pennsylvania
DEPARTMENT OF EDUCATION

PENNSYLVANIA
KEYSTONE EXAMS

Algebra I

Item and Scoring Sampler

2022–2023

Pennsylvania Department of Education Bureau of Curriculum, Assessment and Instruction—August 2022

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INTRODUCTION

General Introduction

The Pennsylvania Department of Education (PDE) provides districts and schools with tools to assist in delivering focused instructional programs aligned to the Pennsylvania Core Standards. These tools include the standards, assessment anchor documents, Keystone Exams Test Definition, Classroom Diagnostic Tool, Standards Aligned System, and content-based item and scoring samplers. This 2022 Algebra I Item and Scoring Sampler is a useful tool for Pennsylvania educators in preparing students for the Keystone Exams by providing samples of test item types and scored student responses. The Item Sampler is not designed to be used as a pretest, a curriculum, or any other benchmark for operational testing.

This Item and Scoring Sampler contains released operational multiple-choice and constructed-response items that have appeared on previously administered Keystone Exams. These items will not appear on any future Keystone Exams. Released items provide an idea of the types of items that have appeared on operational exams and that will appear on future operational Keystone Exams. Each item has been through a rigorous review process to ensure alignment with the Assessment Anchors and Eligible Content (AAEC). This sampler includes items that measure a variety of Assessment Anchor or Eligible Content statements, but it does not include sample items for all Assessment Anchor or Eligible Content statements.

The items in this sampler may be used[1] as samples of item types that students will encounter in operational testing. Classroom teachers may find it beneficial to have students respond to the constructed-response items in this sampler. Educators can then use the sampler as a guide to score the responses either independently or together with colleagues.

This Item and Scoring Sampler is available in Braille format. For more information regarding Braille, call (717) 901-2238.

ABOUT THE KEYSTONE EXAMS

The Keystone Exams are end-of-course assessments currently designed to assess proficiencies in Algebra I, Biology, and Literature. For detailed information about how the Keystone Exams are being integrated into the Pennsylvania graduation requirements, please contact the Pennsylvania Department of Education or visit the PDE website at http://www.education.pa.gov.

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[1] The permission to copy and/or use these materials does not extend to commercial purposes.

Alignment

The Algebra I Keystone Exam consists of questions grouped into **two modules**: Module 1—Operations and Linear Equations & Inequalities and Module 2—Linear Functions and Data Organizations. Each module corresponds to specific content, aligned to statements and specifications included in the course-specific Assessment Anchor documents. The Algebra I content included in the Keystone Algebra I multiple-choice items will align with the Assessment Anchors as defined by the Eligible Content statements. The process skills, directives, and action statements will also specifically align with the Assessment Anchors as defined by the Eligible Content statements.

The content included in Algebra I constructed-response items aligns with content included in the Eligible Content statements. The process skills, directives, and action statements included in the performance demands of the Algebra I constructed-response items align with specifications included in the Assessment Anchor statements, the Anchor Descriptor statements, and/or the Eligible Content statements. In other words, the verbs or action statements used in the constructed-response items or stems can come from the Eligible Content, Anchor Descriptor, or Assessment Anchor statements.

Depth of Knowledge

Webb's Depth of Knowledge (DOK) was created by Dr. Norman Webb of the Wisconsin Center for Education Research. Webb's definition of DOK is the cognitive expectation demanded by standards, curricular activities, and assessment tasks. Webb's DOK includes four levels, from the lowest (recall) level to the highest (extended thinking) level.

Depth of Knowledge	
Level 1	Recall
Level 2	Basic Application of Skill/Concept
Level 3	Strategic Thinking
Level 4	Extended Thinking

Each Keystone item has been through a rigorous review process and is assigned a DOK level. For additional information about DOK, please visit the PDE website at http://static.pdesas.org/content/documents/Keystone_Exams_Understanding_Depth_of_Knowledge_and_Cognitive_Complexity.pdf.

Exam Format

The Keystone Exams are delivered in a paper-and-pencil format as well as in a computer-based online format. The multiple-choice items require students to select the best answer from four possible answer options and record their answers in the spaces provided. The correct answer for each multiple-choice item is worth one point. The constructed-response items require students to develop and write (or construct) their responses. Constructed-response items in Algebra I are scored using item-specific scoring guidelines based on a 0–4-point scale. Each multiple-choice item is designed to take about one to one-and-a-half minutes to complete. Each constructed-response item is designed to take about ten minutes to complete. The estimated time to respond to a test question is the same for both test formats. During an actual exam administration, students are given additional time as necessary to complete the exam.

ITEM AND SCORING SAMPLER FORMAT

This sampler includes the test directions, scoring guidelines, and formula sheet that appear in the Keystone Exams. Each sample multiple-choice item is followed by a table that includes the alignment, the answer key, the DOK, the percentage[2] of students who chose each answer option, and a brief answer option analysis or rationale. Each constructed-response item is followed by a table that includes the alignment, the DOK, and the mean student score. Additionally, each of the included item-specific scoring guidelines is combined with sample student responses representing each score point to form a practical item-specific scoring guide. The *General Description of Scoring Guidelines for Algebra I* used to develop the item-specific scoring guidelines should be used if any additional item-specific scoring guidelines are created for use within local instructional programs. The student responses in this item and scoring sampler are actual student responses; however, the handwriting has been changed to protect the students' identities and to make the item and scoring sampler accessible to as many people as possible.

Example Multiple-Choice Item Information Table

Item Information	
Alignment	Assigned AAEC
Answer Key	Correct Answer
Depth of Knowledge	Assigned DOK
p-value A	Percentage of students who selected option A
p-value B	Percentage of students who selected option B
p-value C	Percentage of students who selected option C
p-value D	Percentage of students who selected option D
Option Annotations	Brief answer option analysis or rationale

Example Constructed-Response Item Information Table

Alignment	Assigned AAEC	**Depth of Knowledge**	Assigned DOK	**Mean Score**	Average Score

[2] All *p*-value percentages listed in the item information tables have been rounded.

ALGEBRA I EXAM DIRECTIONS

Directions:

Below are the exam directions available to students. These directions may be used to help students navigate through the exam.

Formulas that you may need to solve questions in this module are found on page 7 of this test booklet. You may refer to the formula page at any time during the exam.

You may use a calculator on this module. When performing operations with π (pi), you may use either calculator π or the number 3.14 as an approximation of π.

There are two types of questions in each module.

Multiple-Choice Questions:

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

- First read the question and solve the problem on scratch paper. Then choose the correct answer.
- Only one of the answers provided is correct.
- If none of the choices matches your answer, go back and check your work for possible errors.
- Record your answer in the Algebra I answer booklet.

Constructed-Response Questions:

These questions will require you to write your response.

- These questions have more than one part. Be sure to read the directions carefully.
- You cannot receive the highest score for a constructed-response question without completing all the tasks in the question.
- If the question asks you to show your work or explain your reasoning, be sure to show your work or explain your reasoning. However, not all questions will require that you show your work or explain your reasoning. If the question does not require that you show your work or explain your reasoning, you may use the space provided for your work or reasoning, but the work or reasoning will not be scored.
- All responses must be written in the appropriate location within the response box in the Algebra I answer booklet. Some answers may require graphing, plotting, labeling, drawing, or shading. If you use scratch paper to write your draft, be sure to transfer your final response to the Algebra I answer booklet.

INFORMATION ABOUT ALGEBRA I

If you finish early, you may check your work in Module 1 [or Module 2] only.

- Do not look ahead at the questions in Module 2 [or back at the questions in Module 1] of your exam materials.
- After you have checked your work, close your exam materials.

You may refer to this page at any time during this portion of the exam.

GENERAL DESCRIPTION OF SCORING GUIDELINES FOR ALGEBRA I

4 Points

- The response demonstrates a *thorough* understanding of the mathematical concepts and procedures required by the task.
- The response provides correct answer(s) with clear and complete mathematical procedures shown and a correct explanation, as required by the task. The response may contain a minor "blemish" or omission in work or explanation that does not detract from demonstrating a thorough understanding.

3 Points

- The response demonstrates a *general* understanding of the mathematical concepts and procedures required by the task.
- The response and explanation (as required by the task) are mostly complete and correct. The response may have minor errors or omissions that do not detract from demonstrating a general understanding.

2 Points

- The response demonstrates a *partial* understanding of the mathematical concepts and procedures required by the task.
- The response is somewhat correct with partial understanding of the required mathematical concepts and/or procedures demonstrated and/or explained. The response may contain some work that is incomplete or unclear.

1 Point

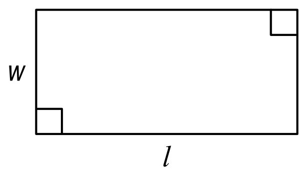
- The response demonstrates a *minimal* understanding of the mathematical concepts and procedures required by the task.

0 Points

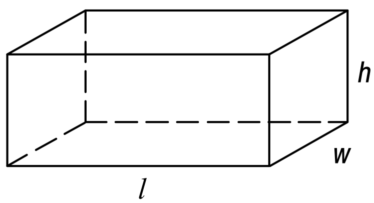
- The response has no correct answer and *insufficient* evidence to demonstrate any understanding of the mathematical concepts and procedures required by the task.

FORMULA SHEET

Formulas that you may need to solve questions on this exam are found below.
You may use calculator π or the number 3.14 as an approximation of π.



$A = lw$



$V = lwh$

Linear Equations

Slope: $m = \dfrac{y_2 - y_1}{x_2 - x_1}$

Point-Slope Formula: $(y - y_1) = m(x - x_1)$

Slope-Intercept Formula: $y = mx + b$

Standard Equation of a Line: $Ax + By = C$

Arithmetic Properties

Additive Inverse: $a + (^-a) = 0$

Multiplicative Inverse: $a \cdot \dfrac{1}{a} = 1$

Commutative Property: $a + b = b + a$
$a \cdot b = b \cdot a$

Associative Property: $(a + b) + c = a + (b + c)$
$(a \cdot b) \cdot c = a \cdot (b \cdot c)$

Identity Property: $a + 0 = a$
$a \cdot 1 = a$

Distributive Property: $a \cdot (b + c) = a \cdot b + a \cdot c$

Multiplicative Property of Zero: $a \cdot 0 = 0$

Additive Property of Equality:
If $a = b$, then $a + c = b + c$

Multiplicative Property of Equality:
If $a = b$, then $a \cdot c = b \cdot c$

ALGEBRA I MODULE 1

MULTIPLE-CHOICE ITEMS

1. An equation is shown below.

$$4\sqrt{3} = \sqrt{24x}$$

What is the value of x?

A. 2

B. 3

C. 6

D. 8

Item Information	
Alignment	A1.1.1.1.2
Answer Key	A
Depth of Knowledge	1
p-value A	70% (correct answer)
p-value B	8%
p-value C	15%
p-value D	7%
Option Annotations	A student could determine the **correct** answer, option A, by converting $4\sqrt{3}$ to $\sqrt{48}$, since 48 is 4^2 times 3, setting the expressions under the radical equal to each other ($48 = 24x$), and then dividing both sides by 24 to get $x = 2$. A student could arrive at an **incorrect** answer by attempting to compare the numbers without correctly interpreting the radicals. For example, the student could arrive at option C by multiplying 4 by 3 to get 12, squaring the 12 to get 144, and then solving $144 = 24x$ by dividing both sides by 24 to get $x = 6$.

2. A coefficient (a) and an exponent (b) are missing in the two monomials shown below.

$$ax^3 \qquad 6x^b$$

The least common multiple (LCM) of the two monomials is $18x^5$. Which pair of statements about the missing coefficient and the missing exponent is true?

A. The missing coefficient (a) must be 9 or 18.
The missing exponent (b) must be 5.

B. The missing coefficient (a) must be 9 or 18.
The missing exponent (b) can be any number 5 or less.

C. The missing coefficient (a) can be any multiple of 3.
The missing exponent (b) must be 5.

D. The missing coefficient (a) can be any multiple of 3.
The missing exponent (b) can be any number 5 or less.

Item Information	
Alignment	A1.1.1.2.1
Answer Key	A
Depth of Knowledge	2
p-value A	37% (correct answer)
p-value B	19%
p-value C	22%
p-value D	22%
Option Annotations	A student could determine the **correct** answer, option A, by identifying the factors of 18 (2, 3 & 3), recognizing the factors of 6 (2 & 3), determining that the missing coefficient must be either 3 • 3 = 9 or 3 • 3 • 2 = 18, and recognizing that the missing exponent must be the same as the LCM's exponent (5) since the other exponent (3) is less than 5. A student could arrive at an **incorrect** answer by applying incorrect reasoning about the GCF of monomials. For example, the student could arrive at option D by using 3 for the missing coefficient since 3 × 6 = 18 and by not realizing that, even though the lesser of the two exponents can be any number less than or equal to 5, the other exponent must be equal to 5.

3. Which expression is a factor of $x^2 + 3x - 40$?

A. $(x - 4)$

B. $(x - 5)$

C. $(x - 8)$

D. $(x - 10)$

Item Information	
Alignment	A1.1.1.5.2
Answer Key	B
Depth of Knowledge	2
p-value A	15%
p-value B	56% (correct answer)
p-value C	18%
p-value D	11%
Option Annotations	A student could determine the **correct** answer, option B, by factoring the given expression: $x^2 + 3x - 40 = (x + 8)(x - 5)$. Of the given answer options, only $(x - 5)$ is one of the factors of the given expression. A student could arrive at an **incorrect** answer by incorrectly factoring the given expression. For example, a student could arrive at option C by recognizing that 5 and 8 are factors of 40 with a difference of 3 but incorrectly pairing the 8 with a minus sign.

4. Simplify:

$$\frac{x(x-5)-14}{x^2-4};\ x \neq {}^{-}2,\ 2$$

A. ${}^{-}5x + \frac{7}{2}$

B. $\frac{x-7}{x-2}$

C. $\frac{x+7}{x+2}$

D. $\frac{x-19}{x-4}$

Item Information	
Alignment	A1.1.1.5.3
Answer Key	B
Depth of Knowledge	1
p-value A	31%
p-value B	39% (correct answer)
p-value C	15%
p-value D	15%
Option Annotations	A student could determine the **correct** answer, option B, by expanding the numerator [$x(x-5)-14 = x^2 - 5x - 14$], factoring the numerator and denominator [$x^2 - 5x - 14 = (x+2)(x-7)$ and $x^2 - 4 = (x+2)(x-2)$], and eliminating the common factor $(x + 2)$, which leaves $\frac{x-7}{x-2}$. A student could arrive at an **incorrect** answer by incorrectly factoring the numerator or by attempting to simplify the expression before factoring. For example, a student could arrive at option A by expanding the numerator [$x(x-5)-14 = x^2 - 5x - 14$] but then simplifying the resulting rational expression in parts: eliminating the x^2 terms, making ${}^{-}5x$ its own term, and simplifying $\frac{-14}{-4}$ to $\frac{7}{2}$ as its own term.

5. The steps taken to correctly solve an equation are shown below, but one step is missing.

$$^{-}2(x - 3) = {}^{-}6(x + 4)$$

$$^{-}2x + 6 = {}^{-}6x - 24$$

$$?$$

$$4x = {}^{-}30$$

$$x = {}^{-}7.5$$

Which set of statements shows the equation that is **most likely** the missing step and the property that justifies the missing step?

A. $4x - 6 = 24$
This step is justified by the additive property of equality.

B. $4x - 6 = 24$
This step is justified by the multiplicative property of equality.

C. $4x + 6 = {}^{-}24$
This step is justified by the additive property of equality.

D. $4x + 6 = {}^{-}24$
This step is justified by the multiplicative property of equality.

Item Information	
Alignment	A1.1.2.1.2
Answer Key	C
Depth of Knowledge	2
p-value A	12%
p-value B	8%
p-value C	70% (correct answer)
p-value D	10%
Option Annotations	A student could determine the **correct** answer, option C, by adding $6x$ to both sides of the equation, leaving $^{-}24$ on the right side of the equation, and identifying the property used to justify this step as the additive property of equality. A student could arrive at an **incorrect** answer by not considering the minus sign or by incorrectly identifying the property being used. For example, a student could arrive at option A by adding $6x$ to each side of the equation and then switching the signs for the "+ 6" and the "$^{-}$24."

6. Deshawn has a box of batteries. Some of the batteries provide 1.5 volts each. The rest of the batteries provide 9 volts each. The total voltage provided by all the batteries in the box is 78 volts. The equation shown below models this situation.

$$1.5x + 9y = 78$$

One solution to this equation is (10, 7). What does this solution represent?

A. The box contains 10 total batteries, 7 of which provide 1.5 volts each.

B. The box contains 10 total batteries, 7 of which provide 9 volts each.

C. The box contains 10 batteries that provide 1.5 volts each and 7 batteries that provide 9 volts each.

D. The box contains 10 batteries that provide 9 volts each and 7 batteries that provide 1.5 volts each.

Item Information	
Alignment	A1.1.2.1.3
Answer Key	C
Depth of Knowledge	2
p-value A	6%
p-value B	12%
p-value C	74% (correct answer)
p-value D	8%
Option Annotations	A student could determine the **correct** answer, option C, by interpreting the *x*-coordinate (10) as the number of batteries that provide 1.5 volts and the *y*-coordinate (7) as the number of batteries that provide 9 volts. A student could arrive at an **incorrect** answer by incorrectly interpreting the meaning of the coordinates. For example, a student could arrive at option B by interpreting the *x*-coordinate (10) as the total number of batteries.

