RIDE Rhode Island Department of Education

Release of Spring 2023 RICAS Test Items

from the

Grade 7 Mathematics Paper-Based Test

June 2023
Rhode Island Department of Education

This document was prepared by the
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Overview of Grade 7 Mathematics Test

The spring 2023 grade 7 Mathematics test was a next-generation assessment that was administered in two formats: a computer-based version and a paper-based version. Most students took the computer-based test. The paper-based test was offered as an accommodation for eligible students who were unable to use a computer. More information can be found on the MCAS Test Administration Resources page at www.doe.mass.edu/mcas/admin.html.

Most of the operational items on the grade 7 Mathematics test were the same, regardless of whether a student took the computer-based version or the paper-based version. In places where a technology-enhanced item was used on the computer-based test, an adapted version of the item was created for use on the paper test. These adapted paper items were multiple-choice, multiple-select, or short-answer items that tested the same Mathematics content and assessed the same standard as the technology-enhanced item.

This document displays released items from the paper-based test. Released items from the computer-based test are available on the RICAS Resource Center website at ricas.pearsonsupport.com/released-items.

Test Sessions and Content Overview

The grade 7 Mathematics test was made up of two separate test sessions. Each session included selected-response, short-answer, and constructed-response questions. On the paper-based test, the selected-response questions were multiple-choice items and multiple-select items, in which students select the correct answer(s) from among several answer options.

Standards and Reporting Categories

The grade 7 Mathematics test was based on standards in the five domains for grade 7 in the *Massachusetts Curriculum Framework for Mathematics* (2017). The five domains are listed below.

- Ratios and Proportional Relationships
- The Number System
- Expressions and Equations
- Geometry
- Statistics and Probability

The *Massachusetts Curriculum Framework for Mathematics* is available on the Department website at www.doe.mass.edu/frameworks/current.html.

Mathematics test results are reported under five MCAS reporting categories, which are identical to the five framework domains listed above.

The tables at the conclusion of this document provide the following information about each released and unreleased operational item: reporting category, standard(s) covered, item type, and item description. The correct answers for released selected-response and short-answer questions are also displayed in the released item table.

Reference Materials and Tools

Each student taking the paper-based version of the grade 7 Mathematics test was provided with a plastic ruler and a grade 7 Mathematics Reference Sheet. A copy of the reference sheet follows the final question in this document. An image of the ruler is not reproduced in the document.

During Session 2, each student had sole access to a calculator. Calculator use was not allowed during Session 1.

During both Mathematics test sessions, the use of bilingual word-to-word dictionaries was allowed for current and former English learner students only. No other reference tools or materials were allowed.

Grade 7 Mathematics

SESSION 1

This session contains 10 questions.

You may use your reference sheet during this session.
*You may **not** use a calculator during this session.*

Directions

Read each question carefully and then answer it as well as you can. You must record all answers in this Test & Answer Booklet.

For some questions, you will mark your answers by filling in the circles in your Test & Answer Booklet. Make sure you darken the circles completely. Do not make any marks outside of the circles. If you need to change an answer, be sure to erase your first answer completely.

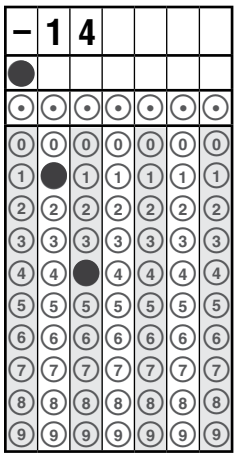
For other questions, you will need to fill in an answer grid. Directions for completing questions with answer grids are provided on the next page.

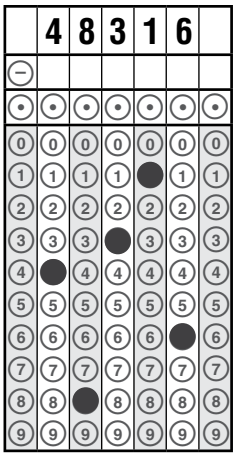
If a question asks you to show or explain your work, you must do so to receive full credit. Write your response in the space provided. Only responses written within the provided space will be scored.

