

Computer-Based Released Items
Grade 8 Mathematics
Spring 2018

The spring 2018 grade 8 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 8 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 8 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***
2	1	<i>Expressions and Equations</i>	8.EE.A.04	SR	Convert a number in scientific notation to standard notation.	B
4	2	<i>Geometry</i>	8.G.A.04	SA	Given two similar rectangles, find the length of a corresponding side.	4
6	3	<i>The Number System</i>	8.NS.A.02	SA	Approximate the value of a square root expression in a given context.	13
8	4	<i>The Number System</i>	8.NS.A.01	SR	Identify which number in a list of numbers is irrational.	B
10	5	<i>Functions</i>	8.F.A.03	SR	Determine which equation in a list of equations represents a linear function.	A
11	6	<i>Functions</i>	8.F.A.01	SA	Graph a linear function given the equation of the line.	<i>see page 5</i>
12	7	<i>Expressions and Equations</i>	8.EE.A.02	CR	Find the value of the unknown variable in a given equation for different situations.	
14	8	<i>Expressions and Equations</i>	8.EE.C.08	SR	Determine the solution for a linear system of equations.	<i>see page 5</i>
17	9	<i>Functions</i>	8.F.A.02	SR	Determine the linear relationship with the greatest rate of change from among different linear representations.	B
18	10	<i>Geometry</i>	8.G.C.09	SR	Find the volume of a cylinder given its radius and height.	C
20	11	<i>Expressions and Equations</i>	8.EE.A.01	SR	Use the properties of exponents to determine which expression is equivalent to the given expression.	B
22	12	<i>Functions</i>	8.F.B.04	SR	Given a table of values, find the initial value (y-intercept) of a linear function that models a given context.	A
24	13	<i>Geometry</i>	8.G.A.05	SR	Given two triangles are similar, find the measurement of a corresponding angle.	A
26	14	<i>Geometry</i>	8.G.A.01	SR	Determine which graph shows the image of a figure after a given transformation.	A
27	15	<i>Expressions and Equations</i>	8.EE.C.08	SA	Find the value of one variable in a system of linear equations that represent a given context.	30
29	16	<i>Geometry</i>	8.G.B.07	SR	Use the Pythagorean theorem to find the missing side length of a triangle.	B
31	17	<i>Geometry</i>	8.G.A.03	SA	Graph the image of a given triangle after a rotation.	<i>see page 6</i>
32	18	<i>Statistics and Probability</i>	8.SP.A.03	CR	Use the equation of a line that models a given context to interpret the slope and intercept, and to solve problems related to the context.	

36	19	<i>Geometry</i>	8.G.B.08	SR	Use the Pythagorean theorem to find the distance between two points on a map.	B
39	20	<i>Geometry</i>	8.G.A.02	SR	Determine which triangle is congruent to a given triangle.	B
40	21	<i>Functions</i>	8.F.A.01	SR	Determine which mapping is not a function.	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 8 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 5–6 of this document. Sample responses and scoring guidelines for any constructed-response items will be posted to the Department’s website later this year.

