

Computer-Based Released Items
Grade 6 Mathematics
Spring 2018

The spring 2018 grade 6 Mathematics test was administered in two formats: a computer-based version and a paper-based version.

- Released items from the **computer-based version** of the 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 version** of the 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 covered, item type, item description, and correct answer (for certain selected-response and short-answer items only). Information about unreleased operational items is also presented here, along with scoring rubrics for constructed-response questions.

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 some instances, the wording of a paper item differed slightly from the computer-based version. In places where a technology-enhanced item was used on the computer-based test, that item was typically replaced with one or more alternative items on the paper test. These alternative items sometimes assessed the same standard as the technology-enhanced item, or other standards from the same reporting category.

Grade 6 Mathematics
Spring 2018 Computer-Based Released Operational Items:
Reporting Categories, Standards, Item Descriptions, and Correct Answers

CBT Item No.*	ePAT Item No.*	Reporting Category	Standard	Item Type**	Description	Correct Answer***
1	1	<i>Geometry</i>	6.G.A.01	SR	Given the area and the length of a rectangle in a real-world context, determine the width.	A
4	2	<i>Ratios and Proportional Relationships</i>	6.RP.A.02	SA	Determine a unit rate, given a real-world context.	24
5	3	<i>Expressions and Equations</i>	6.EE.A.03	SR	Determine which expression is equivalent to a given expression that represents a real-world context.	C
8	4	<i>Expressions and Equations</i>	6.EE.A.02	SA	Determine the value of an expression given the value of the variable.	11.25
9	5	<i>Ratios and Proportional Relationships</i>	6.RP.A.03	SA	Use ratio reasoning to convert between inches and yards in a real-world context.	12
10	6	<i>The Number System</i>	6.NS.C.06	SA	Given a number, graph the opposite of the number on a number line.	<i>see page 5</i>
11	7	<i>Expressions and Equations</i>	6.EE.C.09	SR	Analyze the relationship between the variables in an equation that represents a given real-world context.	<i>see page 5</i>
12	8	<i>Statistics and Probability</i>	6.SP.B.04	CR	Interpret circle graphs to solve problems.	
18	9	<i>Geometry</i>	6.G.A.03	SR	Given the locations of two vertices of a right triangle, determine the coordinates of the third vertex.	C
20	10	<i>Expressions and Equations</i>	6.EE.B.06	SA	Write a variable expression that represents a given real-world context.	<i>see page 5</i>
21	11	<i>Expressions and Equations</i>	6.EE.B.07	SR	Determine which equation represents a given real-world context.	B
23	12	<i>Ratios and Proportional Relationships</i>	6.RP.A.01	SR	Determine the ratio of two ingredients in a mixture.	A
24	13	<i>Geometry</i>	6.G.A.02	SR	Find the volume of a right rectangular prism.	A
25	14	<i>The Number System</i>	6.NS.B.04	CR	Use understanding of greatest common factors and least common multiples to solve problems.	
26	15	<i>Expressions and Equations</i>	6.EE.B.05	SR	Choose two rational solutions of an inequality.	A,C
27	16	<i>Geometry</i>	6.G.A.03	SA	Graph a quadrilateral given the coordinates of two of its vertices.	<i>see page 6</i>
28	17	<i>Ratios and Proportional Relationships</i>	6.RP.A.03	SA	Solve a unit rate problem based on a given real-world context.	24
32	18	<i>Expressions and Equations</i>	6.EE.B.08	SA	Write an inequality that represents a constraint in a real-world context.	<i>see page 6</i>
33	19	<i>Expressions and Equations</i>	6.EE.A.04	SR	Identify equivalent expressions.	<i>see page 7</i>

34	20	<i>Ratios and Proportional Relationships</i>	6.RP.A.01	SA	Determine a ratio that is described by a given ratio relationship in a real-world context.	<i>see page 7</i>
37	21	<i>Ratios and Proportional Relationships</i>	6.RP.A.03	SR	Solve a ratio problem based on a given real-world context.	D

**“CBT Item Number” refers to the position of the item on the operational computer-based test. This is the item number that DESE refers to when reporting student results for a CBT item. “ePAT Item Number” refers to the position of the item in the 2018 released item set for grade 6 Mathematics, found online at mcas.pearsonsupport.com/released-items.

