RIDE Rhode Island Department of Education

Release of Spring 2025 RICAS Test Items

from the

Grade 8 Mathematics Paper-Based Test

July 2025
Rhode Island Department of Education

This document was prepared by the
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Overview of Grade 8 Mathematics Test

The spring 2025 grade 8 Mathematics test was administered in two formats: a computer-based version and a paper-based version. Most students took the computer-based test. The paper-based test was offered as an accommodation for eligible students who were unable to use a computer. More information can be found on the MCAS Test Administration Resources page at www.doe.mass.edu/mcas/admin.html.

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 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.

This document displays released items from the paper-based test. Released items from the computer-based test are available on the RICAS Resource Center website at ricas.onlinehelp.cognia.org/released-items/.

Test Sessions and Content Overview

The grade 8 Mathematics test was made up of two separate test sessions. Each session included selected-response, short-answer, and constructed-response questions. On the paper-based test, the selected-response questions were multiple-choice items and multiple-select items, in which students select the correct answer(s) from among several answer options.

Standards and Reporting Categories

The grade 8 Mathematics test was based on standards in the five domains for grade 8 in the *Massachusetts Curriculum Framework for Mathematics* (2017). The five domains are listed below.

- The Number System
- Expressions and Equations
- Functions
- Geometry
- Statistics and Probability

The *Massachusetts Curriculum Framework for Mathematics* is available on the Department website at www.doe.mass.edu/frameworks/current.html.

Mathematics test results are reported under four MCAS reporting categories, which are based on the five framework domains listed above.

The tables at the conclusion of this document provide the following information about each released and unreleased operational item: reporting category, standard(s) covered, item type, and item description. The correct answers for released selected-response and short-answer questions are also displayed in the released item table.

Reference Materials and Tools

Each student taking the grade 8 Mathematics test was provided with a ruler and a grade 8 Mathematics Reference Sheet. A copy of the reference sheet can be found on the next page of this document.

During Session 2, each student had sole access to a calculator. Calculator use was not allowed during Session 1.

During both Mathematics test sessions, the use of authorized bilingual word-to-word dictionaries and glossaries was allowed for students who are currently or were ever reported as English learners. No other reference tools or materials were allowed.

RIDE Rhode Island Department of Education

Rhode Island Comprehensive Assessment System
Grade 8 Mathematics Reference Sheet

CONVERSIONS

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 gallon ≈ 3.785 liters
1 liter ≈ 0.264 gallon
1 liter = 1000 cubic centimeters

1 inch = 2.54 centimeters
1 meter ≈ 39.37 inches
1 mile = 5280 feet
1 mile = 1760 yards
1 mile ≈ 1.609 kilometers
1 kilometer ≈ 0.62 mile

1 pound = 16 ounces
1 pound ≈ 0.454 kilogram
1 kilogram ≈ 2.2 pounds
1 ton = 2000 pounds

AREA (*A*) FORMULAS

square . . . . . $A = s^2$

rectangle . . . . . $A = bh$
OR
$A = lw$

parallelogram . . . . . $A = bh$

triangle . . . . . $A = \frac{1}{2}bh$

trapezoid . . . . . $A = \frac{1}{2}h(b_1 + b_2)$

circle . . . . . $A = \pi r^2$

CIRCLE FORMULAS

area. . . . . $A = \pi r^2$

circumference . . . . . $C = 2\pi r$
OR
$C = \pi d$

VOLUME (*V*) FORMULAS

cube . . . . . $V = s^3$
(s = length of an edge)

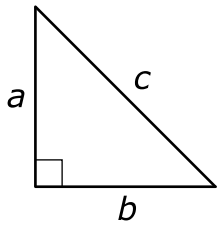
sphere . . . . . $V = \frac{4}{3}\pi r^3$

cone . . . . . $V = \frac{1}{3}\pi r^2 h$

right circular cylinder . . . . . $V = \pi r^2 h$

right prism . . . . . $V = Bh$

PYTHAGOREAN THEOREM



$a^2 + b^2 = c^2$

Grade 8 Mathematics

SESSION 1

This session contains 10 questions.

You may use your reference sheet during this session.
*You may **not** use a calculator during this session.*

Directions

Read each question carefully and then answer it as well as you can. You must record all answers in this Test & Answer Booklet.

For some questions, you will mark your answers by filling in the circles in your Test & Answer Booklet. Make sure you darken the circles completely. Do not make any marks outside of the circles. If you need to change an answer, be sure to erase your first answer completely.

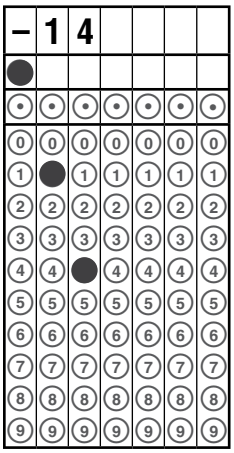
For other questions, you will need to fill in an answer grid. Directions for completing questions with answer grids are provided on the next page.

