VIII. Mathematics, Grade 3

Grade 3 Mathematics Test

The spring 2019 grade 3 Mathematics test was a next-generation assessment that was administered in two primary formats: a computer-based version and a paper-based version. The vast majority of students took the computer-based test. The paper-based test was offered as an accommodation for students with disabilities who are unable to use a computer, as well as for English learners who are new to the country and are unfamiliar with technology.

Most of the operational items on the grade 3 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.

The Scoring Guides can be found at www.doe.mass.edu/mcas/student/. They provide the released constructed-response questions, a unique scoring guide for each question, and samples of student work at each score point.

Test Sessions and Content Overview

The grade 3 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 3 Mathematics test was based on standards in the five domains for grade 3 in the *Massachusetts Curriculum Framework for Mathematics* (2017). The five domains are listed below.

- Operations and Algebraic Thinking

- Number and Operations in Base Ten

- Number and Operations—Fractions

- Measurement and Data

- Geometry

The *Massachusetts Curriculum Framework* is strongly aligned with Rhode Island's Mathematics standards: the Common Core State Standards (CCSS). The RICAS Mathematics assessment tables articulate this alignment and are available on the RIDE website at www.ride.ri.gov/ricas. 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 RICAS reporting categories, which are identical to the five framework domains listed above.

The tables at the conclusion of this chapter 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 3 Mathematics test was provided with a plastic ruler. An image of the ruler is not reproduced in this publication.

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

Grade 3 Mathematics
SESSION 1

This session contains 12 questions.

*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. If you need to change an answer, be sure to erase your first answer completely.

7. See below for examples of how to correctly complete an answer grid.

EXAMPLES

1 This shape is divided into equal parts.
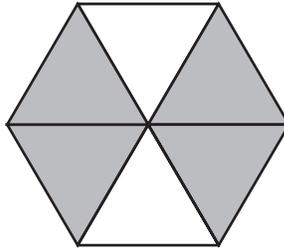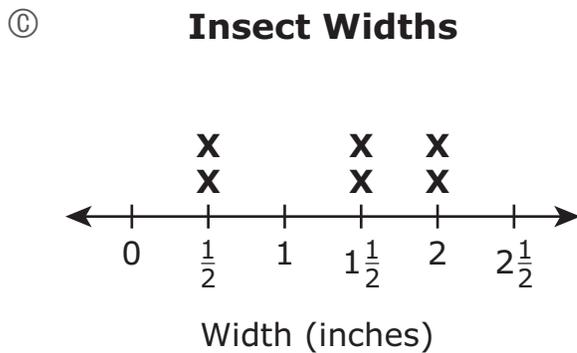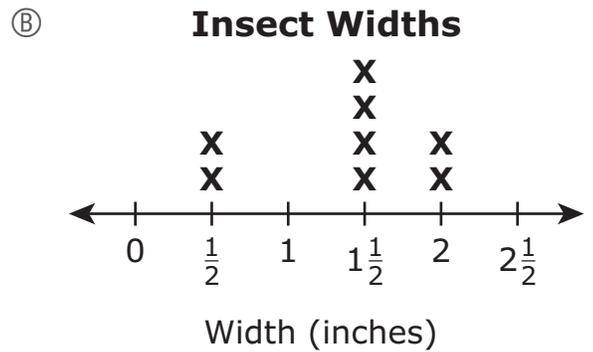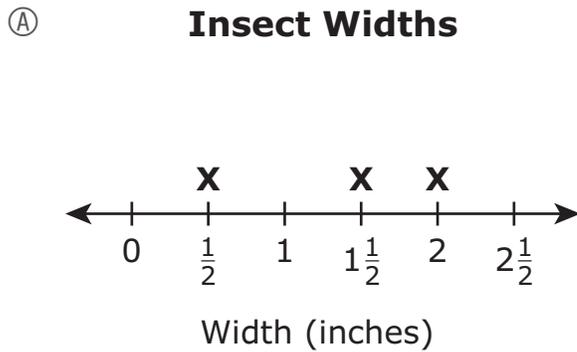

Which of these fractions represents the part of the shape that is shaded?

