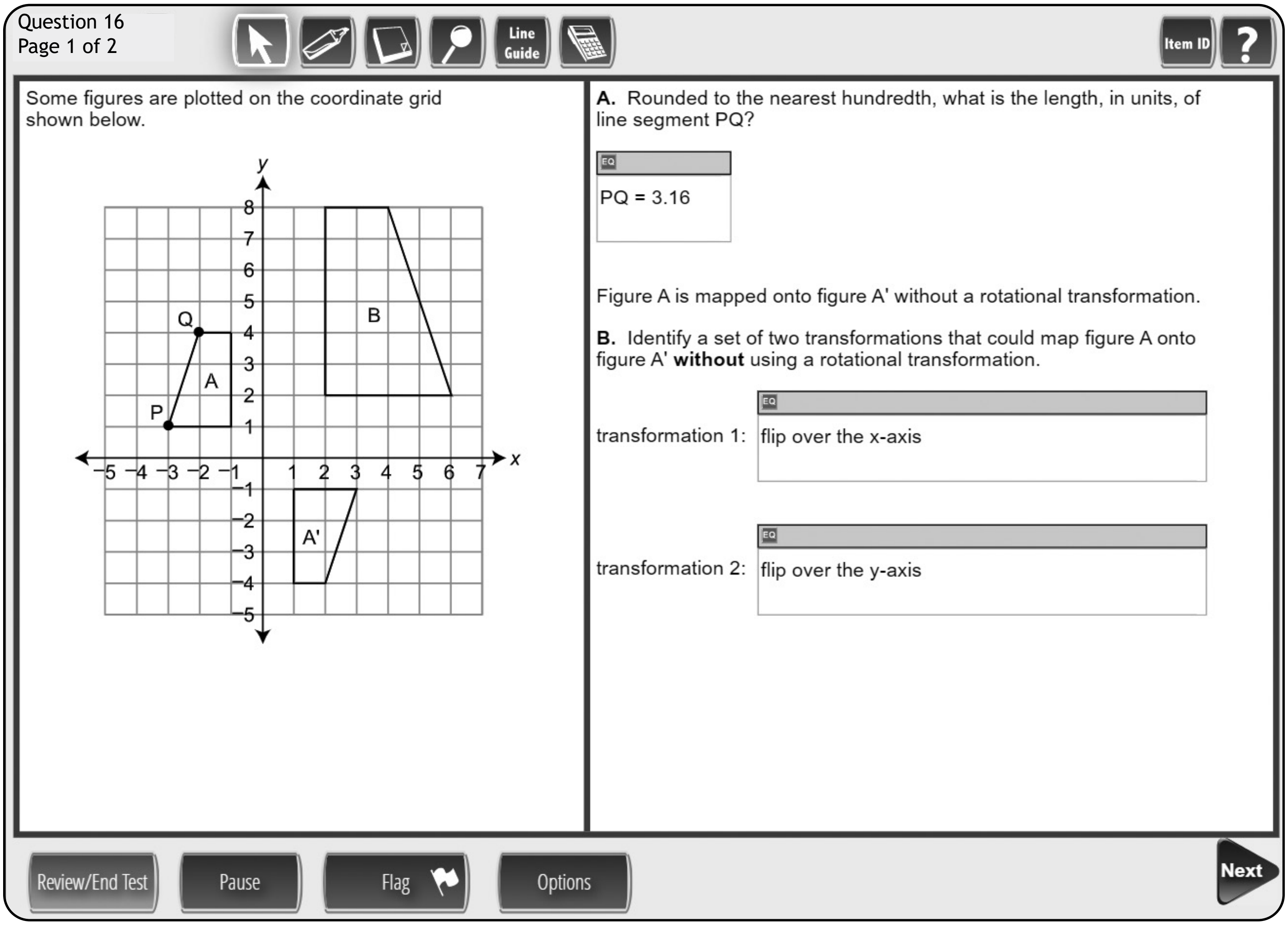
OR $\frac{1}{2}$ point for correct but incomplete explanation

What?	Why?
	Sample Explanation: Figure B is a larger version of figure A, with corresponding sides being in proportion and corresponding angles being equal. The only transformation that can increase/decrease the size of a figure, while preserving angle measures and keeping side lengths proportional, is a dilation. **OR equivalent**

STUDENT RESPONSE

Response Score: 4 points

PARTS A and B



Question 16
Page 1 of 2

Some figures are plotted on the coordinate grid shown below.