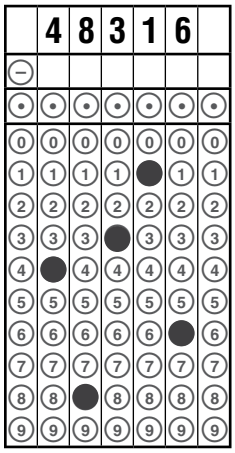
If a question asks you to show or explain your work, you must do so to receive full credit. Write your response in the space provided. Only responses written within the provided space will be scored.

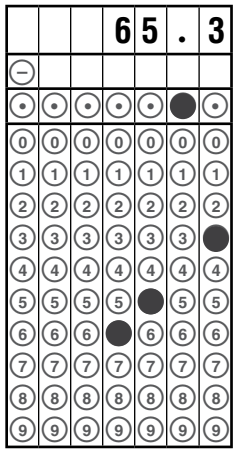
Directions for Completing Questions with Answer Grids

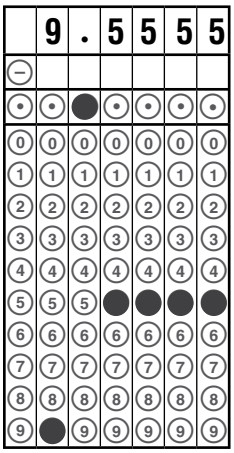
1. Work the question and find an answer.
2. Enter your answer in the answer boxes at the top of the answer grid.
3. Print only one number or symbol in each box. Do not leave a blank box in the middle of an answer.
4. Under each answer box, fill in the circle that matches the number or symbol you wrote above. Make a solid mark that completely fills the circle.
5. Do not fill in a circle under an unused answer box.
6. Fractions cannot be entered into an answer grid and will not be scored. Enter fractions as decimals.
7. If you need to change an answer, be sure to erase your first answer completely.
8. See below for examples of how to correctly complete an answer grid.

Examples









1 Consider this system of equations.

$$y = 3x + 10$$

$$3y = -4x - 9$$

What is the solution of the system of equations?

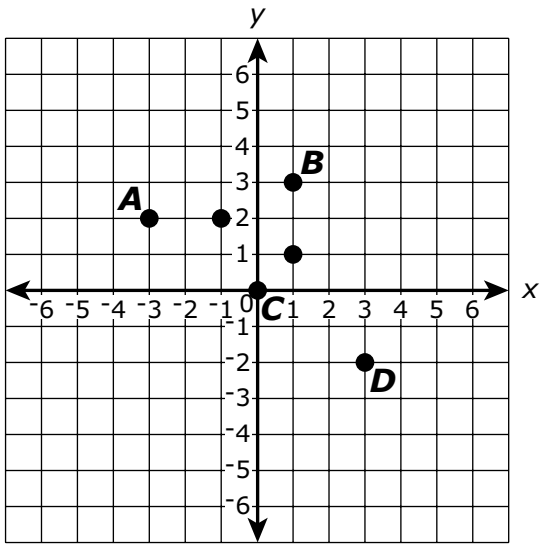
Ⓐ (–4, –2)

Ⓑ (–3, 1)

Ⓒ (–2, 4)

Ⓓ (1, 13)

2 On this coordinate plane, y is **not** a function of x.



Which of the following points could be removed from the coordinate plane so that y would be a function of x?

Ⓐ Point A

Ⓑ Point B

Ⓒ Point C

Ⓓ Point D

3 Consider this expression.

$$5^{-4}$$

Which of the following is equivalent to the expression?

Ⓐ $(5^{-2})^{-2}$

Ⓑ $5^{1} \cdot 5^{-4}$

Ⓒ $5^{2} \cdot 5^{-6}$

Ⓓ $(5^{-4})^{0}$

4 A student bought a sweatshirt for $20 and had the name of his school printed on it for $0.75 per letter.

Which of the following equations could be used to find c, the total cost of the sweatshirt with n letters printed on it?

Ⓐ $c = 20 + 0.75n$

Ⓑ $c = 0.75 + 20n$

Ⓒ $c = n + 20(0.75)$

Ⓓ $c = (20)(0.75)(n)$

5 Which of the following are rational numbers?

Select the **two** correct answers.

Ⓐ $\sqrt{121}$

Ⓑ $\sqrt{150}$

Ⓒ $\sqrt{169}$

Ⓓ $\sqrt{184}$

Ⓔ $\sqrt{192}$

This question has four parts. Be sure to label each part of your response.

6 Researchers are reviewing the weights of different animals.

A. A blue whale weighs 300,000 pounds. What is the weight, in pounds, of the blue whale written in scientific notation?

B. A thread snake weighs 0.001 pound. What is the weight, in pounds, of the thread snake written in scientific notation?

C. The researchers compare the average weights of elephants and tigers.

- The average weight of an elephant is 1×10^4 pounds.
- The average weight of a tiger is 6.25×10^2 pounds.

