pennsylvania
DEPARTMENT OF EDUCATION

The Pennsylvania System of School Assessment

Mathematics Item and Scoring Sampler

2019–2020
Grade 6

Pennsylvania Department of Education Bureau of Curriculum, Assessment and Instruction—September 2019

MATHEMATICS TEST DIRECTIONS

On the following pages are the mathematics questions.

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

Directions for Multiple-Choice Questions:

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

For the multiple-choice questions:

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

Directions for Open-Ended Questions:

Some questions will require you to write your response.

For the open-ended questions:

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

General Description of Scoring Guidelines for Mathematics Open-Ended Questions

4— 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. Response may contain a minor "blemish" or omission in work or explanation that does not detract from demonstrating a *thorough* understanding.

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

0— The response has no correct answer and *insufficient* evidence to demonstrate any understanding of the mathematical concepts and procedures required by the task for that grade level.

Response may show only information copied from the question.

Special Categories within zero reported separately:

Blank.....Blank, entirely erased, entirely crossed out, or consists entirely of whitespace

Refusal.....Refusal to respond to the task

Off Task.....Makes no reference to the item but is not an intentional refusal

Foreign Language.....Written entirely in a language other than English

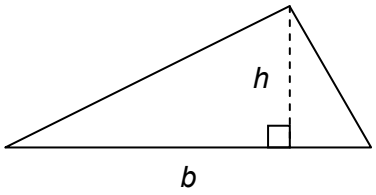
Illegible .....Illegible or incoherent

Grade 6 Formula Sheet

Formulas that you may need on this test are found below.
You may refer back to this page at any time during the mathematics test.

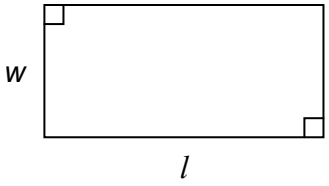
2019
Grade 6

Triangle



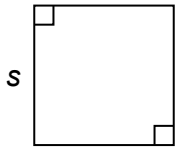
$A = \frac{1}{2}bh$

Rectangle



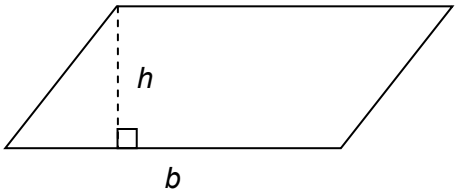
$A = lw$

Square



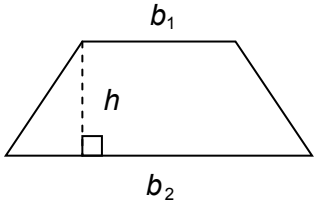
$A = s^2$

Parallelogram



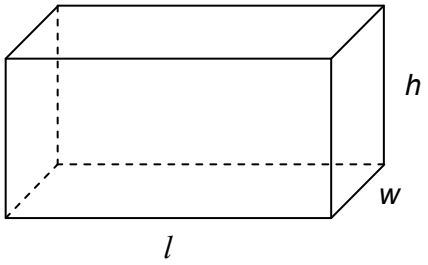
$A = bh$

Trapezoid



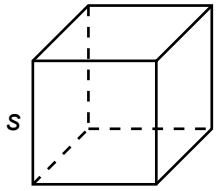
$A = \frac{1}{2}h(b_1 + b_2)$

Rectangular Prism



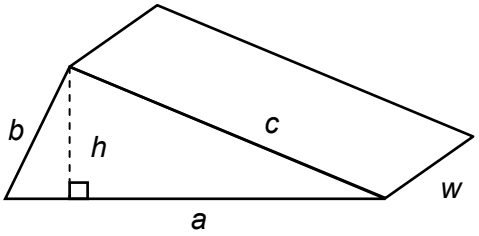
$V = lwh$ $SA = 2lw + 2lh + 2wh$

Cube



$V = s \cdot s \cdot s$ $SA = 6s^2$

Triangular Prism



$SA = ah + aw + bw + cw$

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

MULTIPLE-CHOICE ITEMS

1. Simplify: $2.6 \times 8.4 - 5.4$

A. 2.32

B. 7.8

C. 16.44

D. 21.3

Item Information	
Alignment	A-N.2.1.1
Answer Key	C
Depth of Knowledge	1
p-value A	9%
p-value B	13%
p-value C	58% (correct answer)
p-value D	20%
Option Annotations	A. does not align partial products when multiplying and gets 104 + 208 = 312 then sets decimal as 3.12; subtracts 5.4 from 3.12 by subtracting lesser digit from greater digit in each aligned place to get 2.32 B. subtracts 5.4 from 8.4, and then multiplies the result (3) by 2.6 C. correct D. finds correct product of 21.84; does not align 21.84 and 5.4 when subtracting, so gets 21.30 when set with two decimal places

A calculator is permitted for use in solving questions 2–17 in this sampler.

