MASSACHUSETTS
Department of Elementary
and Secondary Education

Release of Spring 2026 MCAS Test Items from the Grade 8 Mathematics Paper-Based Test

Spring 2026
Massachusetts Department of Elementary and Secondary Education

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This document was prepared by the
Massachusetts Department of Elementary and Secondary Education
Pedro Martinez
Commissioner

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Massachusetts Department of Elementary and Secondary Education
135 Santilli Highway, Everett, MA 02149-1950
Phone 781-338-3000 TTY: N.E.T. Relay 800-439-2370
www.doe.mass.edu

Overview of Grade 8 Mathematics Test

The spring 2026 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 MCAS Resource Center website at mcas.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.

MASSACHUSETTS
Department of Elementary and Secondary Education

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

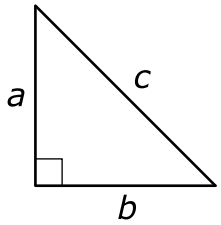
cone . . . . . $V = \frac{1}{3}\pi r^2 h$

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.

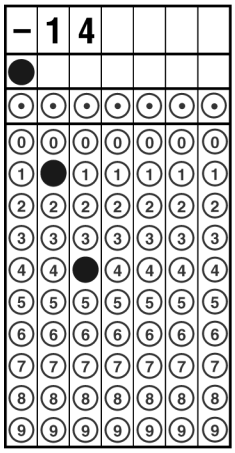
For other questions, you will need to fill in an answer grid. Directions for completing questions with answer grids are provided on the next page.

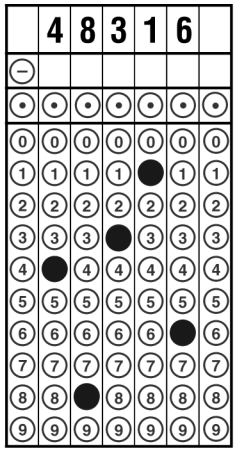
If a question asks you to show or explain your work, you must do so to receive full credit. Write your response in the space provided. Only responses written within the provided space will be scored.

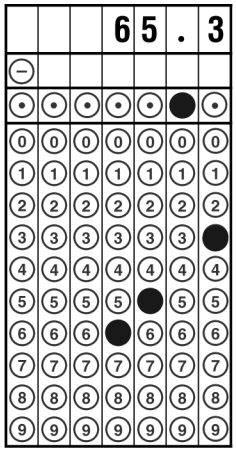
Directions for Completing Questions with Answer Grids

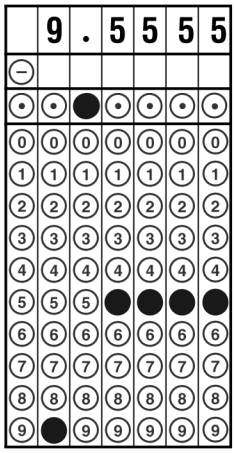
1. Work the question and find an answer.
2. Enter your answer in the answer boxes at the top of the answer grid.
3. Print only one number or symbol in each box. Do not leave a blank box in the middle of an answer.
4. Under each answer box, fill in the circle that matches the number or symbol you wrote 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 equation.

$$x = \sqrt{64}$$

What is the value of x in the equation?

Ⓐ 4

Ⓑ 8

Ⓒ 16

Ⓓ 32

2 Consider this equation of a line.

$$y = -4x + 5$$

Which of the following is true about the graph of the line?

Ⓐ The line intersects the y-axis at $(-4, 0)$ and has a slope of 5.

Ⓑ The line intersects the y-axis at $(5, 0)$ and has a slope of -4.

Ⓒ The line intersects the y-axis at $(0, 5)$ and has a slope of -4.

Ⓓ The line intersects the y-axis at $(0, -4)$ and has a slope of 5.

3 Which of the following functions are **not** linear?

Select the **three** correct answers.

Ⓐ $y = 4$

Ⓑ $2x - y = 0$

Ⓒ $y^3 = 3x - 1$

Ⓓ $y = 4x^2 + 1$

Ⓔ $(x + 2)^2 + y = 0$

Ⓕ $y + 1 = -4(x + 3) - 15$

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

4 Rachel wrote several expressions and equations using exponents.

A. First, Rachel wrote this expression.

$$2^1 \cdot 2^4$$

What is the value of Rachel's first expression? Show or explain how you got your answer.

B. Next, Rachel wrote this expression.

$$\frac{4^5}{4^3}$$

What is the value of Rachel's second expression? Show or explain how you got your answer.

C. Then, Rachel wrote this equation.

$$\frac{4^{12}}{4^x} = 4^5$$

What value of x will make Rachel's equation true? Show or explain how you got your answer.

D. Finally, Rachel compared the values of two expressions. Both expressions are shown in this table.

Expression S	$4^{-2} \cdot 4^7$
Expression T	$\frac{4^6}{4^3}$

Rachel claims that expression S and expression T in the table are equivalent expressions because 7 + 2 = 6 + 3.

Is Rachel's claim correct? Explain your reasoning.

4

5 Consider this expression.

$$\frac{6 \times 10^{-4}}{2 \times 10^{-7}}$$

Which of the following is equivalent to the expression?