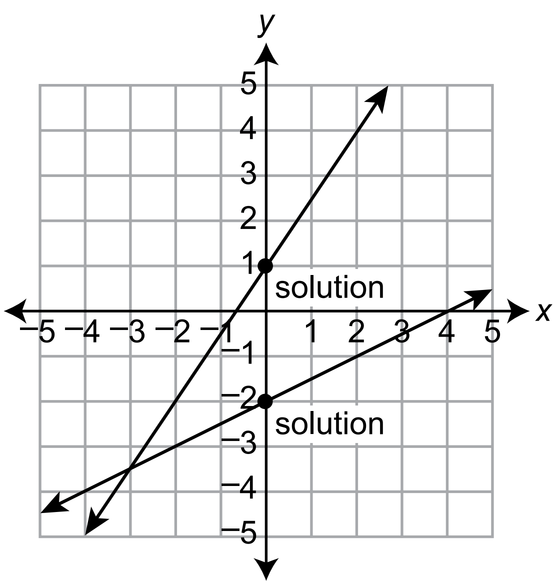
7. A system of equations is shown below.

$$y = \frac{1}{2}x + 1$$

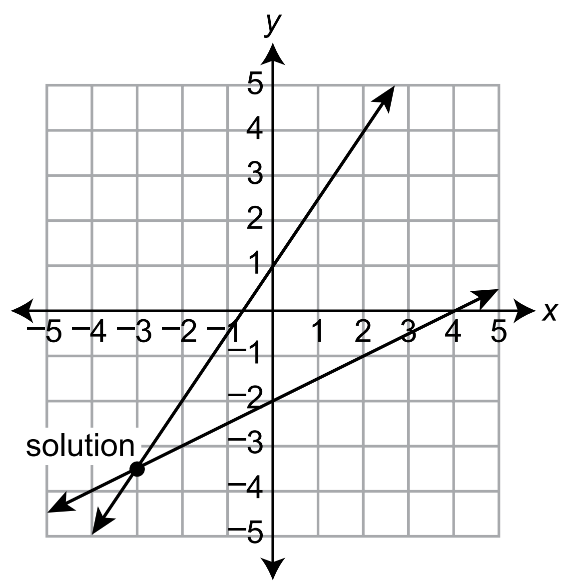
$$y = \frac{3}{2}x - 1$$

Which graph shows the system of equations with the solution or solutions of the system of equations labeled?

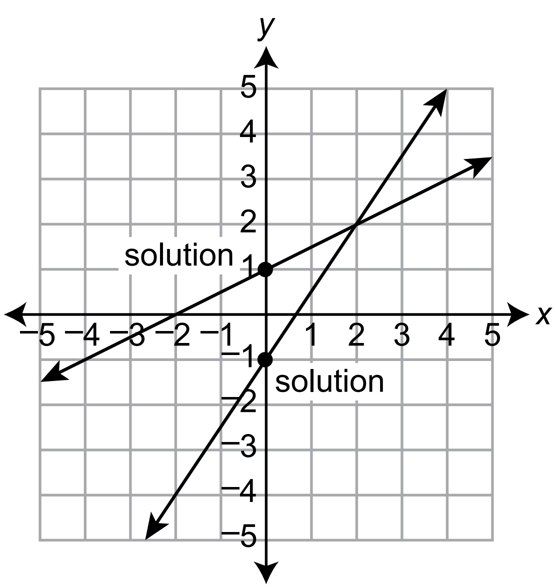
A.



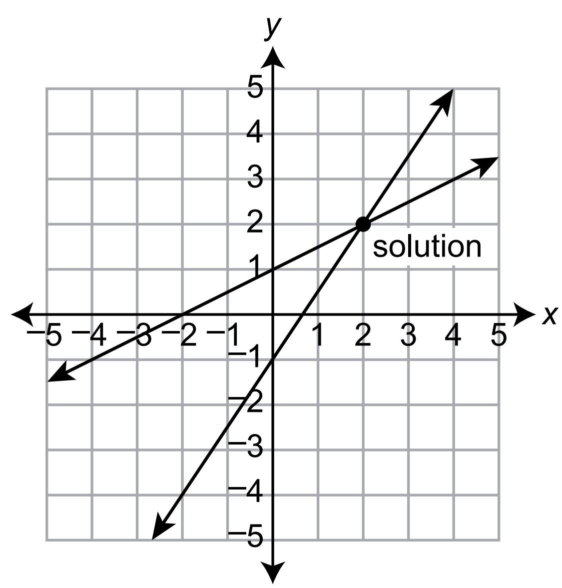
B.



C.

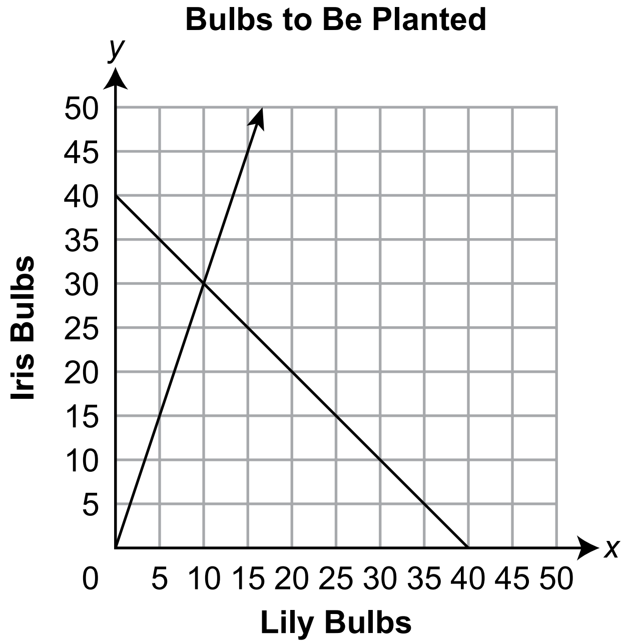


D.



Item Information	
Alignment	A1.1.2.2.1
Answer Key	D
Depth of Knowledge	1
p-value A	6%
p-value B	5%
p-value C	24%
p-value D	65% (correct answer)
Option Annotations	A student could determine the **correct** answer, option D, by identifying the graph of the system of equations and recognizing the point of intersection as the solution of the system. A student could arrive at an **incorrect** answer by misidentifying the graph of the system of equations or by considering points other than the point of intersection as the solution of the system. For example, a student could arrive at option C by identifying the correct graph of the system of equations but considering the *y*-intercepts to be the solutions of the system.

8. Calvin will plant lily bulbs and iris bulbs in his front garden. He will plant a total of 40 flower bulbs and 3 times as many iris bulbs as lily bulbs. The graph below shows the number of lily bulbs (x) and the number of iris bulbs (y) Calvin will plant.



Which statement describes the point of intersection on the graph?

A. Calvin will plant 40 lily bulbs.

B. Calvin will plant 40 iris bulbs.

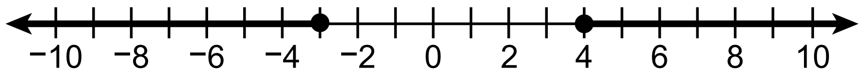
C. Calvin will plant 10 lily bulbs and 30 iris bulbs.

D. Calvin will plant 30 lily bulbs and 10 iris bulbs.

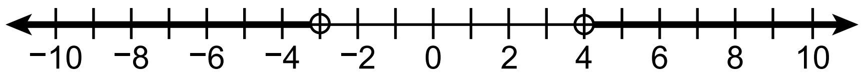
Item Information	
Alignment	A1.1.2.2.2
Answer Key	C
Depth of Knowledge	2
p-value A	4%
p-value B	3%
p-value C	84% (correct answer)
p-value D	9%
Option Annotations	A student could determine the **correct** answer, option C, by identifying the point of intersection as the solution of the system of equations and interpreting the *x*-coordinate (10) as the number of lily bulbs and the *y*-coordinate (30) as the number of iris bulbs. A student could arrive at an **incorrect** answer by misinterpreting the solution of the system of equations or by considering points other than the point of intersection as the solution of the system. For example, a student could arrive at option D by identifying the point of intersection as the solution of the system of equations but switching the meanings of the *x*-coordinate and *y*-coordinate.

9. Which graph represents the solution set of the inequality $|2x - 1| < 7$?

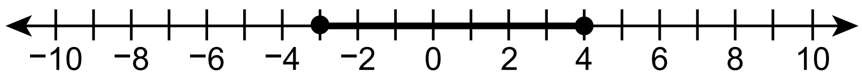
A.



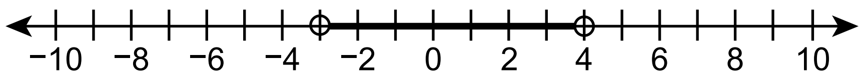
B.



C.



D.

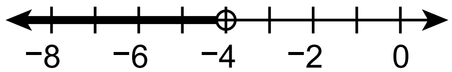


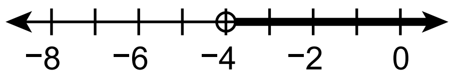
Item Information	
Alignment	A1.1.3.1.1
Answer Key	D
Depth of Knowledge	1
p-value A	8%
p-value B	28%
p-value C	10%
p-value D	54% (correct answer)
Option Annotations	A student could determine the **correct** answer, option D, by rewriting the absolute value inequality as a compound inequality ($^-7 < 2x - 1 < 7$), solving the compound inequality by adding 1 to all three expressions and then dividing all three expressions by 2 to get $^-3 < x < 4$, and identifying the corresponding graph by recognizing that strict inequalities have boundaries with open circles and by recognizing that the solution set is between $^-3$ and 4. A student could arrive at an **incorrect** answer by misidentifying which endpoints to use or by using a solution set that is not between $^-3$ and 4. For example, a student could arrive at option B by recognizing that strict inequalities have boundaries with open circles but interpreting the solution set as being less than $^-3$ or greater than 4.

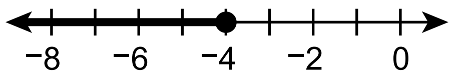
10. An inequality is shown below.

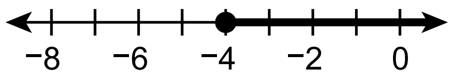
$$-x + 2 > -3(x + 2)$$

Which graph represents the solution set of the inequality?

A. 

B. 

C. 

D. 

Item Information	
Alignment	A1.1.3.1.2
Answer Key	B
Depth of Knowledge	1
p-value A	24%
p-value B	62% (correct answer)
p-value C	6%
p-value D	8%
Option Annotations	A student could determine the **correct** answer, option B, by rewriting the right side of the inequality by distributing the -3 to get $-3x - 6$, solving the inequality by adding $3x$ to both sides, subtracting 2 from both sides, and then dividing both sides by 2 to get $x > -4$, and identifying the corresponding graph by recognizing that a strict inequality has a boundary with an open circle and by recognizing that the solution set is greater than -4. A student could arrive at an **incorrect** answer by misidentifying which endpoint to use or by using a solution set that is not greater than -4. For example, a student could arrive at option A by recognizing that a strict inequality has a boundary with an open circle but interpreting the solution set as being less than -4.

11. Sam arrives at an amusement park with \$61 that he can spend at the amusement park. The entrance fee at the amusement park is \$20. It costs \$3 to play a game and \$4 for each ride. He plays 6 games and goes on *x* rides. The inequality shown below represents this situation.

$$38 + 4x \leq 61$$

The solution of the inequality is $x \leq 5.75$. Based on the solution, which statement **must** be true?

A. Sam went on at most 5 rides.

B. Sam went on at most 6 rides.

C. Sam went on more than 6 rides.

D. Sam went on fewer than 5 rides.

Item Information	
Alignment	A1.1.3.1.3
Answer Key	A
Depth of Knowledge	2
p-value A	71% (correct answer)
p-value B	12%
p-value C	6%
p-value D	11%
Option Annotations	A student could determine the **correct** answer, option A, by recognizing that the inequality represents a solution set of all values less than or equal to 5.75, understanding that the solution set within the context can be only whole numbers, and interpreting this to mean the largest value in the solution set is 5. A student could arrive at an **incorrect** answer by incorrectly interpreting the meaning of the inequality or misunderstanding the limits of the solution set. For example, a student could arrive at option B by interpreting the inequality symbol to mean “at most” but then rounding 5.75 up to 6 without considering that 6 is outside the given solution set.

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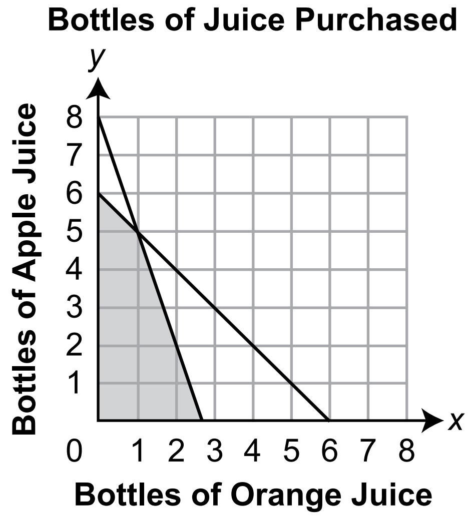
12. April is purchasing bottles of orange juice and bottles of apple juice from the store. She will buy no more than 6 bottles of juice and will spend no more than \$10.00. Each bottle of orange juice costs \$3.75, and each bottle of apple juice costs \$1.25. The graph shown below represents this situation.



Which statement describes all possible solutions where $x = 2$?

A. April will purchase 2 bottles of orange juice and 4 bottles of apple juice.

B. April will purchase 2 bottles of orange juice and no more than 2 bottles of apple juice.

C. April will purchase at least 2 bottles of orange juice and at least 2 bottles of apple juice.

D. April will purchase at least 2 bottles of orange juice and at most 4 bottles of apple juice.

Item Information	
Alignment	A1.1.3.2.2
Answer Key	B
Depth of Knowledge	2
p-value A	10%
p-value B	61% (correct answer)
p-value C	18%
p-value D	11%
Option Annotations	A student could determine the **correct** answer, option B, by interpreting the graph to determine that the values of y (the number of bottles of apple juice) can be no more than 2 when x (the number of bottles of orange juice) is 2. A student could arrive at an **incorrect** answer by not considering the limits of the solution set or by misinterpreting what is meant by $x = 2$. For example, a student could arrive at option C by describing the solution set for $x \geq 2$ and for $y \geq 2$ without considering that all the points in this set of values, other than (2, 2), are outside the given solution set.

CONSTRUCTED-RESPONSE ITEM

13. Small baskets of tomatoes are sold at a vegetable stand for $3 per basket. Large baskets of tomatoes are sold at the stand for $5 per basket. Only whole numbers of baskets may be purchased.

A customer purchases a total of 8 baskets of tomatoes and pays $36.

A. Write and solve a system of equations that models the number of small baskets (*x*) and the number of large baskets (*y*) that the customer purchases. Show or explain all your work.

Go to the next page to finish question 13.

GO ON

13. ***Continued.*** Please refer to the previous page for task explanation.

Another customer claims that he can purchase a total of 10 baskets of tomatoes and pay $45.

B. Use a system of equations that describes this other customer's purchase to explain why the claim is incorrect.

AFTER YOU HAVE CHECKED YOUR WORK, CLOSE YOUR ANSWER BOOKLET AND TEST BOOKLET SO YOUR TEACHER WILL KNOW YOU ARE FINISHED.

STOP

Item-Specific Scoring Guideline

#13 Item Information

Alignment	A1.1.2	**Depth of Knowledge**	2	**Mean Score**	1.58

Assessment Anchor this item will be reported under:

A1.1.2—Linear Equations

Specific Anchor Descriptor addressed by this item:

A1.1.2.2—Write, solve, and/or graph systems of linear equations using various methods.

Scoring Guide

Score	Description
4	The student demonstrates a thorough understanding of linear equations by correctly solving problems with clear and complete procedures and explanations when required.
3	The student demonstrates a general understanding of linear equations by solving problems and providing procedures and explanations with only minor errors or omissions.
2	The student demonstrates a partial understanding of linear equations by providing a portion of the correct problem solving, procedures, and explanations.
1	The student demonstrates a minimal understanding of linear equations.
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 linear equations.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

Top-Scoring Response

Part A (3 points):

$\frac{1}{2}$ point for each correct equation

$\frac{1}{2}$ point for each correct value of the solution

OR $\frac{1}{2}$ point for embedded solution

1 point for complete support

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

<table>
<tr><th>What?</th><th>Why?</th></tr>
<tr><td>$x + y = 8$
$3x + 5y = 36$

AND

$x = 2$ (small baskets)
$y = 6$ (large baskets)</td><td>Sample Work:
$x + y = 8 \quad \rightarrow \quad x = 8 - y$
$3x + 5y = 36 \quad\quad 3x + 5y = 36$

$3(8 - y) + 5y = 36$
$24 - 3y + 5y = 36 \quad x + 6 = 8$
$2y = 12 \quad \rightarrow \quad x = 2$
$y = 6$

OR

Sample Explanation:

First, I set up my system of equations.

$x + y = 8$
$3x + 5y = 36$

I then multiplied the first row by 5 and the second row by $^{-}1$ so I could add them together and cancel out the y-terms. This gave me $2x = 4$, so $x = 2$. I substituted this value into the first equation and solved it for y to get $y = 6$.

OR equivalent</td></tr>
</table>

Part B (1 point):

1 point for correct and complete explanation

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

What?	Why?
	Sample Explanation: The system of equations that describes this other customer's purchase is shown. $x + y = 10$ $3x + 5y = 45$ The solution of this system of equations exists, but neither *x* nor *y* is a whole number, so the customer cannot purchase 10 baskets of tomatoes for $45.

STUDENT RESPONSE

Response Score: 4 points

PARTS A AND B

Question 13
Page 1

Small baskets of tomatoes are sold at a vegetable stand for $3 per basket. Large baskets of tomatoes are sold at the stand for $5 per basket. Only whole numbers of baskets may be purchased.