2. Mia is making a set of clay bowls. Each bowl requires $\frac{3}{4}$ pound of clay. She has $5\frac{5}{6}$ pounds of clay. How many complete bowls can Mia make?

A. 4

B. 5

C. 7

D. 8

Item Information	
Alignment	A-N.1.1.1
Answer Key	C
Depth of Knowledge	2
p-value A	15%
p-value B	12%
p-value C	62% (correct answer)
p-value D	11%
Option Annotations	A. multiplies $5\frac{5}{6}$ by $\frac{3}{4}$ B. subtracts $\frac{3}{4}$ from $5\frac{5}{6}$ C. correct D. rounds quotient to the nearest whole number

3. Angelina is making flower bouquets. She has 24 tulips and 36 roses. She wants all the bouquets to be identical, containing the same number of tulips and the same number of roses, with no flowers left over. What is the **maximum** number of bouquets Angelina can make from these flowers?

A. 2

B. 3

C. 12

D. 24

Item Information	
Alignment	A-N.2.2.1
Answer Key	C
Depth of Knowledge	2
p-value A	8%
p-value B	10%
p-value C	70% (correct answer)
p-value D	12%
Option Annotations	A. identifies a common factor of 24 and 36 but not the greatest common factor B. identifies a common factor of 24 and 36 but not the greatest common factor C. correct D. identifies the greatest factor of the smaller number, but it is not a common factor of both numbers

4. A scientist is studying the effects of temperature variation in liquids. A liquid begins with a temperature of $^{-}4°C$. After that, the scientist heats the liquid until it reaches a temperature with a value that is the opposite of the value of the beginning temperature. To what temperature does the scientist heat the liquid?

A. $^{-}8°C$

B. $-\frac{1}{4}°C$

C. $\frac{1}{4}°C$

D. $4°C$

Item Information	
Alignment	A-N.3.1.2
Answer Key	D
Depth of Knowledge	1
p-value A	9%
p-value B	7%
p-value C	6%
p-value D	78% (correct answer)
Option Annotations	A. doubles the original temperature B. finds the multiplicative inverse C. finds the opposite reciprocal D. correct

5. The ratio of the length to the width of the official German flag is 5:3. Sandra is making 12 German flags for a culture show. Each flag she makes has a length of 20 centimeters. It takes her 4 hours to make all the flags. What is the width of each flag and the average amount of time it takes Sandra to make each flag?

A. width: 12 cm
average time: 3 minutes

B. width: 33 cm
average time: 3 minutes

C. width: 33 cm
average time: 20 minutes

D. width: 12 cm
average time: 20 minutes

Item Information	
Alignment	A-R.1.1
Answer Key	D
Depth of Knowledge	2
p-value A	22%
p-value B	11%
p-value C	16%
p-value D	51% (correct answer)
Option Annotations	A. divides number of flags by total time to find number of minutes B. sets up ratio as $\frac{5}{3} = \frac{x}{20}$, and divides number of flags by total time to find number of minutes C. sets up ratio as $\frac{5}{3} = \frac{x}{20}$ D. correct

6. A baker makes two kinds of doughnuts: chocolate and plain. The table below shows the relationship between the number of chocolate doughnuts she makes and the number of plain doughnuts she makes.

Doughnuts

Chocolate	Plain
3	2
6	4
9	6
12	8
15	10

The pattern continues. When the baker makes 18 chocolate doughnuts, how many doughnuts does she make **in all**?

A. 12

B. 18

C. 30

D. 42

Item Information	
Alignment	A-R.1.1.3
Answer Key	C
Depth of Knowledge	2
p-value A	23%
p-value B	7%
p-value C	55% (correct answer)
p-value D	15%
Option Annotations	A. calculates the number of plain doughnuts instead of the total number of doughnuts B. calculates the number of chocolate doughnuts instead of the total number of doughnuts C. correct D. uses 18 for the number of plain doughnuts, calculates 24 for the number of chocolate doughnuts, and then finds the total

7. At a movie theater, 360 people can see a particular movie over a period of 3 hours. At this rate, how many people can see this movie over a period of 12 hours?

