Computer-Based Released Items
Grade 4 Mathematics
Spring 2022

The spring 2022 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 and short-answer items only). Information about unreleased operational items is also presented here.

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.

Grade 4 Mathematics
Spring 2022 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	SR	Determine which addition equation involving fractions represents a given real-world context.	B
2	Number and Operations in Base Ten	4.NBT.B.4	SR	Determine which set of student work given for a subtraction problem of a four-digit number minus a three-digit number is correct.	B
3	Geometry	4.G.A.1	SR	Identify whether specified line segments and angles can be found in a given figure.	*see page 6*
4	Number and Operations in Base Ten	4.NBT.A.1	SR	Determine which number has a digit with a value that is 10 times the value of a digit in a given number.	B
5	Number and Operations-Fractions	4.NF.C.7	SA	Write a comparison of two decimals to hundredths using the symbols >, <, or =.	*see page 6*
6	Geometry	4.G.A.3	SA	Identify the number of lines of symmetry in a given figure.	1
7	Number and Operations in Base Ten	4.NBT.B.6	SR	Write related multiplication equations for given division equations that include a variable.	*see page 6*
8	Measurement and Data	4.MD.A.3	CR	Determine the area of a rectangle given the length and width, determine the width of a rectangle given the area and length, explain how it is possible for two rectangles with different areas to have the same perimeter, and solve a real-world problem involving rectangles with the same perimeter but with different areas.	
9	Number and Operations-Fractions	4.NF.B.4	SA	Solve a word problem by multiplying a fraction by a whole number.	*see page 7*
10	Operations and Algebraic Thinking	4.OA.A.3	SR	Solve a multi-step real-world problem using multiplication and division, and by interpreting a remainder.	B
11	Measurement and Data	4.MD.A.1	SA	Convert from a larger unit of measure to a smaller unit of measure using minutes and seconds and order measurements given in yards, feet, and inches.	*see page 7*
12	Number and Operations in Base Ten	4.NBT.B.5	SA	Determine the product of a three-digit number and a one-digit number.	2800

13	Measurement and Data	4.MD.C.6	SA	Determine the measure of an angle shown with a drawing of a protractor.	45
14	Number and Operations-Fractions	4.NF.A.1	SA	Determine the denominator that will make a fraction equivalent to a given fraction.	12
15	Operations and Algebraic Thinking	4.OA.C.5	CR	Determine the next step in a shape pattern, identify how many shapes will be in future steps, and demonstrate understanding of the relationships between different features of the pattern.	
16	Number and Operations in Base Ten	4.NBT.A.3	SR	Round a multi-digit whole number to the nearest thousand, ten thousand, and hundred thousand.	*see page 7*
17	Number and Operations-Fractions	4.NF.C.5	SR	Identify two fractions with denominators of 10 and 100 that are equivalent.	*see page 8*
18	Geometry	4.G.A.2	SR	Identify shapes that have at least one pair of parallel sides and at least one pair of perpendicular sides.	A,C,D
19	Number and Operations-Fractions	4.NF.C.6	SR	Identify the fraction that is equivalent to a given decimal.	C
20	Number and Operations-Fractions	4.NF.B.4	SA	Use a visual fraction model to represent the product of a whole number and a unit fraction.	*see page 8*

* 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 8 of this document provide correct answers for technology-enhanced (TE) items. Sample responses and scoring guidelines for constructed-response items will be posted at www.doe.mass.edu/mcas/student/default.html.