A. Rounded to the nearest hundredth, what is the length, in units, of line segment PQ?

PQ = 3.16

Figure A is mapped onto figure A' without a rotational transformation.

B. Identify a set of two transformations that could map figure A onto figure A' **without** using a rotational transformation.

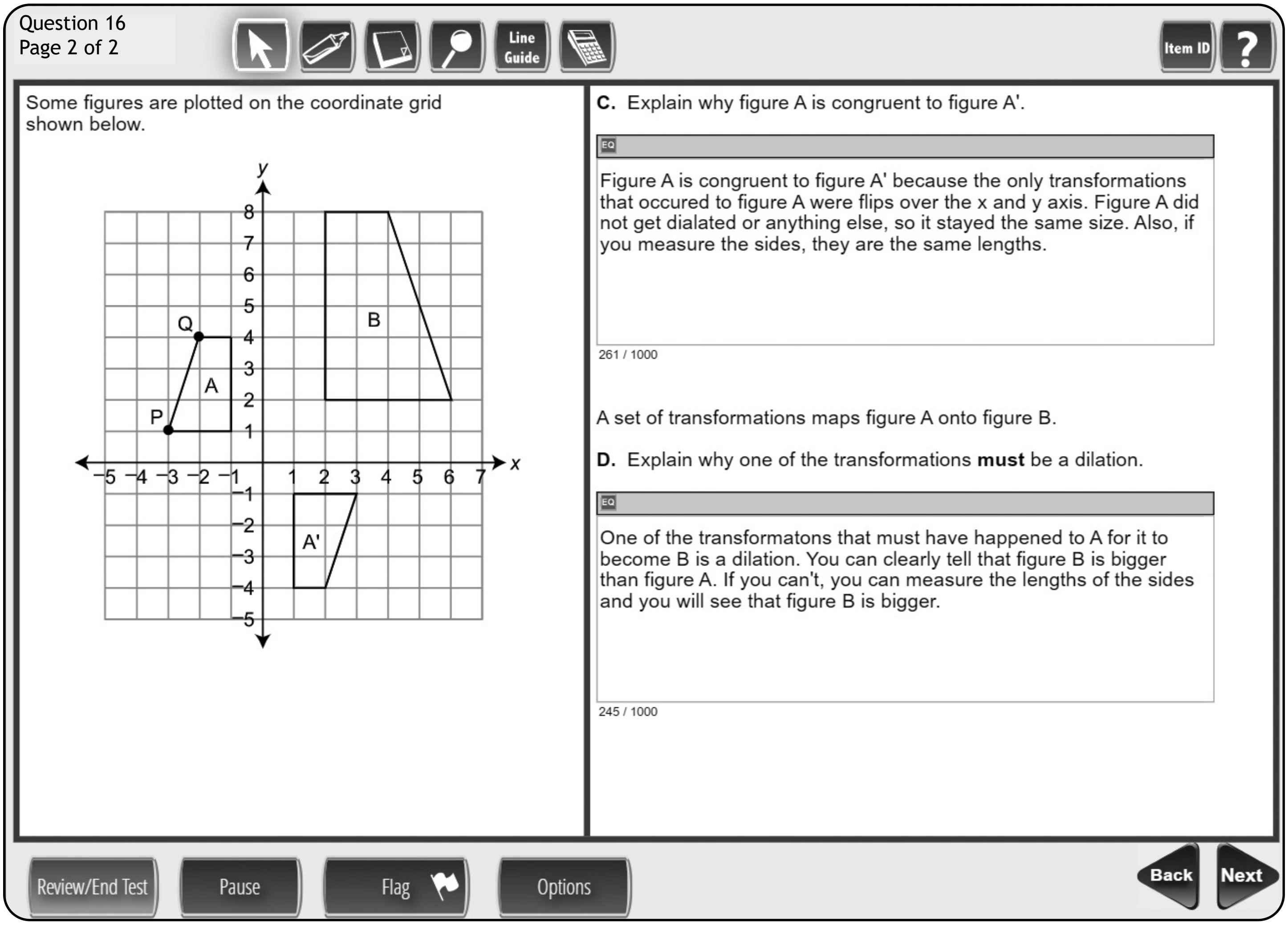
transformation 1: flip over the x-axis

transformation 2: flip over the y-axis

Part A. The student provided the correct answer (*PQ = 3.16*). While support is not required for Part A, the student likely used the Pythagorean theorem to solve the equation $3^2 + 1^2 = c^2$, simplified the left side as 9 + 1 = 10, calculated $\sqrt{10}$ as approximately 3.162, and then rounded to the nearest hundredth. [1 point]

Part B. The student correctly provided a set of two transformations (transformation 1: *flip over the x-axis* and transformation 2: *flip over the y-axis*) that could map figure A onto figure A’ without using a rotational transformation. [1 point]

PARTS C and D



Question 16
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Some figures are plotted on the coordinate grid shown below.

C. Explain why figure A is congruent to figure A'.

Figure A is congruent to figure A' because the only transformations that occured to figure A were flips over the x and y axis. Figure A did not get dialated or anything else, so it stayed the same size. Also, if you measure the sides, they are the same lengths.

261 / 1000

A set of transformations maps figure A onto figure B.

D. Explain why one of the transformations **must** be a dilation.

One of the transformatons that must have happened to A for it to become B is a dilation. You can clearly tell that figure B is bigger than figure A. If you can't, you can measure the lengths of the sides and you will see that figure B is bigger.