A. 1,080

B. 1,440

C. 3,240

D. 4,320

Item Information	
Alignment	A-R.1.1.4
Answer Key	B
Depth of Knowledge	2
p-value A	9%
p-value B	59% (correct answer)
p-value C	5%
p-value D	27%
Option Annotations	A. multiplies 360 by 3 B. correct C. subtracts 3 from 12 and multiplies the difference by 360 D. only multiplies 360 by 12 (does not divide product by 3)

8. On a trip to another state, Emily buys a shirt and a book for a total of $25. She has to pay a 4% sales tax on the things she buys. Which statement explains why the sales tax will be a whole number of dollars?

A. Both 4 and 25 are whole numbers, so their product must be a whole number.

B. Both 4 and 25 are whole numbers, so their quotient must be a whole number.

C. The product of 4 and 25 is 100, which will be divided evenly by the 10 in the denominator of the percentage.

D. The product of 4 and 25 is 100, which will be divided evenly by the 100 in the denominator of the percentage.

Item Information	
Alignment	A-R.1.1.5
Answer Key	D
Depth of Knowledge	2
p-value A	18%
p-value B	14%
p-value C	34%
p-value D	34% (correct answer)
Option Annotations	A. does not recognize that 4% is really 0.04 B. thinks whole numbers are closed under division and mistakenly wants to divide C. uses the wrong denominator D. correct

9. The table below shows information about the total weekly costs to display advertisements on a website and in a newspaper.

Weekly Advertising Costs

Website Advertisements	Newspaper Advertisements	Total Cost ($)
1	1	135 • 1 + 220 • 1
3	2	135 • 3 + 220 • 2
5	3	135 • 5 + 220 • 3
7	4	135 • 7 + 220 • 4

Based on the information shown in the table, which expression can be used to determine the weekly cost, in dollars, of m website and p newspaper advertisements?

A. $355mp$

B. $355 + m + p$

C. $135m + 220p$

D. $220m + 135p$

Item Information	
Alignment	B-E.1.1
Answer Key	C
Depth of Knowledge	2
p-value A	18%
p-value B	16%
p-value C	55% (correct answer)
p-value D	11%
Option Annotations	A. adds 135 and 220, then multiplies the result by the number of website advertisements and the number of newspaper advertisements B. adds 135 and 220, then adds the number of website advertisements and the number of newspaper advertisements C. correct D. reverses costs

10. An algebraic expression is described below.

two less than the product of x and four

The expression is set equal to 10 to create an equation. What value could replace x in the expression and make the resulting equation true?

A. 3

B. 8

C. 38

D. 48

Item Information	
Alignment	B-E.1.1.2 B-E.2.1.1
Answer Key	A
Depth of Knowledge	2
p-value A	54% (correct answer)
p-value B	28%
p-value C	12%
p-value D	6%
Option Annotations	A. correct B. interprets "product" as indicating addition; writes expression as $(4 + x) - 2$ C. substitutes 10 for x in correct expression D. interprets "product" as indicating division; writes expression as $\frac{x}{4} - 2$

11. Maria works in a library. She records the number of people in the library each hour during the day. She makes a graph in which she uses the number of people as the independent variable. What could be the dependent variable in Maria's graph?

A. the temperature outside the library

B. the number of books checked out each hour

C. the amount the library charges per day for late books

D. the amount of money Maria earns each hour for working at the library

Item Information	
Alignment	B-E.3
Answer Key	B
Depth of Knowledge	2
p-value A	8%
p-value B	66% (correct answer)
p-value C	11%
p-value D	15%
Option Annotations	A. thinks of something that the number of people in the library could depend on, not the other way around B. correct C. thinks about a rate that changes based on the passage of time D. considers another variable

12. Audrey surveyed 10 stores in a shopping mall about how many employees they have. She created a box-and-whisker plot to display her data. Which statement describes whether a line plot of Audrey's data can be created using only her box-and-whisker plot?

A. A line plot of Audrey's data cannot be created because a box-and-whisker plot does not display the mean of a data set.

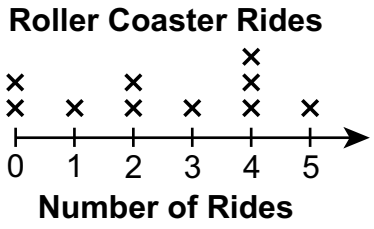
B. A line plot of Audrey's data cannot be created because a box-and-whisker plot does not display each individual data point.

C. A line plot of Audrey's data can be created because a box-and-whisker plot shows each individual data point as a vertical line segment.

D. A line plot of Audrey's data can be created because knowing the minimum, maximum, and each quartile is enough information to find the individual data points.