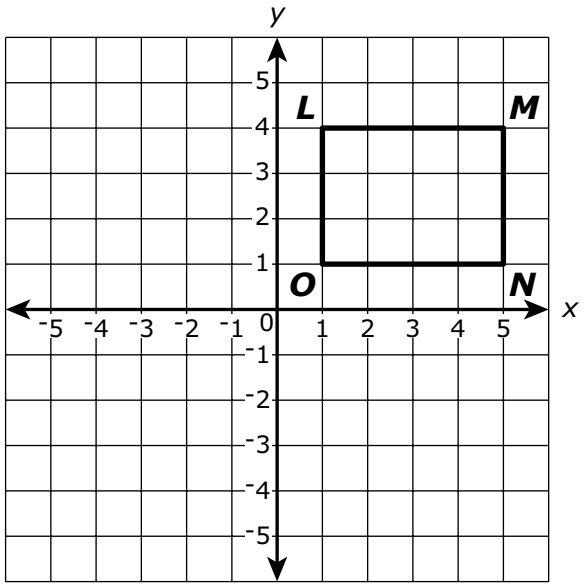
How many times greater is the average weight of an elephant than the average weight of a tiger? Show or explain how you got your answer.

D. The researchers note that there are 3,200 tigers living in the wild. Using 6.25×10^2 pounds as the average weight of a tiger, what is the total weight, in pounds, of all the tigers living in the wild? Show or explain how you got your answer. Write your answer in scientific notation.

6

This question has two parts.

7 Devon and Sara graphed rectangle *LMNO* on this coordinate plane, as shown.



Part A

Devon will reflect rectangle *LMNO* over the *x*-axis to create its image, rectangle *L′M′N′O′*.

Which of the following statements about rectangle *LMNO* and rectangle *L′M′N′O′* is true?

Ⓐ All of the corresponding angles and corresponding sides of the rectangles are congruent.

Ⓑ None of the corresponding angles or corresponding sides of the rectangles are congruent.

Ⓒ The corresponding angles of the rectangles are congruent, but their corresponding sides are not.

Ⓓ The corresponding sides of the rectangles are congruent, but their corresponding angles are not.

Part B

Sara will perform a transformation on rectangle *LMNO* to create an image that is congruent to the rectangle.

Which of the following transformations, if performed on rectangle *LMNO*, will create an image that is **not** congruent to the rectangle?

Ⓐ a translation 1 unit right

Ⓑ a reflection over the *y*-axis

Ⓒ a 180° clockwise rotation about the origin

Ⓓ a dilation by a scale factor of 2 centered at the origin

8 Which of the following equations are true?

Select the **three** correct answers.

Ⓐ $2 \times 10^{-2} = 0.002$

Ⓑ $2 \times 10^{-2} = 0.02$

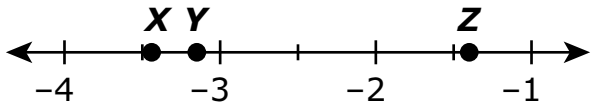
Ⓒ $2 \times 10^{1} = 2$

Ⓓ $2 \times 10^{1} = 20$

Ⓔ $2 \times 10^{3} = 200$

Ⓕ $2 \times 10^{3} = 2000$

9 Points X, Y, and Z are shown on this number line.



Which of the following sentences about the approximate values of points X, Y, and Z are true?

Select the **three** correct answers.

Ⓐ The approximate value of point X is $-2\sqrt{3}$.

Ⓑ The approximate value of point X is $-\sqrt{2}$.

Ⓒ The approximate value of point Y is $-2\sqrt{3}$.

Ⓓ The approximate value of point Y is $-\sqrt{10}$.

Ⓔ The approximate value of point Z is $-\sqrt{2}$.

Ⓕ The approximate value of point Z is $-\sqrt{10}$.

10 A student recorded the weight of a puppy each week for several weeks after the puppy was born. This equation models y, the weight, in pounds, of the puppy x weeks after it was born.

$$y = 0.25x + 1$$

Based on the model, which of the following sentences is true?

Ⓐ The puppy gained 1 pound per week.

Ⓑ The puppy ate 1 pound of food per week.

Ⓒ The puppy reached a final weight of 1 pound.

Ⓓ The puppy weighed 1 pound when it was born.

Grade 8 Mathematics

SESSION 2

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You may use a calculator during this session.

Directions

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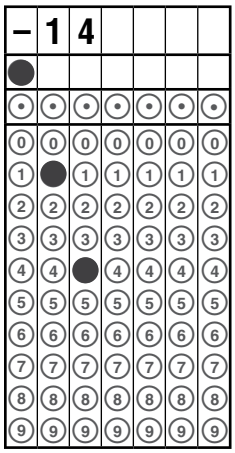
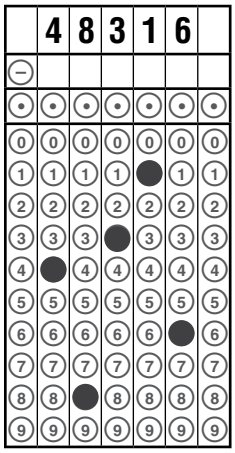
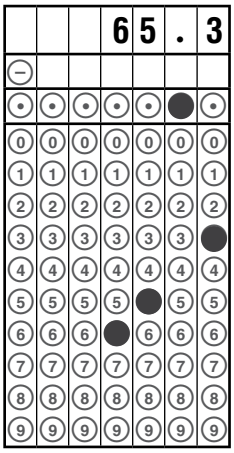
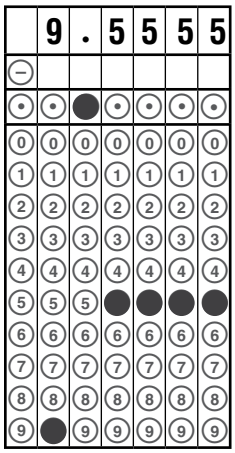