A customer purchases a total of 8 baskets of tomatoes and pays $36.

A. Write and solve a system of equations that models the number of small baskets (*x*) and the number of large baskets (*y*) that the customer purchases. Show or explain all your work.

3x + 5y = 36
x + y = 8

x = 8 - y

3(8 - y) + 5y = 36
24 - 3y + 5y = 36
24 + 2y = 36
2y = 12
y = 6

x + y = 8
x + 6 = 8
x = 2

The customer bought 2 small baskets of tomatoes and 6 large baskets of tomatoes.

237 / 1000

The student provided two correct equations for the system of equations (*3x + 5y = 36* and *x + y = 8*). The student also provided a correct solution process by showing *x + y* = 8 solved for *x* (*x = 8 – y*), substituting that expression for *x* into the first equation [*3(8 – y) + 5y = 36*], solving for *y* (*y = 6*), substituting the value of *y* into the equation *x + y* = 8 (*x + 6 = 8*), and then solving for *x* (*x = 2*). Although not required, the student described what the solution represents (*The customer bought 2 small baskets of tomatoes and 6 large baskets of tomatoes*). [3 points]

Another customer clai

B. Use a system of e

x + y = 10
3x + 5y = 45
x = 10 - y

3(10 - y) + 5y = 45
30 - 3y + 5y = 45
30 + 2y = 45

2y = 15
y = 7.5

x + 7.5 = 10
x = 2.5

This other customer's claim is incorrect because in order for it to be true, he would have had to buy 2.5 baskets of tomatoes and 7.5 large baskets of tomatoes. However, this is not possible because only whole numbers of bushels may be purchased.

380 / 1000

The student provided a correct and complete explanation as to why the solution of the system of equations (*y = 7.5* and *x = 2.5*) demonstrates that the claim is incorrect (*only whole numbers of bushels may be purchased*); the student using “*bushels*” instead of “baskets” is considered a blemish and does not detract from demonstrating a thorough understanding. [1 point]

Review/End Test

STUDENT RESPONSE

Response Score: 3 points

13. Small baskets of tomatoes are sold at a vegetable stand for \$3 per basket. Large baskets of tomatoes are sold at the stand for \$5 per basket. Only whole numbers of baskets may be purchased.

A customer purchases a total of 8 baskets of tomatoes and pays \$36.

A. Write and solve a system of equations that models the number of small baskets (*x*) and the number of large baskets (*y*) that the customer purchases. Show or explain all your work.

$$\$3x^{(2)} + \$5y^{(6)} = \$36$$

$$\begin{array}{r} 3 \\ \times 2 \\ \hline 6 \end{array} \qquad \begin{array}{r} 5 \\ \times 6 \\ \hline 30 \end{array} \qquad \begin{array}{r} 30 \\ +6 \\ \hline 36 \end{array}$$

2 small baskets
6 large baskets

The student provided only one of two correct equations for the system of equations (*\$3x* + *\$5y* = *\$36*). The student also provided correct but incomplete support by showing only a "check" of the correct solution (*3* × *2* = *6*, *5* × *6* = *30*, and *30* + *6* = *36*) without showing how the values were determined. The student provided the correct solution (*2 small baskets* and *6 large baskets*). [2 points]

Go to the next page to finish question 13.

GO ON

13. ***Continued.*** Please refer to the previous page for task explanation.

Another customer claims that he can purchase a total of 10 baskets of tomatoes and pay $45.

B. Use a system of equations that describes this other customer's purchase to explain why the claim is incorrect.

$$\$3x + \$5y = \$45$$

5, 5
6, 4
7, 3
8, 2
1, 9

This customer's claim is incorrect because if you plug in any pair of numbers adding up to (10) and plugging them into (x) and (y), you couldn't get 45. To get ~~45~~ this number, you would have to plug in decimals, but you could only use whole numbers.

The student provided a correct and complete explanation as to why the claim is incorrect by first exhausting all possible whole-number solutions (*if you plug in any pair of numbers adding up to (10)* . . . *you couldn't get 45*) and then by describing why the actual solution does not work (*you would have to plug in decimals, but you could only use whole numbers*). [1 point]

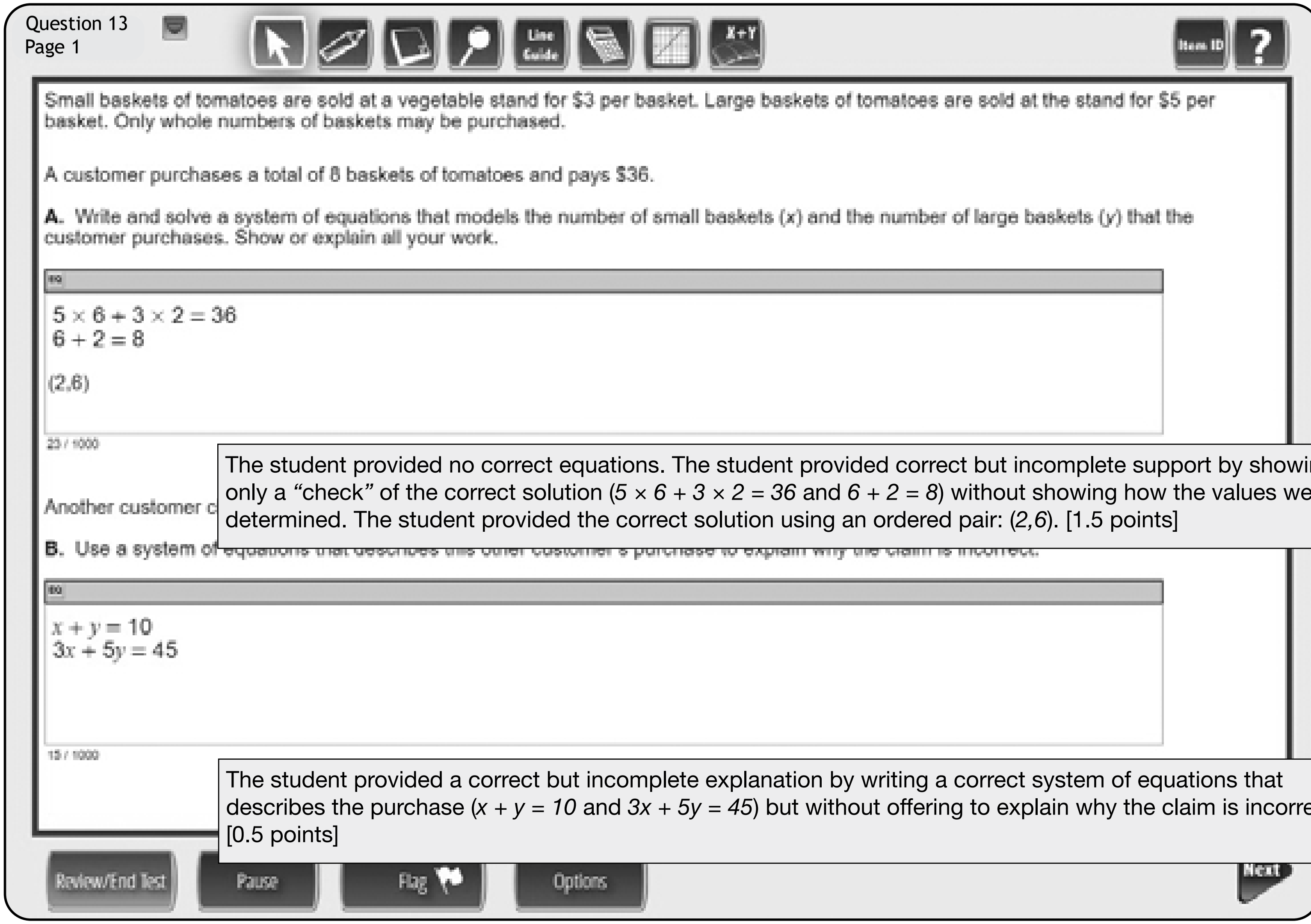
AFTER YOU HAVE CHECKED YOUR WORK, CLOSE YOUR ANSWER BOOKLET AND TEST BOOKLET SO YOUR TEACHER WILL KNOW YOU ARE FINISHED.

STOP

STUDENT RESPONSE

Response Score: 2 points

PARTS A AND B



Question 13
Page 1

Small baskets of tomatoes are sold at a vegetable stand for $3 per basket. Large baskets of tomatoes are sold at the stand for $5 per basket. Only whole numbers of baskets may be purchased.

A customer purchases a total of 8 baskets of tomatoes and pays $36.

A. Write and solve a system of equations that models the number of small baskets (x) and the number of large baskets (y) that the customer purchases. Show or explain all your work.

$5 \times 6 + 3 \times 2 = 36$
$6 + 2 = 8$

(2,6)

23 / 1000

Another customer c

B. Use a system of equations that describes this other customer's purchase to explain why the claim is incorrect.

$x + y = 10$
$3x + 5y = 45$

15 / 1000

Review/End Test Pause Flag Options Next

The student provided no correct equations. The student provided correct but incomplete support by showing only a “check” of the correct solution (*5 × 6 + 3 × 2 = 36* and *6 + 2 = 8*) without showing how the values were determined. The student provided the correct solution using an ordered pair: (*2*,*6*). [1.5 points]

The student provided a correct but incomplete explanation by writing a correct system of equations that describes the purchase (*x* + *y* = *10* and *3x* + *5y* = *45*) but without offering to explain why the claim is incorrect. [0.5 points]

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STUDENT RESPONSE

Response Score: 1 point

13. Small baskets of tomatoes are sold at a vegetable stand for \$3 per basket. Large baskets of tomatoes are sold at the stand for \$5 per basket. Only whole numbers of baskets may be purchased.

A customer purchases a total of 8 baskets of tomatoes and pays \$36.

A. Write and solve a system of equations that models the number of small baskets (*x*) and the number of large baskets (*y*) that the customer purchases. Show or explain all your work.

$3x + 5y = 36$

$\frac{3x}{3} = \frac{36}{3}$

$x = 12$

$\frac{5y}{5} = \frac{36}{5}$

$y = 7.1$

The student provided one of two correct equations for the system of equations ($3x + 5y = 36$). The student provided incorrect support by solving $3x = 36$ for x and $5y = 36$ for y. The student provided an incorrect solution since these values are the x-intercept (12) and the y-intercept (7.1) of the provided equation. [0.5 points]

Go to the next page to finish question 13.

GO ON

13. ***Continued.*** Please refer to the previous page for task explanation.

Another customer claims that he can purchase a total of 10 baskets of tomatoes and pay $45.

B. Use a system of equations that describes this other customer's purchase to explain why the claim is incorrect.

$3x = 5y = 45$

$\frac{3x}{3} = \frac{45}{3}$

$x = 15$

$\frac{5y}{5} = \frac{45}{5}$

$5y = 9$

$3 \times 15 + 5 \times 9 = 105$

The student provided an incorrect explanation by incorrectly writing one of the two equations for the system of equations (*3x = 5y = 45*), solving for the *x*-intercept (15) and the *y*-intercept (9), and not offering to explain why the claim is incorrect. [0 points]

AFTER YOU HAVE CHECKED YOUR WORK, CLOSE YOUR ANSWER BOOKLET AND TEST BOOKLET SO YOUR TEACHER WILL KNOW YOU ARE FINISHED.

STOP

STUDENT RESPONSE

Response Score: 0 points

PARTS A AND B

Question 13
Page 1

Small baskets of tomatoes are sold at a vegetable stand for $3 per basket. Large baskets of tomatoes are sold at the stand for $5 per basket. Only whole numbers of baskets may be purchased.

A customer purchases a total of 8 baskets of tomatoes and pays $36.

A. Write and solve a system of equations that models the number of small baskets (x) and the number of large baskets (y) that the customer purchases. Show or explain all your work.

(x)(y) = 36

(3)(5) = 36

He/She would have to purchase 12 small baskets and 0 large baskets.

93 / 1000

The student provided no correct equations, instead writing *(x)(y) = 36*. The student provided incorrect support by substituting the prices of each small basket ($3) and each large basket ($5) into the provided equation: *(3)(5) = 36*. The student provided an incorrect solution (*12 small baskets and 0 large baskets*) with no support to show how this solution was determined. [0 points]

Another customer cl

B. Use a system of

if you take 45/10 you would get 4.5 so his answer was hypotheoritical or not logical because its impossible

107 / 1000

The student provided an incorrect explanation since the student determined the average price per basket (*if you take 45/10 you would get 4.5*), which has no bearing on whether the claim is incorrect. [0 points]

Review/End Test | Pause | Flag | Options | Next

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CONSTRUCTED-RESPONSE ITEM

14. A company uses cement-mixing trucks to deliver loads of concrete to job sites.

An empty cement-mixing truck weighs 26,000 pounds. Concrete weighs 4,000 pounds per cubic yard. The cement-mixing truck weighs 64,000 pounds when filled with concrete. The compound inequality shown below describes all the possible amounts of concrete (*c*), in cubic yards, that can be carried by the cement-mixing truck.

$$26{,}000 \le 4{,}000c + 26{,}000 \le 64{,}000$$

A. Complete the inequality below to show all the possible amounts of concrete (*c*), in cubic yards, that can be carried by the cement-mixing truck.

______________ $\le c \le$ ______________

A mix is put into the cement-mixing truck to create concrete. The cement-mixing truck must then arrive at its destination in no more than 1.25 hours. The cement-mixing truck can average no more than 25 miles per hour.

B. Write an inequality that describes the possible distances (*d*), in miles, between the location the mix is put into the cement-mixing truck and the destination.

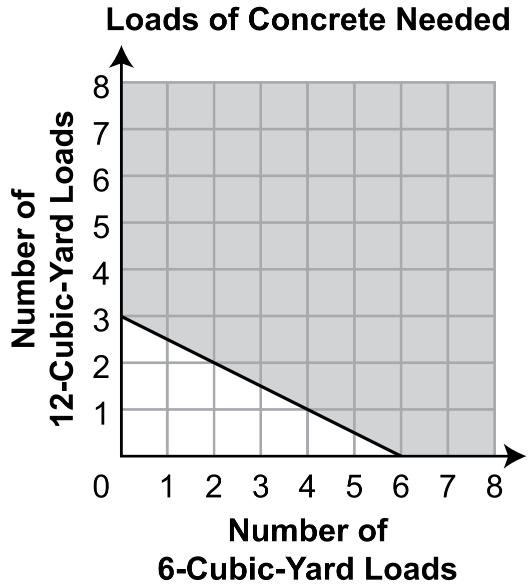
inequality: ______________

Go to the next page to finish question 14.

GO ON

14. ***Continued.*** Please refer to the previous page for task explanation.

A specific job will require more than one truckload of concrete. The company will use cement-mixing trucks that have different load capacities for carrying concrete. The trucks they will use for this job will either have a load capacity of 6 cubic yards of concrete or a load capacity of 12 cubic yards of concrete. The linear inequality graphed below can be used to find the number of loads of concrete of each size that will provide enough concrete to complete the job.



C. What is the **minimum** number of cubic yards of concrete needed to complete the job?

cubic yards of concrete: ____________________

D. Which ordered pair in the solution set represents the **least** total number of loads of concrete needed to complete the job?

ordered pair: (__________ , __________)

AFTER YOU HAVE CHECKED YOUR WORK, CLOSE YOUR ANSWER BOOKLET AND TEST BOOKLET SO YOUR TEACHER WILL KNOW YOU ARE FINISHED.

STOP

Item-Specific Scoring Guideline

#14 Item Information

Alignment	A1.1.3	**Depth of Knowledge**	2	**Mean Score**	1.04

Assessment Anchor this item will be reported under:

A1.1.3—Linear Inequalities

Specific Anchor Descriptor addressed by this item:

A1.1.3.1—Write, solve, and/or graph linear inequalities using various methods.

Scoring Guide

Score	Description
4	The student demonstrates a thorough understanding of linear inequalities by correctly solving problems with clear and complete procedures and explanations when required.
3	The student demonstrates a general understanding of linear inequalities by solving problems and providing procedures and explanations with only minor errors or omissions.
2	The student demonstrates a partial understanding of linear inequalities by providing a portion of the correct problem solving, procedures, and explanations.
1	The student demonstrates a minimal understanding of linear inequalities.
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 points.
2	Student earns 2 points.
1	Student earns 1 point.
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

What?	Why?
$0 \leq c \leq 9.5$	

Part B (1 point):

1 point for correct answer

What?	Why?
$d \leq 31.25$ (miles) **OR** $0 \leq d \leq 31.25$ **OR** $0 < d \leq 31.25$ **OR equivalent**	

Part C (1 point):

1 point for correct answer

What?	Why?
36 (cubic yards)	

Part D (1 point):

1 point for correct answer

What?	Why?
(0, 3)	

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STUDENT RESPONSE

Response Score: 4 points

PARTS A AND B

Question 14
Page 1 of 2

A company uses cement-mixing trucks to deliver loads of concrete to job sites.

An empty cement-mixing truck weighs 26,000 pounds. Concrete weighs 4,000 pounds per cubic yard. The cement-mixing truck weighs 64,000 pounds when filled with concrete. The compound inequality shown below describes all the possible amounts of concrete (c), in cubic yards, that can be carried by the cement-mixing truck.

$$26{,}000 \le 4{,}000c + 26{,}000 \le 64{,}000$$

A. Complete the inequality below to show all the possible amounts of concrete (c), in cubic yards, that can be carried by the cement-mixing truck.

$0 \le c \le 9\frac{1}{2}$

The student provided the correct compound inequality with the correct endpoints of 0 and $9\frac{1}{2}$ $\left(0 \le c \le 9\frac{1}{2}\right)$. While support is not required for Part A, the student likely subtracted 26,000 from all three expressions of the given compound inequality and then divided each of the three resulting expressions by 4,000. [1 point]

A mix is put ... 1.25 hours.

