

Computer-Based Released Items Grade 6 Mathematics Spring 2019

The spring 2019 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 2019 Computer-Based Released Operational Items

CBT Item No.	Reporting Category	Standard	Item Type*	Item Description	Correct Answer**
1	Ratios and Proportional Relationships	6.RP.A.2	SR	Given a real-world context, determine the unit rate.	B
2	Expressions and Equations	6.EE.B.8	SA	Graph the solution set of an inequality on a number line.	<i>see page 6</i>
3	Geometry	6.G.A.4	SR	Create an expression that can be used to find the surface area of a net consisting of rectangles and triangles.	<i>see page 6</i>
4	Geometry	6.G.A.3	SR	Given the coordinates of the vertices of a triangle, determine the length of a side.	C
5	Expressions and Equations	6.EE.C.9	SR	Analyze a graph to determine the unit rate in a real-world context.	B
6	The Number System	6.NS.B.4	SR	Given one factor, determine a possible product by using common factors and common multiples in a real-world context.	D
7	Geometry	6.G.A.2	SR	Find the volumes of right rectangular prisms with fractional edge lengths by completely filling them with unit cubes.	<i>see page 6</i>
8	Expressions and Equations	6.EE.B.7	CR	Create and solve equations that represent a given real-world context.	<i>see page 7</i>
9	Ratios and Proportional Relationships	6.RP.A.3	SR	Use ratios to solve a real-world problem involving a given rate.	B
10	The Number System	6.NS.C.7	SR	Using the context of improper fractions and decimals, determine which rational number is less than a given rational number.	A
11	Ratios and Proportional Relationships	6.RP.A.1	SR	Select ratios that correctly describe given ratio relationships in a real-world context.	A,C
12	Expressions and Equations	6.EE.B.6	SR	Determine which expression can be used to represent a given situation with real-world context.	B
13	Ratios and Proportional Relationships	6.RP.A.1	SA	Determine a ratio, given a real-world context.	<i>see page 8</i>

14	Statistics and Probability	6.SP.B.5	CR	Find and describe the median, mode, and mean of a data set; then given the mean, determine the value of an unknown number in another data set.	<i>see page 9</i>
15	Geometry	6.G.A.2	SR	Given a diagram and a verbal description, determine the volume of a rectangular prism.	B
16	Expressions and Equations	6.EE.A.3	SR	Identify equivalent expressions by using the Distributive Property.	<i>see page 10</i>
17	Expressions and Equations	6.EE.A.1	SR	Determine if expressions with exponents are equivalent to a given value.	<i>see page 10</i>
18	The Number System	6.NS.C.6	SA	Match ordered pairs to points on a coordinate plane and determine which ordered pair represents the image of a point after a reflection.	<i>see page 10</i>
19	Ratios and Proportional Relationships	6.RP.A.3	SR	Determine the volume of a solid by using rate and ratio reasoning within a real-world context.	A
20	The Number System	6.NS.A.1	SR	Determine which expression represents a real-world problem involving division of a fraction by a fraction.	B

* 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 can be found on pages 6, 8, and 10 of this document. Scoring rubrics for constructed-response items are also provided in this document. Sample responses and scoring guidelines for constructed-response items will be posted to the Department's website later this year.

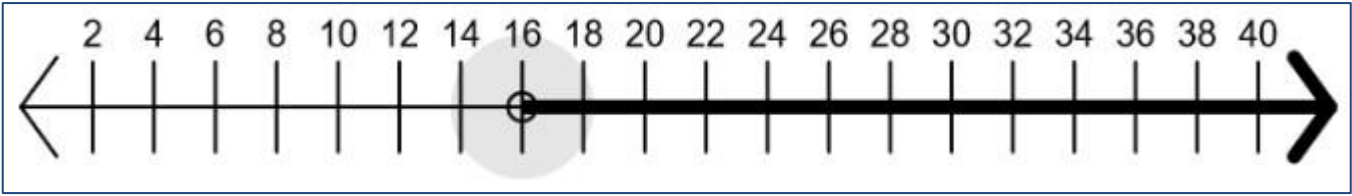
Grade 6 Mathematics
Spring 2019 Computer-Based Unreleased Operational Items

