Computer-Based Released Items
Grade 4 Mathematics
Spring 2021

The spring 2021 grade 4 Mathematics test 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.

The Department of Elementary and Secondary Education is releasing items from both versions of the test to provide information about the knowledge and skills that students are expected to demonstrate.

- Released items from the **computer-based test** are available online at mcas.pearsonsupport.com/released-items. The computer-based released items are collected in a mini test called an ePAT (electronic practice assessment tool). Items in the ePAT are displayed in TestNav 8, the testing platform for the computer-based tests.

- Released items from the **paper-based test** are available in PDF format on the Department's website at www.doe.mass.edu/mcas/testitems.html.

This document provides information about each released item from the *computer-based test*, including: reporting category, standard(s) covered, item type, item description, and correct answer (for selected-response items only). Information about unreleased operational items is also presented here, and scoring rubrics are provided for released constructed-response items.

A Note about Testing Mode

Most of the operational items on the grade 4 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.

2021 Session Sampling

In 2021, due to the COVID-19 pandemic, the Department reduced testing time for students in grades 3–8 through a session sampling approach, in which each student took only a portion of each MCAS assessment. Instead of taking two sessions in each subject, individual students took one session each.

Grade 4 Mathematics
Spring 2021 Computer-Based Released Operational Items

CBT Item No.	Reporting Category	Standard	Item Type*	Item Description	Correct Answer**
1	Number and Operations-Fractions	4.NF.B.3	SA	Use a fraction model to represent the sum of two given fractions with like denominators.	*see page 6*
2	Operations and Algebraic Thinking	4.OA.A.1	SR	Determine which equation represents a multiplicative comparison in a word problem.	C
3	Number and Operations-Fractions	4.NF.C.6	SR	Determine which decimals are equivalent to a given amount represented by a visual model.	A,E
4	Number and Operations-Fractions	4.NF.B.4	SR	Solve a word problem by multiplying a fraction by a whole number.	A
5	Operations and Algebraic Thinking	4.OA.B.4	SR	Identify prime numbers.	B,D
6	Number and Operations in Base Ten	4.NBT.A.2	CR	Express multi-digit whole numbers in standard and expanded forms and use place value understanding to compare the numbers with symbols and to explain your answer.	*see page 6*
7	Measurement and Data	4.MD.A.3	SR	Use the area formula to find the area of a square.	C
8	Geometry	4.G.A.3	SA	Determine the number of lines of symmetry in quadrilaterals.	*see page 7*
9	Measurement and Data	4.MD.B.4	SA	Determine where to place an X on a line plot to represent a missing piece of data.	*see page 7*
10	Number and Operations in Base Ten	4.NBT.B.4	SR	Given one three-digit addend and the three-digit sum, determine the missing addend.	A
11	Operations and Algebraic Thinking	4.OA.C.5	SA	Determine a specified term in a pattern given the first number and the rule of the pattern.	162
12	Number and Operations-Fractions	4.NF.C.5	SA	Determine the numerator of a fraction with a denominator of 100 that makes it equivalent to a given fraction with a denominator of 10.	70

13	Geometry	4.G.A.1	SR	Identify obtuse angles in triangles.	B,E
14	Measurement and Data	4.MD.A.2	CR	Solve real-world problems involving reading an analog clock and adding and subtracting time intervals.	*see page 8*
15	Operations and Algebraic Thinking	4.OA.A.3	SR	Given a multi-step word problem, divide whole numbers and interpret the remainder to complete statements that describe the problem.	*see page 8*
16	Number and Operations-Fractions	4.NF.C.6	SA	Write a decimal equivalent for a given fraction and plot a decimal on a number line.	*Part A: 0.54* *Part B: see page 8*
17	Number and Operations-Fractions	4.NF.A.1	SR	Identify a fraction model that represents a fraction equivalent to a given mixed number.	D
18	Number and Operations in Base Ten	4.NBT.A.3	SR	Round multi-digit whole numbers to the nearest ten thousand.	*see page 9*
19	Measurement and Data	4.MD.C.7	SR	Determine an angle measure given the measure of an adjacent angle and the sum of both angle measures.	A
20	Number and Operations-Fractions	4.NF.A.2	SA	Write a comparison statement using <, >, or = to compare two given fractions with different numerators and denominators.	*see page 9*

* 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. Pages 6 through 9 of this document provide correct answers for technology-enhanced (TE) items and scoring rubrics for constructed-response items. Sample responses and scoring guidelines for constructed-response items will be posted to the Department's website later this year.