B. Write an inequality that describes the possible distances (d), in miles, between the location the mix is put into the cement-mixing truck and the destination.

Inequality: $d \le 31.25$

The student provided a correct inequality ($d \le 31.25$). While support is not required for Part B, the student likely multiplied the maximum speed of the truck (25 miles per hour) by the maximum time (1.25 hours) the cement can be in the truck to determine the maximum distance ($25 \times 1.25 = 31.25$ miles). [1 point]

Review/End Test | Pause | Flag | Options | Next

PARTS C AND D

Question 14
Page 2 of 2

A company uses cement-mixing trucks to deliver loads of concrete to job sites.

A specific job will require more than one truckload of concrete. The company will use cement-mixing trucks that have different load capacities for carrying concrete. The trucks they will use for this job will either have a load capacity of 6 cubic yards of concrete or a load capacity of 12 cubic yards of concrete. The linear inequality graphed below can be used to find the number of loads of concrete of each size that will provide enough concrete to complete the job.

Enlarge

C. What is the **minimum** number of cubic yards of concrete needed to complete the job?

cubic yards of concrete: 36

The student provided the correct answer (*36*). While support is not required for Part C, the student likely recognized that any point on the boundary line of the graphed linear inequality will yield the minimum value, selected a point on the line, multiplied the *x*-coordinate by 6 cubic yards and the *y*-coordinate by 12 cubic yards, and then added the products. For example, by using the point (4, 1), the student could have multiplied 4 by 6 and 1 by 12 and then added the products, resulting in 36 cubic yards of concrete ($4 \times 6 + 1 \times 12 = 24 + 12 = 36$). [1 point]

D. Which ordered pair in the solution set

ordered pair: (0 , 3)

The student provided the correct ordered pair: (*0, 3*). While support is not required for Part D, the student likely recognized that the coordinates should be added and identified that the smallest sum in the solution set occurs at (0, 3), which would result in only 3 loads. [1 point]

Review/End Test Pause Flag Options Back Next

STUDENT RESPONSE

Response Score: 3 points

14. A company uses cement-mixing trucks to deliver loads of concrete to job sites.

An empty cement-mixing truck weighs 26,000 pounds. Concrete weighs 4,000 pounds per cubic yard. The cement-mixing truck weighs 64,000 pounds when filled with concrete. The compound inequality shown below describes all the possible amounts of concrete (*c*), in cubic yards, that can be carried by the cement-mixing truck.

$$26{,}000 \le 4{,}000c + 26{,}000 \le 64{,}000$$

A. Complete the inequality below to show all the possible amounts of concrete (*c*), in cubic yards, that can be carried by the cement-mixing truck.

$26{,}000 \le 4{,}000c + 26{,}000 \le 64{,}000$
$-26{,}000 \quad -26{,}000 \quad -26{,}000$

$\frac{0}{4{,}000} \le \frac{4{,}000c}{4{,}000} \le \frac{38{,}000}{4{,}000}$

$0 \le c \le 9.5$

0 $\le c \le$ 9.5

The student gave the correct answer by providing a compound inequality with the correct endpoints of 0 and 9.5 (*0 ≤ c ≤ 9.5*). The work shown is correct, though not necessary for credit. The student first subtracted 26,000 from all three expressions of the given compound inequality and then divided each of the resulting expressions by 4,000. [1 point]

A mix is put into the cement-mixing truck to create concrete. The cement-mixing truck must then arrive at its destination in no more than 1.25 hours. The cement-mixing truck can average no more than 25 miles per hour.

B. Write an inequality that describes the possible distances (*d*), in miles, between the location the mix is put into the cement-mixing truck and the destination.

$d = rt$
$d = 1.25(25)$
$d = 31.25$

inequality: $0 \le x \le 31.25$

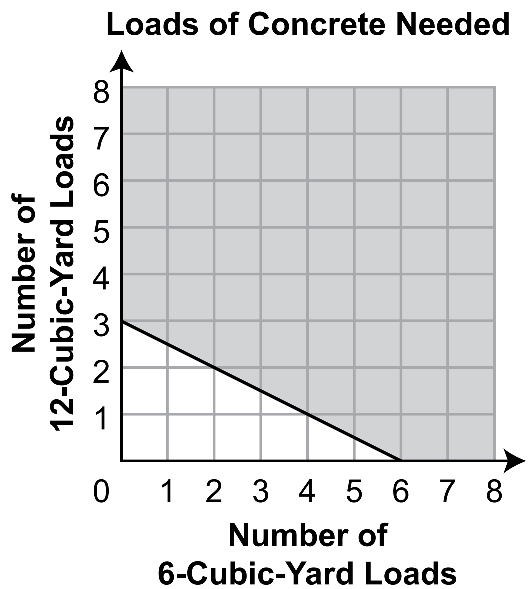
The student provided a correct inequality (*0 ≤ x ≤ 31.25*). The work shown is correct, though not necessary for credit. The student started with the distance formula (*d = rt*) and then multiplied the maximum speed of the truck (25 miles per hour) by the maximum time (1.25 hours) the cement can be in the truck to determine the maximum distance (*d = 31.25*). [1 point]

Go to the next page to finish question 14.

GO ON

14. ***Continued.*** Please refer to the previous page for task explanation.

A specific job will require more than one truckload of concrete. The company will use cement-mixing trucks that have different load capacities for carrying concrete. The trucks they will use for this job will either have a load capacity of 6 cubic yards of concrete or a load capacity of 12 cubic yards of concrete. The linear inequality graphed below can be used to find the number of loads of concrete of each size that will provide enough concrete to complete the job.



The student provided the correct answer (*36*). While support is not required for Part C, the student likely recognized that any point on the boundary line of the graphed linear inequality will yield the minimum value, selected a point on the line, multiplied the *x*-coordinate by 6 cubic yards and the *y*-coordinate by 12 cubic yards, and then added the products. For example, by using the point (2, 2), the student could have multiplied 2 by 6 and 2 by 12 and then added the products, resulting in 36 cubic yards of concrete ($2 \times 6 + 2 \times 12 = 12 + 24 = 36$). [1 point]

cubic yards of concrete: 36

D. Which ordered pair in the solution set represents the **least** total number of loads of concrete needed to complete the job?

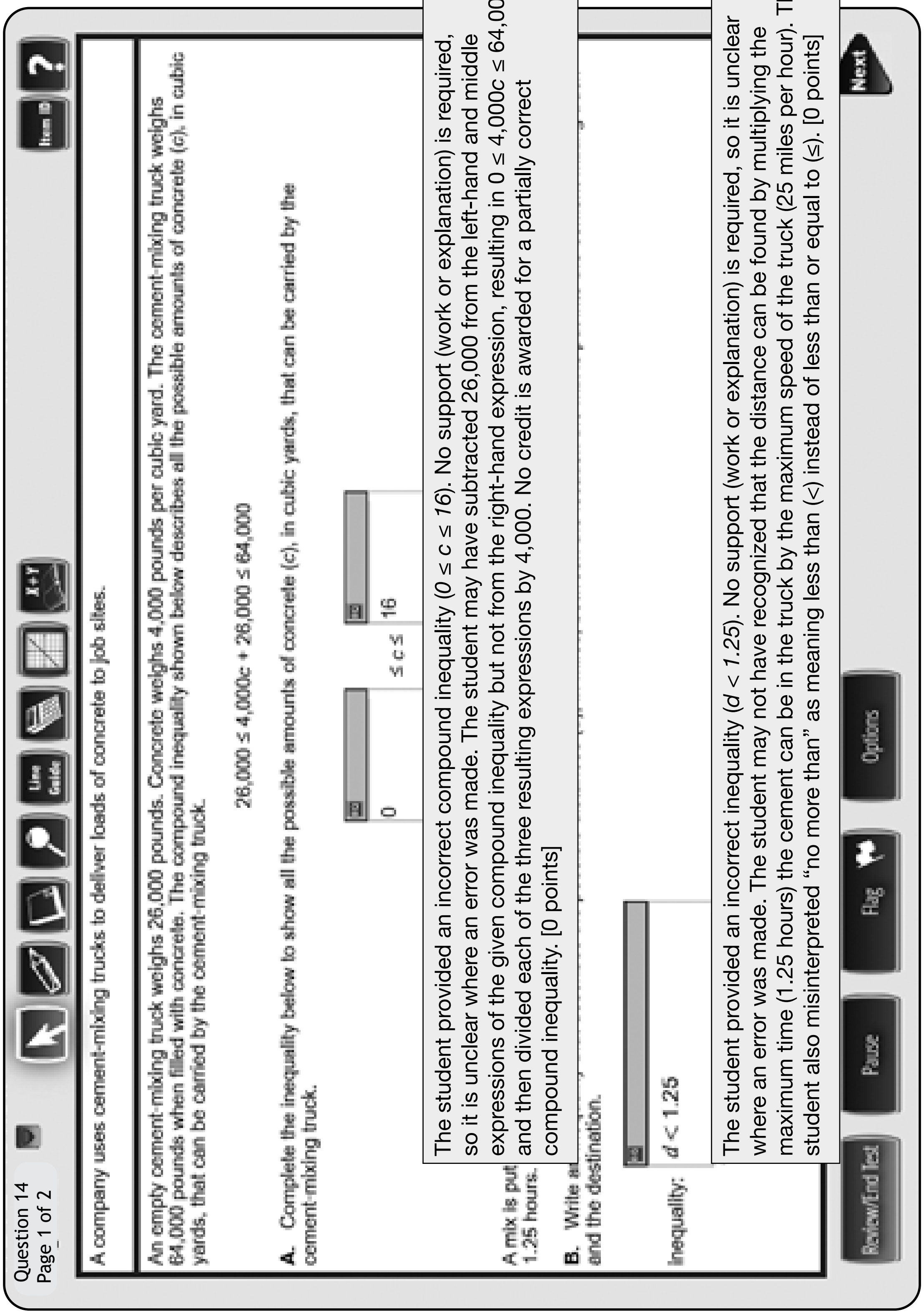
ordered pair: (2 , 2)

The student provided an incorrect ordered pair: (*2, 2*). No support (work or explanation) is required, so it is unclear where an error was made. The student may have recognized that the minimum value should occur on the boundary line of the graphed linear inequality; however, the student may not have considered that sums of the coordinates should be compared, instead selecting a point on the graph for which the *x*-coordinate and the *y*-coordinate are the same. [0 points]

STUDENT RESPONSE

Response Score: 2 points

PARTS A AND B



The student provided an incorrect compound inequality (*$0 \le c \le 16$*). No support (work or explanation) is required, so it is unclear where an error was made. The student may have subtracted 26,000 from the left-hand and middle expressions of the given compound inequality but not from the right-hand expression, resulting in $0 \le 4{,}000c \le 64{,}000$, and then divided each of the three resulting expressions by 4,000. No credit is awarded for a partially correct compound inequality. [0 points]

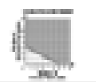
The student provided an incorrect inequality (*$d < 1.25$*). No support (work or explanation) is required, so it is unclear where an error was made. The student may not have recognized that the distance can be found by multiplying the maximum time (1.25 hours) the cement can be in the truck by the maximum speed of the truck (25 miles per hour). The student also misinterpreted "no more than" as meaning less than (<) instead of less than or equal to (≤). [0 points]

PARTS C AND D

Question 14
Page 2 of 2

A company uses cement-mixing trucks to deliver loads of concrete to job sites.

A specific job will require more than one truckload of concrete. The company will use cement-mixing trucks that have different load capacities for carrying concrete. The trucks they will use for this job will either have a load capacity of 6 cubic yards of concrete or a load capacity of 12 cubic yards of concrete. The linear inequality graphed below can be used to find the number of loads of concrete of each size that will provide enough concrete to complete the job.



C. What is the **minimum** number of cubic

cubic yards of concrete: 36 cubic yards

The student provided the correct answer (*36*). While support is not required for Part C, the student likely recognized that any point on the boundary line of the graphed linear inequality will yield the minimum value, selected a point on the line, multiplied the *x*-coordinate by 6 cubic yards and the *y*-coordinate by 12 cubic yards, and then added the products. For example, by using the point (6, 0), the student could have multiplied 6 by 6 and 0 by 12 and then added the products, resulting in 36 cubic yards of concrete ($6 \times 6 + 0 \times 12 = 36 + 0 = 36$). [1 point]

D. Which ordered pair in the solution set represents the **least** total number of loads of concrete needed to complete the job?

ordered pair: (0 , 3)

The student provided a correct ordered pair: (*0, 3*). While support is not required for Part D, the student likely recognized that the coordinates should be added and identified that the smallest sum in the solution set occurs at (0, 3), which would result in only 3 loads. [1 point]

STUDENT RESPONSE

Response Score: 1 point

14. A company uses cement-mixing trucks to deliver loads of concrete to job sites.

An empty cement-mixing truck weighs 26,000 pounds. Concrete weighs 4,000 pounds per cubic yard. The cement-mixing truck weighs 64,000 pounds when filled with concrete. The compound inequality shown below describes all the possible amounts of concrete (c), in cubic yards, that can be carried by the cement-mixing truck.

$$26{,}000 \le 4{,}000c + 26{,}000 \le 64{,}000$$

A. Complete the inequality below to show all the possible amounts of concrete (c), in cubic yards, that can be carried by the cement-mixing truck.

26,000 $\le c \le$ 64,000

The student provided an incorrect compound inequality (*26,000 ≤ c ≤ 64,000*). The student used the endpoints from the given compound inequality without subtracting 26,000 from the endpoint values and dividing each difference by 4,000. [0 points]

A mix is put into the cement-mixing truck to create concrete. The cement-mixing truck must then arrive at its destination in no more than 1.25 hours. The cement-mixing truck can average no more than 25 miles per hour.

B. Write an inequality that describes the possible distances (d), in miles, between the location the mix is put into the cement-mixing truck and the destination.

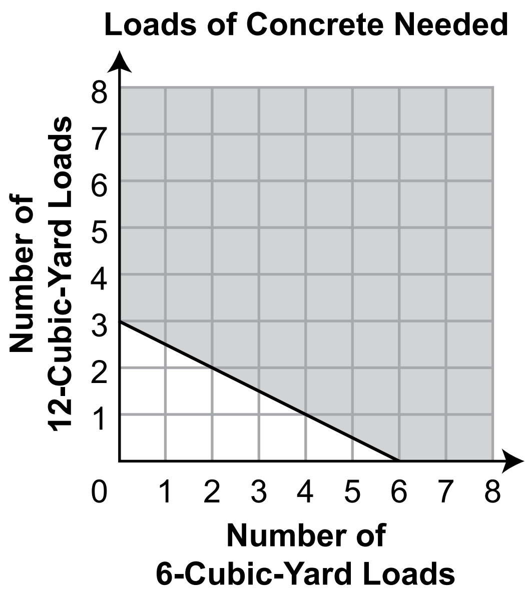
$25d \le 1.25$

inequality: $25d \le 1.25$

The student provided an incorrect inequality (*25d ≤ 1.25*). The student set up the inequality incorrectly by multiplying the distance (d) by the maximum speed of the truck (25 miles per hour) instead of multiplying the maximum time (1.25 hours) the cement can be in the truck by the maximum speed of the truck. [0 points]

14. *Continued.* Please refer to the previous page for task explanation.

A specific job will require more than one truckload of concrete. The company will use cement-mixing trucks that have different load capacities for carrying concrete. The trucks they will use for this job will either have a load capacity of 6 cubic yards of concrete or a load capacity of 12 cubic yards of concrete. The linear inequality graphed below can be used to find the number of loads of concrete of each size that will provide enough concrete to complete the job.



The student provided an incorrect answer (*3 yd*^{3}). No support (work or explanation) is required, so it is unclear where an error was made. Although the student may have recognized that the minimum value should occur on the boundary line of the graphed linear inequality and realized that the coordinates should be combined, the student may have then added the coordinates without first multiplying each coordinate by the volume of the loads (the *x*-coordinate by 6 cubic yards and the *y*-coordinate by 12 cubic yards) and identified the smallest sum, which would occur at (0, 3), resulting in 0 + 3 = 3. [0 points]

cubic yards of concrete: 3 yd^3

D. Which ordered pair in the solution set represents the **least** total number of loads of concrete needed to complete the job?

ordered pair: (0 , 3)

The student provided the correct ordered pair: (*0, 3*). While support is not required for Part D, the student likely recognized that the coordinates should be added and identified that the smallest sum in the solution set occurs at (0, 3), which would result in only 3 loads. [1 point]

YOU ARE FINISHED.

STUDENT RESPONSE

Response Score: 0 points

PARTS A AND B

Question 14
Page 1 of 2

A company uses cement-mixing trucks to deliver loads of concrete to job sites.

An empty cement-mixing truck weighs 26,000 pounds. Concrete weighs 4,000 pounds per cubic yard. The cement-mixing truck weighs 64,000 pounds when filled with concrete. The compound inequality shown below describes all the possible amounts of concrete (c), in cubic yards, that can be carried by the cement-mixing truck.

$$26{,}000 \le 4{,}000c + 26{,}000 \le 64{,}000$$

A. Complete the inequality below to show all the possible amounts of concrete (c), in cubic yards, that can be carried by the cement-mixing truck.

30,000 $\le c \le$ 62,000

The student provided an incorrect compound inequality (*30,000 ≤ c ≤ 62,000*). No support (work or explanation) is required, so it is unclear where an error was made. The student may have started with 26,000 ≤ 4,000*c* + 26,000 from the given compound inequality and then attempted to solve for *c* by adding 4,000 to the lower endpoint, resulting in 30,000, and then transposing the 26 of the remaining 26,000 to arrive at 62,000 for the upper endpoint. [0 points]

A mix is put ...
1.25 hours.

