Computer-Based Released Items
Grade 7 Mathematics
Spring 2018

The spring 2018 grade 7 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 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 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 7 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 7 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	*Ratios and Proportional Relationships*	7.RP.A.02	SR	Determine which equation represents the proportional relationship in a given context.	D
2	2	*The Number System*	7.NS.A.01	SA	Plot the solution to an equation on a number line.	*see page 5*
3	3	*Ratios and Proportional Relationships*	7.RP.A.01	SR	Determine the unit rate in a real-world problem.	C
6	4	*Statistics and Probability*	7.SP.C.05	SR	Determine the likelihoods of events.	*see page 5*
9	5	*Expressions and Equations*	7.EE.A.02	SR	Rewrite a given expression in a real-world context.	A
12	6	*Statistics and Probability*	7.SP.C.08	CR	Find the sample space, list possible outcomes, and determine the probability of a compound event.	
13	7	*Expressions and Equations*	7.EE.B.04	SR	Extend a pattern to find a number in the pattern.	D
16	8	*The Number System*	7.NS.A.02	SR	Divide rational numbers to solve a mathematical problem.	B
19	9	*The Number System*	7.NS.A.03	SA	Use operations on rational numbers to solve a real-world problem.	59.76
20	10	*The Number System*	7.NS.A.02	SR	Determine which expression is equivalent to a given expression.	B
21	11	*Expressions and Equations*	7.EE.B.04	SR	Use a simple equation to solve a real-world problem.	C
22	12	*Expressions and Equations*	7.EE.B.03	SR	Solve a multi-step, real-world problem using operations on rational numbers.	D
23	13	*Geometry*	7.G.B.05	SR	Solve a multi-step problem using facts about supplementary angles and triangles.	D
24	14	*Expressions and Equations*	7.EE.A.01	SR	Determine which expressions are equivalent to given expressions.	*see page 5*
25	15	*Ratios and Proportional Relationships*	7.RP.A.03	CR	Solve multi-step, real-world problems involving unit rates.	
26	16	*Geometry*	7.G.B.04	SR	Determine the area of a circle when given the circumference of the circle.	C
27	17	*Expressions and Equations*	7.EE.A.01	SA	Factor a given expression.	*see page 6*
30	18	*Statistics and Probability*	7.SP.A.02	SR	Use data from random samples to draw an inference about a population.	C
31	19	*Geometry*	7.G.B.06	SR	Solve a mathematical problem involving the volume of a composite three-dimensional shape.	B

37	20	*Geometry*	7.G.A.02	SA	Given one vertex of a triangle, and certain conditions about the triangle, determine the other two vertices.	*see page 6*
40	21	*Expressions and Equations*	7.EE.B.04	SR	Represent a real-world context with an inequality.	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 7 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.

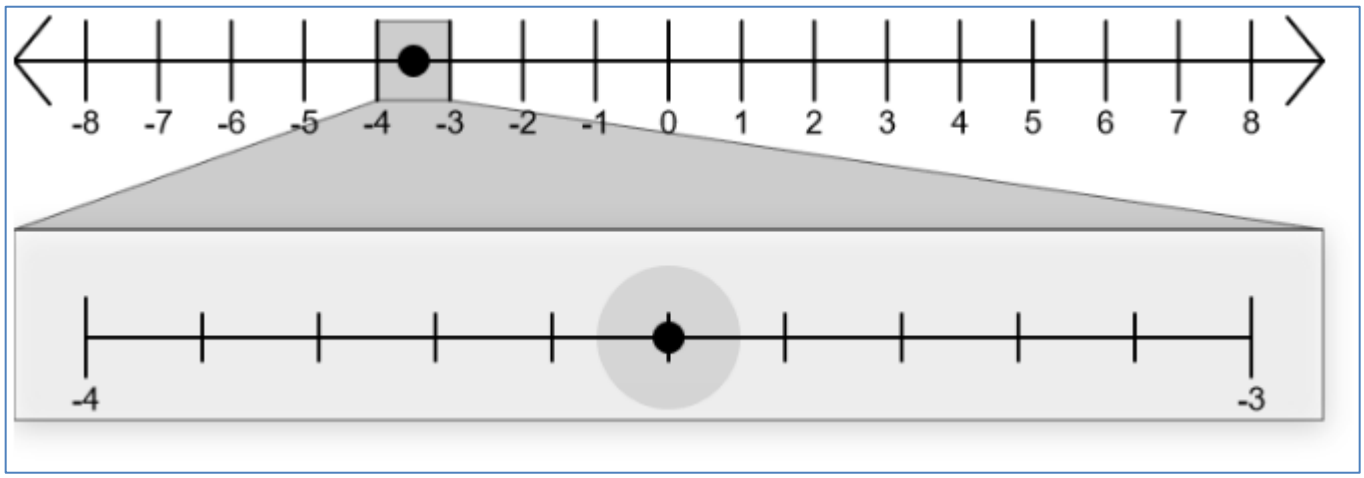
Grade 7 Mathematics
Spring 2018 Computer-Based Unreleased Operational Items: Reporting Categories, Standards, and Item Descriptions