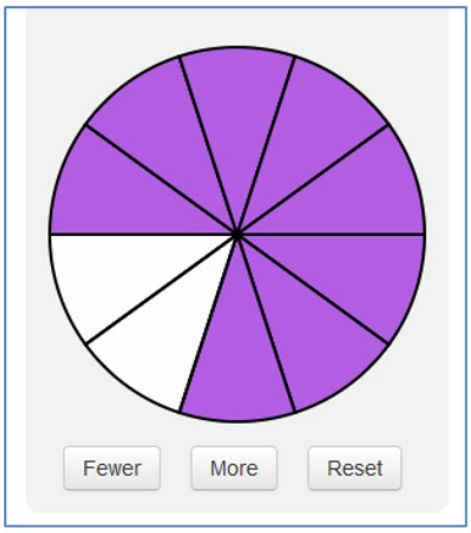
Grade 4 Mathematics
Spring 2021 Computer-Based Unreleased Operational Items

CBT Item No.	Reporting Category	Standard	Item Type*	Item Description
21	Measurement and Data	4.MD.C.6	SR	Determine the angle measure of an angle in a triangle shown on a protractor.
22	Number and Operations in Base Ten	4.NBT.B.5	SA	Find the product of two two-digit whole numbers.
23	Operations and Algebraic Thinking	4.OA.A.1	SA	Write a verbal statement of multiplicative comparison that represents a given equation in a word problem.
24	Number and Operations-Fractions	4.NF.A.2	CR	Write a fraction comparison using symbols, compare fractions with different denominators, and critique the reasoning of others about different-sized wholes in a word problem.
25	Measurement and Data	4.MD.A.3	SR	Select the expressions that can be used to find the perimeter of a rectangle, given the length and width.
26	Operations and Algebraic Thinking	4.OA.B.4	SR	Determine if given numbers are multiples of other numbers and identify three factor pairs of a given number.
27	Number and Operations-Fractions	4.NF.C.7	SA	Write a comparison of two decimals to hundredths using the symbols <, >, or =.
28	Operations and Algebraic Thinking	4.OA.A.2	SR	Create an equation to represent a multiplicative comparison word problem.
29	Number and Operations-Fractions	4.NF.A.1	SA	Create a fraction model that represents an equivalent fraction of a given fraction with a denominator of 100.
30	Operations and Algebraic Thinking	4.OA.A.2	SA	Solve a word problem using a multiplicative comparison.
31	Operations and Algebraic Thinking	4.OA.C.5	SR	Identify features of patterns given a starting number and a rule for each pattern.
32	Measurement and Data	4.MD.C.5	SR	Give the measure of an angle that turns through a portion of a circle.
33	Number and Operations in Base Ten	4.NBT.B.5	SA	Determine the product of a four-digit whole number and a one-digit whole number.
34	Number and Operations-Fractions	4.NF.B.3	SR	Determine the sum of two mixed numbers with like denominators.

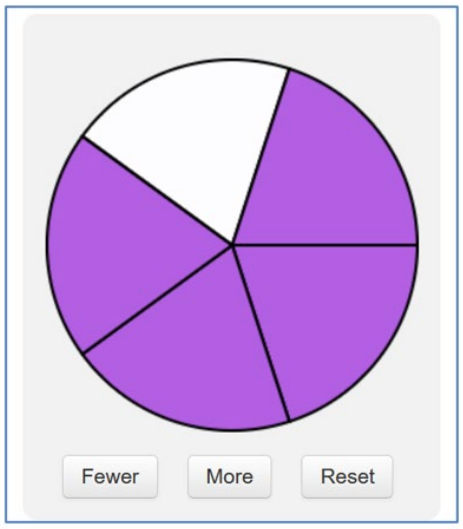
35	Geometry	4.G.A.2	CR	Identify right and obtuse triangles from a given set of triangles, and identify two-dimensional figures that have at least one pair of perpendicular sides.
36	Number and Operations in Base Ten	4.NBT.A.1	SR	Complete statements that describe the relationship between digits in multi-digit whole numbers.
37	Number and Operations-Fractions	4.NF.C.7	SR	Determine which number sentences with the symbols <, >, or = correctly compare decimals given in tenths and hundredths.
38	Number and Operations in Base Ten	4.NBT.B.4	SA	Subtract a four-digit whole number from another four-digit whole number.
39	Number and Operations in Base Ten	4.NBT.B.6	SR	Determine the whole number quotient of a four-digit dividend and a one-digit divisor.
40	Measurement and Data	4.MD.A.1	SR	Determine the number of minutes given a time in hours that includes a fraction.