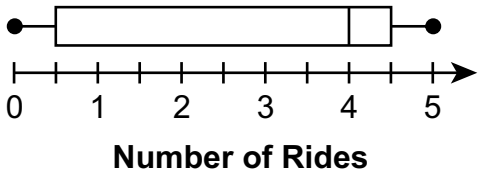
Item Information	
Alignment	D-S.1.1
Answer Key	B
Depth of Knowledge	2
p-value A	13%
p-value B	42% (correct answer)
p-value C	16%
p-value D	29%
Option Annotations	A. picks a correct observation about the mean but one that does not relate to the individual data points B. correct C. is not clear on what the vertical line segments represent in a box-and-whisker plot D. knows what is in a box-and-whisker plot but is not sure how to use that data

13. Ten students went to a carnival. The number of times each student rode the carnival roller coaster is shown in the line plot below.

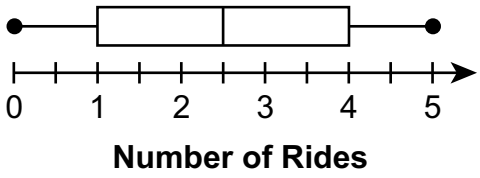


Which box-and-whisker plot represents the distribution of the number of roller coaster rides by the students?

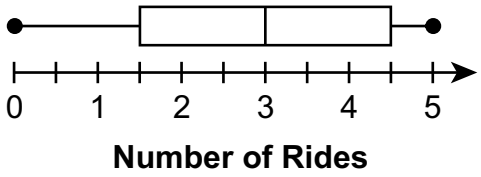
A.



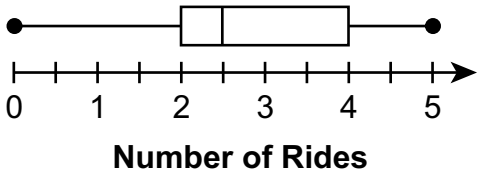
B.



C.



D.



Item Information	
Alignment	D-S.1.1.1
Answer Key	B
Depth of Knowledge	2
p-value A	21%
p-value B	52% (correct answer)
p-value C	14%
p-value D	13%
Option Annotations	A. interprets the median to have the most values and the interquartile range to include all values but the maximum and minimum B. correct C. interprets the IQR to be shifted toward the right by the two values at 2 and the three values at 4 D. observes that more than half the values lie from 2 to 4, so sets the interquartile range from 2 to 4

14. The list below shows the height, in meters, of an ocean's first high tide for each of 6 days.

1.72 1.8 1.86 1.88 1.74 1.86

What is the **mean** height of the ocean's first high tide for the 6 days?

A. 1.81 meters

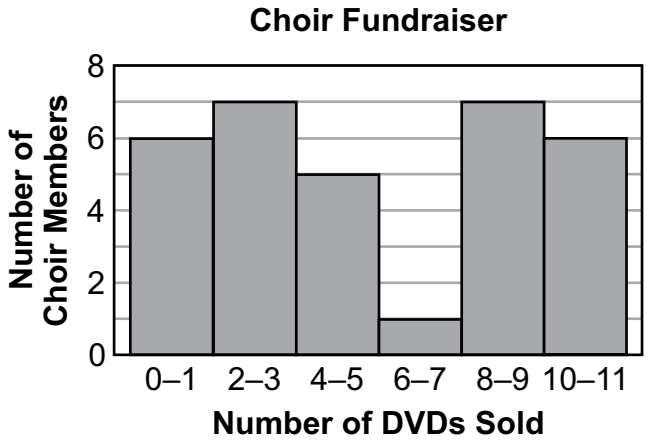
B. 1.83 meters

C. 1.86 meters

D. 1.87 meters

Item Information	
Alignment	D-S.1.1.2
Answer Key	A
Depth of Knowledge	1
p-value A	58% (correct answer)
p-value B	10%
p-value C	20%
p-value D	12%
Option Annotations	A. correct B. confuses mean with median C. confuses mean with mode D. confuses mean with median and determines the middle of the unordered list

15. The histogram below represents the numbers of DVDs sold by members of a school choir for a fundraiser.



Based on the histogram, which statement about the distribution of the numbers of DVDs sold by the choir members is true?

A. The distribution is skewed to the right.

B. The distribution clusters around 6 to 7 DVDs.

C. The distribution is symmetric about 5 or 6 DVDs.

D. The distribution peaks at 2 to 3 DVDs and 8 to 9 DVDs.

Item Information	
Alignment	D-S.1.1.3
Answer Key	D
Depth of Knowledge	2
p-value A	5%
p-value B	12%
p-value C	6%
p-value D	77% (correct answer)
Option Annotations	A. notices that the greatest number of DVDs is on the right of the graph and confuses that with skewed to the right B. notices the least number of students sold 6–7 DVDs, considers that a cluster C. divides 11 DVDs in half, and confuses that with a line of symmetry D. correct

16. The high temperatures, in degrees Fahrenheit, for 10 days are listed below.

41 49 51 53 57 63 64 64 71 77

Which measure of center is the highest?