Ⓐ $\dfrac{4}{6}$

Ⓑ $\dfrac{6}{4}$

Ⓒ $\dfrac{2}{4}$

Ⓓ $\dfrac{4}{2}$

**2** The widths, in inches, of some insects are shown.

$1\frac{1}{2}$ in. $1\frac{1}{2}$ in. $1\frac{1}{2}$ in. $\frac{1}{2}$ in. $\frac{1}{2}$ in.

2 in.   2 in. $\frac{1}{2}$ in. $\frac{1}{2}$ in.
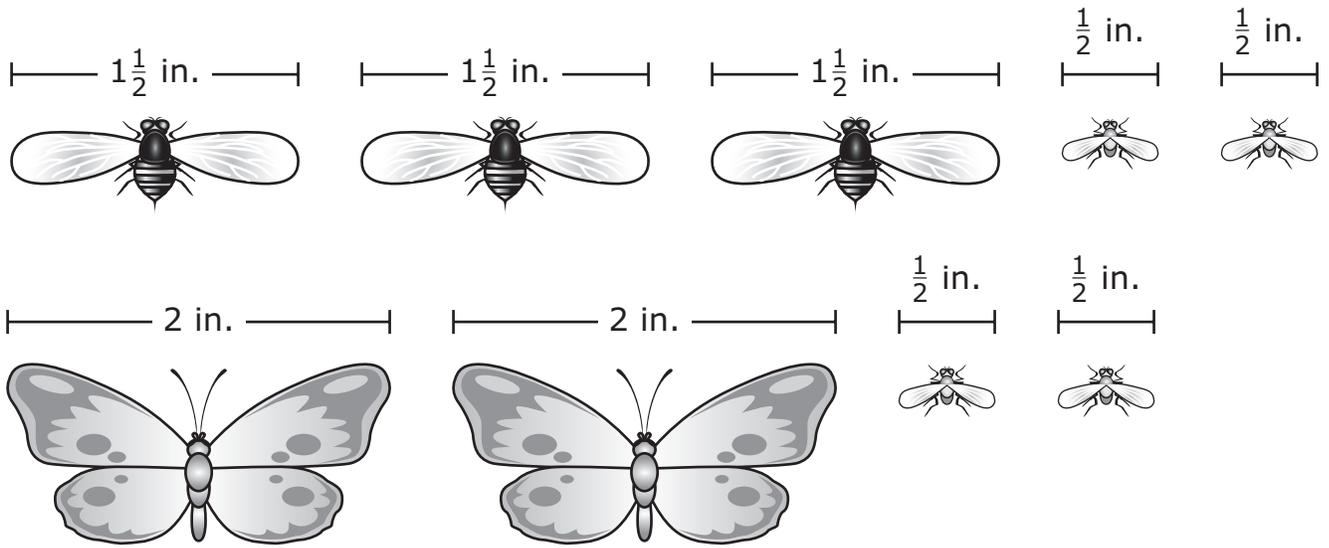
Which line plot shows the number of insects with each width?

Ⓐ **Insect Widths**

```
              X       X   X

  +---+---+---+---+---+--->
  0   1/2  1  1 1/2 2  2 1/2
```
Width (inches)

Ⓑ **Insect Widths**

```
                      X
                      X
          X           X   X
          X           X   X
  +---+---+---+---+---+--->
  0   1/2  1  1 1/2 2  2 1/2
```
Width (inches)

Ⓒ **Insect Widths**

```
          X           X   X
          X           X   X
  +---+---+---+---+---+--->
  0   1/2  1  1 1/2 2  2 1/2
```
Width (inches)

