Computer-Based Released Items
Grade 7 Mathematics Spring
2019

The spring 2019 grade 7 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 7 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 7 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	7.RP.A.1	SR	Determine the unit rate using fractions and whole numbers to solve a real-world problem.	C
2	The Number System	7.NS.A.2	SA	Determine the product of an expression using order of operations.	1
3	Statistics and Probability	7.SP.A.2	SR	Use a given two-way table containing data from two populations to determine the probability of an event.	B
4	Ratios and Proportional Relationships	7.RP.A.2	CR	Determine whether the graphed relationship is proportional; use rate and ratio language to analyze the relationship; and write an equation to describe a proportional relationship.	*see page 6*
5	The Number System	7.NS.A.2	SR	Determine the quotient when dividing a decimal number by a decimal number that has a value less than one.	D
6	The Number System	7.NS.A.3	SR	Use the four operations to determine the value of a given multi-step expression containing fractions.	A
7	The Number System	7.NS.A.3	SR	Compute with rational numbers representing temperature changes in a real-world context.	*see page 7*
8	Geometry	7.G.A.3	SR	Determine which two-dimensional figure results from slicing a three-dimensional figure in a given way.	B
9	Expressions and Equations	7.EE.B.3	SA	Solve a multi-step real-life problem posed with a positive whole number, percent, and a fraction.	*see page 7*
10	The Number System	7.NS.A.1	SA	Determine the sum of two numbers expressed as absolute values.	11
11	Statistics and Probability	7.SP.A.1	SR	Determine which sampling strategy will result in a representative sample of a population.	C
12	Expressions and Equations	7.EE.B.4	CR	Given a real-world context, create an equation and an inequality with variables, and use them to solve problems.	*see page 8*
13	Geometry	7.G.A.2	SA	Determine if a unique triangle can be formed using a given set of conditions.	1

14	Statistics and Probability	7.SP.B.3	SR	Create correct comparison statements about mean and mean absolute deviation based on line plots.	*see page 9*
15	Statistics and Probability	7.SP.C.8	SA	Determine the probability of a given compound event by using a tree diagram.	*see page 9*
16	Expressions and Equations	7.EE.A.2	SR	Determine an equivalent expression to a given expression representing a real-world context.	C
17	Geometry	7.G.B.4	SR	Determine the circumference and the area of a given circle.	B;C
18	Expressions and Equations	7.EE.A.1	SA	Use the distributive property to simplify a linear expression.	*see page 9*
19	Statistics and Probability	7.SP.C.7	SR	Using a uniform probability model, determine the probabilities of events expressed as decimals, fractions, or percents.	*see page 10*
20	Ratios and Proportional Relationships	7.RP.A.3	SR	Solve a multi-step percent problem using proportional relationships involving markdowns.	*see page 10*

* 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 7, 9, 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 7 Mathematics
Spring 2019 Computer-Based Unreleased Operational Items

CBT Item No.	Reporting Category	Standard	Item Type*	Item Description
21	The Number System	7.NS.A.1	SR	Determine which addition expression is equivalent to a given subtraction expression.
22	Expressions and Equations	7.EE.A.2	SR	Determine which expression is equivalent to a given expression.
23	Expressions and Equations	7.EE.B.4	SA	Graph the solution set of an inequality that represents a real-world problem.
24	Ratios and Proportional Relationships	7.RP.A.1	SR	Compute a unit rate associated with ratios of fractions in a real-world problem.
25	The Number System	7.NS.A.3	SR	Solve a real-world problem that involves fractions and mixed numbers using operations.
26	Statistics and Probability	7.SP.C.5	CR	Determine the likelihood of an event and calculate the probability of other events in a real-world context.
27	The Number System	7.NS.A.2	SA	Determine the product of a negative fraction multiplied by a negative fraction, and then express the product as a rational decimal number.
28	Statistics and Probability	7.SP.B.3	SR	Express the difference between two means in terms of the mean absolute deviation.
29	Expressions and Equations	7.EE.A.1	SR	Expand a linear expression with a rational coefficient.
30	Expressions and Equations	7.EE.B.4	SA	Solve a two-step equation.
31	The Number System	7.NS.A.3	SR	Convert a value from one system of measurement to another, using operations.
32	Expressions and Equations	7.EE.B.4	SA	Write an equation to model a given written scenario based on a real-world context.
33	Ratios and Proportional Relationships	7.RP.A.2	SR	Determine which proportion represents a given real-world relationship.
34	Ratios and Proportional Relationships	7.RP.A.3	SR	Determine the solution of a percent increase problem with real-world context.
35	Expressions and Equations	7.EE.B.3	SA	Solve a real-world, multi-step problem involving mixed numbers, percents, and whole numbers.
36	Ratios and Proportional Relationships	7.RP.A.1	SA	Determine the unit rate in a multi-step problem, given a real-world scenario.

