Computer-Based Released Items
Grade 6 Mathematics
Spring 2021

The spring 2021 grade 6 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 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 ricas.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 6 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 6 Mathematics
Spring 2021 Computer-Based Released Operational Items

CBT Item No.	Reporting Category	Standard	Item Type*	Item Description	Correct Answer**
1	Expressions and Equations	6.EE.A.2	SR	Determine the value of an expression given the value of a variable.	D
2	The Number System	6.NS.C.7	SR	Interpret inequalities using absolute values of integers.	C,E
3	The Number System	6.NS.B.2	SA	Find the quotient of two multi-digit numbers.	79
4	The Number System	6.NS.B.4	SR	Find the greatest common factor of two numbers to solve a real-world problem.	*see page 6*
5	Ratios and Proportional Relationships	6.RP.A.3	SR	Solve a ratio problem based on a given real-world context.	D
6	Geometry	6.G.A.3	CR	Solve problems on a coordinate plane by plotting points, finding the distance between points, and finding the coordinates of points given the distance between them.	*see page 6*
7	The Number System	6.NS.C.6	SA	Graph a negative decimal on a number line.	*see page 7*
8	Statistics and Probability	6.SP.B.4	SA	Create a histogram to represent a given set of data.	*see page 7*
9	Expressions and Equations	6.EE.B.5	SR	Determine the value of the variable in an inequality.	D
10	Statistics and Probability	6.SP.A.1	SR	Identify multiple statistical questions.	B,E
11	Ratios and Proportional Relationships	6.RP.A.2	SR	Solve a unit-rate problem based on a given real-world context.	A
12	Expressions and Equations	6.EE.A.4	SR	Identify expressions that are equivalent to a given variable expression.	A,D,F
13	The Number System	6.NS.A.1	SA	Calculate the quotient of two fractions.	*see page 7*

14	Ratios and Proportional Relationships	6.RP.A.1	CR	Solve a real-world problem by interpreting and finding ratios based on a given ratio relationship.	*see page 8*
15	Expressions and Equations	6.EE.B.8	SA	Graph on a number line an inequality that represents a constraint in a given real-world context.	*see page 8*
16	Expressions and Equations	6.EE.B.7	SR	Determine which equation represents a given real-world context.	D
17	Expressions and Equations	6.EE.B.6	SR	Determine which expression can be used to represent a real-world context and use it to complete sentences about the context.	*see page 8*
18	Statistics and Probability	6.SP.B.5	SA	Determine the median and mean of a set of data.	B;3
19	Expressions and Equations	6.EE.C.9	SR	Choose a two-variable equation that best represents a given real-world context.	C
20	Expressions and Equations	6.EE.A.1	SR	Evaluate numerical expressions involving whole-number exponents.	*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.

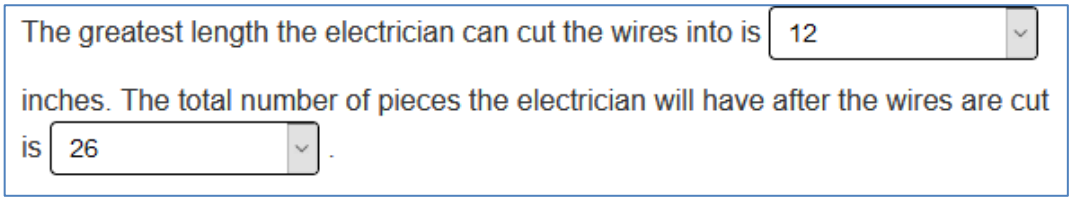
Grade 6 Mathematics
Spring 2021 Computer-Based Unreleased Operational Items

CBT Item No.	Reporting Category	Standard	Item Type*	Item Description
21	The Number System	6.NS.B.3	SR	Add and subtract decimals within a real-world context.
22	Ratios and Proportional Relationships	6.RP.A.2	SA	Determine the unit rate within a real-world context.
23	Statistics and Probability	6.SP.B.5	SR	Calculate the mean of a given set of data.
24	Expressions and Equations	6.EE.B.7	CR	Write and solve equations that model a real-world problem.
25	Ratios and Proportional Relationships	6.RP.A.1	SR	Identify the ratios that represent the relationships between given quantities.
26	Expressions and Equations	6.EE.A.3	SA	Use the distributive property to generate an equivalent expression within a real-world context.
27	Expressions and Equations	6.EE.B.8	SR	Identify the inequality which represents a constraint within a real-world context.
28	Expressions and Equations	6.EE.A.3	SR	Use the distributive property to determine equivalent expressions given a variable expression.
29	Geometry	6.G.A.1	SA	Find the area of a right triangle and decompose a polygon into triangles to complete sentences about its area.
30	Ratios and Proportional Relationships	6.RP.A.1	SR	Determine which statement describes a given ratio relationship in a real-world context.
31	Statistics and Probability	6.SP.A.2	SR	Determine the interquartile range of data displayed in a box plot.
32	Expressions and Equations	6.EE.A.3	SR	Use properties of operations to identify an equivalent equation.
33	Ratios and Proportional Relationships	6.RP.A.3	SR	Determine the volume of a liquid by using rate and ratio reasoning within a real-world context.
34	Statistics and Probability	6.SP.A.1	SR	Identify multiple statistical questions.