Ⓓ **Insect Widths**

```
          X
          X           X
          X           X   X
          X           X   X
  +---+---+---+---+---+--->
  0   1/2  1  1 1/2 2  2 1/2
```
Width (inches)
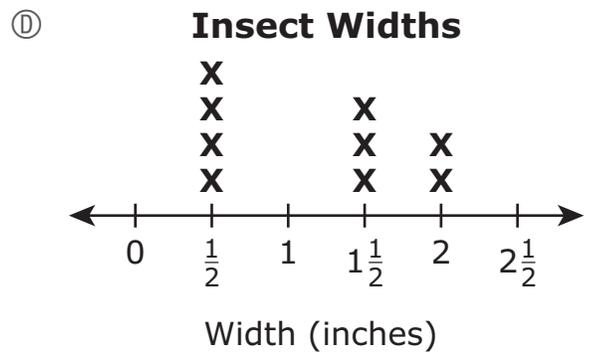
3 Which of these is a quadrilateral that is **not** a rectangle?

Ⓐ

Ⓑ

Ⓒ

Ⓓ
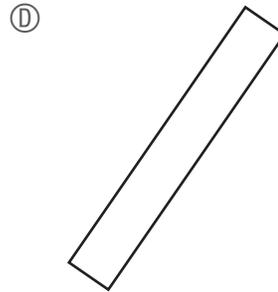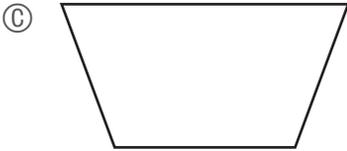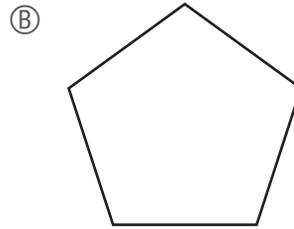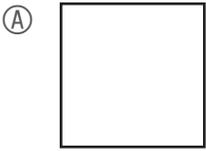
4   Harry bought 2 books. Each book cost $4. He paid with a $20 bill.

How much change should Harry get back?

Ⓐ $6

Ⓑ $8

Ⓒ $12

Ⓓ $14

5 Which of these fractions are equivalent to $\frac{3}{6}$?

Select the **three** correct answers.

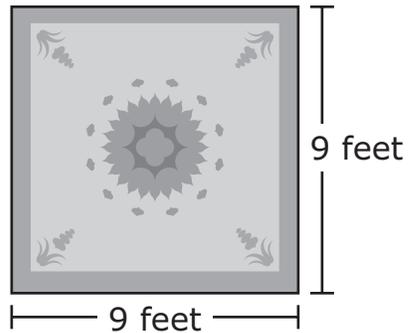Ⓐ $\frac{1}{2}$

Ⓑ $\frac{2}{3}$

Ⓒ $\frac{6}{3}$

Ⓓ $\frac{2}{4}$

Ⓔ $\frac{3}{8}$

Ⓕ $\frac{4}{8}$

This question has two parts.

6   **Part A**

A green rug is in the shape of a square, as shown.

9 feet

9 feet

What is the perimeter, in feet, of the green rug? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

Part B

A blue rug is in the shape of a rectangle. The blue rug has the same perimeter as the green rug from Part A, but it has a different length and a different width.

What could be the length and width, in feet, of the blue rug? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