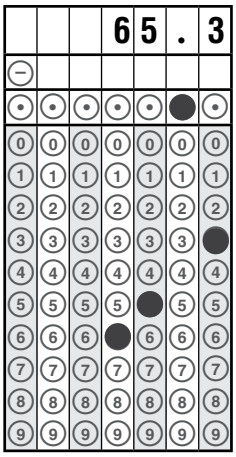
Directions for Completing Questions with Answer Grids

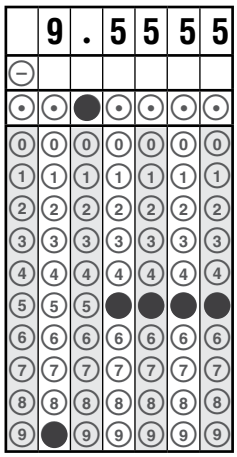
1. Work the question and find an answer.
2. Enter your answer in the answer boxes at the top of the answer grid.
3. Print only one number or symbol in each box. Do not leave a blank box in the middle of an answer.
4. Under each answer box, fill in the circle that matches the number or symbol you wrote above. Make a solid mark that completely fills the circle.
5. Do not fill in a circle under an unused answer box.
6. Fractions cannot be entered into an answer grid and will not be scored. Enter fractions as decimals.
7. If you need to change an answer, be sure to erase your first answer completely.
8. See below for examples of how to correctly complete an answer grid.

EXAMPLES









1 Felicia made a scale drawing of her kitchen. She used this scale.

Scale
1 inch = 5 feet

The width of Felicia's actual kitchen is 12 feet. Which proportion could be used to find w, the width of Felicia's kitchen on the scale drawing?

Ⓐ $\frac{1}{5} = \frac{12}{w}$

Ⓑ $\frac{1}{5} = \frac{w}{12}$

Ⓒ $\frac{1}{12} = \frac{5}{w}$

Ⓓ $\frac{1}{12} = \frac{w}{5}$

2 Which of the following shows the factored form of this expression?

$$10k + 40$$

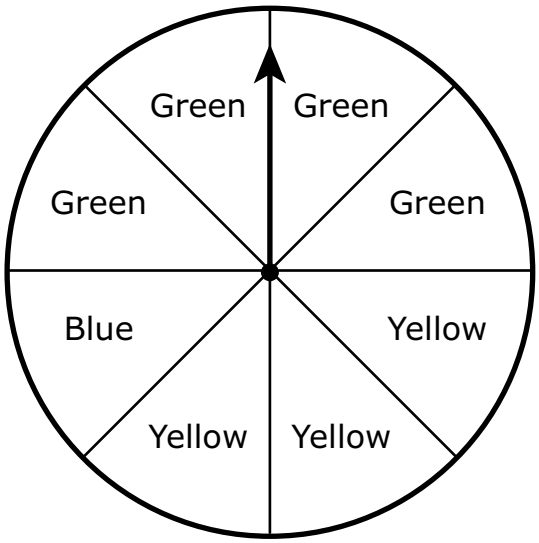
Ⓐ $5(2k + 35)$

Ⓑ $5(2k + 40)$

Ⓒ $10(k + 4)$

Ⓓ $10(k + 40)$

3 This spinner is divided into 8 equal sections. Each section is either green, yellow, or blue, as shown.



The arrow on the spinner will be spun 200 times.

Based on the number of times the arrow on the spinner is spun, which of the following predictions are **most** likely to be true?

Select the **three** correct answers.

Ⓐ The arrow will stop on green approximately 50 times.

Ⓑ The arrow will stop on green approximately 100 times.

Ⓒ The arrow will stop on yellow approximately 75 times.

Ⓓ The arrow will stop on yellow approximately 125 times.

Ⓔ The arrow will stop on blue approximately 25 times.

Ⓕ The arrow will stop on blue approximately 50 times.

This question has four parts. Be sure to label each part of your response.

4 Hank has been hired to paint all the rooms in a hotel.

- All of the rooms in the hotel are the same size.
- Hank will paint 3 hotel rooms every $7\frac{1}{2}$ hours.
- Hank will paint at the same rate until the job is complete.

A. How many hours will it take Hank to paint 6 hotel rooms? Show or explain how you got your answer.

B. How many hours will it take Hank to paint 1 hotel room? Show or explain how you got your answer

C. Write an equation that can be used to find h, the number of hours it will take Hank to paint r hotel rooms.

D. It will take Hank 1,200 hours to paint all the hotel rooms. What is the total number of rooms in the hotel? Show or explain how you got your answer.