B. Write an inequality that describes the possible distances (d), in miles, between the location the mix is put into the cement-mixing truck and the destination.

inequality: $25 \le d \le 31.25$

10 / 50

The student provided an incorrect compound inequality (*25 ≤ d ≤ 31.25*). Although the *31.25* is the correct upper endpoint, the student used the maximum speed of the truck (25 miles per hour) as the lower endpoint. No credit is awarded for a partially correct compound inequality. [0 points]

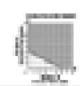
Review/End T...

PARTS C AND D

Question 14
Page 2 of 2

A company uses cement-mixing trucks to deliver loads of concrete to job sites.

A specific job will require more than one truckload of concrete. The company will use cement-mixing trucks that have different load capacities for carrying concrete. The trucks they will use for this job will either have a load capacity of 6 cubic yards of concrete or a load capacity of 12 cubic yards of concrete. The linear inequality graphed below can be used to find the number of loads of concrete of each size that will provide enough concrete to complete the job.



Enlarge

C. What is the **minimum** number of cubic yards of concrete needed to complete the job?

cubic yards of concrete: 72

The student provided an incorrect answer (*72*) for the minimum number of cubic yards of concrete needed to complete the job. No support (work or explanation) is required, so it is unclear where an error was made. The student may have multiplied 6 cubic yards by 12 cubic yards (6 × 12 = 72). [0 points]

D. Which ordered pair in the solution set represents the **least** total number of loads of concrete needed to complete the job?

ordered pair: (6 , 3)

The student provided an incorrect ordered pair: (*6, 3*). No support (work or explanation) is required, so it is unclear where an error was made. The student may have identified the *x*-intercept (6) and the *y*-intercept (3), and then used these intercepts to write an ordered pair without considering that this ordered pair represents a point in the solution set that is not on the boundary line of the linear inequality. [0 points]

Review/End Test Pause Flag Options Back Next

ALGEBRA I MODULE 1—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	A1.1.1.1.2	A	1	70%	8%	15%	7%
2	A1.1.1.2.1	A	2	37%	19%	22%	22%
3	A1.1.1.5.2	B	2	15%	56%	18%	11%
4	A1.1.1.5.3	B	1	31%	39%	15%	15%
5	A1.1.2.1.2	C	2	12%	8%	70%	10%
6	A1.1.2.1.3	C	2	6%	12%	74%	8%
7	A1.1.2.2.1	D	1	6%	5%	24%	65%
8	A1.1.2.2.2	C	2	4%	3%	84%	9%
9	A1.1.3.1.1	D	1	8%	28%	10%	54%
10	A1.1.3.1.2	B	1	24%	62%	6%	8%
11	A1.1.3.1.3	A	2	71%	12%	6%	11%
12	A1.1.3.2.2	B	2	10%	61%	18%	11%

Constructed-Response

Sample Number	Alignment	Points	Depth of Knowledge	Mean Score
13	A1.1.2	4	2	1.58
14	A1.1.3	4	2	1.04

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ALGEBRA I MODULE 2

MULTIPLE-CHOICE ITEMS

1. The first six numbers in a pattern are listed below.

$^{-}19.2 \quad {}^{-}18.4 \quad {}^{-}17.6 \quad {}^{-}16.8 \quad {}^{-}16 \quad {}^{-}15.2$

The pattern continues. Which expression could be used to determine the 100th number in the pattern?

A. $^{-}39.2(100) + 20$

B. $^{-}0.8(100) - 18.4$

C. $0.8(100) - 20$

D. $20(100) - 135.2$

Item Information	
Alignment	A1.2.1.1.1
Answer Key	C
Depth of Knowledge	2
p-value A	8%
p-value B	30%
p-value C	54% (correct answer)
p-value D	8%
Option Annotations	A student could determine the **correct** answer, option C, by using the pattern to determine the rate of change (0.8). Of the given answer choices, only option C uses a rate of change of 0.8. A student could arrive at an **incorrect** answer by incorrectly determining the rate of change and testing only one of the values in the pattern. For example, a student could arrive at option B by thinking the values are going down by 0.8 without considering the effect of the negative signs and then testing only the first value in the pattern [$^{-}0.8(1) - 18.4 = {}^{-}19.2$].

2. The table below lists **all** the ordered pairs representing a relation.

x	*y*
1	0
1	4
2	4
3	0
5	4
5	0

What is the domain of the relation?

A. {0, 4}

B. {1, 2, 3, 5}

C. {all real numbers from 0 to 4}

D. {all real numbers from 1 to 5}

Item Information	
Alignment	A1.2.1.1.3
Answer Key	B
Depth of Knowledge	1
p-value A	14%
p-value B	60% (correct answer)
p-value C	8%
p-value D	18%
Option Annotations	A student could determine the **correct** answer, option B, by recognizing that the domain is the set of the *x*-values in a given relation and finding the option with the same set of *x*-values as shown in the table. A student could arrive at an **incorrect** answer by identifying the range instead of the domain or by including all real number values between the given numbers. For example, a student could arrive at option D by thinking the domain must include all real numbers between the minimum and maximum *x*-values.

3. For a local race, the prize for first place is $250 plus an additional $5 for every person who registers for the race. The equation shown below represents the prize (y), in dollars, for first place based on the number of people (x) who register for the race.

$$y = 5x + 250$$

Which statement about the prize for first place is true?

A. The prize for first place will always be a multiple of 50.

B. The prize for first place will be $325 if 75 people register for the race.

C. The prize for first place when there are 50 people registered for the race is twice as much as when there are 25 people registered.

D. The prize for first place when there are 100 people registered for the race is twice as much as when there are 25 people registered.

Item Information	
Alignment	A1.2.1.2.1
Answer Key	D
Depth of Knowledge	2
p-value A	11%
p-value B	6%
p-value C	24%
p-value D	59% (correct answer)
Option Annotations	A student could determine the **correct** answer, option D, by substituting 100 and 25 into the equation for x and comparing the associated y-values (750 and 375). A student could arrive at an **incorrect** answer by misinterpreting what the values in the equation represent or by misapplying the numbers in the answer choices. For example, a student could arrive at option C by thinking the y-value must double when the x-value is doubled without considering the effect of the constant term on the associated y-values.

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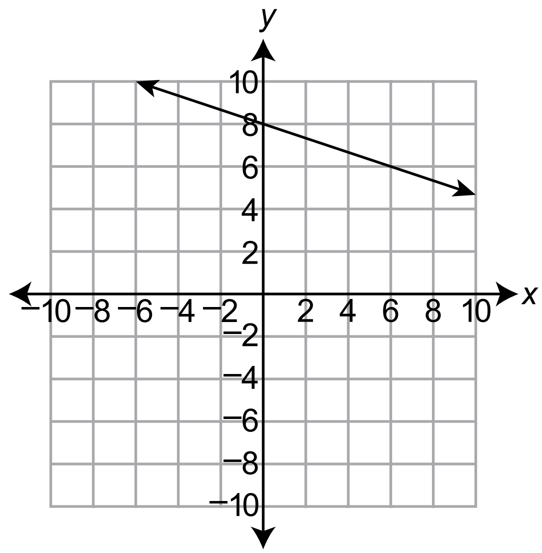
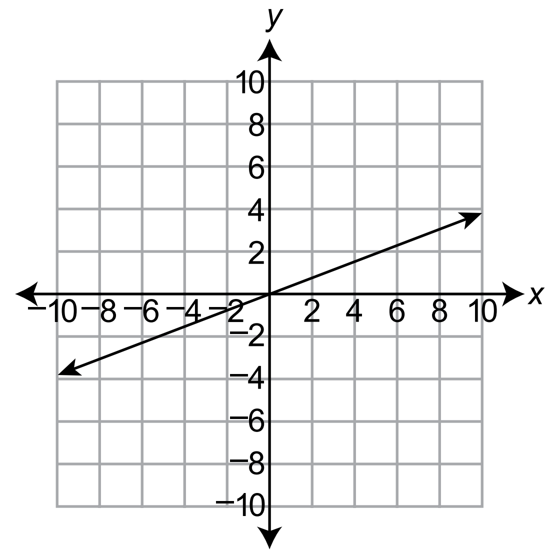
4. The equation $3x + y = 8$ describes a function of x. Which graph represents the function?

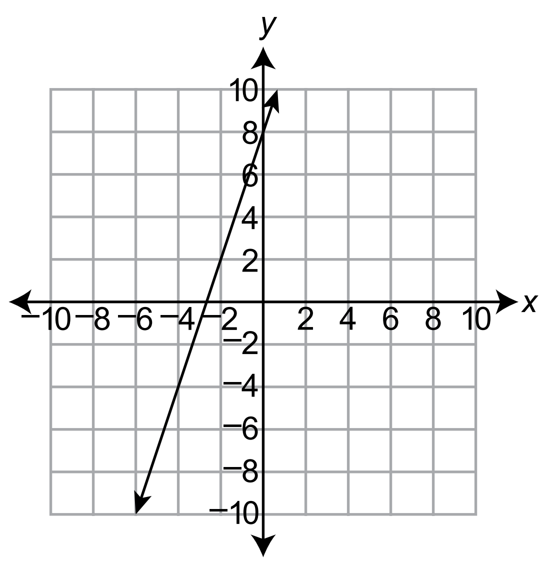
A.



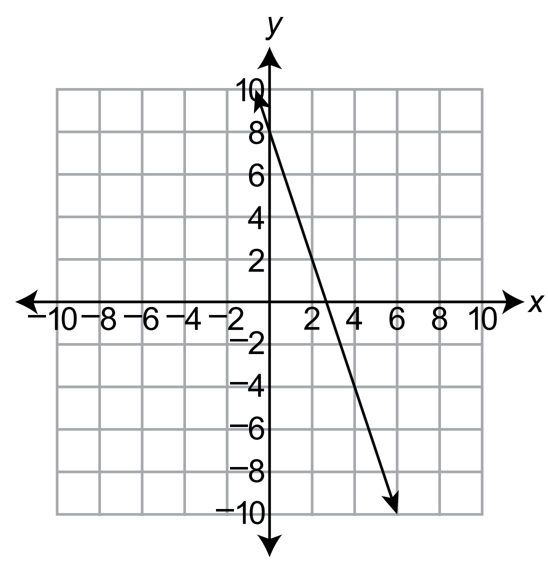
B.



C.



D.



Item Information	
Alignment	A1.2.1.2.2
Answer Key	D
Depth of Knowledge	1
p-value A	10%
p-value B	7%
p-value C	17%
p-value D	66% (correct answer)
Option Annotations	A student could determine the **correct** answer, option D, by rewriting the equation in slope-intercept form ($y = {}^{-}3x + 8$) or by substituting 0s in for x and for y to find the y-intercept ($y = 8$) and the x-intercept $\left(3x = 8 \rightarrow x = 2\frac{2}{3}\right)$, respectively. A student could arrive at an **incorrect** answer by applying an incorrect slope. For example, a student could arrive at option C by using the coefficient of x as the slope without first rewriting the equation in slope-intercept form.

5. Paul paints houses. He charges his customers a fixed amount to cover the expenses of using a paint sprayer and buying brushes. He also charges an amount based on the number of gallons of paint (x) he will need. The equation shown below represents the total amount (y), in dollars, Paul charges his customers for the materials he will need for a job.

$$y = 14.5x + 80$$

What is represented by the number 14.5 in Paul's equation?

A. the number of gallons of paint Paul will need

B. the charge for each gallon of paint Paul will need

C. the number of hours it will take to complete the paint job

D. the fixed amount charged for using a paint sprayer and buying brushes

Item Information	
Alignment	A1.2.2.1.1
Answer Key	B
Depth of Knowledge	2
p-value A	26%
p-value B	63% (correct answer)
p-value C	5%
p-value D	6%
Option Annotations	A student could determine the **correct** answer, option B, by identifying the coefficient of x as the rate of change and interpreting that to mean the amount charged for each gallon of paint. A student could arrive at an **incorrect** answer by switching the meanings of two elements in the equation or by misinterpreting the rate of change within the context. For example, a student could arrive at option A by switching the meanings of the 14.5 and the x.

6. What is the equation of the line that passes through the points ($^-2$, 4) and (6, 2)?

A. $y = 0.25x + 4.5$

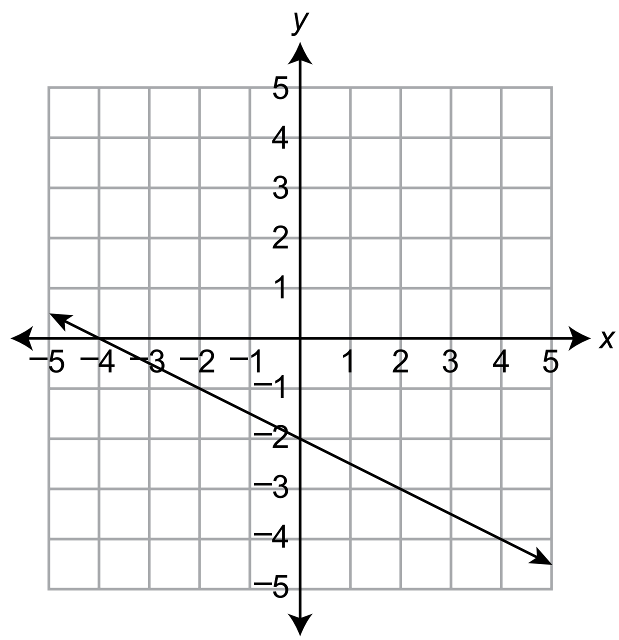
B. $y = 0.25x + 0.5$

C. $y = {}^-0.25x + 14$

D. $y = {}^-0.25x + 3.5$

Item Information	
Alignment	A1.2.2.1.3
Answer Key	D
Depth of Knowledge	1
p-value A	13%
p-value B	12%
p-value C	14%
p-value D	61% (correct answer)
Option Annotations	A student could determine the **correct** answer, option D, by using the slope formula ($m = \frac{2 - 4}{6 - {}^-2} = \frac{^-2}{8} = {}^-0.25$), applying the point-slope formula using the slope and either of the given points [$y - 2 = {}^-0.25(x - 6)$ or $y - 4 = {}^-0.25(x - {}^-2)$], and then rewriting that equation in slope-intercept form. A student could arrive at an **incorrect** answer by reversing the sign of the slope or by incorrectly finding the value of the *y*-intercept. For example, a student could arrive at option C by finding the slope but then determining the *x*-intercept instead of the *y*-intercept by starting at the point (6, 2) and then adding 1 to the *x*-coordinate and $^-0.25$ to the *y*-coordinate until the *y*-coordinate becomes 0, which occurs at the point (14, 0).

7. A line is graphed on the coordinate plane shown below.



Which statement correctly describes the line?

A. The line has a slope of $^{-}2$ and a *y*-intercept of $^{-}4$.

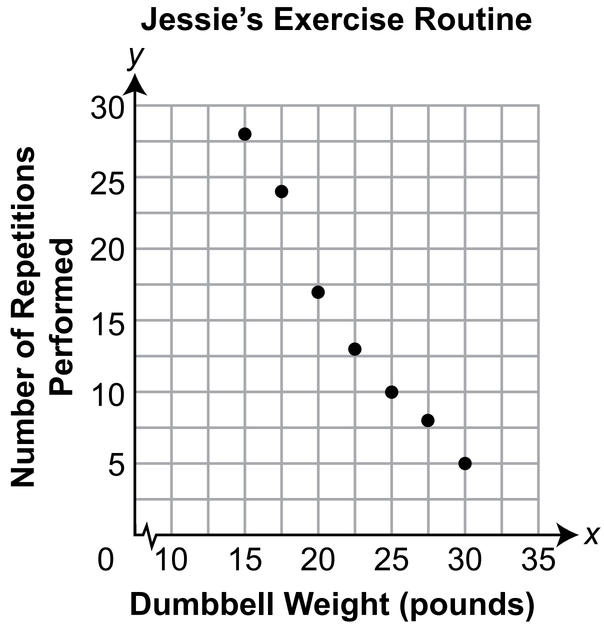
B. The line has a slope of $^{-}2$ and a *y*-intercept of $^{-}2$.

C. The line has a slope of $\frac{-1}{2}$ and a *y*-intercept of $^{-}4$.

D. The line has a slope of $\frac{-1}{2}$ and a *y*-intercept of $^{-}2$.

Item Information	
Alignment	A1.2.2.1.4
Answer Key	D
Depth of Knowledge	1
p-value A	13%
p-value B	12%
p-value C	7%
p-value D	68% (correct answer)
Option Annotations	A student could determine the **correct** answer, option D, by using two ordered pairs on the graph to determine the slope $\left(m = \frac{{}^{-}2 - 0}{0 - {}^{-}4} = \frac{{}^{-}2}{4} = \frac{{}^{-}1}{2}\right)$ and identifying that the line crosses the *y*-axis at (0, ⁻2) for a *y*-intercept of ⁻2. A student could arrive at an **incorrect** answer by inverting the slope formula or by using the *x*-intercept instead of the *y*-intercept. For example, a student could arrive at option A by inverting the slope formula as $m = \frac{{}^{-}4 - 0}{0 - {}^{-}2} = \frac{-4}{2} = {}^{-}2$ and by using ⁻4 for the *y*-intercept since the line crosses the *x*-axis at (⁻4, 0).

8. Jessie lifts dumbbells as part of her exercise routine. The scatter plot below shows the relationship between the number of pounds (x) a dumbbell weighs and the number of repetitions (y) of a specific exercise that Jessie can perform.



Based on the scatter plot, which equation represents a line of best fit that could be used to model the relationship between the weights of the dumbbells and the numbers of repetitions that Jessie can perform?