CBT Item No.*	Reporting Category	Standard	Item Type**	Description
4	*Statistics and Probability*	7.SP.A.01	SR	Determine which sampling method would provide a random sample in a given context.
5	*The Number System*	7.NS.A.03	CR	Use operations on integers and rational numbers to solve a real-world problem.
7	*The Number System*	7.NS.A.01	SA	Represent the sum of integers on a number line.
8	*The Number System*	7.NS.A.02	SR	Convert a rational number to a decimal.
10	*The Number System*	7.NS.A.03	SA	Use operations on integers to solve a real-world problem.
11	*Geometry*	7.G.A.03	SR	Determine which two-dimensional figure will not result from slicing a given three-dimensional figure.
14	*Ratios and Proportional Relationships*	7.RP.A.02	SA	Determine the unit rate in a real-world problem, given a graph.
15	*Geometry*	7.G.B.05	SA	Solve a multi-step problem using facts about supplementary and complementary angles.
17	*Statistics and Probability*	7.SP.C.07	SA	Determine the probability of an event and give the probability as a fraction.
18	*Ratios and Proportional Relationships*	7.RP.A.02	SR	Determine which table represents a proportional relationship between two quantities.
28	*Statistics and Probability*	7.SP.B.04	SR	Determine the possible mean and mean absolute deviation for two sets of data in a real-world context.
29	*Ratios and Proportional Relationships*	7.RP.A.01	SR	Determine how to calculate the unit rate in a real-world problem.
32	*Expressions and Equations*	7.EE.B.03	CR	Use properties of rational numbers to solve multi-step, real-world problems involving money and percents.
33	*Geometry*	7.G.A.01	SR	Solve a problem by using a scale drawing to determine the actual area.
34	*Statistics and Probability*	7.SP.C.08	SA	Find the probability of a simple event.
35	*Expressions and Equations*	7.EE.B.04	SA	Given a real-world situation, determine which equation can be used to solve a problem; and solve a different problem by reasoning about the quantities.
36	*Ratios and Proportional Relationships*	7.RP.A.03	SR	Determine and compare percent decreases in a real-world problem.
38	*Statistics and Probability*	7.SP.B.03	SR	Compare the medians of two sets of data in a real-world context.
39	*Geometry*	7.G.B.06	SA	Solve a mathematical problem involving the surface area of a composite three-dimensional shape.

*"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 #2: Technology-Enhanced Item



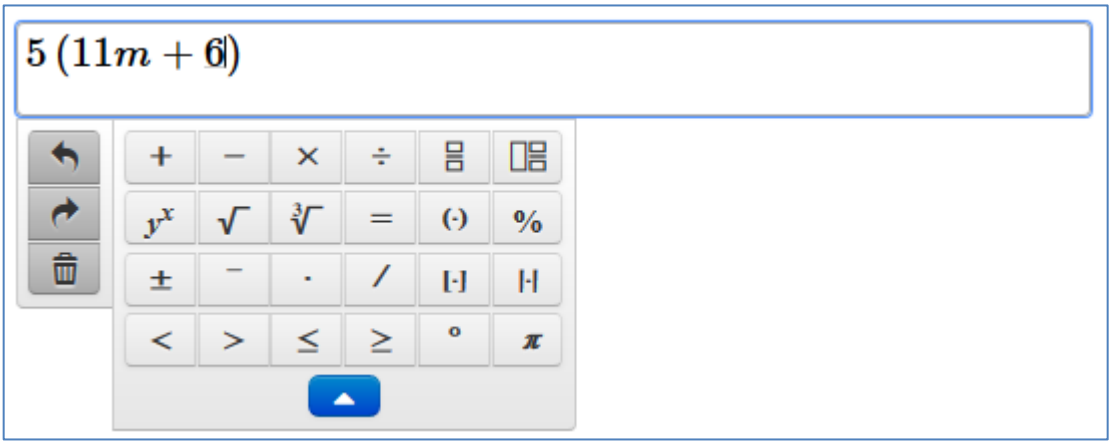
Correct Answer for CBT Item #6: Technology-Enhanced Item