4

5 In which of the following equations does x have a value of 4?

Ⓐ $x = \frac{(20 - 6)}{2}$

Ⓑ $x = \frac{(10 + 2)}{3}$

Ⓒ $x = \frac{(23 + 5)}{4}$

Ⓓ $x = \frac{(37 - 2)}{5}$

6 This two-dimensional shape is the result of slicing a three-dimensional figure.

Which of the following describes a way of slicing a three-dimensional figure that would result in the given shape?

Ⓐ slicing a right rectangular pyramid parallel to its base

Ⓑ slicing a right rectangular pyramid perpendicular to its base

Ⓒ slicing a right rectangular prism through exactly three of its faces

Ⓓ slicing a right rectangular pyramid through exactly three of its faces

7 Which of the following is equivalent to $\frac{11}{18}$?

Ⓐ 0.61

Ⓑ $0.6\overline{1}$

Ⓒ $0.\overline{61}$

Ⓓ 0.611

8 A farmer sprayed two rows of flowering plants, Row 1 and Row 2, each with a different type of fertilizer.

- Each row received the same amount of sunlight and water.
- After several weeks, the farmer selected every third plant in each row and counted the number of flowers on those plants.
- The farmer calculated the mean and the mean absolute deviation of the number of flowers on the plants in each row.

Based on the results, the farmer determined that Row 2 had the greater number of flowers per plant, and the lesser amount of variation in the number of flowers per plant.

Which of the following could have been the farmer's results?

Ⓐ Row 1: mean = 10.2, mean absolute deviation = 0.39
Row 2: mean = 14.9, mean absolute deviation = 2.2

Ⓑ Row 1: mean = 10.2, mean absolute deviation = 2.2
Row 2: mean = 14.9, mean absolute deviation = 0.39

Ⓒ Row 1: mean = 14.9, mean absolute deviation = 0.39
Row 2: mean = 10.2, mean absolute deviation = 2.2

Ⓓ Row 1: mean = 14.9, mean absolute deviation = 2.2
Row 2: mean = 10.2, mean absolute deviation = 0.39

This question has two parts.

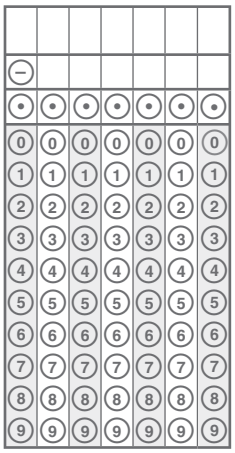
9 The first four terms of an arithmetic pattern are shown.

5, 8, 11, 14, . . .

Part A

What is the seventh term in the pattern?

Enter your answer in the answer boxes at the top of the answer grid **and** completely fill the matching circles.



Part B

Which of the following expressions can be used to find the nth term in the pattern?

Ⓐ $3(n - 1)$

Ⓑ $3 + 5(n - 1)$

Ⓒ $3 + (n - 1) + 5$

Ⓓ $3(n - 1) + 5$

10 Last year, a group received d dollars in donations. This year, the group received 30% less money in donations than it received last year.

Which expressions can be used to represent the total amount of money, in dollars, the group received in donations **this** year?

Select the **two** correct expressions.

Ⓐ $0.70d$

Ⓑ $0.97d$

Ⓒ $d - 0.30d$

Ⓓ $d - 0.03d$

Ⓔ $0.30 - d$

Grade 7 Mathematics

SESSION 2

This session contains 10 questions.

You may use your reference sheet during this session.
You may use a calculator during this session.