Grade 4 Mathematics
Spring 2022 Computer-Based Unreleased Operational Items

CBT Item No.	Reporting Category	Standard	Item Type*	Item Description
21	Geometry	4.G.A.1	SR	Identify all obtuse angles in a given two-dimensional figure.
22	Number and Operations in Base Ten	4.NBT.A.2	CR	Convert between numbers written in word form, expanded form, and number form; compare numbers in the different forms using <, >, or =; and critique the reasoning of a given estimate based on place value.
23	Number and Operations-Fractions	4.NF.B.3	SR	Determine the sum of two mixed numbers with like denominators.
24	Operations and Algebraic Thinking	4.OA.A.1	SR	Interpret a multiplication equation to complete written statements of multiplicative comparison.
25	Number and Operations-Fractions	4.NF.C.6	SA	Plot a point on a zoom number line that represents where a decimal that is equivalent to a given fraction is located.
26	Number and Operations-Fractions	4.NF.C.5	SR	Add fractions with denominators of 10 and 100.
27	Number and Operations-Fractions	4.NF.A.2	SR	Determine if given comparisons between two fractions with unlike denominators are true.
28	Measurement and Data	4.MD.C.5	SR	Identify which figure has a given angle measure.
29	Operations and Algebraic Thinking	4.OA.A.3	SR	Solve a real-world problem using division and interpreting a remainder.
30	Operations and Algebraic Thinking	4.OA.A.1	SA	Write an equation with a variable for the unknown that can be used to solve a given word problem involving multiplicative comparison.
31	Number and Operations in Base Ten	4.NBT.B.4	SA	Determine the sum of a five-digit number and a four-digit number.
32	Number and Operations-Fractions	4.NF.C.7	CR	Identify the greatest decimal in a given group; compare decimals to hundredths using <, >, or =; write a decimal that is between two given decimals; and determine which decimal is closest to a given decimal.
33	Geometry	4.G.A.3	SR	Identify one, two, or three or more lines of symmetry for four different figures.
34	Measurement and Data	4.MD.C.7	SA	Determine the measure of an unknown angle when given the measurements of two angles and the sum of all three angles.

35	Number and Operations-Fractions	4.NF.A.2	SR	Identify a fraction that will make a comparison statement with another fraction true.
36	Operations and Algebraic Thinking	4.OA.B.4	SR	Identify composite numbers.
37	Operations and Algebraic Thinking	4.OA.A.2	SA	Solve a word problem involving multiplicative comparison and create an equation to represent a given multiplicative-comparison word problem.
38	Measurement and Data	4.MD.B.4	SA	Create a line plot to display a set of data given as fractions with different denominators.
39	Measurement and Data	4.MD.A.2	SA	Solve a word problem that involves expressing a larger metric unit of measure as a smaller metric unit of measure.
40	Geometry	4.G.A.1	SR	Identify the mathematical term that describes a given angle.

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

Correct Answer for CBT Item #3: Technology-Enhanced Item

	Yes	No
line segment PR	○	●
line segment PQ	●	○
angle SPQ	●	○
angle SQR	○	●

Correct Answer for CBT Item #5: Technology-Enhanced Item

$$0.29 < 0.8$$

Or

$$0.8 > 0.29$$

Correct Answer for CBT Item #7: Technology-Enhanced Item

$36 \div p = 4$ has a related multiplication fact of $\boxed{4} \times \boxed{p} = \boxed{36}$

$s \div 7 = 5$ has a related multiplication fact of $\boxed{7} \times \boxed{5} = \boxed{s}$

$72 \div 12 = a$ has a related multiplication fact of $\boxed{12} \times \boxed{a} = \boxed{72}$

Or

Any equivalent variations of the multiplication equations

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

$$\frac{8}{5}$$

Or

Any equivalent fraction, mixed number, or decimal

Correct Answer for CBT Item #11: Technology-Enhanced Item

Part A:

Finish Times

Time	Time in Seconds
3 minutes	180
4 minutes, 39 seconds	279
10 minutes, 17 seconds	617

Part B:

least | 8 feet | 100 inches | 3 yards | 120 inches | greatest

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

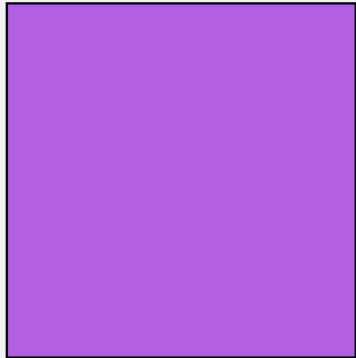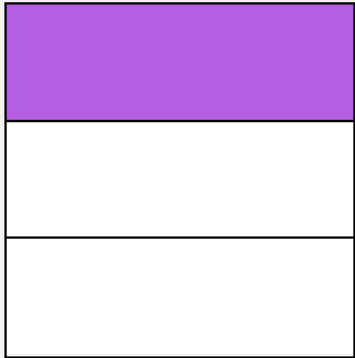The number 142,839 rounded to the nearest **thousand** is 143,000.

The number 142,839 rounded to the nearest **ten thousand** is 140,000.

The number 142,839 rounded to the nearest **hundred thousand** is 100,000.

Correct Answer for CBT Item #17: Technology-Enhanced Item

$$\frac{4}{1} \quad \frac{40}{1} \quad \boxed{\frac{4}{10}} \quad \frac{44}{10} \quad \frac{4}{100} \quad \boxed{\frac{40}{100}} \quad \frac{44}{100}$$

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

Or
Any other equivalent fraction model