245 / 1000

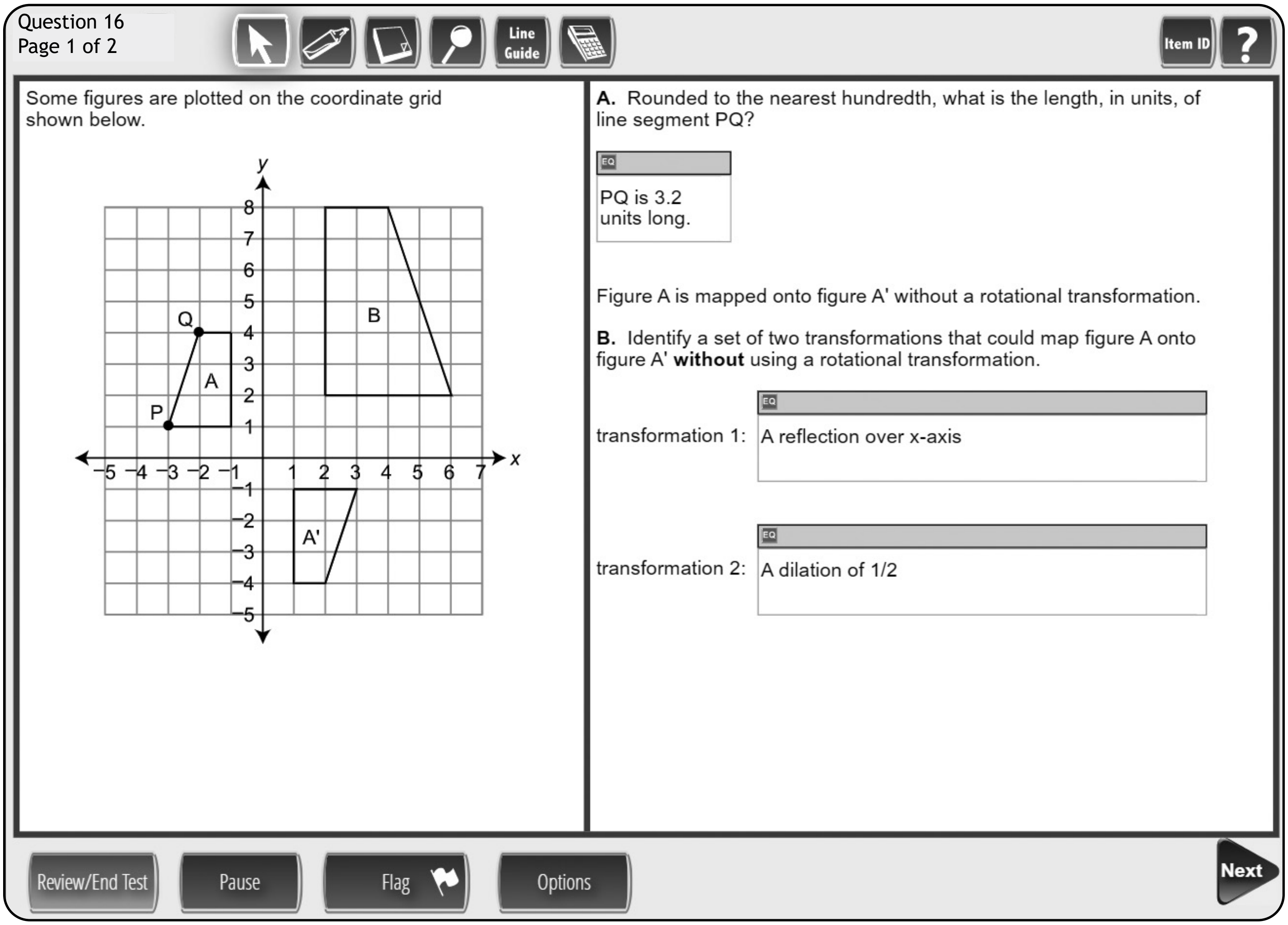
Part C. The student provided a correct explanation (*Figure A did not get dialated . . . so it stayed the same size. Also, if you measure the sides, they are the same lengths*) as to why figure A is congruent to figure A'. [1 point]

Part D. The student provided a correct explanation (*figure B is bigger than figure A*) as to why one of the transformations must be a dilation to map figure A onto figure B. [1 point]

STUDENT RESPONSE

Response Score: 2 points

PARTS A and B



Question 16
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Some figures are plotted on the coordinate grid shown below.

A. Rounded to the nearest hundredth, what is the length, in units, of line segment PQ?

PQ is 3.2 units long.

Figure A is mapped onto figure A' without a rotational transformation.

B. Identify a set of two transformations that could map figure A onto figure A' **without** using a rotational transformation.