Directions

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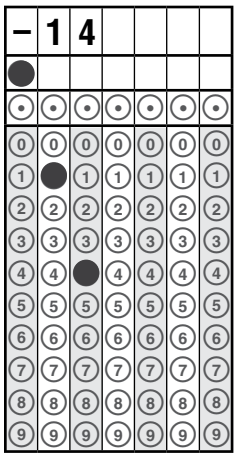
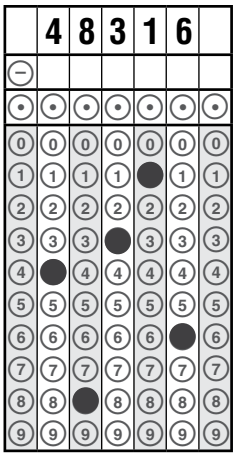
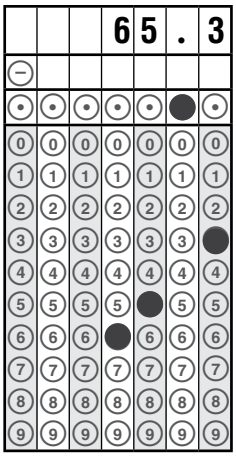
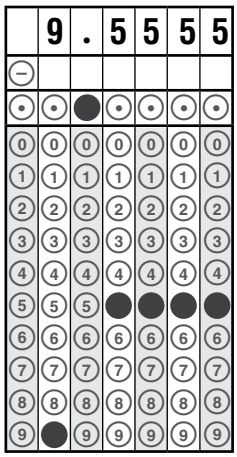








11 A student has $25 to buy walnuts and cashews.

- Walnuts cost $5 per pound.
- Cashews cost $7 per pound.
- The student buys 3 pounds of walnuts.

Which of the following inequalities can be used to find c, the possible number of pounds of cashews that the student can buy?

Ⓐ $15 + 7c \geq 25$

Ⓑ $15 + 7c \leq 25$

Ⓒ $5 + 7c \geq 25$

Ⓓ $5 + 7c \leq 25$

12 An employee works 35 hours each week at an office.

- In her first year working at the office, the employee earned $16.50 per hour.
- In her second year working at the office, the employee received an 8% raise.

Which of the following statements is true?

Ⓐ After the raise, the employee earned $1.08 more per hour and earned $37.80 more per week.

Ⓑ After the raise, the employee earned $1.32 more per hour and earned $46.20 more per week.

Ⓒ After the raise, the employee earned $2.06 more per hour and earned $72.01 more per week.

Ⓓ After the raise, the employee earned $2.06 more per hour and earned $46.20 more per week.

This question has three parts. Be sure to label each part of your response.

13 Trevor has a recipe for honey mustard salad dressing. This table shows the ingredients and the amounts of each ingredient needed to make his recipe.

Salad Dressing Ingredients

Ingredient	Amount Needed
oil	1 cup
vinegar	$\frac{5}{8}$ cup
honey	$\frac{1}{2}$ cup
mustard	1 tablespoon

1 fluid ounce = 2 tablespoons

1 cup = 8 fluid ounces

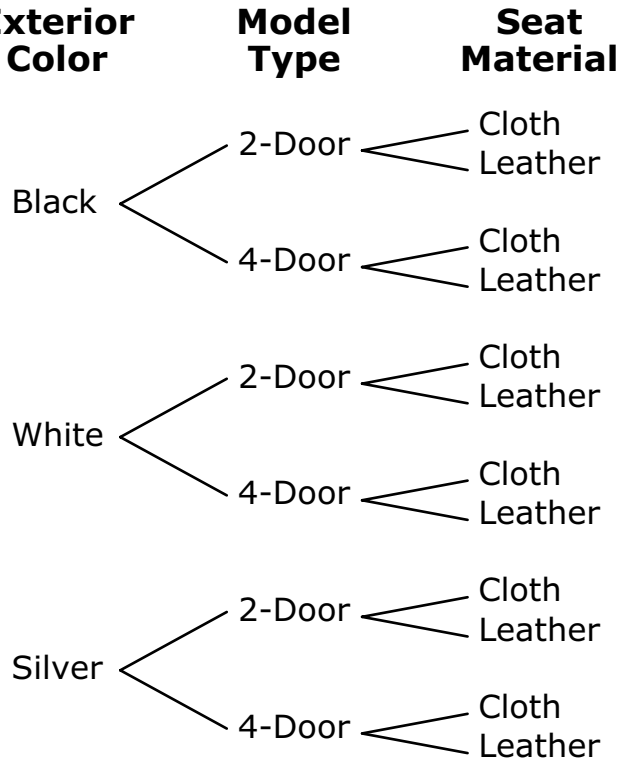
A. What is the number of fluid ounces of vinegar needed to make Trevor's recipe? Show or explain how you got your answer.

B. What is the total number of fluid ounces of salad dressing that Trevor's recipe will make? Show or explain how you got your answer.