7 The post office sells pages of stamps. Each page has the same number of stamps. One page of stamps is shown.

KEY
= 1 stamp
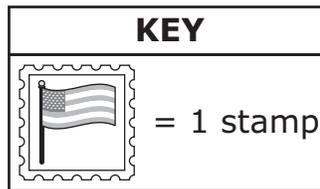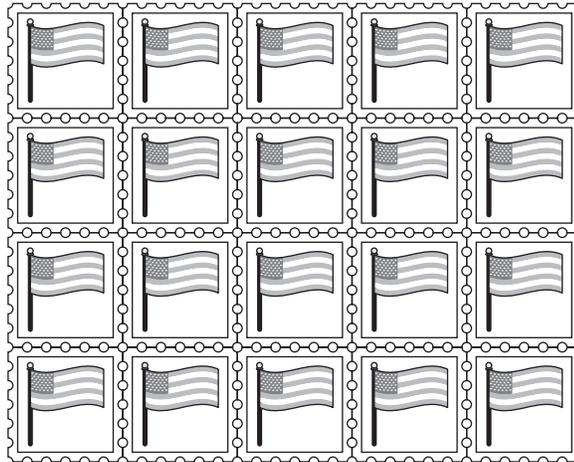
Christa bought 6 pages of stamps. How many stamps did Christa buy in all?

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

**8**   Which of these problems can be solved using this division expression?

$$56 \div 7$$

Select the **two** correct answers.

Ⓐ   A student has 56 juice boxes. A cooler will hold 7 juice boxes. How many coolers are needed to hold all of the juice boxes?

Ⓑ   A student has 56 juice boxes. Of the 56 juice boxes, 7 juice boxes are fruit punch. How many juice boxes are not fruit punch?

Ⓒ   A student has 56 juice boxes. He will give 7 juice boxes to his brother. How many juice boxes will the student have remaining?

Ⓓ   A student has 56 juice boxes. He will buy 7 more juice boxes at the store. How many juice boxes will the student have after he gets home from the store?

Ⓔ   A student has 56 juice boxes. The juice boxes are in packages. Each package has 7 juice boxes. How many packages of juice boxes does the student have?

9   The students at a school went on a field trip. The school used 4 buses for the field trip. There were 60 students on each bus.

What was the total number of students who went on the field trip?

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

10   What is the missing number that makes this number sentence true?

$$5 + 11 + 2 = \boxed{?} + 5 + 2$$

Ⓐ 2

Ⓑ 7

Ⓒ 11

Ⓓ 18

11   Point *V* is labeled on this number line.
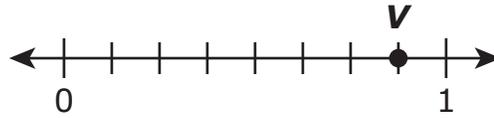
Which fraction shows where point *V* is on the number line?

Ⓐ $\dfrac{8}{8}$

Ⓑ $\dfrac{7}{8}$

Ⓒ $\dfrac{2}{8}$

Ⓓ $\dfrac{1}{8}$

Use your ruler to answer question 12.

12 What is the length, to the nearest $\frac{1}{2}$ inch, of the nail shown?

Ⓐ 2 inches

Ⓑ $2\frac{1}{2}$ inches

Ⓒ 3 inches

Ⓓ $3\frac{1}{2}$ inches

Grade 3 Mathematics
SESSION 2

This session contains 8 questions.

*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.

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7. See below for examples of how to correctly complete an answer grid.

EXAMPLES

13 This table shows the number of books read by three students during the school year.

Books Read

Student	Number of Books
Kim	12
Ted	9
Jon	15

Which picture graph shows the number of books read by each student during the school year? Be sure to use this key.

KEY
Each ▢ represents 3 books.