37	Geometry	7.G.B.5	CR	Use facts about angles to write and solve equations that can be used to find the measures of unknown angles in a diagram.
38	Ratios and Proportional Relationships	7.RP.A.2	SR	Determine the unit rate in a real-world problem.
39	Statistics and Probability	7.SP.B.3	SA	Determine the number of data that lie between the means of two data sets.
40	Expressions and Equations	7.EE.B.4	SR	Choose an expression that can be used to solve a real-world problem.

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

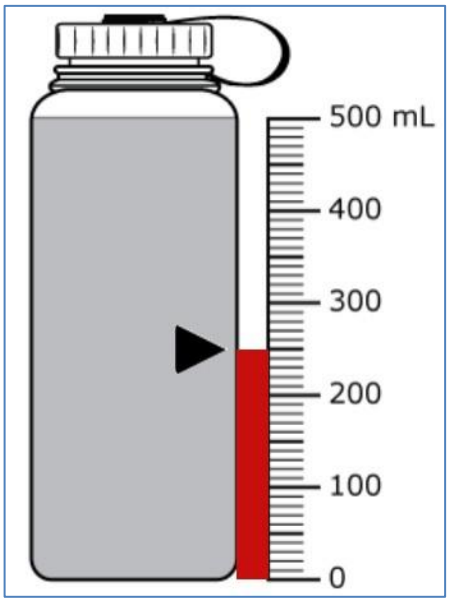
Rubric for CBT Item #4: Constructed Response

Scoring Guide	
Score	Description
4	The student response demonstrates an exemplary understanding of the Ratios and Proportional Relationships concepts involved in recognizing and representing proportional relationships between quantities. The student determines whether a given relationship is proportional, explains what a point on the graph means in terms of the situation, uses the graph to solve a problem, and writes an equation for the relationship.
3	The student response demonstrates a good understanding of the Ratios and Proportional Relationships concepts involved in recognizing and representing proportional relationships between quantities. 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 recognizing and representing proportional relationships between quantities. 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 recognizing and representing proportional relationships between quantities.
0	The student response contains insufficient evidence of an understanding of the Ratios and Proportional relationships concepts involved in recognizing and representing proportional relationships between quantities to merit any points.

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

The temperature [increased] by a total of [6.5] °F.