A. mean

B. mean absolute deviation

C. median

D. mode

Item Information	
Alignment	D-S.1.1.4
Answer Key	D
Depth of Knowledge	2
p-value A	15%
p-value B	15%
p-value C	26%
p-value D	44% (correct answer)
Option Annotations	A. incorrectly assumes 77 is an outlier and would disproportionately affect the mean upwards B. incorrectly chooses a measure of variability, not a measure of center C. incorrectly assumes 41 is an outlier and would disproportionately affect the mean downwards, so chooses the median (does not consider mode) D. correct

OPEN-ENDED QUESTION

17. A factory produces blue pens and black pens. Each week, $\frac{2}{3}$ of the pens produced at the factory are black.

A. Write and solve an equation that can be used to determine the number of blue pens (x) produced at the factory in a week when 45,000 pens are produced.

B. What is the total number of pens produced at the factory in a week when 21,000 blue pens are produced?

Go to the next page to finish question 17.

GO ON

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

A different factory produces red pens and green pens. Of the pens produced at the factory each week, $\frac{3}{4}$ are red. In a week when 39,000 red pens are produced, the factory manager uses the equation $\frac{3}{4}y = 39{,}000$.

C. What does the variable *y* represent in the manager's equation?

D. What is the total number of green pens produced during a week when 39,000 red pens are produced?

After you have checked your work, close your answer booklet and test booklet so your teacher will know you are finished.

Item-Specific Scoring Guideline

#17 Item Information

Alignment	B-E.2	**Depth of Knowledge**	2	**Mean Score**	0.98

Assessment Anchor this item will be reported under:

M06.B-E.2—Interpret and solve one-variable equations and inequalities.

Specific Anchor Descriptor addressed by this item:

M06.B-E.2.1—Create, solve, and interpret one-variable equations or inequalities in real-world and mathematical problems.

Scoring Guide

Score	In this item, the student . . .
4	Demonstrates a thorough understanding of how to interpret and solve one-variable equations and inequalities by correctly solving problems and clearly explaining procedures.
3	Demonstrates a general understanding of how to interpret and solve one-variable equations and inequalities by correctly solving problems and clearly explaining procedures with only minor errors or omissions.
2	Demonstrates a partial understanding of how to interpret and solve one-variable equations and inequalities by correctly performing a significant portion of the required task.
1	Demonstrates minimal understanding of how to interpret and solve one-variable equations and 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 3.0–3.5 points.
2	Student earns 2.0–2.5 points.
1	Student earns 0.5–1.5 points. OR Student demonstrates minimal understanding of how to interpret and solve one-variable equations and inequalities.
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):

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

$\frac{1}{2}$ point for correct value of x

What?	Why?
$45{,}000 \times \frac{1}{3} = x$ **OR** $45{,}000 \div 3 = 15{,}000$ **OR equivalent** **AND** 15,000 (blue pens)	

Part B (1 point):

1 point for correct answer

What?	Why?
63,000 (pens)	

Part C (1 point):

1 point for correct response

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

What?	Why?
Sample Response: The number of pens the factory produced that week. **OR equivalent**	

Part D (1 point):

1 point for correct answer

What?	Why?
13,000 (pens)	

STUDENT RESPONSE

Response Score: 4 points

17. A factory produces blue pens and black pens. Each week, $\frac{2}{3}$ of the pens produced at the factory are black.

A. Write and solve an equation that can be used to determine the number of blue pens (x) produced at the factory in a week when 45,000 pens are produced.

$45,000 * \frac{1}{3}$

$45,000 * \frac{1}{3} = 15,000$

15,000 blue blue pens were produced

The response provides the correct equation and the correct value of x.

B. What is the total number of pens produced at the factory in a week when 21,000 blue pens are produced?

63,000 pens.

The response provides the correct answer.

Go to the next page to finish question 17.

GO ON

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

A different factory produces red pens and green pens. Of the pens produced at the factory each week, $\frac{3}{4}$ are red. In a week when 39,000 red pens are produced, the factory manager uses the equation $\frac{3}{4}y = 39{,}000$.

C. What does the variable *y* represent in the manager's equation?

The variable y represents the total number of red and green pens produced in the week where 39,000 pens were red.

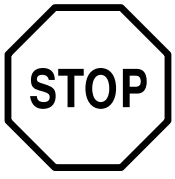
The response provided is correct.

D. What is the total number of green pens produced during a week when 39,000 red pens are produced?

13,000 green pens

The response provides the correct answer.