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

Correct Answer for CBT Item #1: Technology-Enhanced Item



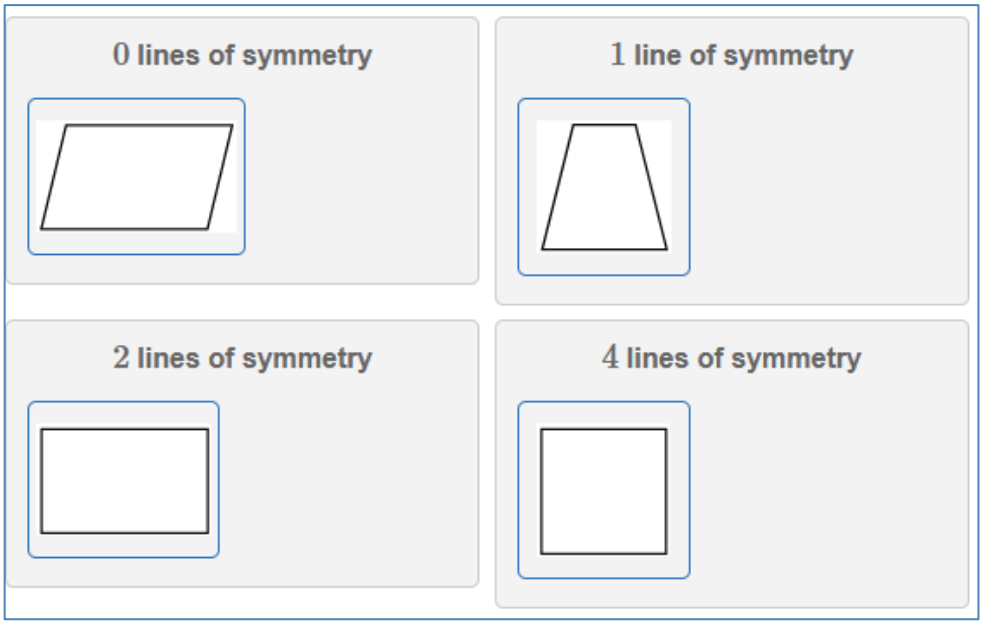
OR



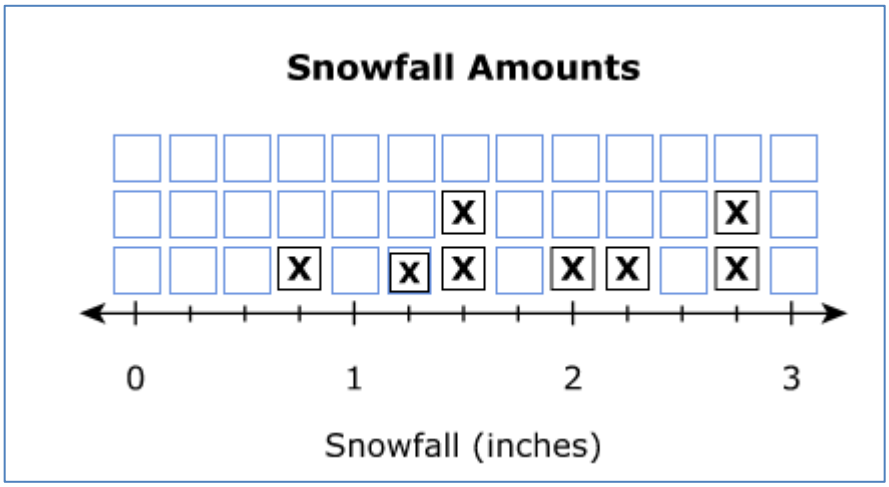
Rubric for CBT Item #6: Constructed Response