35	The Number System	6.NS.C.8	CR	Solve problems on a coordinate plane by finding the distance between points, plotting points, and finding the coordinates of a point given its distance from a different point.
36	The Number System	6.NS.C.5	SR	Determine whether given real-world situations can be best represented by positive or negative numbers.
37	Geometry	6.G.A.4	SA	Use the net of a square pyramid to find its surface area.
38	Ratios and Proportional Relationships	6.RP.A.3	SR	Compare unit rates given a ratio in a real-world context involving money.
39	Statistics and Probability	6.SP.B.5	SR	Determine which statements correctly describe data represented in a dot plot.
40	Geometry	6.G.A.2	SR	Determine the number of cubes with fractional edge lengths that would fit in a given right rectangular prism in a real-world context.

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

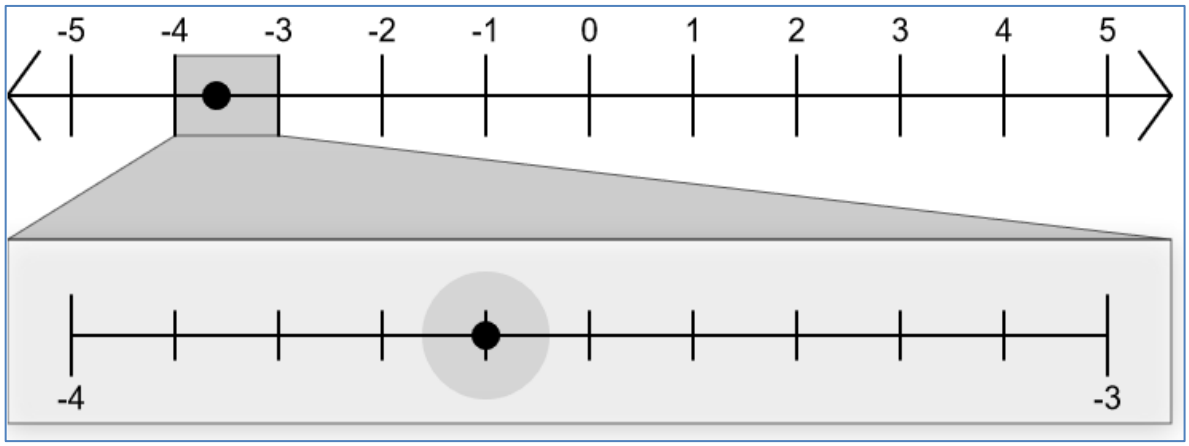
Correct Answer for CBT Item #4: Technology-Enhanced Item



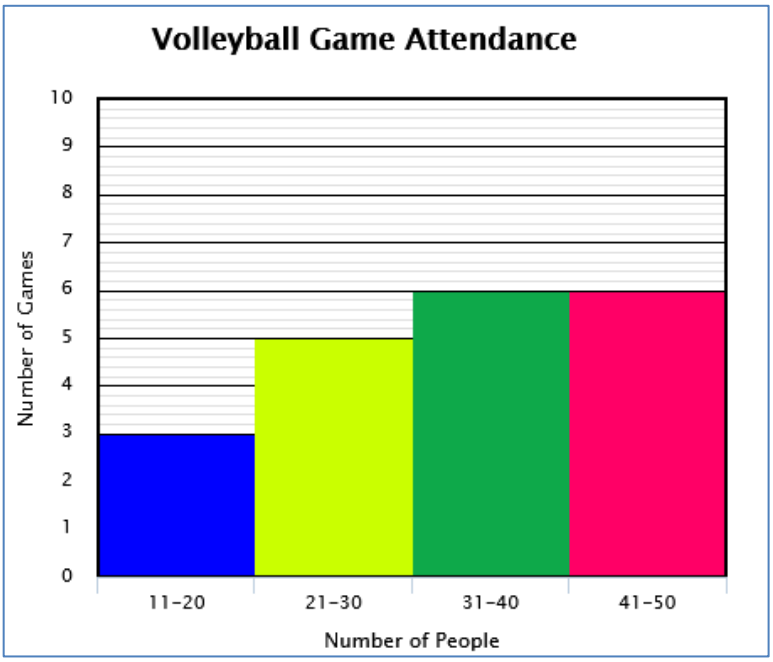
Rubric for CBT Item #6: Constructed Response

Scoring Guide	
Score	Description
4	The student response demonstrates an exemplary understanding of the Geometry concepts involved in drawing polygons in the coordinate plane given coordinates for the vertices; using coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate; and applying these techniques in the context of solving a real-world problem.
3	The student response demonstrates a good understanding of the Geometry concepts involved in drawing polygons in the coordinate plane given coordinates for the vertices; using coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate; and applying these techniques in the context of solving a real-world problem. 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 Geometry concepts involved in drawing polygons in the coordinate plane given coordinates for the vertices; using coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate; and applying these techniques in the context of solving a real-world problem. 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 Geometry concepts involved in drawing polygons in the coordinate plane given coordinates for the vertices; using coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate; and applying these techniques in the context of solving a real-world problem.
0	The student response demonstrates insufficient evidence of an understanding of the Geometry concepts involved in drawing polygons in the coordinate plane given coordinates for the vertices; using coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate; and applying these techniques in the context of solving a real-world problem. As a result, the response does not merit any points.