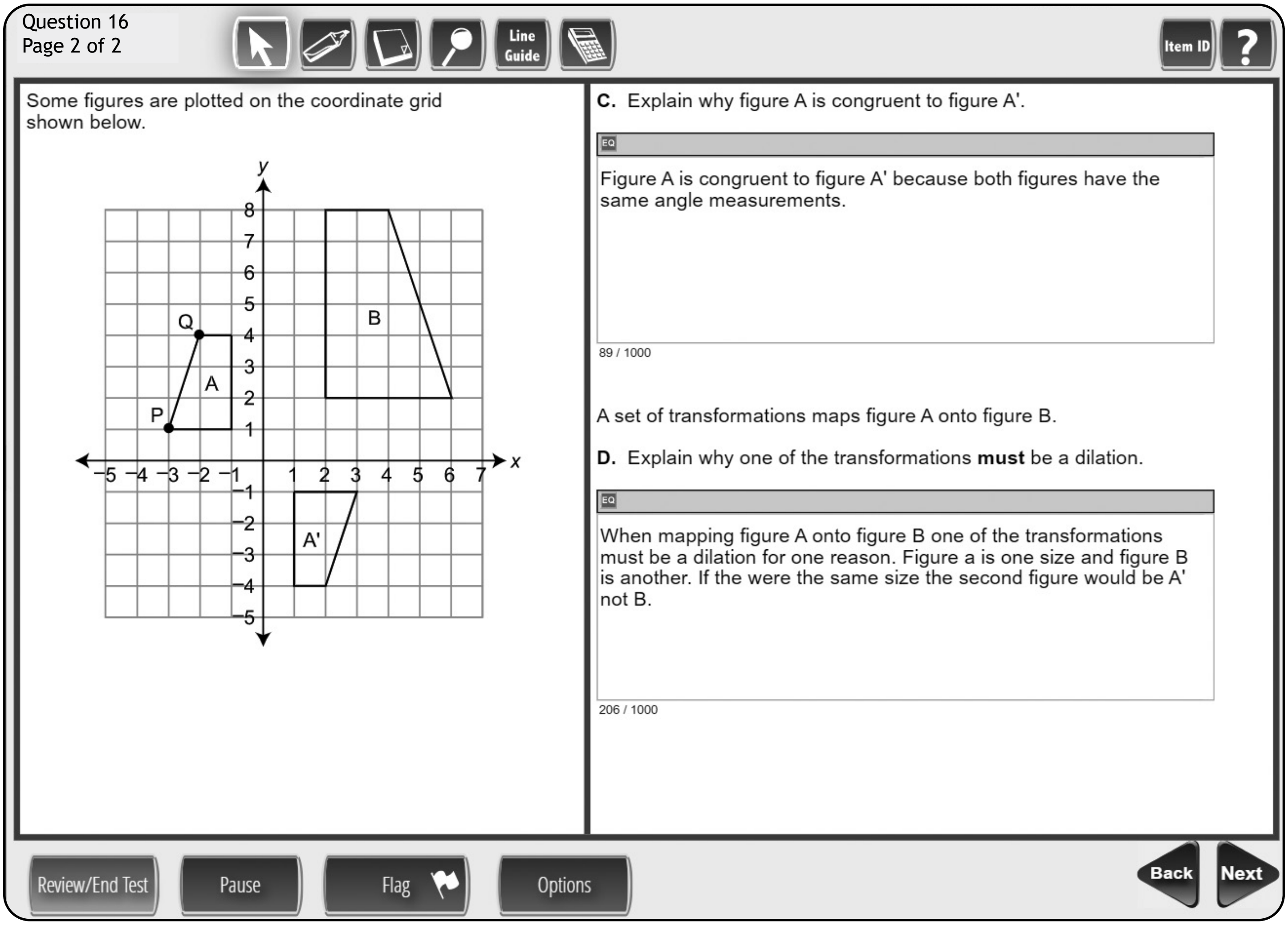
transformation 1: A reflection over x-axis

transformation 2: A dilation of 1/2

Part A. The student provided an answer correctly rounded to the nearest tenth (*3.2 units*) rather than to the nearest hundredth. While support is not required for Part A, the student likely used the Pythagorean theorem to solve the equation $3^2 + 1^2 = c^2$, simplified the left side as 9 + 1 = 10, calculated $\sqrt{10}$ as approximately 3.162, and then rounded to the nearest tenth. [0.5 points]

Part B. The student provided an incorrect set of two transformations (transformation 1: *A reflection over x-axis* and transformation 2: *A dilation of* $\frac{1}{2}$) that could map figure A onto figure A’ without using a rotational transformation. Both transformations must be correct for credit to be awarded. [0 points]

PARTS C and D



Question 16
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Some figures are plotted on the coordinate grid shown below.