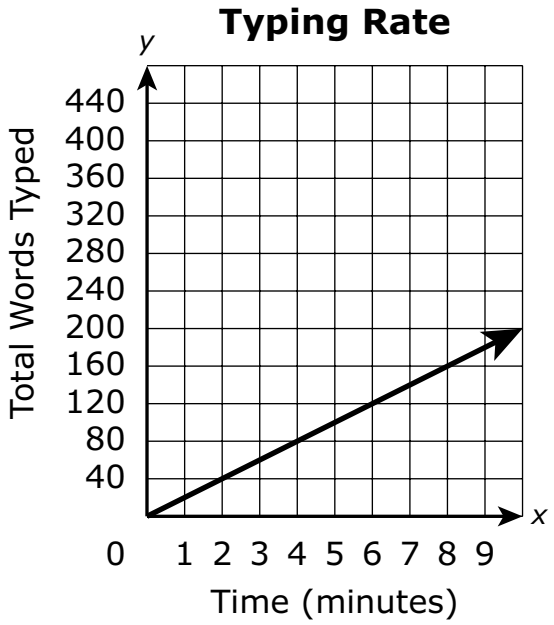




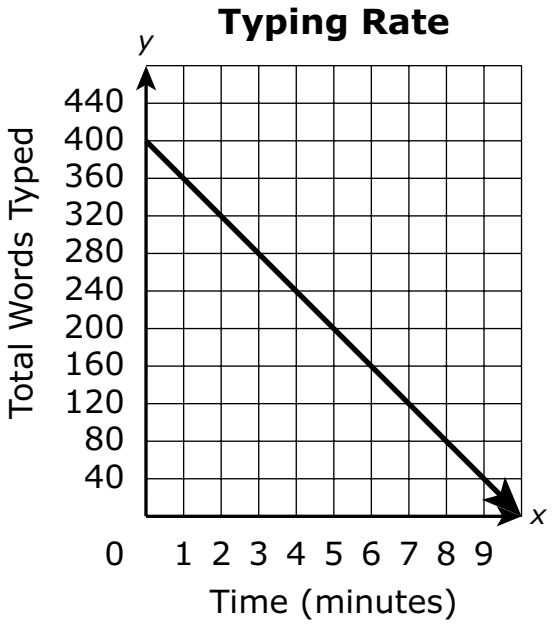
11 A student is typing a story on a computer. She types at a constant rate of 40 words per minute.

Which graph represents the relationship between *y*, the total number of words the student has typed, and *x*, the time in minutes that she has spent typing?