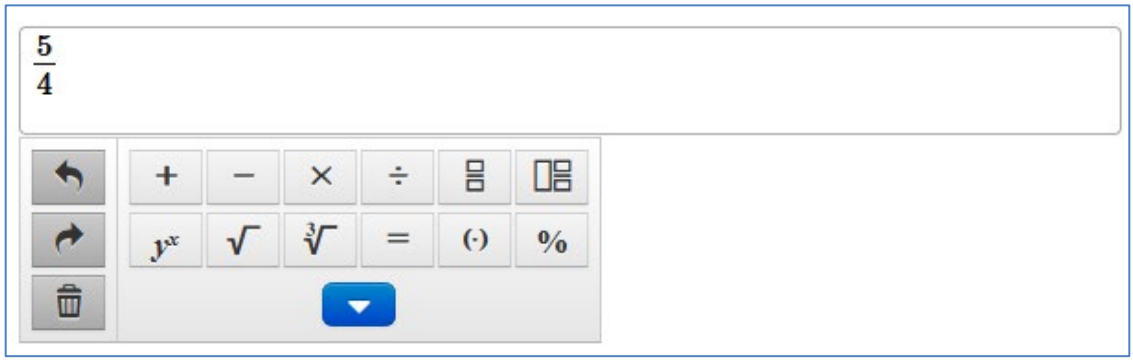
Correct Answer for CBT Item #7: Technology-Enhanced Item



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



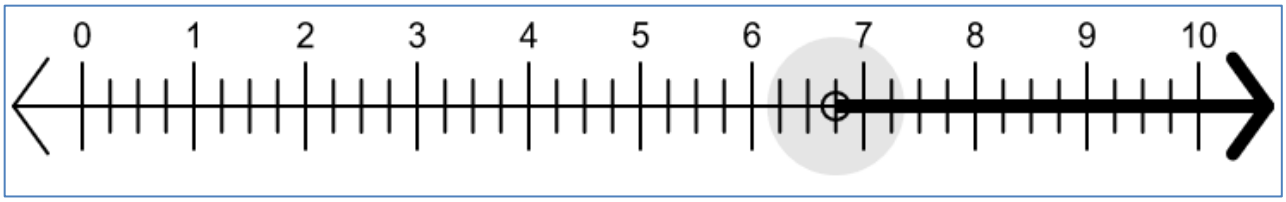
Correct Answer for CBT Item #13: Technology-Enhanced Item



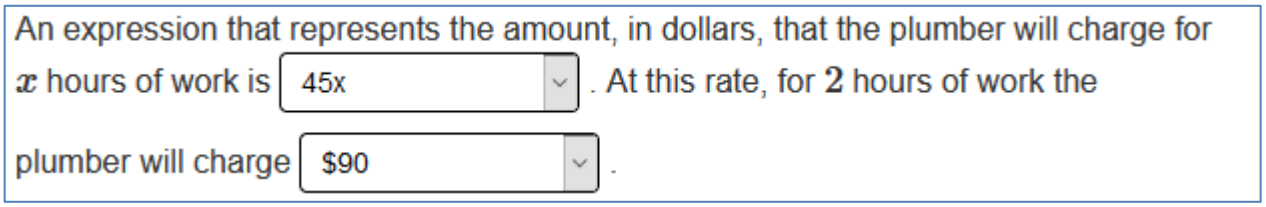
Rubric for CBT Item #14: Constructed Response

Scoring Guide	
Score	Description
4	The student response demonstrates an exemplary understanding of the Ratios and Proportional Relationships concepts involved in making distinctions between part:part and part:whole and the value of a ratio; and using ratio language to describe a ratio relationship.
3	The student response demonstrates a good understanding of the Ratios and Proportional Relationships concepts involved in making distinctions between part:part and part:whole and the value of a ratio; and using ratio language to describe a ratio relationship. 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 Ratios and Proportional Relationships concepts involved in making distinctions between part:part and part:whole and the value of a ratio; and using ratio language to describe a ratio relationship. 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 Ratios and Proportional Relationships concepts involved in making distinctions between part:part and part:whole and the value of a ratio; and using ratio language to describe a ratio relationship.
0	The student response contains insufficient evidence of an understanding of the Ratios and Proportional Relationships concepts involved in making distinctions between part:part and part:whole and the value of a ratio; and using ratio language to describe a ratio relationship. As a result, the response does not merit any points.

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



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



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

Equation	True	False
$8 = 2^3$	◉	○
$9^2 = 81$	◉	○
$12 = 6^2$	○	◉
$7^3 = 21$	○	◉