A. $y = {}^-0.8x + 30$

B. $y = {}^-1.5x + 50$

C. $y = {}^-2.8x + 73$

D. $y = {}^-3.5x + 52$

Item Information	
Alignment	A1.2.2.2.1
Answer Key	B
Depth of Knowledge	2
p-value A	38%
p-value B	39% (correct answer)
p-value C	12%
p-value D	11%
Option Annotations	A student could determine the **correct** answer, option B, by estimating the slope $\left(m = \frac{5-25}{30-15} = \frac{-20}{15} = -1\frac{1}{3}\right)$. Of the given answer choices, only option B has a slope that is close to $-1\frac{1}{3}$. A student could arrive at an **incorrect** answer by estimating an incorrect slope or *y*-intercept. For example, a student could arrive at option A by estimating the slope using two points from the right side of the data [e.g., (25, 10) and (30, 5), which results in $m = \frac{5-10}{30-25} = \frac{-5}{5} = -1$] without considering the effect of the two points on the left and using the greatest value on the *y*-axis as the *y*-intercept.

9. The list below represents the number of novels written by each of Amir's 10 favorite authors.

1 3 3 4 5 7 8 10 12 23

What is the interquartile range of the number of novels written by each of Amir's 10 favorite authors?

A. 3

B. 6

C. 7

D. 22

Item Information	
Alignment	A1.2.3.1.1
Answer Key	C
Depth of Knowledge	1
p-value A	16%
p-value B	18%
p-value C	47% (correct answer)
p-value D	19%
Option Annotations	A student could determine the **correct** answer, option C, by determining the first and third quartile values, which are the 3rd value (3) and 8th value (10) of the sorted list, and then finding the difference between these two values (10 – 3). A student could arrive at an **incorrect** answer by determining an incorrect measure of data. For example, a student could arrive at option D by determining the range of the data, which is the difference between the maximum value (23) and the minimum value (1).

10. Dion has two bunches of similar bananas. One bunch has 8 bananas, and the other bunch has 9 bananas. The list below shows the weight, in grams, of each of the bananas in the bunch of 8.

138 118 121 164 140 115 129 123

Which measurement is **most likely** closest to the total weight of the bunch of 9 bananas?

A. 932 grams

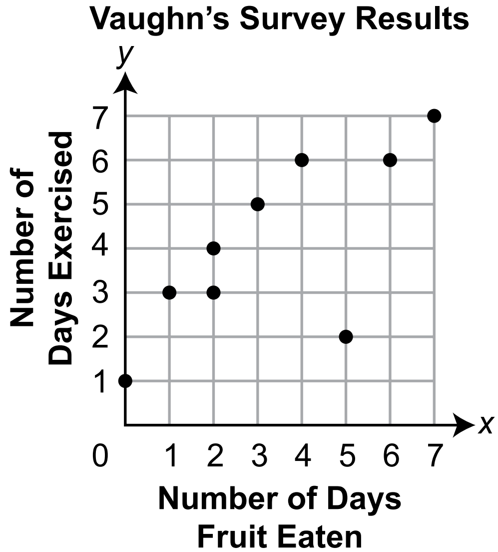
B. 1,048 grams

C. 1,179 grams

D. 1,368 grams

Item Information	
Alignment	A1.2.3.2.1
Answer Key	C
Depth of Knowledge	2
p-value A	7%
p-value B	25%
p-value C	64% (correct answer)
p-value D	4%
Option Annotations	A student could determine the **correct** answer, option C, by determining either the median value (126) or the mean value (131) of the 8 given weights and then multiplying that value by 9, resulting in either 1,134 or 1,179. Of the answer choices, only option C is close to the derived product. A student could arrive at an **incorrect** answer by incorrectly determining the measure of center or misapplying a measure of center. For example, a student could arrive at option B by determining either the median value (126) or the mean value (131) of the 8 given weights, multiplying that value by 8 instead of 9, resulting in either 1,008 or 1,048, and then selecting the answer choice that is closest to the derived product.

11. Vaughn surveyed 9 classmates. He asked each classmate for the number of days in the previous week that he or she had eaten fruit and the number of days that he or she had exercised. The scatter plot below shows the results of his survey.



What is the **median** number of days that the 9 classmates exercised last week?

A. 2

B. 3

C. 4

D. 5

Item Information	
Alignment	A1.2.3.2.2
Answer Key	C
Depth of Knowledge	2
p-value A	4%
p-value B	12%
p-value C	75% (correct answer)
p-value D	9%
Option Annotations	A student could determine the **correct** answer, option C, by identifying the median value of the *y*-coordinates (4) since the *y*-coordinates represent the numbers of days exercised. A student could arrive at an **incorrect** answer by misinterpreting what each coordinate represents. For example, a student could arrive at option B by identifying the median value of the *x*-coordinates, which represent the numbers of days the students had eaten fruit.

12. A bookstore manager will randomly select 1 of 5 newly arrived fiction books and 1 of 4 newly arrived nonfiction books for a window display. What is the probability that the manager will select the shortest of the newly arrived fiction books and the longest of the newly arrived nonfiction books?

A. 5%

B. 10%

C. 20%

D. 45%

Item Information	
Alignment	A1.2.3.3.1
Answer Key	A
Depth of Knowledge	2
p-value A	37% (correct answer)
p-value B	17%
p-value C	29%
p-value D	17%
Option Annotations	A student could determine the **correct** answer, option A, by determining the probability of selecting the shortest fiction book $\left(\frac{1}{5}\right)$, determining the probability of selecting the longest nonfiction book $\left(\frac{1}{4}\right)$, and then multiplying these probabilities together $\left(\frac{1}{5} \bullet \frac{1}{4} = \frac{1}{20} = 0.05\right)$. A student could arrive at an **incorrect** answer by misapplying the simple probabilities. For example, a student could arrive at option C by determining the number of combinations of books (5 • 4 = 20) and incorrectly interpreting this as a percentage.

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CONSTRUCTED-RESPONSE ITEM

13. Lydia delivers vegetables from a community garden. For the residents of her community, she charges a fixed fee and a constant amount per pound of vegetables she delivers. Some of the delivery charges based on the weight of the vegetables are shown in the table below.

Lydia's Delivery Charges

Weight (pounds)	Delivery Charge (dollars)
2	3.00
4	4.00
5	4.50
7	5.50

A. Based on the information in the table, how much would Lydia charge to deliver 10 pounds of vegetables?

B. Explain why including 0 in the domain of the function does **not** make sense in the context of the situation described.

Go to the next page to finish question 13.

GO ON

13. ***Continued.*** Please refer to the previous page for task explanation.

For people who live outside of the community, Lydia adds a \$5.00 gas fee to the delivery charge.

C. Explain why the linear function for Lydia's delivery charges for residents in her community and the linear function for her delivery charges for people who live outside of the community have the same domain but different ranges.

D. Write a function to represent Lydia's delivery charge (y), in dollars, to deliver x pounds of vegetables to people who live **outside** the community.

AFTER YOU HAVE CHECKED YOUR WORK, CLOSE YOUR ANSWER BOOKLET AND TEST BOOKLET SO YOUR TEACHER WILL KNOW YOU ARE FINISHED.

STOP

Item-Specific Scoring Guideline

#13 Item Information

Alignment	A1.2.1	**Depth of Knowledge**	2	**Mean Score**	1.88

Assessment Anchor this item will be reported under:

A1.2.1—Functions

Specific Anchor Descriptor addressed by this item:

A1.2.1.1—Analyze and/or use patterns or relations.

A1.2.1.2—Interpret and/or use linear functions and their equations, graphs, or tables.

Scoring Guide

Score	Description
4	The student demonstrates a thorough understanding of functions by correctly solving problems with clear and complete procedures and explanations when required.
3	The student demonstrates a general understanding of functions by solving problems and providing procedures and explanations with only minor errors or omissions.
2	The student demonstrates a partial understanding of functions by providing a portion of the correct problem solving, procedures, and explanations.
1	The student demonstrates a minimal understanding of functions.
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 functions.
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

What?	Why?
$7	

Part B (1 point):

1 point for correct and complete explanation

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

What?	Why?
	Sample Explanation: If 0 was in the domain, it would represent delivering 0 pounds of vegetables and would cost $2. Nobody would pay $2 to not have anything delivered. **OR equivalent**

Part C (1 point):

1 point for correct and complete explanation

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

Note: Student does not need to provide an example for full credit (not requested in the prompt).

What?	Why?
	Sample Explanation: The linear functions would have the same domain because the set of possible weights of vegetables Lydia can deliver does not change. The linear functions would have different ranges because the delivery charge for people who live outside the community has an additional \$5 gas fee. For example, \$3 exists in the range for the delivery charges for residents in her community but does not exist in the range for the delivery charges for people who live outside of the community, because of the \$5 gas fee. **OR equivalent**

Part D (1 point):

1 point for correct answer

OR $\frac{1}{2}$ point for an equation with either the correct slope or correct *y*-intercept

OR $\frac{1}{2}$ point for a correct expression (i.e., $0.5x + 7$ or equivalent)

What?	Why?
$y = 0.5x + 7$ **OR equivalent**	

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STUDENT RESPONSE

Response Score: 4 points

13. Lydia delivers vegetables from a community garden. For the residents of her community, she charges a fixed fee and a constant amount per pound of vegetables she delivers. Some of the delivery charges based on the weight of the vegetables are shown in the table below.

Lydia's Delivery Charges

Weight (pounds)	Delivery Charge (dollars)
2	3.00
4	4.00
5	4.50
7	5.50

A. Based on the information in the table, how much would Lydia charge to deliver 10 pounds of vegetables?

Lydia would charge $7 for 10 poundof vegetables.

1 pound - $.50

deliverycharge - $0.5x+2$

The student provided the correct answer (*$7*). The work shown is correct, though not necessary for credit. The student included the recognition that each pound of vegetables delivered is $0.50 and the delivery charge is an additional $2. From here, the student likely determined the charge for the delivery of 10 pounds of vegetables by multiplying 0.50 by 10 and adding 2, resulting in a delivery charge of $7. [1 point]

B. Explain why including 0 in the domain of the function does **not** make sense in the context of the situation described.

If thereare 0 pounds of vegetables then there is no need to pay for it.

The student provided a correct and complete explanation (*If there are 0 pounds of vegetables then there is no need to pay for it*). [1 point]

Go to the next page to finish question 13.

GO ON

13. ***Continued.*** Please refer to the previous page for task explanation.

For people who live outside of the community, Lydia adds a $5.00 gas fee to the delivery charge.

C. Explain why the linear function for Lydia's delivery charges for residents in her community and the linear function for her delivery charges for people who live outside of the community have the same domain but different ranges.

They have the same domain because Lydia still charges 50 cents per pound for the vegetables.

They have different ranges because the people outside of the community have to pay for a $5 gas fee for Lydia to get the vegetables to them, causing the amount of money to go up.

The student provided a correct and complete explanation (*They have the same domain because Lydia still charges 50 cents per pound for the vegetables. They have different ranges because the people outside of the community have to pay for a $5 gas fee . . . causing the amount of money to go up*) by recognizing that the domain represents the pounds of vegetables delivered and the ranges are different due to the gas fee. [1 point]

D. Write a function to represent Lydia's delivery charge (y), in dollars, to deliver x pounds of vegetables to people who live **outside** the community.

$y = 0.5x + 7$

The student provided a correct function ($y = 0.5x + 7$). While support is not required for Part D, the student likely recognized that the constant amount per pound would remain at $0.50 ($0.5x$) and that the original $2 fixed fee would increase by $5 to $7 ($+ 7$). [1 point]

AFTER YOU HAVE CHECKED YOUR WORK, CLOSE YOUR ANSWER BOOKLET AND TEST BOOKLET SO YOUR TEACHER WILL KNOW YOU ARE FINISHED.

STOP

STUDENT RESPONSE

Response Score: 3 points

PARTS A AND B

Question 13
Page 1 of 2

Lydia delivers vegetables from a community garden. For the residents of her community, she charges a fixed fee and a constant amount per pound of vegetables she delivers. Some of the delivery charges based on the weight of the vegetables are shown in the table below.

Lydia's Delivery Charges

Weight (pounds)	Delivery Charge (dollars)
2	3.00
4	4.00
5	4.50
7	5.50

A. Based on the information in the table, how much would Lydia charge to deliver 10 pounds of vegetables?

$6.00

5 / 50

The student provided an incorrect answer (*$6.00*). No support (work or explanation) is required, so it is unclear where an error was made. The student may have determined the delivery charge for 8 pounds of vegetables (0.50 • 8 + 2 = 6). [0 points]

B. Explain why including 0 in the domain of the function does **not** make sense in the context of the situation described.

It would make not make any sense because Lydia needs to buy vegtables, so knowing how much 0 pounds of vegtables does not matter to her, plus it is obvoius 0 of something costs zero dollars.

190 / 1000

The student provided a correct and complete explanation (*it is obvoius 0 of something costs zero dollars*), realizing that someone receiving nothing should pay nothing. [1 point]

Review/End Test | Pause | Flag | Options | Next

PARTS C AND D

Question 13
Page 2 of 2

Lydia delivers vegetables from a community garden. For the residents of her community, she charges a fixed fee and a constant amount per pound of vegetables she delivers. Some of the delivery charges based on the weight of the vegetables are shown in the table below.

Lydia's Delivery Charges

Weight (pounds)	Delivery Charge (dollars)
2	3.00
4	4.00
5	4.50
7	5.50

For people who live outside of the community, Lydia adds a $5.00 gas fee to the delivery charge.

C. Explain why the linear function for Lydia's delivery charges for residents in her community and the linear function for her delivery charges for people who live outside of the community have the same domain but different ranges.

The pounds of vegtables (domain) are still available while the cost (range) are increased by five dollars because of the out of city gas fee.

141 / 1000

The student provided a correct and complete explanation (*The pounds of vegtables (domain) are still available while the cost (range) are increased by five dollars because of the out of city gas fee*). [1 point]

D. Write a function to represent Lydia's delivery charge (y), in dollars, to deliver x pounds of vegetables to people who live **outside** the community.

$y = x \times 0.50 + 7$

10 / 50

The student provided a correct function ($y = x \times 0.50 + 7$). While support is not required for Part D, the student likely recognized that the constant amount per pound would remain at $0.50 ($x \times 0.50$) and that the original $2 fixed fee would increase by $5 to $7 (+ 7). [1 point]

STUDENT RESPONSE

Response Score: 2 points

13. Lydia delivers vegetables from a community garden. For the residents of her community, she charges a fixed fee and a constant amount per pound of vegetables she delivers. Some of the delivery charges based on the weight of the vegetables are shown in the table below.

Lydia's Delivery Charges

Weight (pounds)	Delivery Charge (dollars)
2	3.00
4	4.00
5	4.50
7	5.50

A. Based on the information in the table, how much would Lydia charge to deliver 10 pounds of vegetables?

She would Charge $11.50

2	3
4	4
5	4.5
7	5.5
10	y

+3 +6

$m = \frac{1}{2}$

$y = 11.50$

The student provided an incorrect answer (*$11.50*). The student provided work, although it is not required or assessed. Based on the work provided, the student correctly determined that the slope (*m*) is $\frac{1}{2}$. In the redrawn table, the student correctly showed that the domain increases by 3 (+*3*) from 7 to 10 but incorrectly increased the range by 6 (+*6*) from 5.5 to *y*, resulting in *y = 11.50*. The student may have determined the incorrect amount of increase for the range by dividing the amount of increase for the domain by $\frac{1}{2}$ instead of multiplying it by $\frac{1}{2}$. [0 points]

That doesn't make sense because if the domain is zero then that means there is zero pounds. When there is zero pounds it obviously wouldn't cost any money.

The student provided a correct and complete explanation (*if the domain is zero then that means there is zero pounds. When there is zero pounds it obviously wouldn't cost any money*). [1 point]

13. ***Continued.*** Please refer to the previous page for task explanation.

For people who live outside of the community, Lydia adds a $5.00 gas fee to the delivery charge.

C. Explain why the linear function for Lydia's delivery charges for residents in her community and the linear function for her delivery charges for people who live outside of the community have the same domain but different ranges.

Everyone will have the same domains because adding $5 to the charge doesn't affect how many pounds someone buys. But since you are adding $5, the ranges will increase

to the delivery charge

The student provided a correct and complete explanation (*adding $5 to the charge doesn't affect how many pounds someone buys. But since you are adding $5 to the delivery charge, the ranges will increase*). [1 point]

D. Write a function to represent Lydia's delivery charge (*y*), in dollars, to deliver *x* pounds of vegetables to people who live **outside** the community.

Weight (pounds)	Charge (dollars)
2	6.00
4	7.00
6	8.00

$y = \frac{1}{2}x + 5$

The student provided an incorrect function $\left(y = \frac{1}{2}x + 5\right)$ with a correct slope $\left(\frac{1}{2}\right)$. The student provided work, although it is not required or assessed. Based on the work provided, the student omitted the original $2 fixed fee that all customers pay and instead used only the $5 gas fee for people who live outside the community. [0.5 points]

AFTER YOU HAVE CHECKED YOUR WORK, CLOSE YOUR ANSWER BOOKLET AND TEST BOOKLET SO YOUR TEACHER WILL KNOW YOU ARE FINISHED.

STOP

STUDENT RESPONSE

Response Score: 1 point

PARTS A AND B

Question 13
Page 1 of 2

Lydia delivers vegetables from a community garden. For the residents of her community, she charges a fixed fee and a constant amount per pound of vegetables she delivers. Some of the delivery charges based on the weight of the vegetables are shown in the table below.