Correct Answer for CBT Item #9: Technology-Enhanced Item



Rubric for CBT Item #12: Constructed Response

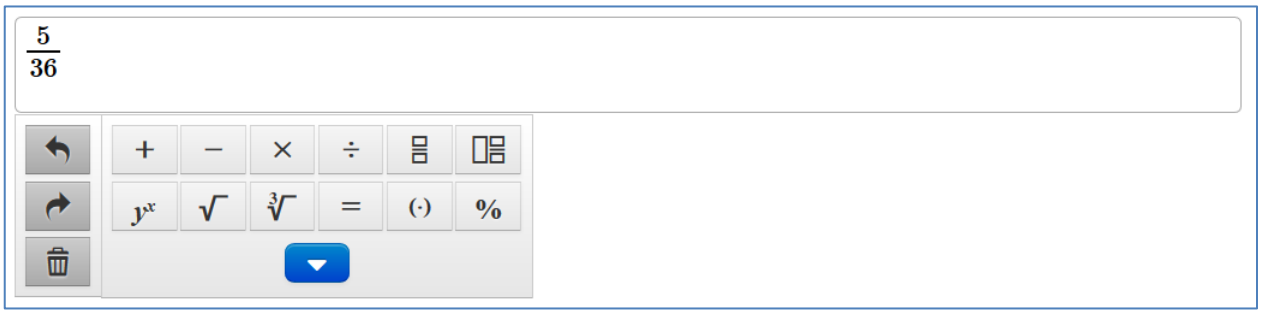
Scoring Guide	
Score	Description
4	The student response demonstrates an exemplary understanding of the Expressions and Equations concepts involved in using variables to represent quantities in a real-world problem, and constructing simple equations and inequalities to solve problems by reasoning about the quantities.
3	The student response demonstrates a good understanding of the Expressions and Equations concepts involved in using variables to represent quantities in a real-world problem, and constructing simple equations and inequalities to solve problems by reasoning about the quantities. 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 variables to represent quantities in a real-world problem, and constructing simple equations and inequalities to solve problems by reasoning about the quantities. 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 variables to represent quantities in a real-world problem, and constructing simple equations and inequalities to solve problems by reasoning about the quantities.
0	The student response contains insufficient evidence of an understanding of the Expressions and Equations concepts involved in using variables to represent quantities in a real-world problem, and constructing simple equations and inequalities to solve problems by reasoning about the quantities to merit any points.

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

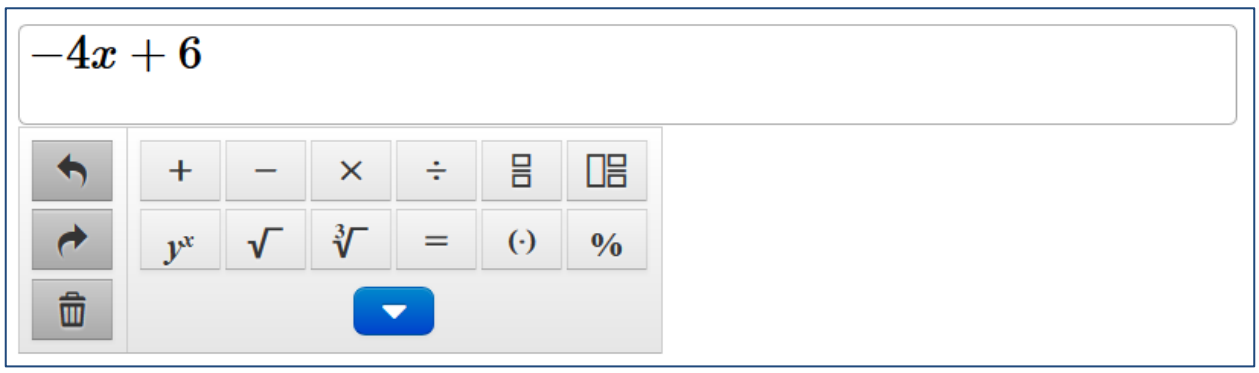
Based on the line plots, the mean number of whales seen on morning trips is **less than** the mean number of whales seen on afternoon trips.

Based on the line plots, the mean absolute deviation in the number of whales seen on morning trips is **greater than** the mean absolute deviation in the number of whales seen on afternoon trips.

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



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



Correct Answer for CBT Item #19: Technology-Enhanced Item

Color of Ball	0.1%	$\frac{1}{4}$	0.4	10%
red	○	○	◉	○
orange	○	◉	○	○
green	○	○	○	◉
yellow	○	◉	○	○

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

The customer's claim is [incorrect] . The final price of the sweater will be [$27.00] .