Scoring Guide	
Score	Description
4	The student response demonstrates an exemplary understanding of the Number and Operations in Base Ten concepts involved in reading, writing, and comparing numbers using the base-ten numerals, number names, and expanded form. The student correctly writes numbers in numerical and expanded forms, justifies how to compare numbers using >, <, or =, and uses place value to find an unknown number.
3	The student response demonstrates a good understanding of the Number and Operations in Base Ten concepts involved in reading, writing, and comparing numbers using the base-ten numerals, number names, and expanded form. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is flawed. As a result, the response merits 3 points.
2	The student response demonstrates a fair understanding of the Number and Operations in Base Ten concepts involved in reading, writing, and comparing numbers using the base-ten numerals, number names, and expanded form. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Number and Operations in Base Ten concepts involved in reading, writing, and comparing numbers using the base-ten numerals, number names, and expanded form.
0	The student response contains insufficient evidence of an understanding of the Number and Operations in Base Ten concepts involved in reading, writing, and comparing numbers using the base-ten numerals, number names, and expanded form. As a result, the response does not merit any points.

Correct Answer for CBT Item #8: Technology-Enhanced Item



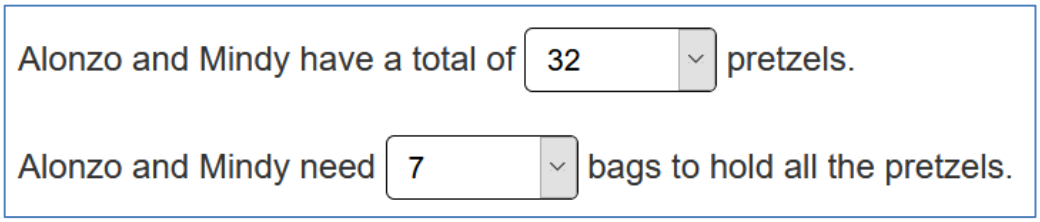
Correct Answer for CBT Item #9: Technology-Enhanced Item



Rubric for CBT Item #14: Constructed Response

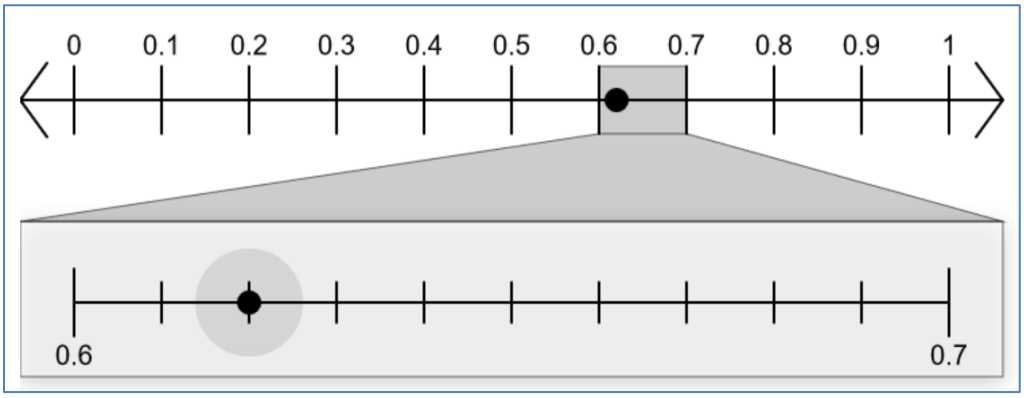
Scoring Guide	
Score	Description
4	The student response demonstrates an exemplary understanding of the Measurement and Data concepts involved in using the four operations to solve word problems involving intervals of time. The student identifies time given on an analog clock and computes elapsed time for past and future events.
3	The student response demonstrates a good understanding of the Measurement and Data concepts involved in using the four operations to solve word problems involving intervals of time. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is flawed. As a result, the response merits 3 points.
2	The student response demonstrates a fair understanding of the Measurement and Data concepts involved in using the four operations to solve word problems involving intervals of time. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Measurement and Data concepts involved in using the four operations to solve word problems involving intervals of time.
0	The student response contains insufficient evidence of an understanding of the Measurement and Data concepts involved in using the four operations to solve word problems involving intervals of time. As a result, the response does not merit any points.

Correct Answer for CBT Item #15: Technology-Enhanced Item



Correct Answer for CBT Item #16: Technology-Enhanced Item

Part B:



Correct Answer for CBT Item #18: Technology-Enhanced Item

Number	Rounds to 30,000	Rounds to 40,000
34,124	●	○
35,021	○	●
37,826	○	●
32,788	●	○

Correct Answer for CBT Item #20: Technology-Enhanced Item