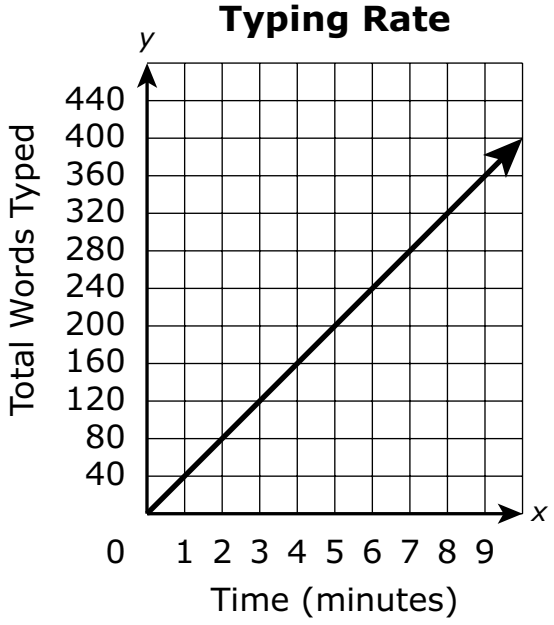
Ⓐ



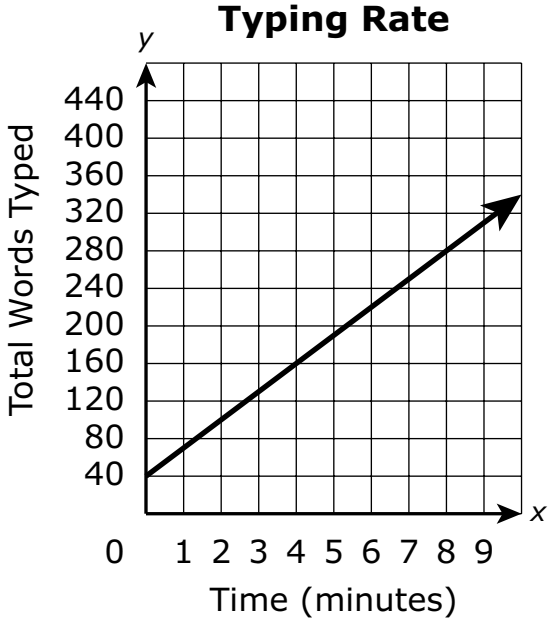
Ⓑ



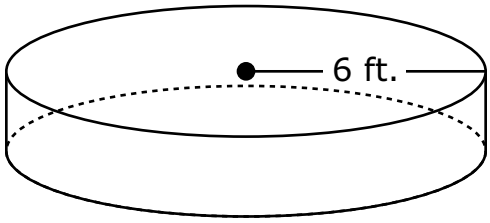
Ⓒ



Ⓓ



12 A pool in the shape of a cylinder has a radius of 6 feet, as shown.



Which of the following is closest to the amount of water needed to fill the pool to a height of 2 feet? (Use 3.14 for π.)

Ⓐ 57 cubic feet

Ⓑ 75 cubic feet

Ⓒ 226 cubic feet

Ⓓ 710 cubic feet

13 Consider this linear function.

$$y = 45x + 50$$

Which of the following tables show a linear function with a y-intercept that is **less than** the y-intercept in the given function?

Select the **three** correct answers.

Ⓐ

x	0	1	2
y	45	95	145

Ⓑ

x	0	1	2
y	50	95	140

Ⓒ

x	0	1	2
y	35	75	115

Ⓓ

x	0	1	2
y	40	75	110

Ⓔ

x	0	1	2
y	55	115	175

Ⓕ

x	0	1	2
y	60	115	170

14 Which of the following lists of ordered pairs could represent a function?

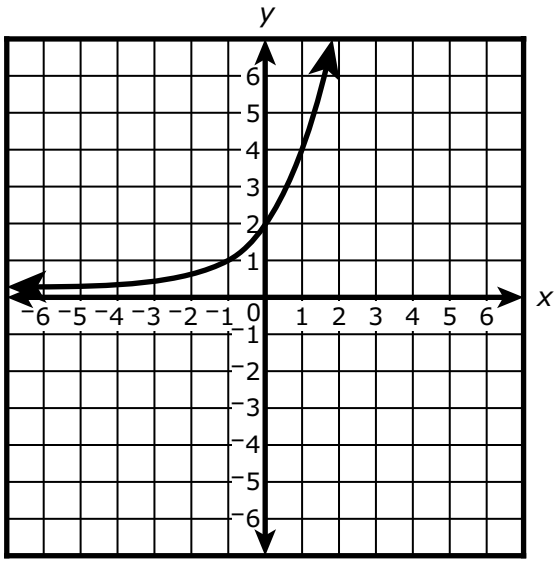
Ⓐ (1, 1), (2, 2), (3, 3), (4, 4)

Ⓑ (1, 2), (1, 3), (1, 4), (1, 5)

Ⓒ (1, 1), (1, 2), (3, 4), (4, 5)

Ⓓ (1, 2), (2, 3), (2, 4), (3, 4)

15 A function is graphed on a coordinate plane, as shown.



Which statement **best** describes the graph?

Ⓐ It is linear and increasing for all values of x.

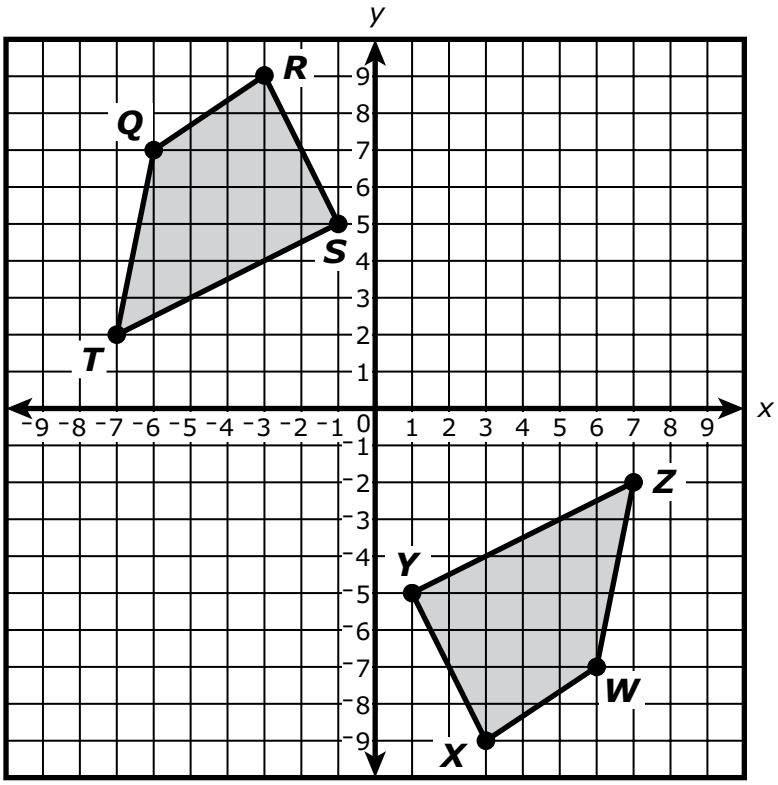
Ⓑ It is linear and increasing for positive values of x only.

