

**Computer-Based Released Items**  
**Grade 8 Mathematics**  
**Spring 2022**

The spring 2022 grade 8 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](https://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](http://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 8 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 8 Mathematics**  
**Spring 2022 Computer-Based Released Operational Items**

CBT Item No.	Reporting Category	Standard	Item Type*	Item Description	Correct Answer**
1	The Number System and Expressions and Equations	8.EE.A.3	SR	Convert a number in scientific notation to standard notation.	D
2	The Number System and Expressions and Equations	8.NS.A.2	SR	Determine the approximate location of an irrational number on a number line.	B
3	The Number System and Expressions and Equations	8.EE.A.2	SR	Evaluate square roots of small perfect squares and cube roots of small perfect cubes.	B,D
4	Statistics and Probability	8.SP.A.3	CR	Interpret the meanings of the parts of an equation that represents a real-world context and use the equation to solve a real-world problem.	
5	The Number System and Expressions and Equations	8.NS.A.1	SR	Determine a decimal equivalent of a given fraction.	C
6	The Number System and Expressions and Equations	8.EE.C.8	SR	Determine which given system of equations has no solution.	D
7	Geometry	8.G.A.1	SR	Compare the properties of figures graphed on a coordinate plane after various transformations.	D;C
8	Functions	8.F.B.4	SR	Determine the rate of change and the initial value of a function from data represented in a table.	<i>see page 6</i>
9	The Number System and Expressions and Equations	8.EE.B.5	SA	Determine and compare two rates of change in a given real-world context.	1
10	The Number System and Expressions and Equations	8.EE.A.1	SR	Determine which expression with an exponent is equivalent to a given expression featuring multiplication of two numbers with the same base but different exponents.	D
11	The Number System and Expressions and Equations	8.EE.B.5	SA	Graph a proportional relationship based on a real-world context.	<i>see page 6</i>
12	Geometry	8.G.A.5	CR	Use facts about the angle sum of triangles to calculate angle measures and determine whether two triangles are similar.	
13	Functions	8.F.B.5	SR	Determine where the graph of a function is increasing or decreasing.	D

14	Geometry	8.G.B.6	SR	Determine the relationship between the areas of three squares whose sides form a right triangle.	B
15	Geometry	8.G.C.9	SR	Find the volume of a cone given its diameter and height.	B
16	Functions	8.F.A.1	SR	Determine which graph shows a relationship that is not a function.	D
17	The Number System and Expressions and Equations	8.EE.B.6	SR	Use similar triangles to compare the slope of two line segments on the same line.	D
18	Functions	8.F.A.1	SR	Determine if the values in a table represent a function after adding an ordered pair to the table.	<i>see page 6</i>
19	Functions	8.F.A.3	SR	Determine which graph represents a linear function.	C
20	Geometry	8.G.A.2	SR	Determine which transformation of a shape results in a given image.	<i>see page 6</i>

\* 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. Correct answers for technology-enhanced (TE) items are provided on page 6. Sample responses and scoring guidelines for constructed-response items will be posted at [www.doe.mass.edu/mcas/student/default.html](http://www.doe.mass.edu/mcas/student/default.html).