Ⓐ **Books Read**

Kim	▢▢▢▢▢▢▢▢▢▢▢
Ted	▢▢▢▢▢▢▢▢▢
Jon	▢▢▢▢▢▢▢▢▢▢▢▢▢▢

Ⓑ **Books Read**

Kim	▢▢▢▢
Ted	▢▢▢
Jon	▢▢▢▢▢

Ⓒ **Books Read**

Kim	▢▢▢▢▢▢
Ted	▢▢▢▢▢
Jon	▢▢▢▢▢▢▢▢

Ⓓ **Books Read**

Kim	▢▢▢
Ted	▢▢
Jon	▢▢▢▢
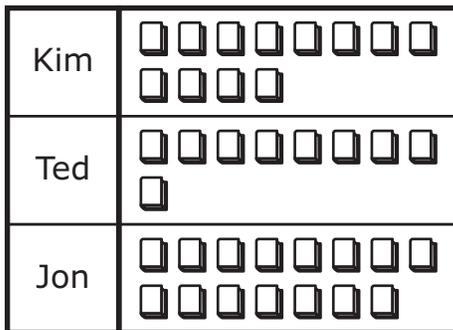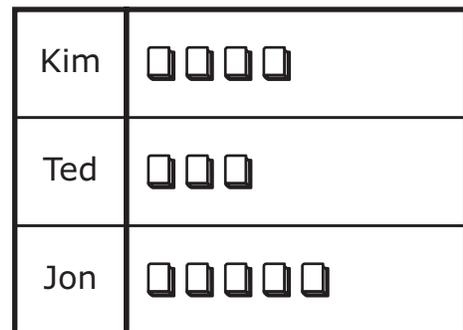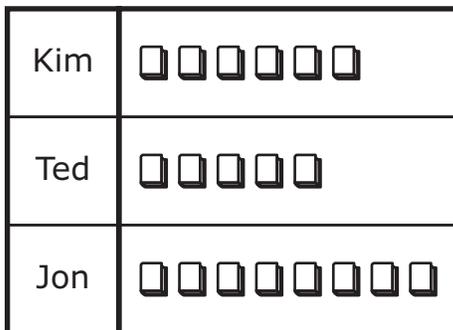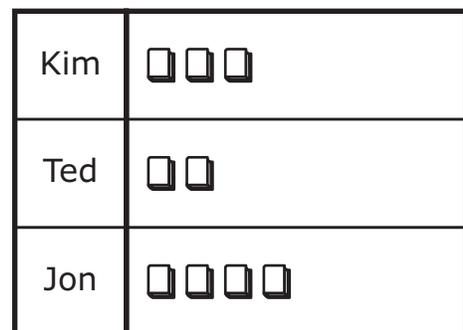
14 Which number rounds to 90 when rounded to the nearest 10?

Ⓐ 84

Ⓑ 97

Ⓒ 85

Ⓓ 96

This question has three parts.

15   Sergio and Tameka want to find the solution to this equation.

$$6 \times 15 = \boxed{?}$$

Part A

Which of the following expressions can Sergio use to help him find the solution to the equation?

Ⓐ   (2 + 15) + (4 + 15)

Ⓑ   (6 × 5) + (6 × 10)

Ⓒ   (6 × 5) + (6 × 7)

Ⓓ   (6 × 6) + (6 × 7)

Part B

What number belongs in the $\boxed{?}$ to make this equation true?

$$6 \times 15 = \boxed{?}$$

Enter your answer in the space provided.

Part C

Tameka says she can use this expression to solve the same equation.

$$(6 \times 7) + (6 \times 8)$$

Is Tameka correct? Explain how you know whether she can use her expression to solve the same equation or not.

Enter your answer and your explanation in the space provided.

16   Which of these number lines has a point that represents where $\frac{11}{8}$ is located?

Ⓐ

Ⓑ

Ⓒ

Ⓓ
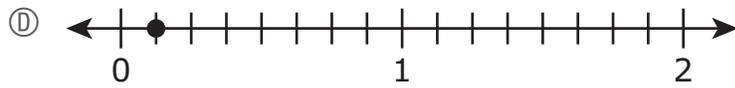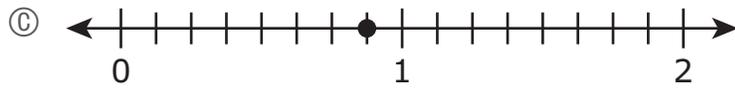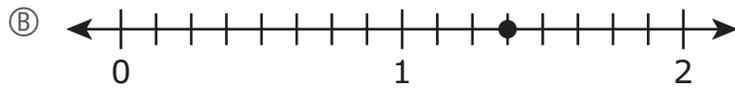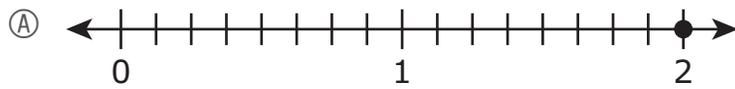
17 Ian made a pattern by shading some numbers on a multiplication table, as shown.