**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 5–7 of this document. Sample responses and scoring guidelines for any constructed-response items will be posted to the Department’s website later this year.

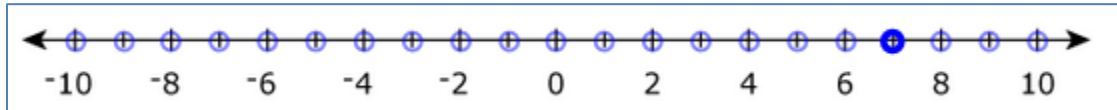
Grade 6 Mathematics
Spring 2018 Computer-Based Unreleased Operational Items:
Reporting Categories, Standards, and Item Descriptions

CBT Item No.*	Reporting Category	Standard	Item Type**	Description
2	<i>Statistics and Probability</i>	6.SP.B.05	SR	Find the mean of a set of data.
3	<i>The Number System</i>	6.NS.C.06	SA	Graph a point on a coordinate plane.
6	<i>The Number System</i>	6.NS.B.03	SR	Find the sum and product of two multi-digit decimals.
7	<i>Ratios and Proportional Relationships</i>	6.RP.A.03	CR	Solve real-world problems involving finding a fraction and percents.
13	<i>Ratios and Proportional Relationships</i>	6.RP.A.01	SR	Describe a ratio in a real-world context.
14	<i>Geometry</i>	6.G.A.01	SR	Find the area of a composite figure.
15	<i>Statistics and Probability</i>	6.SP.B.04	SA	Create a histogram based on given data from a real-world situation.
16	<i>The Number System</i>	6.NS.C.07	SA	Identify a rational number that is within a range of other rational numbers.
17	<i>Expressions and Equations</i>	6.EE.C.09	SA	Identify an equation that represents a real-world relationship given in a table, and determine the value of one variable given the other.
19	<i>The Number System</i>	6.NS.B.04	SR	Determine the prime factorization of a number.
22	<i>The Number System</i>	6.NS.C.08	SR	Find the distance between two points on a coordinate plane.
29	<i>Expressions and Equations</i>	6.EE.A.03	CR	Generate and simplify variable expressions to represent the perimeter and the area of a rectangle.
30	<i>Statistics and Probability</i>	6.SP.B.05	SR	Determine the interquartile range of a set of data.
31	<i>The Number System</i>	6.NS.B.02	SA	Divide multi-digit numbers to solve a problem.
35	<i>Geometry</i>	6.G.A.04	SA	Identify the shape and determine the surface area of a three-dimensional figure given its net.
36	<i>Statistics and Probability</i>	6.SP.B.04	SA	Create a dot plot based on given data from a real-world situation.
38	<i>Expressions and Equations</i>	6.EE.A.01	SR	Create exponential expressions that are equivalent to given expressions.
39	<i>Geometry</i>	6.G.A.01	SA	Solve a problem that involves finding the area of a rectangle.
40	<i>Expressions and Equations</i>	6.EE.A.02	SR	Create an expression that matches a verbal description.

*“CBT Item Number” refers to the position of the item on the operational computer-based test. This is the item number that DESE refers to when reporting student results for a CBT item.