Lydia's Delivery Charges

Weight (pounds)	Delivery Charge (dollars)
2	3.00
4	4.00
5	4.50
7	5.50

A. Based on the information in the table, how much would Lydia charge to deliver 10 pounds of vegetables?

5

1 / 50

The student provided an incorrect answer (5). No support (work or explanation) is required, so it is unclear where an error was made. The student may have forgotten to add on the fixed fee of $2 after determining that the cost per pound of vegetables is $0.50 and multiplying that amount by 10 (for 10 pounds of vegetables) for a total of $5. [0 points]

B. Explain why including 0 in the domain of the function does **not** make sense in the context of the situation described.

Because if you include the zero pounds there would be no charge so it would not make sense in the equation.

107 / 1000

The student provided a correct and complete explanation (*if you include the zero pounds there would be no charge so it would not make sense in the equation*). [1 point]

Review/End Test | Pause | Flag | Options | Next

PARTS C AND D

Question 13
Page 2 of 2

Lydia delivers vegetables from a community garden. For the residents of her community, she charges a fixed fee and a constant amount per pound of vegetables she delivers. Some of the delivery charges based on the weight of the vegetables are shown in the table below.

Lydia's Delivery Charges

Weight (pounds)	Delivery Charge (dollars)
2	3.00
4	4.00
5	4.50
7	5.50

For people who live outside of the community, Lydia adds a $5.00 gas fee to the delivery charge.

C. Explain why the linear function for Lydia's delivery charges for residents in her community and the linear function for her delivery charges for people who live outside of the community have the same domain but different ranges.

Because the domain all have to be different.

44 / 1000

The student provided an incorrect explanation (*Because the domain all have to be different*). This is incorrect because the domain stays the same and the ranges are different due to the $5 gas fee for people outside of the community. [0 points]

D. Write a function to represent Lydia's delivery charge (y), in dollars, to deliver x pounds of vegetables to people who live **outside** the community.

$y = 5x + 5$

6 / 50

The student provided an incorrect function ($y = 5x + 5$). No support (work or explanation) is required, so it is unclear where an error was made. The student may have used the $5 gas fee for both the slope and the initial value without considering the original function for the residents in Lydia's community. [0 points]

Review/End Test | Pause | Flag | Options | Back | Next

STUDENT RESPONSE

Response Score: 0 points

13. Lydia delivers vegetables from a community garden. For the residents of her community, she charges a fixed fee and a constant amount per pound of vegetables she delivers. Some of the delivery charges based on the weight of the vegetables are shown in the table below.

Lydia's Delivery Charges

Weight (pounds)	Delivery Charge (dollars)
2	3.00
4	4.00
5	4.50
7	5.50

A. Based on the information in the table, how much would Lydia charge to deliver 10 pounds of vegetables?

$7.50

The student provided an incorrect answer (*$7.50*). No support (work or explanation) is required, so it is unclear where an error was made. [0 points]

B. Explain why including 0 in the domain of the function does **not** make sense in the context of the situation described.

Including 0 in the domain of the function does not make sense because the weight would be in the domain and the delivery charge would be in the range

The student provided an incorrect explanation (*Including 0 in the domain . . . does not make sense because the weight would be in the domain and the delivery charge would be in the range*). While the domain is the weight and the range is the delivery charge, this explanation does not describe why including 0 in the domain would not make sense (because 0 would represent 0 pounds of vegetables and would cost $2, which no one would pay). [0 points]

13. *Continued.* Please refer to the previous page for task explanation.

For people who live outside of the community, Lydia adds a $5.00 gas fee to the delivery charge.

C. Explain why the linear function for Lydia's delivery charges for residents in her community and the linear function for her delivery charges for people who live outside of the community have the same domain but different ranges.

The functions would have the same domain because for every two pounds Lydia goes up, she adds a $1 charge.

The student provided an incorrect explanation (*The functions would have the same domain because for every two pounds Lydia goes up, she adds a $1 charge*). This does not clearly state that the weight of the vegetables doesn't change and that the range would change due to the gas fee for those outside of the community. [0 points]

D. Write a function to represent Lydia's delivery charge (y), in dollars, to deliver x pounds of vegetables to people who live **outside** the community.

$y = x + 5$

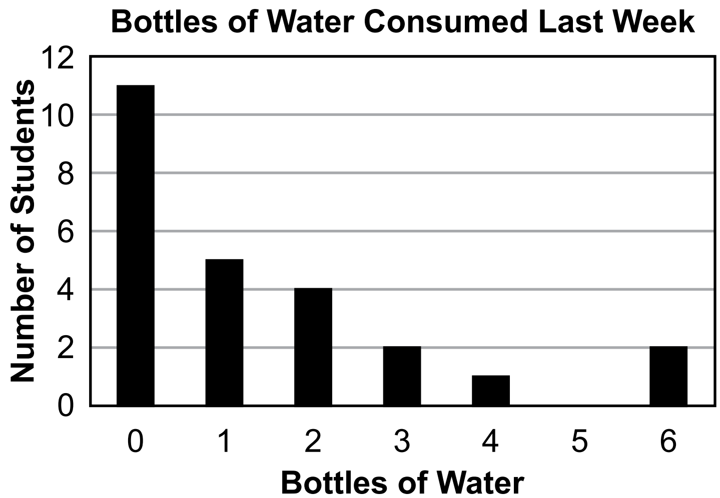
The student provided an incorrect function ($y = x + 5$). No support (work or explanation) is required, so it is unclear where an error was made. For the slope, the student may have used the *adds a $1 charge* from the explanation provided in Part C without considering that *for every two pounds* would cause the slope to become $0.50 ($1 ÷ 2 = $0.50). For the initial value, the student may have omitted the original $2 fixed fee that all customers pay and instead used only the $5 gas fee for people who live outside the community. [0 points]

AFTER YOU HAVE CHECKED YOUR WORK, CLOSE YOUR ANSWER BOOKLET AND TEST BOOKLET SO YOUR TEACHER WILL KNOW YOU ARE FINISHED.

STOP

CONSTRUCTED-RESPONSE ITEM

14. Lucy randomly surveyed 25 students in her school about the number of bottles of water they consumed in the last week. She recorded the results in the bar graph shown below.



A. What is the mode of the responses from Lucy's survey?

mode: ________________

B. How many bottles of water, in all, did the 25 students Lucy surveyed consume last week?

____________ bottles of water

Go to the next page to finish question 14.

GO ON

14. ***Continued.*** Please refer to the previous page for task explanation.

There are 236 students in Lucy's school.

C. Based on her graph, how many of the 236 students should Lucy expect to have consumed either 0 bottles or 1 bottle of water last week?

____________ students

Lucy determines that the interquartile range of the 25 responses is *q*.

D. Write an expression to represent the interquartile range of the responses Lucy should expect to get, based on her graph, if she surveys all 236 students in her school.

expression: ________________________________

AFTER YOU HAVE CHECKED YOUR WORK, CLOSE YOUR ANSWER BOOKLET AND TEST BOOKLET SO YOUR TEACHER WILL KNOW YOU ARE FINISHED.

STOP

Item-Specific Scoring Guideline

#14 Item Information

Alignment	A1.2.3	Depth of Knowledge	2	Mean Score	1.52

Assessment Anchor this item will be reported under:

A1.2.3—Data Analysis

Specific Anchor Descriptor addressed by this item:

A1.2.3.1—Use measures of dispersion to describe a set of data.

A1.2.3.2—Use data displays in problem-solving settings and/or to make predictions.

Scoring Guide

Score	Description
4	The student demonstrates a thorough understanding of data analysis by correctly solving problems with clear and complete procedures and explanations when required.
3	The student demonstrates a general understanding of data analysis by solving problems and providing procedures and explanations with only minor errors or omissions.
2	The student demonstrates a partial understanding of data analysis by providing a portion of the correct problem solving, procedures, and explanations.
1	The student demonstrates a minimal understanding of data analysis.
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 points.
2	Student earns 2 points.
1	Student earns 1 point.
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

What?	Why?
0	

Part B (1 point):

1 point for correct answer

What?	Why?
35 (bottles of water)	

Part C (1 point):

1 point for correct answer

What?	Why?
151 (students) **OR** 152 (students) **OR** 151.04 (students)	

Part D (1 point):

1 point for correct answer

What?	Why?
q **OR** 2 **OR equivalent expression**	

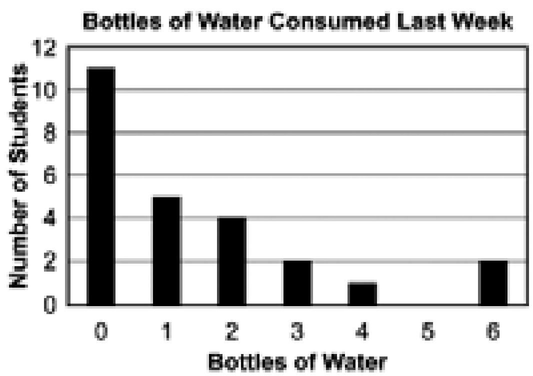
STUDENT RESPONSE

Response Score: 4 points

PARTS A AND B

Question 14
Page 1 of 2

Lucy randomly surveyed 25 students in her school about the number of bottles of water they consumed in the last week. She recorded the results in the bar graph shown below.



A. What is the mode of the responses from Lucy's survey?

mode: 0

The student provided the correct answer for the mode (*0*). While support is not required for Part A, the student likely looked at the bar graph and identified the number of bottles with the most responses (that is, the tallest bar), which is 0 bottles of water. [1 point]

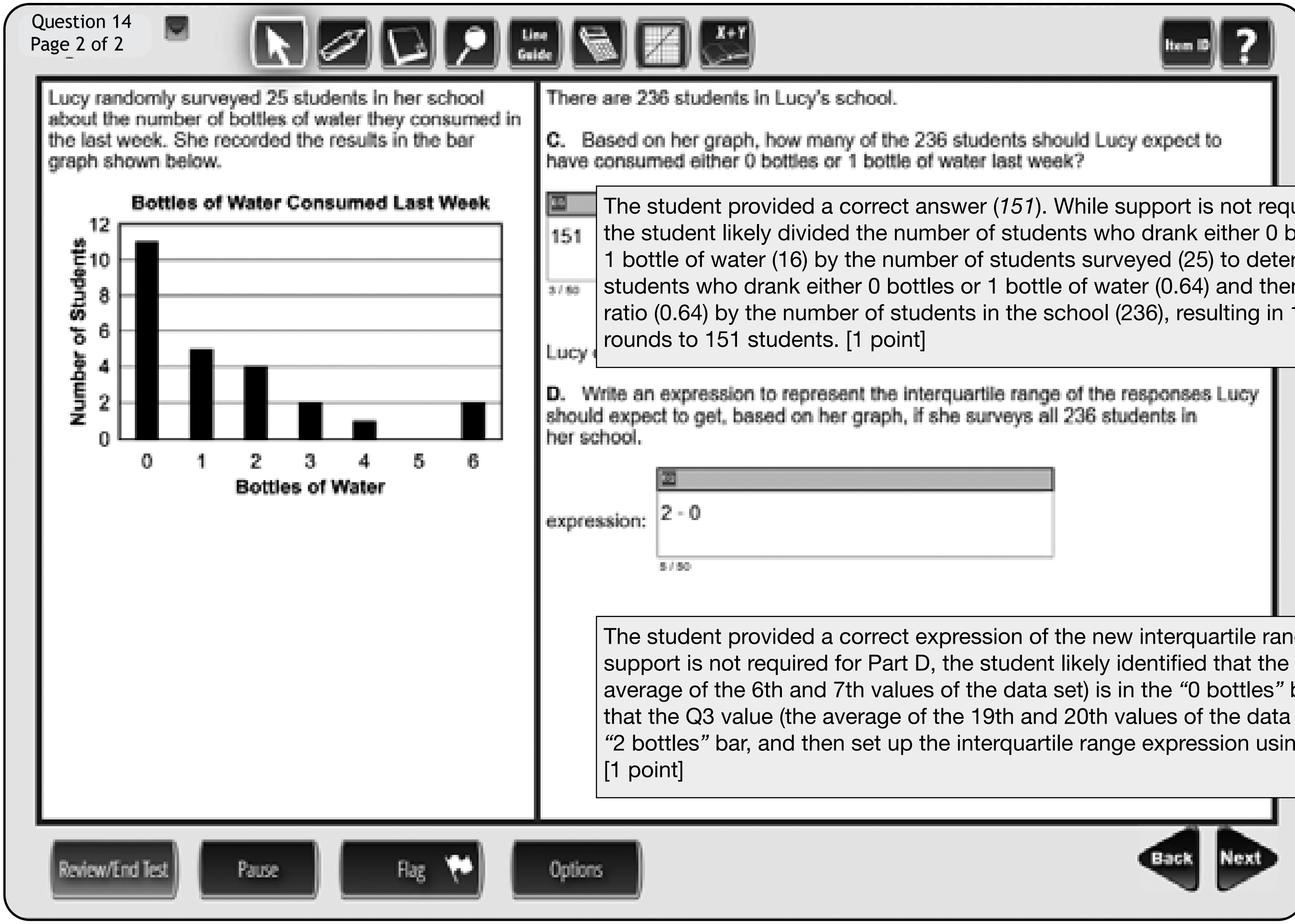
B. How many bottles of water, in all, did the 25 students Lucy surveyed consume last week?

35 bottles of water

The student provided the correct answer (*35*). While support is not required for Part B, the student likely multiplied the height of each bar by the number of bottles for that bar and then added the products ($0 \bullet 11 + 1 \bullet 5 + 2 \bullet 4 + 3 \bullet 2 + 4 \bullet 1 + 5 \bullet 0 + 6 \bullet 2 = 0 + 5 + 8 + 6 + 4 + 0 + 12 = 35$). [1 point]

Review/End Test Pause Flag Options Next

PARTS C AND D



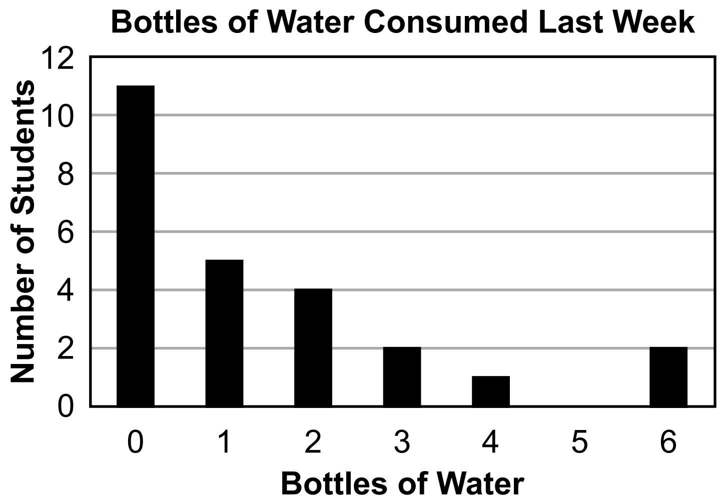
The student provided a correct answer (*151*). While support is not required for Part C, the student likely divided the number of students who drank either 0 bottles or 1 bottle of water (16) by the number of students surveyed (25) to determine the ratio of students who drank either 0 bottles or 1 bottle of water (0.64) and then multiplied the ratio (0.64) by the number of students in the school (236), resulting in 151.04, which rounds to 151 students. [1 point]

The student provided a correct expression of the new interquartile range (*2 - 0*). While support is not required for Part D, the student likely identified that the Q1 value (the average of the 6th and 7th values of the data set) is in the "0 bottles" bar, identified that the Q3 value (the average of the 19th and 20th values of the data set) is in the "2 bottles" bar, and then set up the interquartile range expression using Q3 – Q1. [1 point]

STUDENT RESPONSE

Response Score: 3 points

14. Lucy randomly surveyed 25 students in her school about the number of bottles of water they consumed in the last week. She recorded the results in the bar graph shown below.



A. What is the mode of the responses from Lucy's survey?

0	1	2	3	4	5	6
11	5	4	2	1	0	2

mode: 11

The student provided an incorrect answer (*11*). The student provided work, although it is not required or assessed. Based on the work provided, the student correctly determined the height of each bar and identified the bar with the greatest height; however, the student then used the height of the bar (11) instead of the number of bottles (0) as the mode. [0 points]

B. How many bottles of water, in all, did the 25 students Lucy surveyed consume last week?

$$\left.\begin{aligned} 5 \cdot 1 &= 5 \\ 4 \cdot 2 &= 8 \\ 2 \cdot 3 &= 6 \\ 1 \cdot 4 &= 4 \\ 2 \cdot 6 &= 12 \end{aligned}\right\} 35$$

35 bottles of water

The student provided the correct answer (*35*). The work shown is correct, though not necessary for credit. For each bar, the student multiplied the height of the bar by the number of bottles for that bar, omitting the 0-bottle bar and the 5-bottle bar (both of which would result in 0 bottles consumed), and then added the products. [1 point]

14. ***Continued.*** Please refer to the previous page for task explanation.

There are 236 students in Lucy's school.

C. Based on her graph, how many of the 236 students should Lucy expect to have consumed either 0 bottles or 1 bottle of water last week?

$16/25 = 0.64 = \frac{64}{100}$

0 - 11 bottles
1 - 5 bottles
$\}$ 16 bottles

236
× .64
151.04
round
↓
151 students

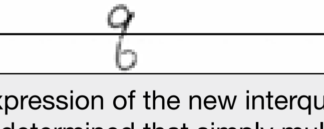
151 students

The student provided a correct answer (*151*). The work shown is correct, though not necessary for credit. The student counted the number of students who drank either 0 bottles or 1 bottle of water, divided that number (16) by the number of students surveyed (25) to determine the ratio of students who drank either 0 bottles or 1 bottle of water (0.64), and then multiplied the number of students in the school (236) by the ratio (0.64), resulting in 151.04, which rounds down to 151 students. [1 point]

D. Write an expression to represent the interquartile range of the responses Lucy should expect to get, based on her graph, if she surveys all 236 students in her school.