×	0	1	2	3	
0	0	0	0	0	
1	0	1	2	3	
2	0	2	4	6	
3	0	3	6	9	

Ian fills in the rest of the multiplication table. Then he continues his shading pattern.

What is the next number Ian will shade in his pattern?

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

18 A division equation is shown.

$$16 \div 2 = g$$

Which of these can also be used to find the value of g?

Ⓐ $g \times 2 = 16$

Ⓑ $2 \div 16 = g$

Ⓒ $g \div 2 = 16$

Ⓓ $16 \times 2 = g$

19   Jessica has 3 vases. She wants to put the same number of flowers in each vase. She has 27 flowers altogether.

Jessica wrote this number sentence to find out how many flowers to put in each vase.

$$3 \times \boxed{?} = 27$$

What is the missing number that makes Jessica's number sentence true?

Ⓐ   6

Ⓑ   7

Ⓒ   8

Ⓓ   9

20   A figure is divided into four equal parts, as shown.

Which fraction of the total area of the figure is **one** part?

Ⓐ $\dfrac{1}{4}$

Ⓑ $\dfrac{2}{4}$

Ⓒ $\dfrac{3}{4}$

Ⓓ $\dfrac{4}{4}$

Grade 3 Mathematics
Spring 2019 Released Operational Items

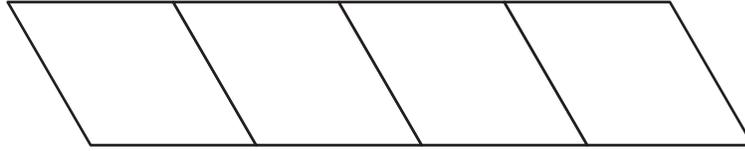| PBT Item No.	Page No.	Reporting Category	Standard	Item Type*	Item Description	Correct Answer**
1	134	*Number and Operations-Fractions*	3.NF.A.1	SR	Determine the fraction that is represented by a given fraction model.	A
2	135	*Measurement and Data*	3.MD.B.4	SR	Determine the line plot that represents a set of given data with measurements in both fractions and mixed numbers.	D
3	136	*Geometry*	3.G.A.1	SR	Determine which shape in a given set of shapes is not a rectangle.	C
4	137	*Operations and Algebraic Thinking*	3.OA.D.8	SR	Solve a two-step word problem using multiplication and subtraction.	C
5	138	*Number and Operations-Fractions*	3.NF.A.3	SR	Select the fractions that are equivalent to a given fraction.	A,D,F
6	139–140	*Measurement and Data*	3.MD.D.8	CR	Determine the perimeter of a square and then determine a length and a width of a rectangle with the same perimeter as the square, but with different dimensions.	
7	141	*Number and Operations in Base Ten*	3.NBT.A.3	SA	Solve a real-world problem by finding the product of a one-digit number and a multiple of 10.	120
8	142	*Operations and Algebraic Thinking*	3.OA.A.2	SR	Choose word problems that can be solved using a given division expression.	A,E
9	143	*Number and Operations in Base Ten*	3.NBT.A.3	SA	Determine the product of a one-digit number and a multiple of 10 to solve a word problem.	240
10	143	*Number and Operations in Base Ten*	3.NBT.A.2	SR	Determine which number completes a given addition equation.	C
11	144	*Number and Operations-Fractions*	3.NF.A.2	SR	Identify the fraction that is represented by the location of a given point on a number line.	B
12	145	*Measurement and Data*	3.MD.B.4	SR	Use a ruler to measure the length of an item to the nearest half-inch.	B
13	148	*Measurement and Data*	3.MD.B.3	SR	Identify the scaled picture graph that represents a given data set with three categories.	B
14	149	*Number and Operations in Base Ten*	3.NBT.A.1	SR	Determine which two-digit whole number, when rounded to the nearest ten, rounds to a given number.	C
15	150–151	*Operations and Algebraic Thinking*	3.OA.B.5	CR	Show how to use the distributive property to solve a multiplication problem and critique the reasoning of another student who wants to use a different method.	
16	152	*Number and Operations-Fractions*	3.NF.A.2	SR	Identify the partitioned number line that shows the location of a given fraction that is greater than 1.	B
17	153	*Operations and Algebraic Thinking*	3.OA.D.9	SA	Determine the next number of a given pattern in a multiplication table.	16
18	154	*Operations and Algebraic Thinking*	3.OA.B.6	SR	Determine the multiplication equation that could be used to solve a given division equation.	A
19	155	*Operations and Algebraic Thinking*	3.OA.A.4	SR	Determine the missing factor in a multiplication equation that represents a given word problem.	D
20	156	*Geometry*	3.G.A.2	SR	Determine what fraction of the area of the whole figure one part is.	A