Ⓒ It is nonlinear and increasing for all values of x.

Ⓓ It is nonlinear and increasing for positive values of x only.

This question has four parts. Be sure to label each part of your response.

16 Kirsten rotated quadrilateral *QRST* 180° clockwise to create its image, quadrilateral *WXYZ*, as shown on this coordinate plane.



A. About which point did Kirsten rotate quadrilateral *QRST*?

B. Which angle in quadrilateral *QRST* is congruent to $\angle W$ in quadrilateral *WXYZ*? Explain your reasoning.

C. Which line segment in quadrilateral *WXYZ* is congruent to line segment *QR* in quadrilateral *QRST*? Explain your reasoning.

D. Describe a **series** of transformations Kirsten can perform on quadrilateral *WXYZ* so that its image has vertices with the same coordinates as quadrilateral *QRST*. Show or explain how you got your answer.

16

17 Which of the following could represent the side lengths, in meters, of a right triangle?

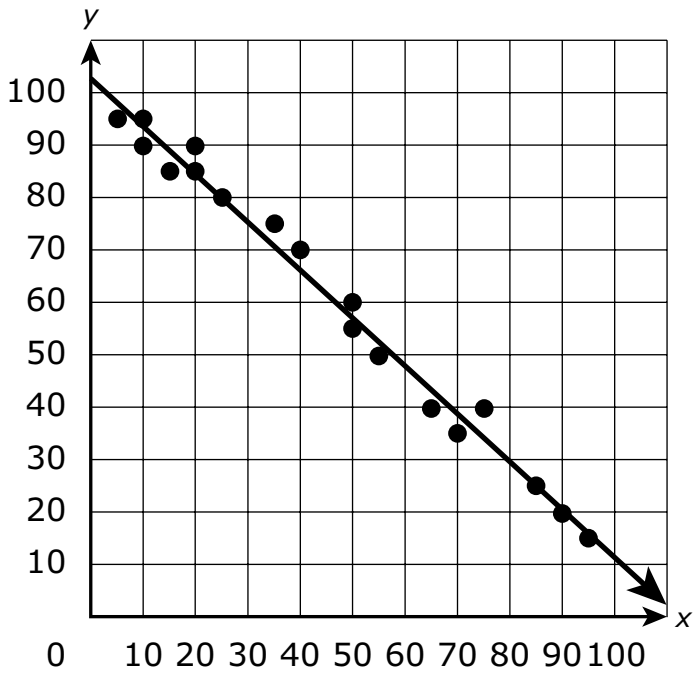
Ⓐ 3, 4, 7

Ⓑ 6, 8, 15

Ⓒ 8, 15, 17

Ⓓ 9, 16, 25

18 A line of best fit is drawn on this scatter plot.



Which statement about the scatter plot is true?

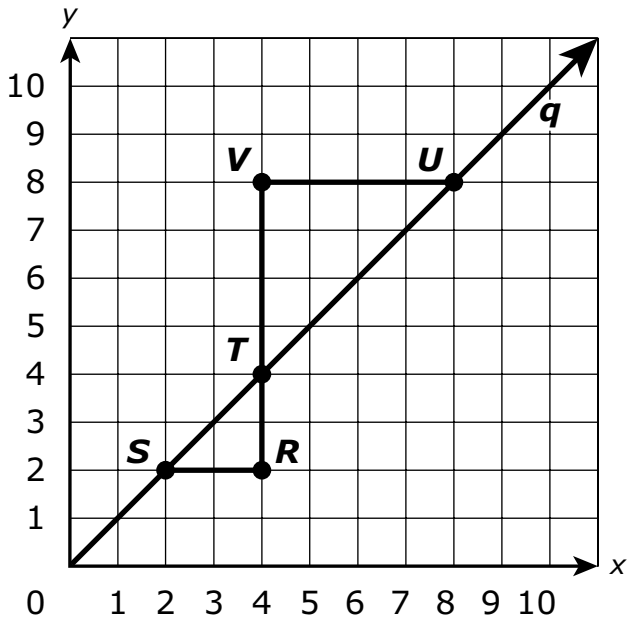
Ⓐ The line falls above most of the data points, and the data show a strong positive association.

Ⓑ The line falls above most of the data points, and the data show a strong negative association.

Ⓒ The line falls between most of the data points, and the data show a strong positive association.

Ⓓ The line falls between most of the data points, and the data show a strong negative association.

19 Line *q* and triangles *STR* and *UTV* are shown on this graph.



Which statements about the graph are true?

Select the **three** correct answers.

Ⓐ Triangles *STR* and *UTV* are similar.

Ⓑ Triangles *STR* and *UTV* are congruent.

Ⓒ Angles *STR* and *UVT* have the same measure.