C. Trevor plans to use 3 tablespoons of salad dressing per serving. What is the total number of servings that he can make with his recipe? Show or explain how you got your answer.

13

14 This tree diagram shows the available combinations of exterior color, model type, and seat material of one brand of car for sale at a dealership.



The dealership has only one car with each specific combination of exterior color, model type, and seat material of this brand for sale.

Which of the following statements are correct?

Select the **two** correct statements.

Ⓐ There are a total of 6 cars of this brand for sale at the dealership.

Ⓑ There are a total of 12 cars of this brand for sale at the dealership.

Ⓒ There are a total of 21 cars of this brand for sale at the dealership.

Ⓓ There is a total of 1 silver car of this brand for sale at the dealership.

Ⓔ There are a total of 2 silver cars of this brand for sale at the dealership.

Ⓕ There are a total of 4 silver cars of this brand for sale at the dealership.

15 Consider these angle measures.

50°, 50°, 100°

Which of the following describes the number of unique triangles that can be drawn using all three angle measures as interior angles?

Ⓐ no triangles

Ⓑ exactly one triangle

Ⓒ exactly three triangles

Ⓓ more than three triangles

16 A teacher recorded some data about the students in her class:

- The probability of a randomly selected student having a pet is 80%.
- The probability of a randomly selected student having short hair is 0.65.
- The probability of a randomly selected student having no siblings is 21%.
- The probability of a randomly selected student having a cell phone is $\frac{5}{10}$.

A student from the class is selected at random. Based on the teacher's data, which of the following statements about the student are true?

Select the **two** correct statements.

Ⓐ It is unlikely that the student has a pet.

Ⓑ It is likely that the student has short hair.

Ⓒ It is unlikely that the student has short hair.

Ⓓ It is neither unlikely nor likely that the student has no siblings.

Ⓔ It is neither unlikely nor likely that the student has a cell phone.

17 The diameter of a circle has a length of 6 inches.

Which of the following statements about the circle are true?

Select the **two** correct statements.

Ⓐ The radius of the circle has a length of 3 inches.

Ⓑ The radius of the circle has a length of 12 inches.

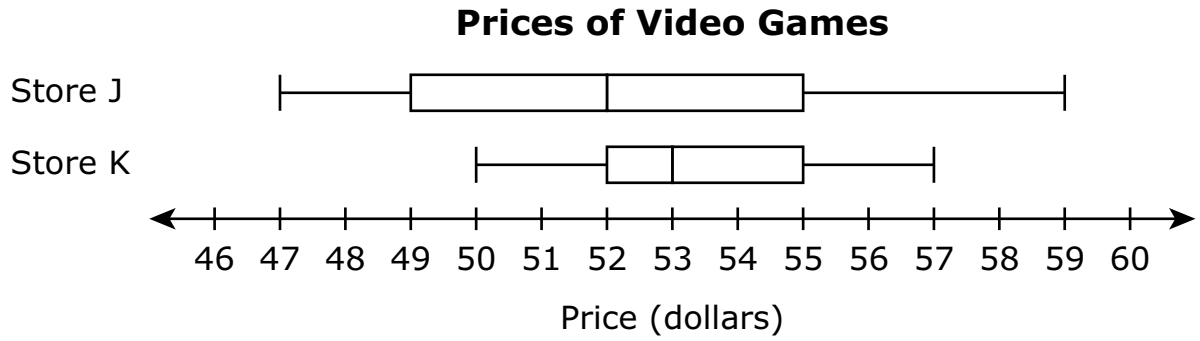
Ⓒ The radius of the circle has a length of 36 inches.

Ⓓ The area of the circle is 6π square inches.

Ⓔ The area of the circle is 9π square inches.

Ⓕ The area of the circle is 36π square inches.

18 Kevin compared the prices, in dollars, of video games sold at Store J and at Store K. This double box plot shows the distributions of the data he collected.



What is the difference, in dollars, of the range of the data for Store J and the range of the data for Store K?

Ⓐ 1

Ⓑ 2

Ⓒ 3

Ⓓ 5

19 A chef used a recipe to make a batch of soup. The recipe for the soup requires $\frac{2}{3}$ cup of cream for every $1\frac{2}{3}$ cups of broth. The chef used 5 cups of broth for the batch of soup.