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

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



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

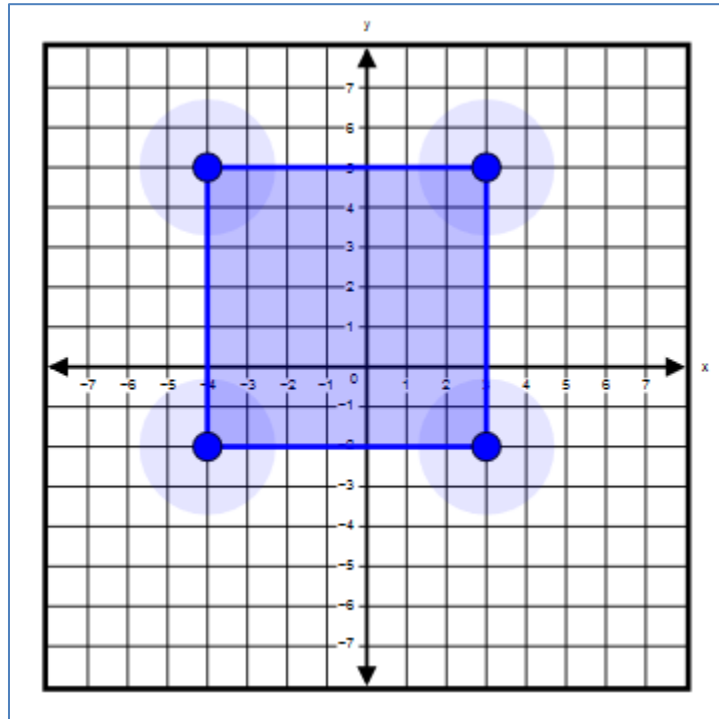
Canoe Rental	
Number of hours, h	Total Cost, c (dollars)
2	8
3	12
5	20

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

23 + 3x

A digital math input interface is shown. The input field contains the expression $23 + 3x$. Below the input field is a toolbar with various mathematical symbols and operators: a left arrow, a right arrow, a trash icon, a plus sign, a minus sign, a multiplication sign, a division sign, a fraction template, a power template, a square root symbol, a cube root symbol, an equals sign, a negative sign, and a percent sign. A blue dropdown arrow is also present in the toolbar.

Correct Answer for CBT Item #27: Technology-Enhanced Item



Correct Answer for CBT Item #32: Technology-Enhanced Item

$h < 40$

	+	-	×	÷	$\frac{\square}{\square}$	$\square \square$
	y^x	$\sqrt{\square}$	$\sqrt[3]{\square}$	=	(-)	%
	±	-	·	/	[]	[]
	<	>	≤	≥	°	π

Correct Answer for CBT Item #33: Technology-Enhanced Item

$4p$ $p + p + p + p$	$p(7 - 4)$ $p + p + p$	$5p$ $3p + 2p$	$2(3p)$ $8p - 2p$
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Correct Answer for CBT Item #34: Technology-Enhanced Item

5 : 2

←	+	-	×	÷	$\frac{\square}{\square}$	$\frac{\square}{\square}$
→	y^x	$\sqrt{\quad}$	$\sqrt[3]{\quad}$	=	(-)	%
🗑️	▼					

Rubric for CBT Item #12: Constructed Response

Scoring Guide	
Score	Description
4	The student response demonstrates an exemplary understanding of the Statistics and Probability concepts involved in reading and interpreting circle graphs. The student compares information presented in circle graphs and uses that information to make appropriate conclusions about the data represented by the graph.
3	The student response demonstrates a good understanding of the Statistics and Probability concepts involved in reading and interpreting circle graphs. 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 reading and interpreting circle graphs. 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 reading and interpreting circle graphs.
0	The student response contains insufficient evidence of an understanding of the Statistics and Probability concepts involved in reading and interpreting circle graphs to merit any points.

Rubric for CBT Item #25: Constructed Response

Scoring Guide	
Score	Description
4	The student response demonstrates an exemplary understanding of the Number System concepts involved in solving problems with common multiples and divisibility.
3	The student response demonstrates a good understanding of the Number System concepts involved in solving problems with common multiples and divisibility. 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 Number System concepts involved in solving problems with common multiples and divisibility. 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 Number System concepts involved in solving problems with common multiples and divisibility.
0	The student response contains insufficient evidence of an understanding of the Number System concepts involved in solving problems with common multiples and divisibility to merit any points.