

Computer-Based Released Items **Grade 7 Mathematics** **Spring 2022**

The spring 2022 grade 7 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 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.

Grade 7 Mathematics
Spring 2022 Computer-Based Released Operational Items

CBT Item No.	Reporting Category	Standard	Item Type*	Item Description	Correct Answer**
1	Expressions and Equations	7.EE.B.3	SR	Solve a multi-step problem using properties of operations.	C
2	The Number System	7.NS.A.2	SR	Determine whether the values of given expressions are negative or positive.	<i>see page 6</i>
3	Expressions and Equations	7.EE.B.4	SA	Graph on a number line the solution set of an inequality that represents a real-world problem.	<i>see page 6</i>
4	Expressions and Equations	7.EE.A.1	SR	Determine which expression is equivalent to a given linear expression by applying properties of operations.	C
5	The Number System	7.NS.A.3	SR	Solve a real-world problem that involves fractions and mixed numbers using operations.	B
6	The Number System	7.NS.A.1	SR	Represent subtraction of integers on a number line.	D
7	Expressions and Equations	7.EE.A.2	SR	Determine which expressions can be used to represent a real-world situation.	B,E
8	Statistics and Probability	7.SP.C.8	CR	Find probabilities of compound events involving a spinner and a number cube.	
9	The Number System	7.NS.A.1	SR	Use subtraction of integers to solve a problem.	D
10	Expressions and Equations	7.EE.A.1	SR	Expand a linear expression with a rational coefficient.	<i>see page 6</i>
11	Ratios and Proportional Relationships	7.RP.A.1	SR	Determine the unit rate in a real-world problem.	B
12	The Number System	7.NS.A.3	SR	Apply the four operations to solve a real-world problem involving rational numbers.	<i>see page 6</i>
13	Geometry	7.G.B.4	SA	Determine the radius of a circle given its area.	40
14	Ratios and Proportional Relationships	7.RP.A.2	SR	Determine which proportion can be used to solve a real-world problem given in a verbal description.	A

15	Geometry	7.G.B.5	CR	Use facts about angles to write and solve equations that can be used to find the measures of unknown angles in a diagram.	
16	Ratios and Proportional Relationships	7.RP.A.2	SR	Determine and apply the unit rate of a given real-world context from a graph.	<i>see page 6</i>
17	Statistics and Probability	7.SP.B.3	SA	Determine the number of data points that lie between the means of two data sets.	6
18	Ratios and Proportional Relationships	7.RP.A.3	SA	Solve multi-step percent problems involving markdowns.	18.02; D
19	Expressions and Equations	7.EE.B.4	SA	Write an equation to model a given written scenario based on a real-world context.	<i>see page 7</i>
20	Expressions and Equations	7.EE.B.3	SR	Solve a real-world problem involving the area of a rectangle.	C

* 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 and 7 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 7 Mathematics
Spring 2022 Computer-Based Unreleased Operational Items

CBT Item No.	Reporting Category	Standard	Item Type*	Item Description
21	Ratios and Proportional Relationships	7.RP.A.3	SR	Solve a multi-step real-world ratio problem.
22	Ratios and Proportional Relationships	7.RP.A.2	CR	Recognize if data represented on a graph is proportional, solve a problem involving proportions on a graph, and write an equation that can be used to represent the relationship between quantities.
23	The Number System	7.NS.A.2	SR	Determine which expression is equivalent to a given expression.
24	The Number System	7.NS.A.3	SR	Determine which expression is equivalent to a given expression.
25	Expressions and Equations	7.EE.A.1	SA	Apply properties to add linear expressions in a real-world context.
26	Expressions and Equations	7.EE.A.2	SA	Determine which expressions can be used to represent a real-world problem involving price markups and markdowns.
27	The Number System	7.NS.A.3	SR	Determine which expression is equivalent to a given expression.
28	Statistics and Probability	7.SP.C.8	SR	Determine which tree diagram correctly models the probabilities of compound events.
29	The Number System	7.NS.A.2	SA	Determine the value of a variable that will make an algebraic expression positive and rational.
30	The Number System	7.NS.A.1	SA	Plot the value of a rational expression on a number line.
31	Expressions and Equations	7.EE.B.3	CR	Solve multi-step real-life problems using fractions, decimals, and whole numbers.
32	Geometry	7.G.A.2	SA	Determine the number of triangles that could be drawn using a given set of side lengths.
33	Statistics and Probability	7.SP.C.7	SA	Determine the probability of an event using a uniform probability model.
34	Geometry	7.G.A.3	SR	Determine which two-dimensional figure will be the result from slicing a given three-dimensional figure.

35	Geometry	7.G.A.1	SR	Determine dimensions of a scaled rectangle given the original rectangle and scale.
36	Statistics and Probability	7.SP.C.5	SR	Identify which set is most likely to produce an event that will match a given probability.
37	Ratios and Proportional Relationships	7.RP.A.3	SR	Solve a multi-step real-world percent problem.
38	Statistics and Probability	7.SP.C.8	SR	Determine the probability of a compound event using a tree diagram and a fair coin.
39	Statistics and Probability	7.SP.B.4	SR	Solve a problem that involves making comparisons between two population medians using data from two random samples.
40	Statistics and Probability	7.SP.A.1	SR	Determine which sampling strategy will produce a valid representative sample for a given population.

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

Correct Answer for CBT Item #2: Technology-Enhanced Item

Negative Value	Positive Value
$8 \div (-2)$	-9×7
$5 \times (-3)$	$-2 \times (-4)$
	$-14 \div (-2)$
	$-12 \div 6$

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



Correct Answer for CBT Item #10: Technology-Enhanced Item

$$-4(-3x + 1) = 12x + -4$$

Correct Answer for CBT Item #12: Technology-Enhanced Item

The athlete did sit-ups on the second day and sit-ups on the third day.

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

Based on the graph, the cost of 4 footballs is \$. The unit rate per football is \$.

Correct Answer for CBT Item #19: Technology-Enhanced Item

$$5k + 6 = c$$

Or

an equivalent equation