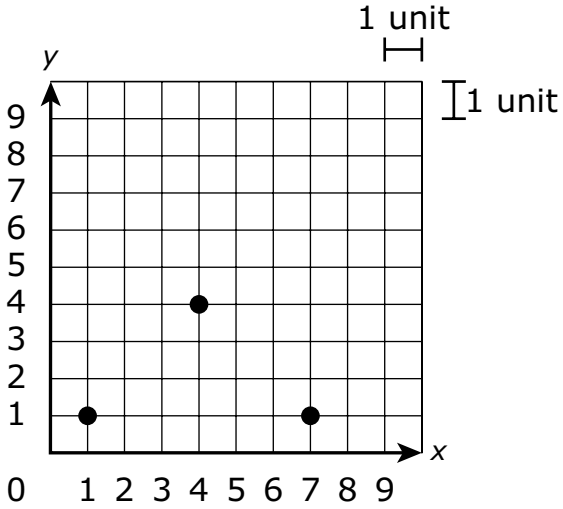
Ⓓ Angles *SRT* and *UVT* have the same measure.

Ⓔ Line segments *ST* and *TU* have the same slope.

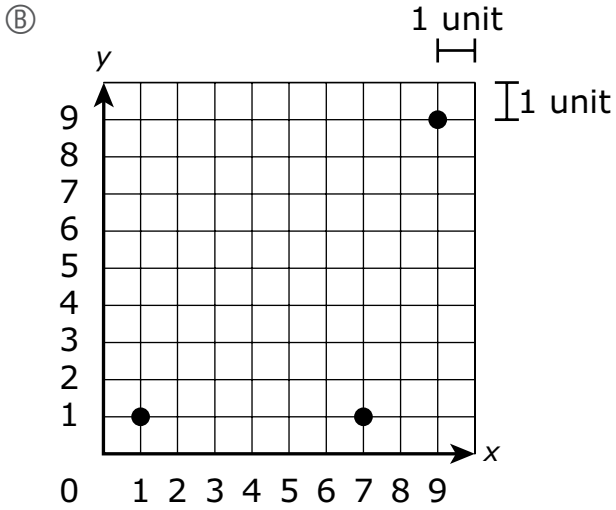
Ⓕ Line segments *ST* and *TU* have the same length.

20 Which of the following graphs shows three points that, when connected, form the vertices of a right triangle with a hypotenuse that has a length of exactly 10 units?