* 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.

PBT Item No.	Reporting Category	Standard	Item Type*	Item Description
21	*Number and Operations in Base Ten*	3.NBT.A.1	SR	Determine which number would result when a given whole number is rounded to the nearest hundred.
22	*Operations and Algebraic Thinking*	3.OA.D.9	SR	Determine the rule in a given number pattern.
23	*Measurement and Data*	3.MD.A.2	SA	Interpret a drawing of a container and use subtraction to solve a word problem involving liquid volume in metric units.
24	*Geometry*	3.G.A.2	SR	Determine the fraction that represents one part of a given circle that is divided into equal parts.
25	*Number and Operations-Fractions*	3.NF.A.3	CR	Compare fractions in a real-world context and explain the reasoning to support the comparisons.
26	*Measurement and Data*	3.MD.C.7	SR	Determine the equation that can be used when decomposing a rectilinear figure to find the total area.
27	*Operations and Algebraic Thinking*	3.OA.B.6	SR	Find a related equation with a variable that can be used to solve a given division equation with the same variable.
28	*Measurement and Data*	3.MD.B.3	SA	Solve a one-step "how many more" problem using a given bar graph.
29	*Measurement and Data*	3.MD.C.6	SR	Determine the area of given figures by counting the unit squares.
30	*Operations and Algebraic Thinking*	3.OA.C.7	SA	Find the product of three one-digit whole numbers.
31	*Geometry*	3.G.A.1	SR	Determine which shape has the same number of angles as a given shape.
32	*Operations and Algebraic Thinking*	3.OA.A.2	SR	Determine the equation that can be used to solve a given division word problem.
33	*Operations and Algebraic Thinking*	3.OA.C.7	SR	Identify division equations that are true.
34	*Measurement and Data*	3.MD.C.5	SR	Identify the correct statement relating square units to what is measured.
35	*Measurement and Data*	3.MD.A.1	SA	Measure a time interval given starting and ending times shown on two different analog clocks.
36	*Operations and Algebraic Thinking*	3.OA.A.3	SR	Determine the multiplication or division equation that can be used to solve a given word problem.
37	*Number and Operations-Fractions*	3.NF.A.1	SR	Determine the fraction that is represented by the shaded parts of a given fraction model.
38	*Number and Operations in Base Ten*	3.NBT.A.2	CR	Solve problems requiring addition and subtraction of two- and three-digit numbers and justify the thinking of another student.
39	*Number and Operations-Fractions*	3.NF.A.3	SR	Determine which fraction model represents a fraction with a value that is between two given fractions.
40	*Operations and Algebraic Thinking*	3.OA.A.1	SR	Determine the equation that can be used to solve a multiplication word problem.

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