C. Explain why figure A is congruent to figure A'.

Figure A is congruent to figure A' because both figures have the same angle measurements.

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A set of transformations maps figure A onto figure B.

D. Explain why one of the transformations **must** be a dilation.

When mapping figure A onto figure B one of the transformations must be a dilation for one reason. Figure a is one size and figure B is another. If the were the same size the second figure would be A' not B.

206 / 1000

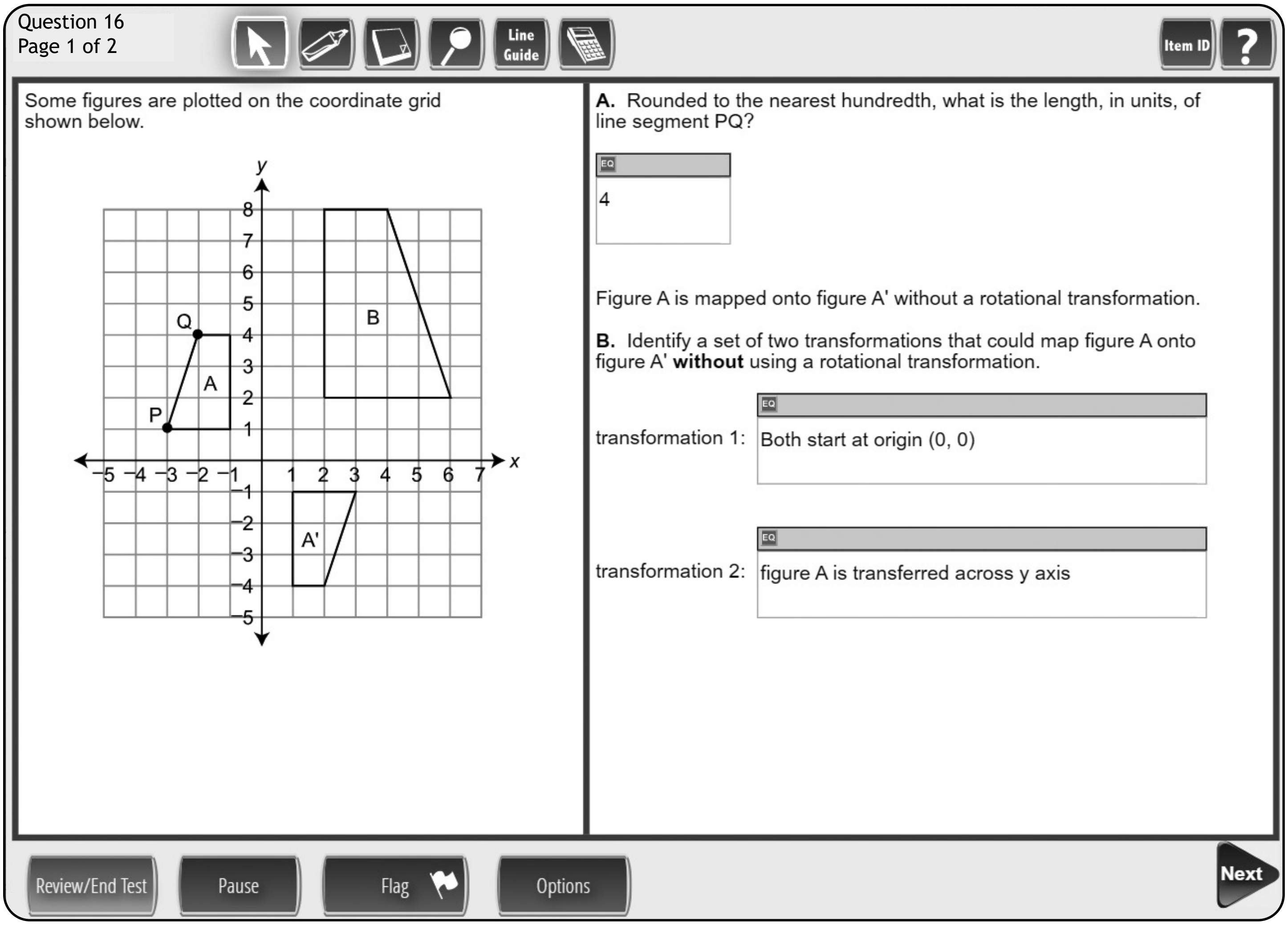
Part C. The student provided a correct but incomplete explanation (*both figures have the same angle measurements*) as to why figure A is congruent to figure A’. Figures with the same angle measures are similar but not necessarily congruent. A second comparison, such as observing that the two figures have the same size, same shape, or same side lengths, is needed for a complete explanation. [0.5 points]