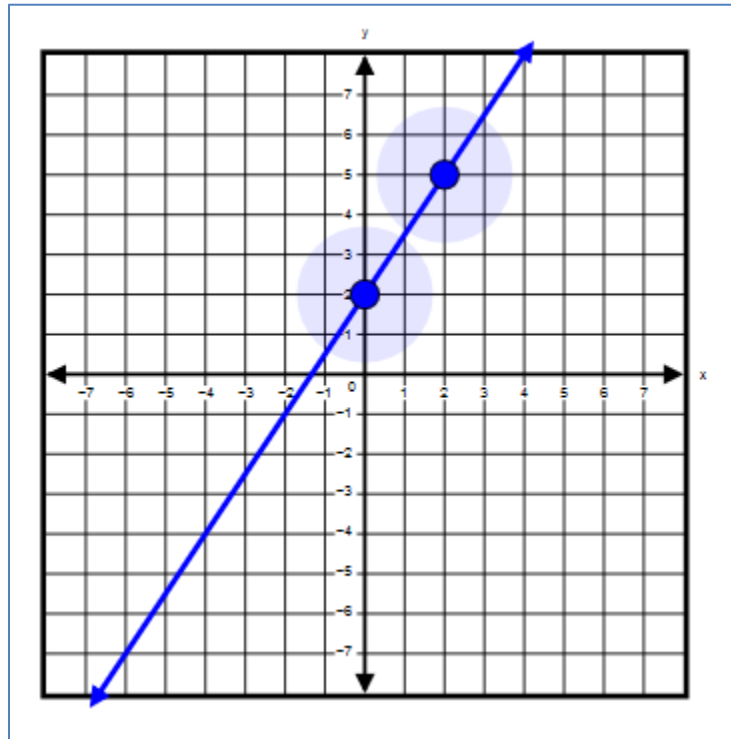
Grade 8 Mathematics
Spring 2018 Computer-Based Unreleased Operational Items:
Reporting Categories, Standards, and Item Descriptions

CBT Item No.*	Reporting Category	Standard	Item Type**	Description
1	<i>Expressions and Equations</i>	8.EE.B.05	SR	Compare characteristics of two different proportional relationships represented by lines on a coordinate plane.
3	<i>Expressions and Equations</i>	8.EE.C.07	SR	Find the value of the unknown variable in a given equation.
5	<i>Functions</i>	8.F.B.04	CR	Determine output values of a graphed function for given input values, and write an expression that represents the output values for a given context.
7	<i>Expressions and Equations</i>	8.EE.B.05	SR	Compare characteristics of two different proportional relationships.
9	<i>Statistics and Probability</i>	8.SP.A.04	SR	Make comparisons of two different groups using a two-way table.
13	<i>The Number System</i>	8.NS.A.02	SA	Approximate the square root of a given number on a number line.
15	<i>Geometry</i>	8.G.A.03	SR	Select the graph of an image after a series of transformations, and determine the rule for finding the coordinates of an image after a series of transformations.
16	<i>Expressions and Equations</i>	8.EE.A.03	SR	Convert a number in standard notation to scientific notation.
19	<i>Expressions and Equations</i>	8.EE.B.06	SR	Find the equation of a line that has the same slope as a given line graphed on a coordinate plane.
21	<i>Expressions and Equations</i>	8.EE.B.05	SR	Determine which graph represents a proportional relationship in a given context.
23	<i>Expressions and Equations</i>	8.EE.B.06	SR	Use similar triangles to compare the slope of two line segments on the same line.
25	<i>Geometry</i>	8.G.A.02	CR	Describe the transformation that produced a given result and understand that transformations preserve congruence.
28	<i>Expressions and Equations</i>	8.EE.B.05	SR	Determine which equation represents a proportional relationship in a given context.
30	<i>Functions</i>	8.F.B.04	SR	Identify the equation that represents a given context.
33	<i>Statistics and Probability</i>	8.SP.A.01	SA	Determine which points on a scatter plot are outliers.
34	<i>Expressions and Equations</i>	8.EE.C.08	SA	Determine the solution for a linear system of equations given its graph.
35	<i>Geometry</i>	8.G.A.02	SR	Describe the sequence of transformations to map a figure to its image and understand that transformations preserve congruence.
37	<i>Expressions and Equations</i>	8.EE.C.07	SA	Find the value of the unknown variable in a given equation.
38	<i>Functions</i>	8.F.A.03	SR	Determine which graph represents a linear function.

*“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).