CBT Item No.	Reporting Category	Standard	Item Type*	Item Description
21	The Number System	6.NS.B.2	SR	Determine whether the given division equations are true or false.
22	Expressions and Equations	6.EE.A.2	SA	Evaluate an expression using substitution.
23	Ratios and Proportional Relationships	6.RP.A.3	CR	Using ratio and proportional reasoning, solve real-world problems involving fractions, decimals, percentages, and whole numbers.
24	Ratios and Proportional Relationships	6.RP.A.3	SR	Determine which graphical representation does not represent a given ratio.
25	Statistics and Probability	6.SP.A.2	SR	Determine the mean and the mode of a given data set.
26	The Number System	6.NS.C.6	SR	Determine the value of a given point on a number line.
27	Expressions and Equations	6.EE.B.5	SR	Solve a two-step equation for an unknown value.
28	Statistics and Probability	6.SP.B.4	SR	Determine which box plot represents a given set of data and interpret a box plot to solve a real-world problem.
29	The Number System	6.NS.A.1	SA	Solve a word problem with real-world context using division of mixed numbers by mixed numbers.
30	Expressions and Equations	6.EE.B.6	SR	Determine which mathematical expression can be used to represent a given situation with real-world context.
31	The Number System	6.NS.C.7	SR	Order absolute value expressions from least to greatest value.
32	Expressions and Equations	6.EE.B.5	SR	Solve a two-step equation to find the value of an unknown quantity.
33	The Number System	6.NS.C.8	SR	Determine which points on a coordinate plane have a given distance between them.
34	Geometry	6.G.A.2	CR	Solve a real-world problem involving volumes of right rectangular prisms.
35	Expressions and Equations	6.EE.B.7	SR	Given an equation of the form $px = q$, select the equation that is equivalent to the given equation.
36	Ratios and Proportional Relationships	6.RP.A.2	SR	Determine the unit rate given a real-world context.

37	The Number System	6.NS.B.3	SR	Determine the product of multi-digit decimals to solve a real-world problem.
38	Statistics and Probability	6.SP.A.3	SR	Determine the measures of center associated with a given set of data.
39	Expressions and Equations	6.EE.A.4	SR	Determine which expressions are equivalent to a given expression.
40	Expressions and Equations	6.EE.C.9	SR	Given the value of one variable, determine the value of another variable by analyzing the relationship of data shown on a coordinate plane.

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

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



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

Total surface area =

$$\frac{1}{2}(4 \times 6) + \frac{1}{2}(4 \times 6) + 4 \times 5 + 4 \times 5 + 4 \times 6 \text{ square inches}$$

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




Rectangular Prism	Filled	Not Filled
<p>A 3D diagram of a rectangular prism. The front edge is labeled "2 ft.", the height is labeled "1 ft.", and the depth is labeled "1/4 ft.".</p>	<input checked="" type="radio"/>	<input type="radio"/>
<p>A 3D diagram of a rectangular prism. The front edge is labeled "3 ft.", the height is labeled "1 3/4 ft.", and the depth is labeled "1/2 ft.".</p>	<input type="radio"/>	<input checked="" type="radio"/>
<p>A 3D diagram of a rectangular prism. The front edge is labeled "2 ft.", the height is labeled "1/2 ft.", and the depth is labeled "1/2 ft.".</p>	<input checked="" type="radio"/>	<input type="radio"/>


Rubric for CBT Item #8: Constructed Response


Scoring Guide	
Score	Description
4	The student response demonstrates an exemplary understanding of the Expressions and Equations concepts involving solving real-world problems by writing and solving equations of the form $x + p = q$ and $px = q$.
3	The student response demonstrates a good understanding of the Expressions and Equations concepts involving solving real-world problems by writing and solving equations of the form $x + p = q$ and $px = q$. 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 Expressions and Equations concepts involving solving real-world problems by writing and solving equations of the form $x + p = q$ and $px = q$. 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 Expressions and Equations concepts involving solving real-world problems by writing and solving equations of the form $x + p = q$ and $px = q$.
0	The student response contains insufficient evidence of the understanding of the Expressions and Equations concepts involving solving real-world problems by writing and solving equations of the form $x + p = q$ and $px = q$ to merit any points.

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

2 : 1

 + x  

 y^x $\sqrt{\quad}$ $\sqrt[3]{\quad}$ = \circ $\%$

 **a**

Rubric for CBT Item #14: Constructed Response

Scoring Guide	
Score	Description
4	The student response demonstrates an exemplary understanding of the Statistics and Probability concepts involved in summarizing numerical data sets in relation to their context by giving quantitative measures of center. The student finds the median, mode, and mean of a data set, and then determines a missing data point when given a new mean.
3	The student response demonstrates a good understanding of the Statistics and Probability concepts involved in summarizing numerical data sets in relation to their context by giving quantitative measures of center. 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 Statistics and Probability concepts involved in summarizing numerical data sets in relation to their context by giving quantitative measures of center. 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 Statistics and Probability concepts involved in summarizing numerical data sets in relation to their context by giving quantitative measures of center.
0	The student response contains insufficient evidence of an understanding of the Statistics and Probability concepts involved in summarizing numerical data sets in relation to their context by giving quantitative measures of center to merit any points.

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

$3x + 5 + 7x$ $10x + 5$	$10x + 6$ $2(5x + 3)$	$4(2x + 3)$ $8x + 12$	$10x + 10x$ $4(5x)$
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Correct Answer for CBT Item #17: Technology-Enhanced Item

2^6	3^4	4^3	6^2	8^2
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Correct Answer for CBT Item #18: Technology-Enhanced Item

Part A:

Point <i>A</i> $(4, 6)$	Point <i>B</i> $(-4, 6)$	Point <i>C</i> $(-6, -4)$	Point <i>D</i> $(6, -4)$
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Part B:

$(-8, -5)$

	+	-	×	÷	$\frac{\square}{\square}$	$\frac{\square}{\square}$
	y^x	$\sqrt{\square}$	$\sqrt[3]{\square}$	=	(.)	%