Based on the recipe, how many cups of cream did the chef use to make the batch of soup?

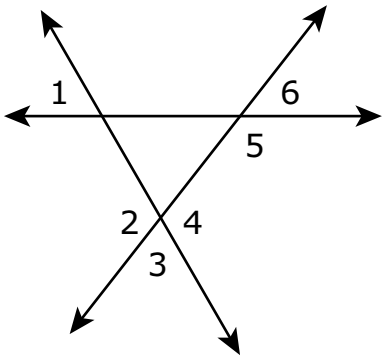
Ⓐ 2

Ⓑ $3\frac{1}{3}$

Ⓒ 4

Ⓓ $4\frac{1}{3}$

20 Consider this diagram.



Which pair of angles in the diagram represents a pair of vertical angles?

Ⓐ angle 6 and angle 5

Ⓑ angle 6 and angle 2

Ⓒ angle 2 and angle 3

Ⓓ angle 2 and angle 4

RIDE Rhode Island Department of Education

Rhode Island Comprehensive Assessment System
Grade 7 Mathematics Reference Sheet

CONVERSIONS

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 gallon ≈ 3.785 liters
1 liter ≈ 0.264 gallon
1 liter = 1000 cubic centimeters

1 inch = 2.54 centimeters
1 meter ≈ 39.37 inches
1 mile = 5280 feet
1 mile = 1760 yards
1 mile ≈ 1.609 kilometers
1 kilometer ≈ 0.62 mile

1 pound = 16 ounces
1 pound ≈ 0.454 kilogram
1 kilogram ≈ 2.2 pounds
1 ton = 2000 pounds

AREA (*A*) FORMULAS

square . . . . . $A = s^2$

rectangle . . . . . $A = bh$
OR
$A = lw$

parallelogram . . $A = bh$

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

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

circle . . . . . $A = \pi r^2$

CIRCLE FORMULAS

area . . . . . $A = \pi r^2$

circumference . . $C = 2\pi r$
OR
$C = \pi d$

VOLUME (*V*) FORMULAS

cube . . . . . $V = s^3$
(s = length of an edge)

right prism . . . . . $V = Bh$

TOTAL SURFACE AREA (*SA*) FORMULAS

right rectangular prism . . $SA = 2(lw) + 2(hw) + 2(lh)$

Grade 7 Mathematics
Spring 2023 Released Operational Items

PBT Item No.	Page No.	Reporting Category	Standard	Item Type*	Item Description	Correct Answer**
1	4	*Ratios and Proportional Relationships*	7.RP.A.2	SR	Determine which proportion can be used to find a missing value, given a scale.	B
2	4	*Expressions and Equations*	7.EE.A.1	SR	Determine which expression represents a factored form of a given expression.	C
3	5	*Statistics and Probability*	7.SP.C.6	SR	Approximate the probability of a chance event by analyzing its long-run relative frequency, given the relative frequency of a spinner.	B,C,E
4	6–7	*Ratios and Proportional Relationships*	7.RP.A.1	CR	Determine unit rates associated with ratios of fractions and use them to solve real-world problems.	
5	8	*Expressions and Equations*	7.EE.B.4	SR	Determine which simple equation is satisfied by a given solution.	B
6	8	*Geometry*	7.G.A.3	SR	Determine which statement correctly describes a way that a three-dimensional figure could be sliced to result in a given two-dimensional shape.	A
7	9	*The Number System*	7.NS.A.2	SR	Determine a decimal equivalent of a given fraction.	B
8	9	*Statistics and Probability*	7.SP.B.4	SR	Determine the possible mean and mean absolute deviation for two sets of data in a real-world context.	B
9	10	*Expressions and Equations*	7.EE.B.4	SA	Extend a pattern to find a number in the pattern, and choose an expression that represents the general rule of the pattern.	23;D
10	11	*Expressions and Equations*	7.EE.A.2	SR	Determine which expressions are equivalent to a verbal description of a real-world context.	A,C
11	14	*Expressions and Equations*	7.EE.B.4	SR	Determine which inequality, in the form $px+q<r$, can be used to represent a real-world situation.	B
12	15	*Expressions and Equations*	7.EE.B.3	SR	Solve a multi-step, real-world problem involving percent increases with money.	B
13	16–17	*The Number System*	7.NS.A.3	CR	Use operations on integers and rational numbers to solve a real-world problem.	
14	18	*Statistics and Probability*	7.SP.C.8	SR	Identify the outcomes in a sample space represented by a tree diagram.	B,F
15	19	*Geometry*	7.G.A.2	SR	Determine whether the given conditions of a triangle represent a unique triangle, more than one triangle, or no triangle.	A
16	20	*Statistics and Probability*	7.SP.C.5	SR	Determine the likelihood of events occurring based on the probability of a list of chance events.	B,E
17	21	*Geometry*	7.G.B.4	SR	Determine the radius and the area given the diameter of a circle.	A,E
18	22	*Statistics and Probability*	7.SP.B.3	SR	Determine the difference of the ranges of data displayed in a double box plot.	D