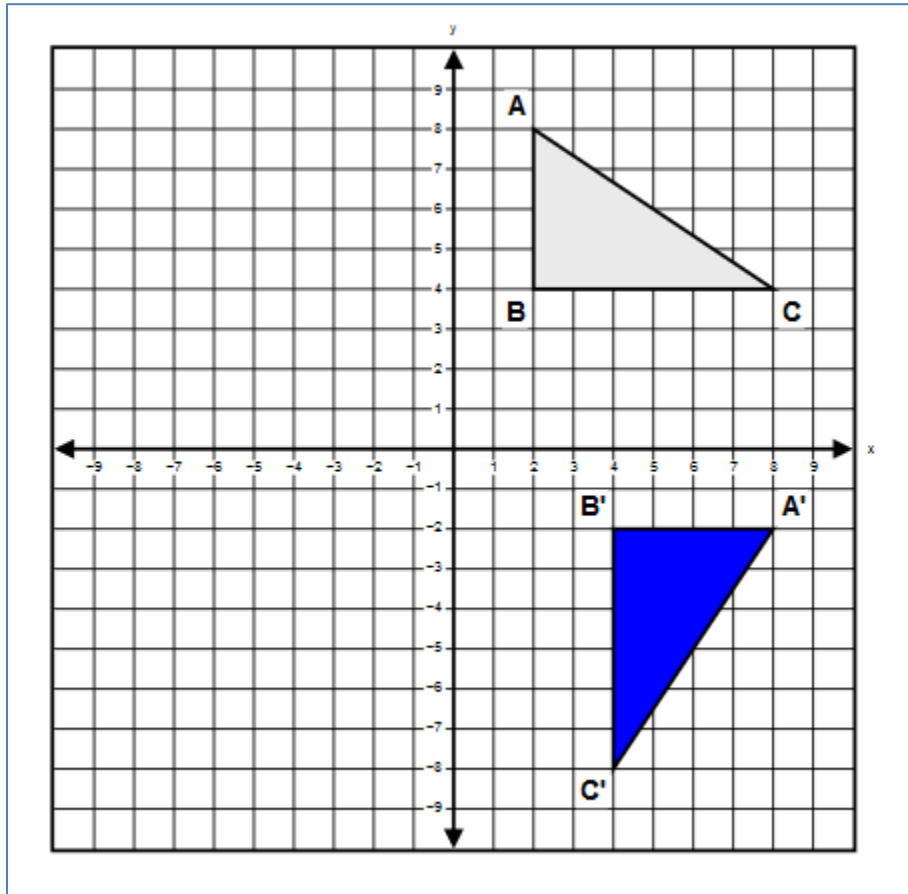
Correct Answer for CBT Item #11: Technology-Enhanced Item



Correct Answer for CBT Item #14: Technology-Enhanced Item

(3 , 2)

Correct Answer for CBT Item #31: Technology-Enhanced Item



Rubric for CBT Item #12: Constructed Response

Scoring Guide	
Score	Description
4	The student response demonstrates an exemplary understanding of the Expressions and Equations concepts involved in using square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number; evaluating square roots of small perfect squares and cube roots of small perfect cubes, and knowing that $\sqrt{2}$ is irrational.
3	The student response demonstrates a good understanding of the Expressions and Equations concepts involved in using square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number; evaluating square roots of small perfect squares and cube roots of small perfect cubes, and knowing that $\sqrt{2}$ is irrational. 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 involved in using square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number; evaluating square roots of small perfect squares and cube roots of small perfect cubes, and knowing that $\sqrt{2}$ is irrational. 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 involved in using square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number; evaluating square roots of small perfect squares and cube roots of small perfect cubes, and knowing that $\sqrt{2}$ is irrational.
0	The student response contains insufficient evidence of an understanding of the Expressions and Equations concepts involved in using square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number; evaluating square roots of small perfect squares and cube roots of small perfect cubes, and knowing that $\sqrt{2}$ is irrational to merit any points.

Rubric for CBT Item #32: Constructed Response

Scoring Guide	
Score	Description
4	The student response demonstrates an exemplary understanding of the Statistics and Probability concepts involved in using the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
3	The student response demonstrates a good understanding of the Statistics and Probability concepts involved in using the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. 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 using the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. 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 using the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
0	The student response contains insufficient evidence of an understanding of the Statistics and Probability concepts involved in using the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept, to merit any points.