Part D. The student provided a correct explanation (*Figure a is one size and figure B is another*) as to why one of the transformations must be a dilation to map figure A onto figure B. [1 point]

STUDENT RESPONSE

Response Score: 0 points

PARTS A and B



Some figures are plotted on the coordinate grid shown below.

A. Rounded to the nearest hundredth, what is the length, in units, of line segment PQ?

4

Figure A is mapped onto figure A' without a rotational transformation.

B. Identify a set of two transformations that could map figure A onto figure A' **without** using a rotational transformation.

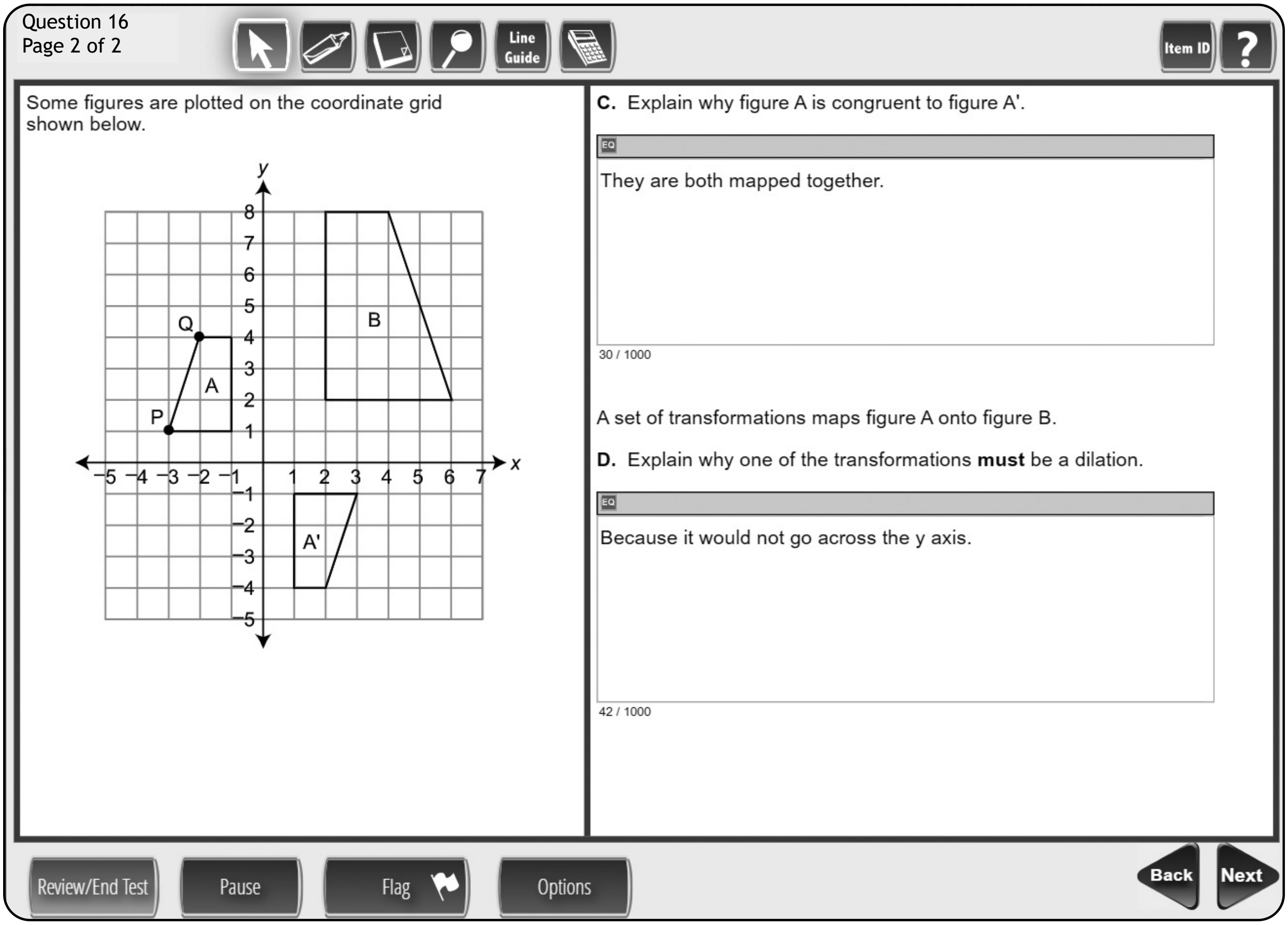
transformation 1: Both start at origin (0, 0)