PBT Item No.	Page No.	Reporting Category	Standard	Item Type*	Item Description	Correct Answer**
19	22	*Ratios and Proportional Relationships*	7.RP.A.3	SR	Use proportional relationships to solve a multi-step ratio problem.	A
20	23	*Geometry*	7.G.B.5	SR	Identify angles in a diagram that represent vertical angles.	D

***** Mathematics item types are: selected-response (SR), short-answer (SA), and constructed-response (CR).

****** Answers are provided here for selected-response and short-answer items only. Sample responses and scoring guidelines for any constructed-response items will be posted to the Department's website later this year.

Grade 7 Mathematics
Spring 2023 Unreleased Operational Items

PBT Item No.	Reporting Category	Standard	Item Type*	Item Description
21	*Ratios and Proportional Relationships*	7.RP.A.1	SR	Determine the unit rate associated with ratios of fractions, and use the unit rate to solve a real-world problem.
22	*Expressions and Equations*	7.EE.B.3	SR	Determine the reasonableness of an estimated solution to a real-world problem using rational numbers expressed as whole numbers, fractions, and percentages.
23	*Expressions and Equations*	7.EE.A.1	SR	Determine which expression is equivalent to a given expression.
24	*Expressions and Equations*	7.EE.B.3	SA	Solve a real-world problem using operations with rational numbers.
25	*Statistics and Probability*	7.SP.C.8	CR	Find the probability of a compound event using a tree diagram and simulation, and make an organized list based on the simulation.
26	*The Number System*	7.NS.A.3	SR	Solve a real-world problem involving the four operations with positive and negative integers using elevation as a context.
27	*The Number System*	7.NS.A.1	SR	Determine which number line shows the solution of an equation involving subtraction of two rational numbers.
28	*The Number System*	7.NS.A.2	SR	Convert a rational number to a decimal.
29	*Ratios and Proportional Relationships*	7.RP.A.2	SR	Determine which table represents a proportional relationship between two quantities.
30	*The Number System*	7.NS.A.1	SR	Determine the value of an expression containing positive and negative mixed numbers.
31	*The Number System*	7.NS.A.3	SR	Solve a multi-step, real-world problem by converting units.
32	*Statistics and Probability*	7.SP.B.4	SR	Determine which comparative statement involving the mean and the range within a real-world context is true based on given data.
33	*Expressions and Equations*	7.EE.A.1	SR	Determine which expression is equivalent to a given expression.
34	*Statistics and Probability*	7.SP.C.7	SR	Determine the probability of an event using a uniform probability model.
35	*Ratios and Proportional Relationships*	7.RP.A.2	SR	Determine which proportion represents a given verbal description of a proportional relationship.
36	*The Number System*	7.NS.A.3	SR	Solve a real-world problem involving the four operations.
37	*Geometry*	7.G.A.1	CR	Identify and apply a scale to determine the dimensions and areas of rectangles given in a real-world context.
38	*Ratios and Proportional Relationships*	7.RP.A.2	SR	Interpret the proportional relationship shown in a graph, use it to create an equation, and solve a problem.
39	*Expressions and Equations*	7.EE.A.2	SR	Determine which expressions can be used to represent a real-world situation.
40	*Expressions and Equations*	7.EE.B.3	SR	Solve a real-world, multi-step problem involving mixed numbers, percentages, and whole numbers.

* Mathematics item types are: selected-response (SR), short-answer (SA), and constructed-response (CR).