**Grade 8 Mathematics**  
**Spring 2022 Computer-Based Unreleased Operational Items**

CBT Item No.	Reporting Category	Standard	Item Type*	Item Description
21	Functions	8.F.B.4	SR	Determine the rate of change and the initial value of a function from the graph of the line that represents the function.
22	Geometry	8.G.A.1	SR	Determine the effects of a rotation on the angles and sides of a triangle.
23	Functions	8.F.A.2	CR	Determine the initial values, rates, equations and solutions of linear relationships represented in different ways.
24	The Number System and Expressions and Equations	8.NS.A.2	SR	Compare two irrational numbers and one rational number by ordering them from least to greatest.
25	Functions	8.F.A.3	SR	Determine which statement about a linear equation is true.
26	The Number System and Expressions and Equations	8.EE.C.7	SR	Determine the number of solutions for a linear equation with one variable.
27	The Number System and Expressions and Equations	8.NS.A.1	SR	Identify an irrational number from a list of numbers.
28	The Number System and Expressions and Equations	8.EE.C.8	SR	Determine the coordinates of the solution of a system of equations.
29	The Number System and Expressions and Equations	8.EE.A.3	SA	Given two quantities, each expressed as a single digit multiplied by an integer power of ten, determine how many times as much one quantity is than the other.
30	The Number System and Expressions and Equations	8.EE.C.7	SA	Solve a linear equation by collecting like terms.
31	Geometry	8.G.A.5	SR	Determine which angles are congruent when two parallel lines are intersected by a transversal.
32	Statistics and Probability	8.SP.A.2	SR	Justify why a line drawn through data on a scatter plot is unsuitable as a line of best fit.
33	Geometry	8.G.A.3	SR	Given a sequence of transformations, determine the coordinates of the image of a given point.
34	Geometry	8.G.A.4	SR	Identify transformations which, when performed on a triangle, will result in a congruent figure.

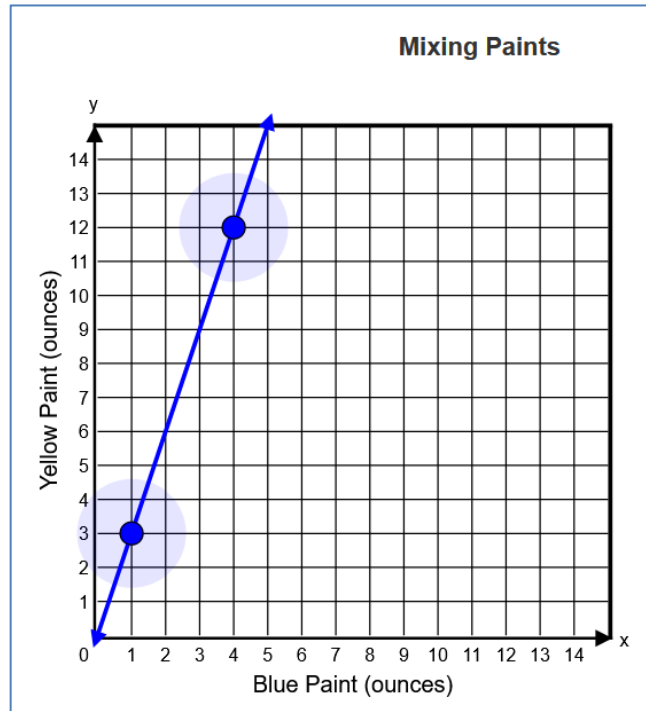
35	Geometry	8.G.B.7	SA	Determine an unknown side length of a right triangle using the Pythagorean Theorem.
36	Geometry	8.G.A.3	SR	Determine the coordinates of a point in a figure on a coordinate plane after a reflection.
37	The Number System and Expressions and Equations	8.EE.B.5	CR	Graph a proportional relationship, interpreting the unit rate as the slope of the graph, and then compare that proportional relationship to another proportional relationship represented in a different way.
38	Geometry	8.G.A.2	SR	Identify a transformation that would not result in a congruent figure.
39	The Number System and Expressions and Equations	8.EE.A.1	SA	Use and apply properties of integer exponents to simplify a numerical expression.
40	Statistics and Probability	8.SP.A.4	SA	Use relative frequencies from a two-way frequency table to solve a real-world problem.

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

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

The slope of the function is  and the y-intercept of the function is .

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



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

When the ordered pair  $(2, 2)$  is added to the table, the table   $y$  as a function of  $x$  because each value of  $x$   to a unique value of  $y$ .

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

Triangle  $HJK$  can be  to form triangle  $H'J'K'$ . Triangle  $HJK$  is  to triangle  $H'J'K'$ .