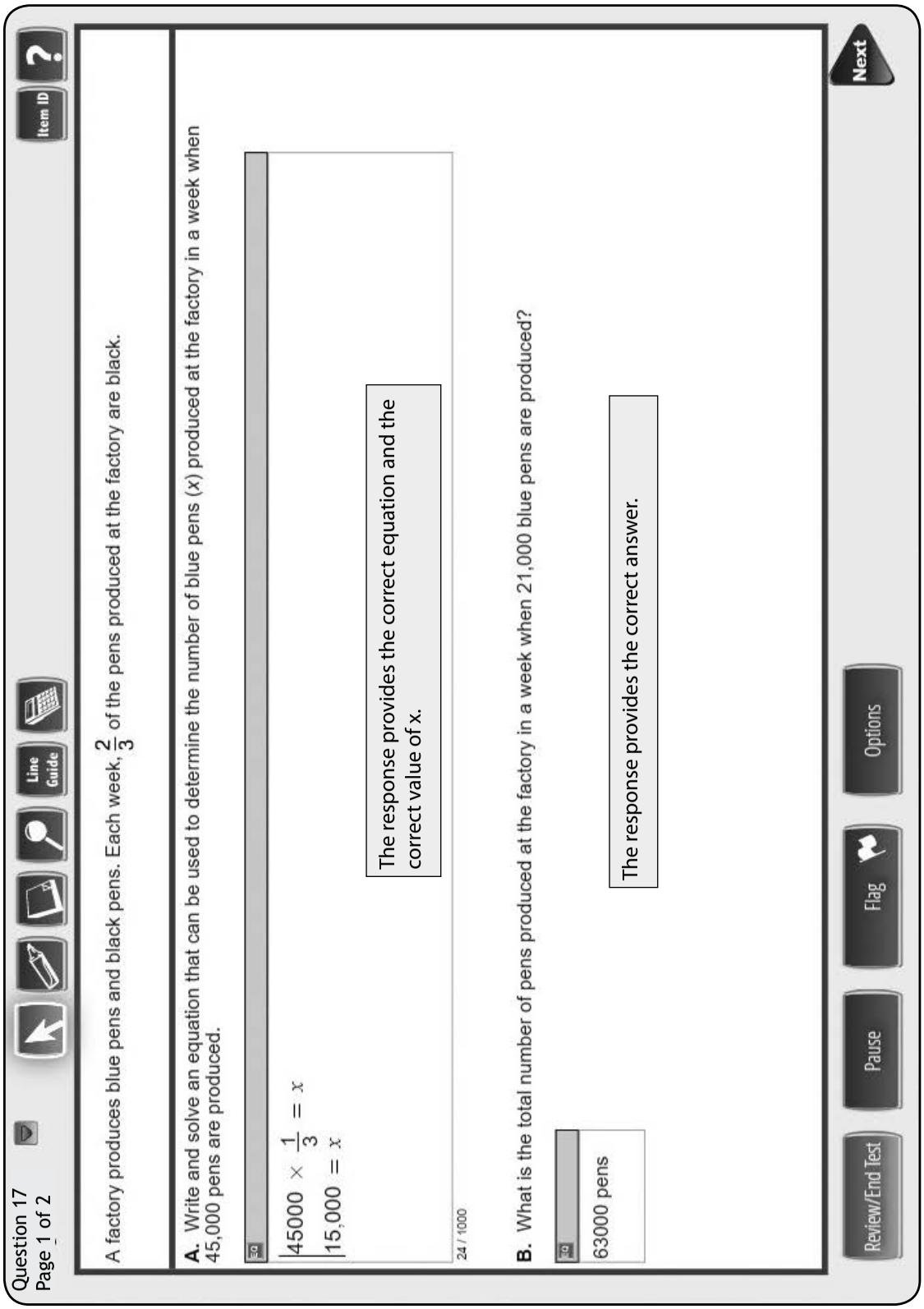
After you have checked your work, close your answer booklet and test booklet so your teacher will know you are finished.



STUDENT RESPONSE

Response Score: 3 points

PARTS A AND B



Question 17
Page 2 of 2

Line Guide | Item ID | ?

A factory produces blue pens and black pens. Each week, $\frac{2}{3}$ of the pens produced at the factory are black.

A different factory produces red pens and green pens. Of the pens produced at the factory each week, $\frac{3}{4}$ are red. In a week when 39,000 red pens are produced, the factory manager uses the equation $\frac{3}{4}y = 39{,}000$.

C. What does the variable *y* represent in the manager's equation?

EQ

The variable y represents the amount of pens amde that week.