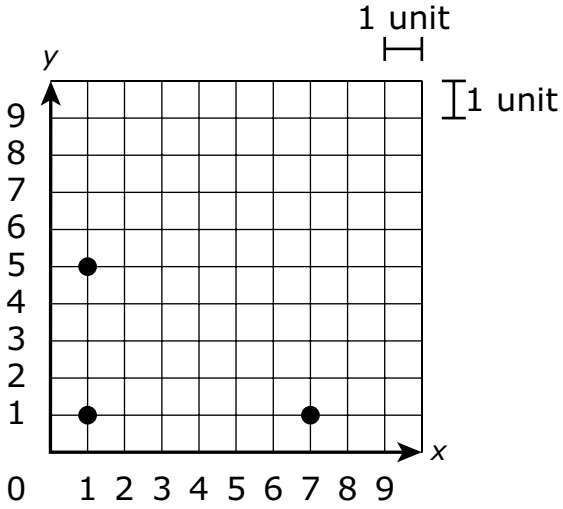
Ⓐ



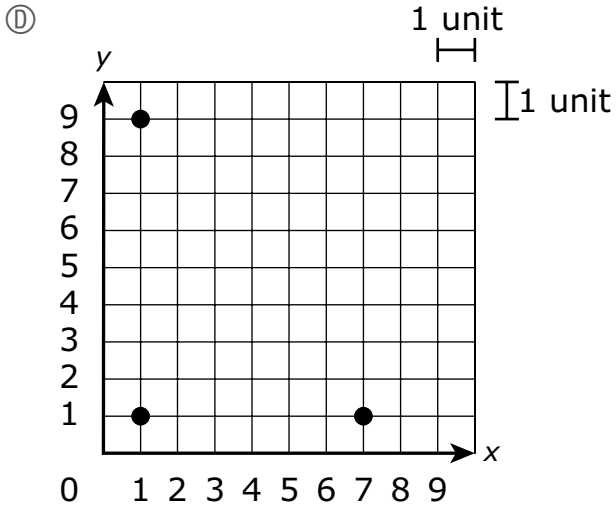
Ⓑ



Ⓒ



Ⓓ



Grade 8 Mathematics
Spring 2025 Released Operational Items

PBT Item No.	Page No.	Reporting Category	Standard	Item Type*	Item Description	Correct Answer (SR)**
1	5	*Number System & Expressions/Equsations*	8.EE.C.8	SR	Determine the coordinates of the solution of a system of equations.	B
2	6	*Functions*	8.F.A.1	SR	Given a set of points on a coordinate plane, determine which point should be removed in order to create a function.	B
3	6	*Number System & Expressions/Equations*	8.EE.A.1	SR	Apply the properties of positive and negative integer exponents to identify equivalent expressions.	C
4	7	*Functions*	8.F.B.4	SR	Determine which equation can be used to find the value of an unknown quantity, given a verbal description of a ratio in a real-world context.	A
5	7	*Number System & Expressions/Equations*	8.NS.A.1	SR	Identify rational numbers from a list of radical expressions.	A,C
6	8–9	*Number System & Expressions/Equations*	8.EE.A.4	CR	Convert numbers expressed in standard notation into scientific notation, and multiply and divide numbers expressed in scientific notation using a real-world context.	
7	10-11	*Geometry*	8.G.A.2	SR	Determine which statement about a rectangle and its image after a reflection is true, and identify which transformation preserves congruence of a figure.	A;D
8	12	*Number System & Expressions/Equations*	8.EE.A.3	SR	Convert expressions written in scientific notation to expressions written in standard notation.	B,D,F
9	12	*Number System & Expressions/Equations*	8.NS.A.2	SR	Determine the approximate locations of irrational numbers on a number line.	A,D,E
10	13	*Statistics and Probability*	8.SP.A.3	SR	Interpret the *y*-intercept in a linear model based on data to determine which sentence interpreting the model is true.	D
11	16	*Number System & Expressions/Equations*	8.EE.B.5	SR	Determine which graph represents a proportional relationship described within a real-world context.	C
12	17	*Geometry*	8.G.C.9	SR	Determine the volume of a cylinder in a real-world context.	C
13	18	*Functions*	8.F.A.2	SR	Compare the *y*-intercepts of linear functions represented algebraically and in tables.	A,C,D
14	19	*Functions*	8.F.A.1	SR	Determine which set of coordinate pairs represents a function.	A
15	19	*Functions*	8.F.B.5	SR	Determine which statement best describes a given graph qualitatively.	C
16	20–21	*Geometry*	8.G.A.1	CR	Given a polygon and its image after a transformation, verify congruence by analyzing properties of both polygons and describe a series of transformations that would result in the same image of the polygon.	
17	22	*Geometry*	8.G.B.6	SR	Determine which set of numbers could represent the side lengths of a right triangle.	C
18	22	*Statistics and Probability*	8.SP.A.2	SR	Justify why a line drawn through data on a scatter plot is suitable as a line of best fit.	D
19	23	*Number System & Expressions/Equations*	8.EE.B.6	SR	Use similar triangles to compare the slopes of two line segments on the same line.	A,D,E
20	24	*Geometry*	8.G.B.8	SR	Apply the Pythagorean Theorem to determine which graph shows the vertices of a right triangle with a given hypotenuse length.	D

* 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. 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 2025 Unreleased Operational Items

PBT Item No.	Reporting Category	Standard	Item Type*	Item Description
21	*Geometry*	8.G.A.3	SR	Given a transformation, determine the coordinates of the image of a given point.
22	*Number System & Expressions/Equations*	8.NS.A.2	SR	Identify the approximate value of an irrational number.
23	*Number System & Expressions/Equations*	8.NS.A.1	SR	Identify an irrational number from a list of numbers.
24	*Statistics and Probability*	8.SP.A.1	CR	Interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities.
25	*Number System & Expressions/Equations*	8.EE.C.7	SR	Solve a linear equation by collecting like terms.
26	*Number System & Expressions/Equations*	8.EE.A.1	SR	Use the properties of exponents to identify equivalent expressions.
27	*Number System & Expressions/Equations*	8.EE.B.5	SR	Interpret a proportional relationship on a graph by identifying and interpreting the slope of the graph.
28	*Number System & Expressions/Equations*	8.EE.B.6	SR	Determine which equation represents a line graphed on a coordinate plane.
29	*Number System & Expressions/Equations*	8.EE.A.4	SR	Solve a real-world problem by performing operations with numbers expressed in both scientific and standard notation.
30	*Number System & Expressions/Equations*	8.EE.A.2	SA	Determine the cube root of a given number in the context of volume of a cube.
31	*Geometry*	8.G.B.7	SR	Identify an equation that can be used to find an unknown leg length of a right triangle.
32	*Functions*	8.F.B.4	CR	Given a graph, determine the slope and *y*-intercept and use the equation of the line to predict the value of y given its corresponding x value.
33	*Geometry*	8.G.A.3	SR	Determine the coordinates of a point in a figure on a coordinate plane after a reflection.
34	*Geometry*	8.G.A.5	SR	Given parallel lines cut by a transversal, identify all angles that must be congruent to a given angle measure.
35	*Geometry*	8.G.C.9	SA	Determine the volume of a cone, given its radius and height in a real-world context.
36	*Functions*	8.F.A.2	SR	Compare properties of two functions represented algebraically and in a table, and interpret each function's rate of change and initial value.
37	*Functions*	8.F.A.1	SR	Determine which graph does not represent a function.
38	*Number System & Expressions/Equations*	8.EE.C.8	SR	Find the value of one variable in a system of linear equations representing a real-world context.
39	*Geometry*	8.G.A.4	SR	Determine which transformation on a given figure would result in an image that is similar but not congruent to the figure.
40	*Geometry*	8.G.C.9	SA	Find the volume of a sphere given its radius.

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