Outcome	Likely	Unlikely	Neither Unlikely nor Likely
A number less than 2	○	●	○
A number greater than 1	●	○	○
An odd number	○	○	●
A multiple of 2	○	○	●

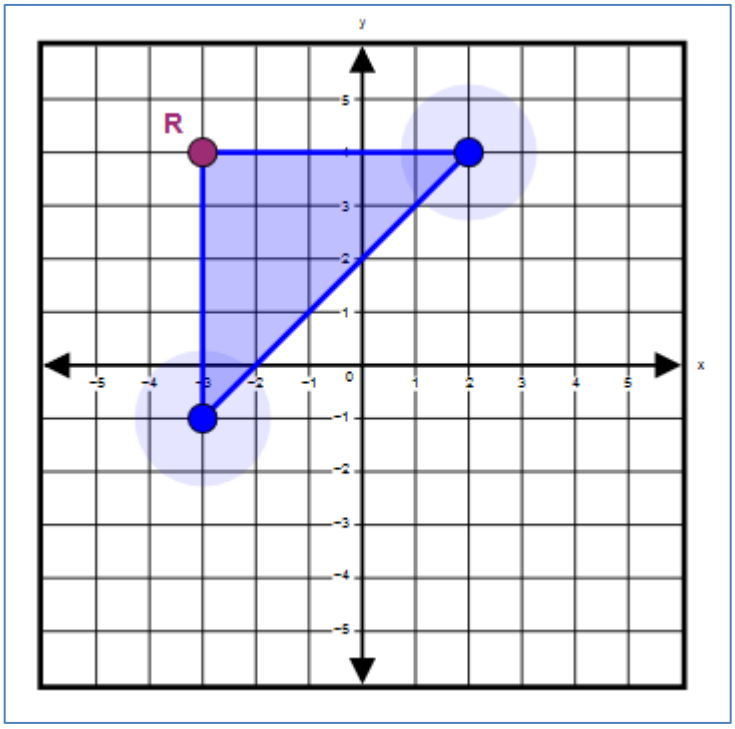
Correct Answer for CBT Item #24: Technology-Enhanced Item

$\frac{a}{2}+3$	$\frac{a}{2}-3$	$-\frac{a}{2}+3$	$-\frac{a}{2}-3$
$\frac{1}{2}(a+6)$	$a-\left(\frac{1}{2}a+3\right)$	$-\frac{3}{4}\left(\frac{2}{3}a-4\right)$	$-2\left(\frac{1}{4}a+\frac{3}{2}\right)$

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



Correct Answer for CBT Item #37: Technology-Enhanced Item



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 finding probabilities of compound events using organized lists, tables, and tree diagrams. The student determines specific sample spaces and the probability associated with an event.
3	The student response demonstrates a good understanding of the Statistics and Probability concepts involved in finding probabilities of compound events using organized lists, tables, and tree diagrams. 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 finding probabilities of compound events using organized lists, tables, and tree diagrams. 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 finding probabilities of compound events using organized lists, tables, and tree diagrams.
0	The student response contains insufficient evidence of an understanding of the Statistics and Probability concepts involved in finding probabilities of compound events using organized lists, tables, and tree diagrams 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 Ratios and Proportional Relationships concepts involved in using proportional relationships to solve multi-step ratio problems. The student compares unit prices of two products, and makes a decision about which product has a lower price.
3	The student response demonstrates a good understanding of the Ratios and Proportional Relationships concepts involved in using proportional relationships to solve multi-step ratio problems. 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 using proportional relationships to solve multi-step ratio problems. 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 using proportional relationships to solve multi-step ratio problems.
0	The student response contains insufficient evidence of an understanding of the Ratios and Proportional Relationships concepts involved in using proportional relationships to solve multi-step ratio problems to merit any points.