The response provided is correct.

60 / 1000

D. What is the total number of green pens produced during a week when 39,000 red pens are produced?

EQ

9750 green pens

The response provides an incorrect answer.

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

STUDENT RESPONSE

Response Score: 2 points

17. A factory produces blue pens and black pens. Each week, $\frac{2}{3}$ of the pens produced at the factory are black.

A. Write and solve an equation that can be used to determine the number of blue pens (x) produced at the factory in a week when 45,000 pens are produced.

$45{,}000 \times \frac{2}{3} = 30{,}000 = \text{Black pens}$

$$\begin{array}{r} 45{,}000 \\ -\ 30{,}000 \\ \hline 15{,}000 \end{array}$$

$x = 15{,}000 = \text{Blue pens}$

The response provides the correct equation and the correct value of x.

B. What is the total number of pens produced at the factory in a week when 21,000 blue pens are produced?

The total number of pens in a week when 21,000 are blue pens, is 31,500

The response provides an incorrect answer.

Go to the next page to finish question 17.

GO ON

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

A different factory produces red pens and green pens. Of the pens produced at the factory each week, $\frac{3}{4}$ are red. In a week when 39,000 red pens are produced, the factory manager uses the equation $\frac{3}{4}y = 39{,}000$.

C. What does the variable *y* represent in the manager's equation?

The variable y in this equation is equal to the amount of green pens

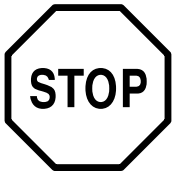
The response provided is incorrect.

D. What is the total number of green pens produced during a week when 39,000 red pens are produced?

If 39,000 red pens are produced then 13,000 green pens were produced.

The response provides a correct answer.

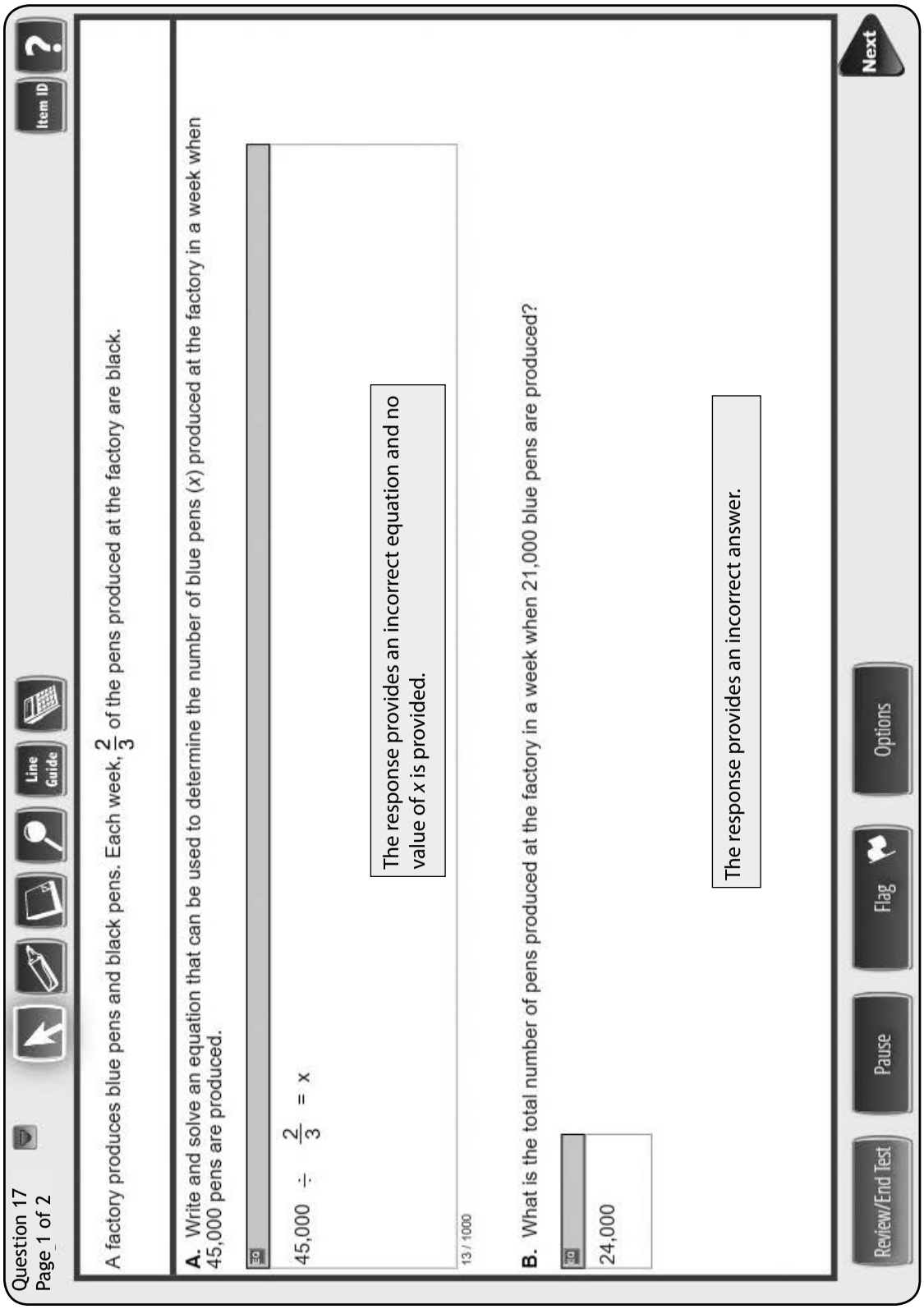
After you have checked your work, close your answer booklet and test booklet so your teacher will know you are finished.