transformation 2: figure A is transferred across y axis

Part A. The student provided an incorrect answer (*4*) for the length of line segment PQ. No support (work or explanation) is required, so it is unclear where an error was made. The student may have added the two sides of the triangle (3 + 1 = 4) to find the length of line segment PQ. [0 points]

Part B. The student provided an incorrect set of two transformations (transformation 1: *Both start at origin (0, 0)* and transformation 2: *figure A is transferred across y axis*) that could map figure A onto figure A’ without using a rotational transformation. [0 points]

PARTS C and D



Question 16
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Some figures are plotted on the coordinate grid shown below.

C. Explain why figure A is congruent to figure A'.

They are both mapped together.

30 / 1000

A set of transformations maps figure A onto figure B.

D. Explain why one of the transformations **must** be a dilation.

Because it would not go across the y axis.

42 / 1000

Part C. The student provided an incorrect explanation (*They are both mapped together*) as to why figure A is congruent to figure A'. [0 points]

Part D. The student provided an incorrect explanation (*it would not go across the y axis*) as to why one of the transformations must be a dilation to map figure A onto figure B. [0 points]

MATHEMATICS—SUMMARY DATA

Multiple-Choice

Sample Number	Alignment	Answer Key	Depth of Knowledge	*p*-value A	*p*-value B	*p*-value C	*p*-value D
1	B-E.1.1.2	A	1	55%	15%	18%	12%
2	B-E.1.1.3	C	2	18%	14%	53%	15%
3	A-N.1.1.1	B	2	18%	32%	28%	22%
4	A-N.1.1.5 A-N.1.1.1	A	2	39%	34%	14%	13%
5	B-E.1.1	D	1	18%	15%	21%	46%
6	B-E.1.1.4	A	2	34%	30%	17%	19%
7	B-E.2.1	C	2	15%	18%	59%	8%
8	B-E.2.1.1	D	2	13%	7%	9%	71%
9	B-E.2.1.2	D	2	12%	21%	19%	48%
10	B-E.2.1.3	C	1	24%	14%	52%	10%
11	B-E.3.1.1	C	1	14%	16%	56%	14%
12	B-F.1.1.2	A	2	45%	18%	25%	12%
13	B-F.2.1.1	A	2	51%	10%	27%	12%
14	B-F.2.1.2	C	2	5%	6%	68%	21%
15	D-S.1.1.1	C	1	9%	18%	60%	13%

Open-Ended

Sample Number	Alignment	Points	Depth of Knowledge	Mean Score
16	C-G.1 C-G.2.1.3	4	2	1.38