14
103
47
37
18
18
9
232
close

0	1	2	3	4	5	6
103	47	37	18	9	0	18



0: 11/25 = .44
1: 5/25 = .20
2: 4/24 = .16
3: 2/25 = .08
4: 1/25 = .04
5: 0/25 = .00
6: 2/25 = .08

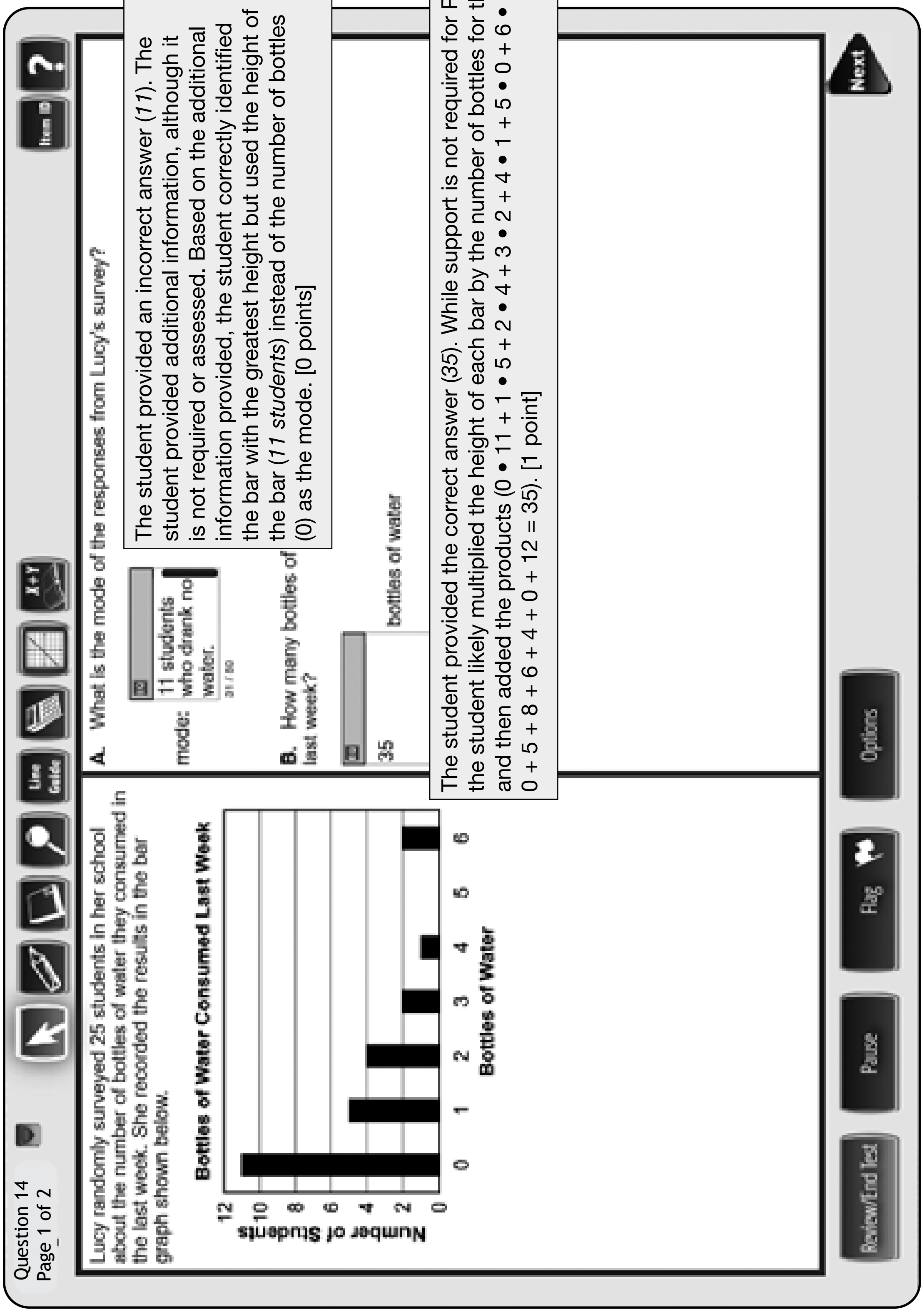
expression: q

The student provided a correct expression of the new interquartile range (*q*). The work shown is correct, though not necessary for credit. The student determined that simply multiplying the numbers used to calculate the interquartile range by a constant amount would not change the interquartile range itself (that is, *q* would remain *q*). The student did this by first calculating the ratio of each response from the original survey of 25 students and then multiplying these ratios by the total number of students (236), which showed that the interquartile range would not change if Lucy surveyed the whole school. [1 point]

STUDENT RESPONSE

Response Score: 2 points

PARTS A AND B



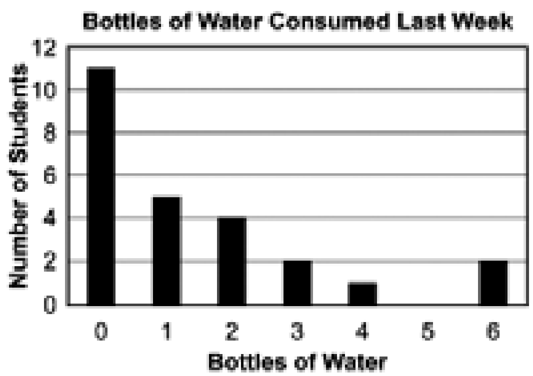
The student provided an incorrect answer (*11*). The student provided additional information, although it is not required or assessed. Based on the additional information provided, the student correctly identified the bar with the greatest height but used the height of the bar (*11 students*) instead of the number of bottles (0) as the mode. [0 points]

The student provided the correct answer (*35*). While support is not required for Part B, the student likely multiplied the height of each bar by the number of bottles for that bar and then added the products ($0 \bullet 11 + 1 \bullet 5 + 2 \bullet 4 + 3 \bullet 2 + 4 \bullet 1 + 5 \bullet 0 + 6 \bullet 2 = 0 + 5 + 8 + 6 + 4 + 0 + 12 = 35$). [1 point]

PARTS C AND D

Question 14
Page 2 of 2

Lucy randomly surveyed 25 students in her school about the number of bottles of water they consumed in the last week. She recorded the results in the bar graph shown below.



There are 236 students in Lucy's school.

C. Based on her graph, how many of the 236 students should Lucy expect to have consumed either 0 bottles or 1 bottle of water last week?

151

The student provided a correct answer (*151*). While support is not required for Part C, the student likely divided the number of students who drank either 0 bottles or 1 bottle of water (16) by the number of students surveyed (25) to determine the ratio of students who drank either 0 bottles or 1 bottle of water (0.64) and then multiplied the ratio (0.64) by the number of students in the school (236), resulting in 151.04, which rounds to 151 students. [1 point]

Lucy de

D. Write an expression to represent the interquartile range of the responses Lucy should expect to get, based on her graph, if she surveys all 236 students in her school.

expression: Of 236, 104 have had 0 bottles during the week.

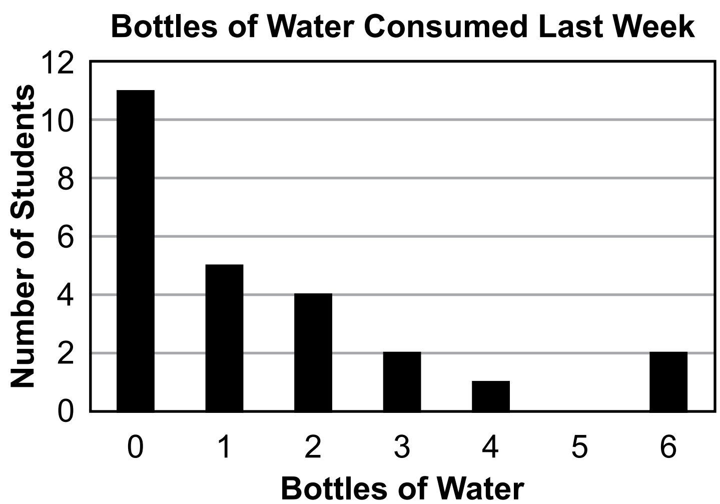
The student provided an incorrect answer (*Of 236, 104 have had 0 bottles during the week*). No support (work or explanation) is required, so it is unclear where an error was made. The student may have considered only the ratio of students who drank 0 bottles of water $\left(\frac{11}{25} = 0.44\right)$ and then multiplied the number of students in the school (236) by the ratio (0.44), resulting in 103.84, which rounds to 104 students. [0 points]

Review/End Test Pause Flag Options Back Next

STUDENT RESPONSE

Response Score: 1 point

14. Lucy randomly surveyed 25 students in her school about the number of bottles of water they consumed in the last week. She recorded the results in the bar graph shown below.



A. What is the mode of the responses from Lucy's survey?

The student provided an incorrect answer (*2*). No support (work or explanation) is required, so it is unclear where an error was made. The student may have identified the most common bar height, since the 3-bottle bar and the 6-bottle bar each had a height of 2 students. [0 points]

mode: 2

B. How many bottles of water, in all, did the 25 students Lucy surveyed consume last week?

14 bottles of water

The student provided an incorrect answer (*14*). No support (work or explanation) is required, so it is unclear where an error was made. The student may have determined the number of students who consumed at least 1 bottle of water (5 + 4 + 2 + 1 + 2 = 14). [0 points]

14. ***Continued.*** Please refer to the previous page for task explanation.

There are 236 students in Lucy's school.

C. Based on her graph, how many of the 236 students should Lucy expect to have consumed either 0 bottles or 1 bottle of water last week?

The student provided a correct answer (*151*). While support is not required for Part C, the student likely divided the number of students who drank either 0 bottles or 1 bottle of water (16) by the number of students surveyed (25) to determine the ratio of students who drank either 0 bottles or 1 bottle of water (0.64) and then multiplied the ratio (0.64) by the number of students in the school (236), resulting in 151.04, which rounds to 151 students. [1 point]

151 students

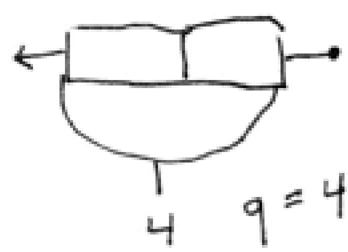
Lucy determines that the interquartile range of the 25 responses is q.

D. Write an expression to represent the interquartile range of the responses Lucy should expect to get, based on her graph, if she surveys all 236 students in her school.

$3\frac{1}{2} : 9.44 = 33.04$ $\quad 4/25$

$25 \cdot 9.44 = 236$

0, 1, 2, 2, 4, 5, 11



$q = 4$

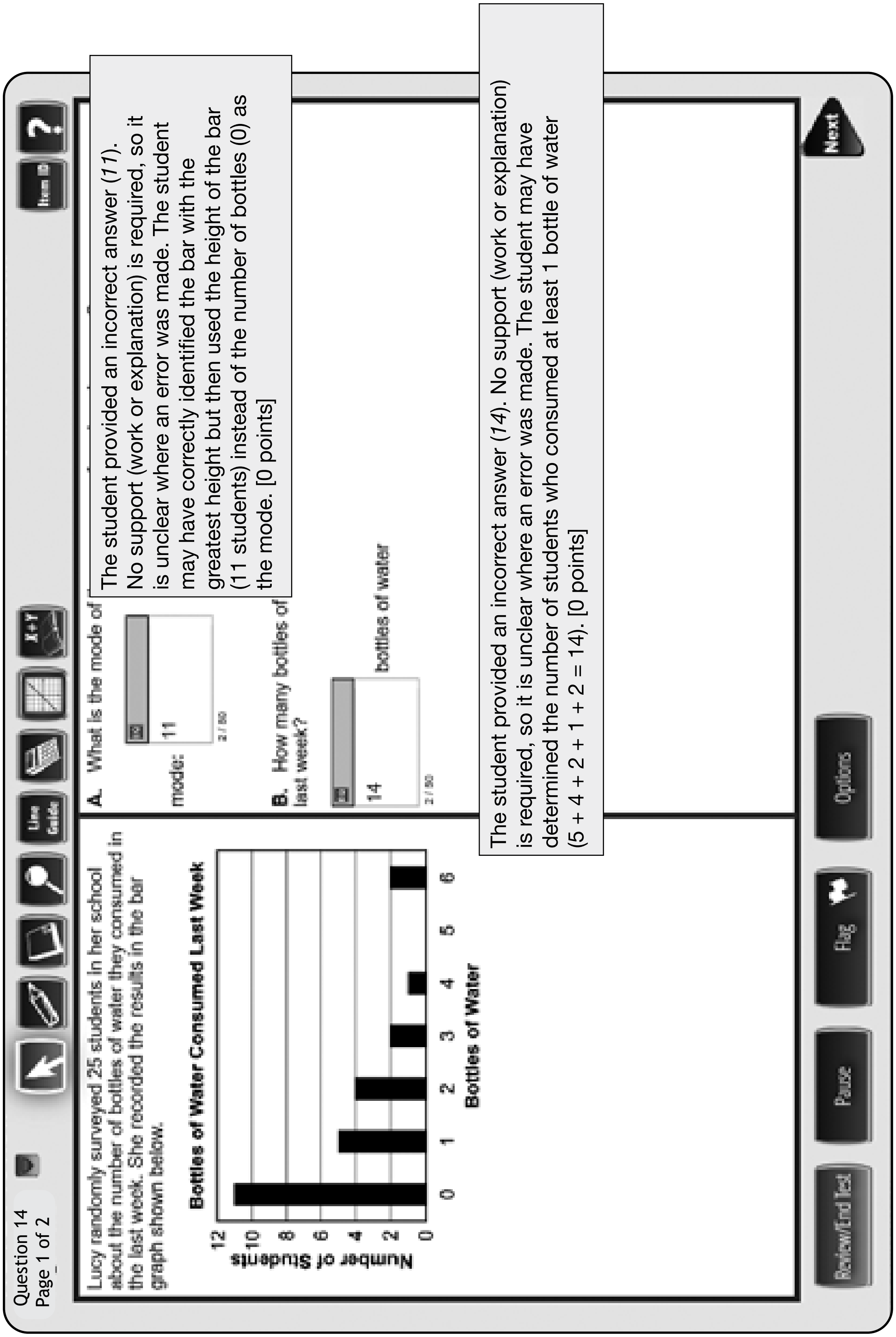
expression: $9.44q$

The student provided an incorrect answer (*9.44q*). The student provided work, although it is not required or assessed. Based on the work provided, the student determined that the number of students surveyed (25) should be multiplied by 9.44 to get the total number of students in the school (236); using this information, the student then multiplied the interquartile range of the 25 responses (*q*) by 9.44 to incorrectly determine the interquartile range of all 236 students. [0 points]

STUDENT RESPONSE

Response Score: 0 points

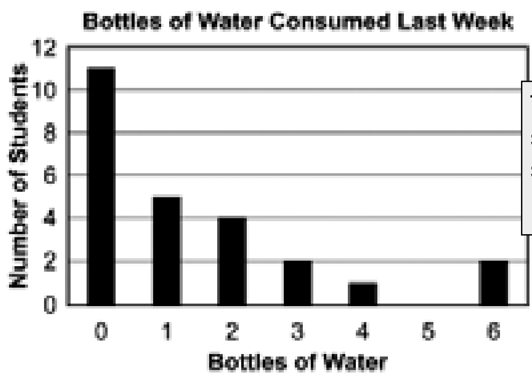
PARTS A AND B



PARTS C AND D

Question 14
Page 2 of 2

Lucy randomly surveyed 25 students in her school about the number of bottles of water they consumed in the last week. She recorded the results in the bar graph shown below.



There are 236 students in Lucy's school.

C. Based on her graph, how many of the 236 students should Lucy expect to have consumed either 0 bottles or 1 bottle of water last week?

200 students

The student provided an incorrect answer (*200*). No support (work or explanation) is required, so it is unclear where an error was made. The student may have subtracted the number of students surveyed (25) and the number of students who drank 0 bottles of water (11) from the number of students in the school (236). [0 points]

D. Write an expression to represent the interquartile range of the responses Lucy should expect to get, based on her graph, if she surveys all 236 students in her school.

expression: $q = 236 - 14$

8 / 50

The student provided an incorrect answer (*q = 236 – 14*), which was in the form of an equation instead of an expression. Based on the equation, the student subtracted the number of students who consumed at least 1 bottle of water (14) from the total number of students in the school (236). No credit is awarded for an equation with one side consisting of a correct expression (*q*). [0 points]

Review/End Test Pause Flag Options Back Next

ALGEBRA I MODULE 2—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	A1.2.1.1.1	C	2	8%	30%	54%	8%
2	A1.2.1.1.3	B	1	14%	60%	8%	18%
3	A1.2.1.2.1	D	2	11%	6%	24%	59%
4	A1.2.1.2.2	D	1	10%	7%	17%	66%
5	A1.2.2.1.1	B	2	26%	63%	5%	6%
6	A1.2.2.1.3	D	1	13%	12%	14%	61%
7	A1.2.2.1.4	D	1	13%	12%	7%	68%
8	A1.2.2.2.1	B	2	38%	39%	12%	11%
9	A1.2.3.1.1	C	1	16%	18%	47%	19%
10	A1.2.3.2.1	C	2	7%	25%	64%	4%
11	A1.2.3.2.2	C	2	4%	12%	75%	9%
12	A1.2.3.3.1	A	2	37%	17%	29%	17%

Constructed-Response

Sample Number	Alignment	Points	Depth of Knowledge	Mean Score
13	A1.2.1	4	2	1.88
14	A1.2.3	4	2	1.52

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Keystone Exams
Algebra I

Item and Scoring Sampler 2022