STUDENT RESPONSE

Response Score: 1 point

PARTS A AND B



Question 17
Page 2 of 2

Line Guide | Item ID | ?

A factory produces blue pens and black pens. Each week, $\frac{2}{3}$ of the pens produced at the factory are black.

A different factory produces red pens and green pens. Of the pens produced at the factory each week, $\frac{3}{4}$ are red. In a week when 39,000 red pens are produced, the factory manager uses the equation $\frac{3}{4}y = 39{,}000$.

C. What does the variable *y* represent in the manager's equation?

EQ

The variable y represents the amount of green pens produced.

The response provided is incorrect.

60 / 1000

D. What is the total number of green pens produced during a week when 39,000 red pens are produced?

EQ

13,000

The response provides a correct answer.

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

STUDENT RESPONSE

Response Score: 0 points

17. A factory produces blue pens and black pens. Each week, $\frac{2}{3}$ of the pens produced at the factory are black.

A. Write and solve an equation that can be used to determine the number of blue pens (x) produced at the factory in a week when 45,000 pens are produced.

$\frac{4}{5} = 45{,}000$ pens are produced

Nothing is correct for credit.

B. What is the total number of pens produced at the factory in a week when 21,000 blue pens are produced?

$\frac{2}{2} = 21{,}000$ pens are produced

The response provides an incorrect answer.

Go to the next page to finish question 17.

GO ON

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

A different factory produces red pens and green pens. Of the pens produced at the factory each week, $\frac{3}{4}$ are red. In a week when 39,000 red pens are produced, the factory manager uses the equation $\frac{3}{4}y = 39{,}000$.

C. What does the variable *y* represent in the manager's equation?

The y represent 4

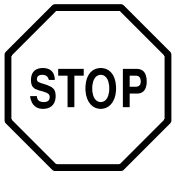
The response provided is incorrect.

D. What is the total number of green pens produced during a week when 39,000 red pens are produced?

$\frac{3}{4} = 39{,}000$ Red pens are produced

The response provides an incorrect answer.

After you have checked your work, close your answer booklet and test booklet so your teacher will know you are finished.



MATHEMATICS—SUMMARY DATA

MULTIPLE-CHOICE

Sample Number	Alignment	Answer Key	Depth of Knowledge	*p*-values A	*p*-values B	*p*-values C	*p*-values D
1	A-N.2.1.1	C	1	9%	13%	58%	20%
2	A-N.1.1.1	C	2	15%	12%	62%	11%
3	A-N.2.2.1	C	2	8%	10%	70%	12%
4	A-N.3.1.2	D	1	9%	7%	6%	78%
5	A-R.1.1	D	2	22%	11%	16%	51%
6	A-R.1.1.3	C	2	23%	7%	55%	15%
7	A-R.1.1.4	B	2	9%	59%	5%	27%
8	A-R.1.1.5	D	2	18%	14%	34%	34%
9	B-E.1.1	C	2	18%	16%	55%	11%
10	B-E.1.1.2 B-E.2.1.1	A	2	54%	28%	12%	6%
11	B-E.3	B	2	8%	66%	11%	15%
12	D-S.1.1	B	2	13%	42%	16%	29%
13	D-S.1.1.1	B	2	21%	52%	14%	13%
14	D-S.1.1.2	A	1	58%	10%	20%	12%
15	D-S.1.1.3	D	2	5%	12%	6%	77%
16	D-S.1.1.4	D	2	15%	15%	26%	44%

OPEN-ENDED

Sample Number	Alignment	Points	Depth of Knowledge	Mean Score
17	B-E.2	4	2	0.98