Ⓐ 3×10^{3}

Ⓑ 4×10^{3}

Ⓒ 3×10^{-11}

Ⓓ 4×10^{-11}

6 Which of the following equations represents a linear function?

Ⓐ $y = x + 7^2$

Ⓑ $y = x^2 + 7$

Ⓒ $y = x^2 + 7^2$

Ⓓ $y = (x + 7)^2$

7 Which of the following is a rational number?

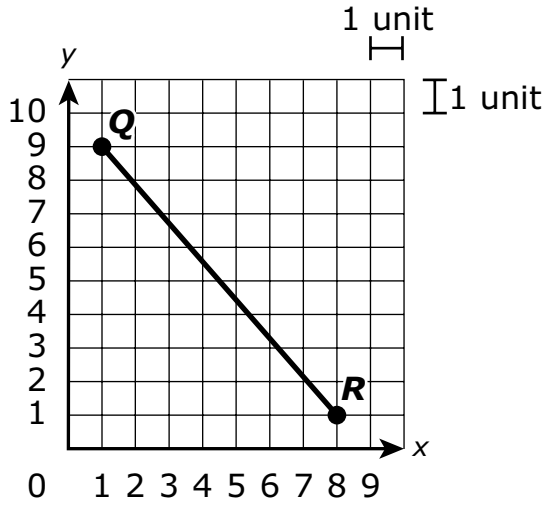
Ⓐ $\sqrt{2}$

Ⓑ $\sqrt{5}$

Ⓒ $\sqrt{16}$

Ⓓ $\sqrt{20}$

8 Line segment *QR* is graphed on this coordinate plane.



Which of the following expressions represents the length, in units, of line segment *QR*?

Ⓐ $7 + 8$

Ⓑ $7^2 + 8^2$

Ⓒ $\sqrt{7^2 + 8^2}$

Ⓓ $\sqrt{(7 + 8)^2}$

9 Between which of the following pairs of integers on the number line is $\sqrt{8}$ located?

Ⓐ 2 and 3

Ⓑ 3 and 4

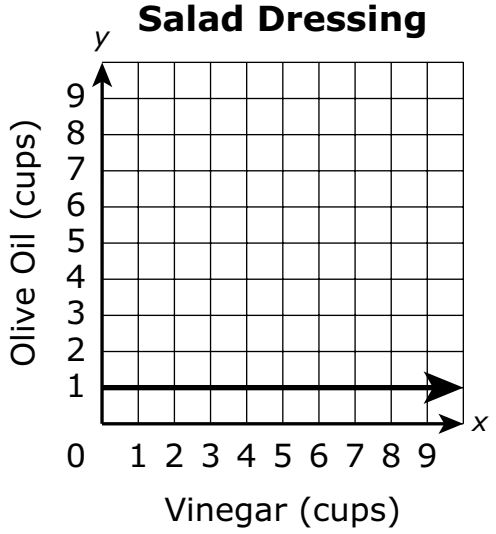
Ⓒ 7 and 8

Ⓓ 15 and 16

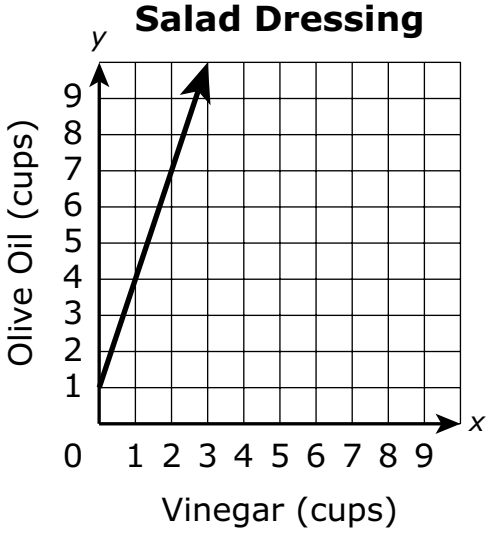
10 A recipe for salad dressing requires 1 cup of vinegar for every 3 cups of olive oil.

Which of the following graphs shows the relationship between x, the number of cups of vinegar, and y, the number of cups of olive oil, required for the recipe?

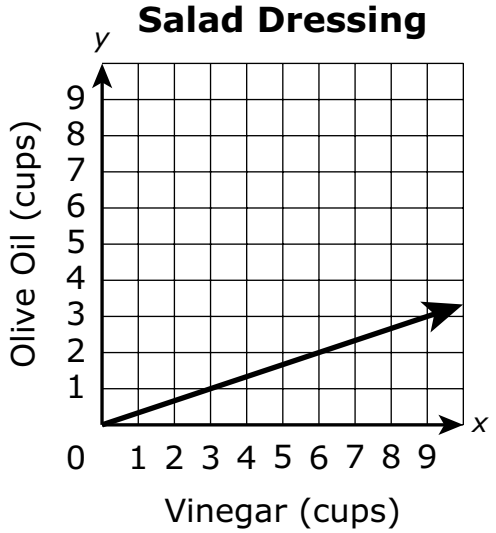
Ⓐ



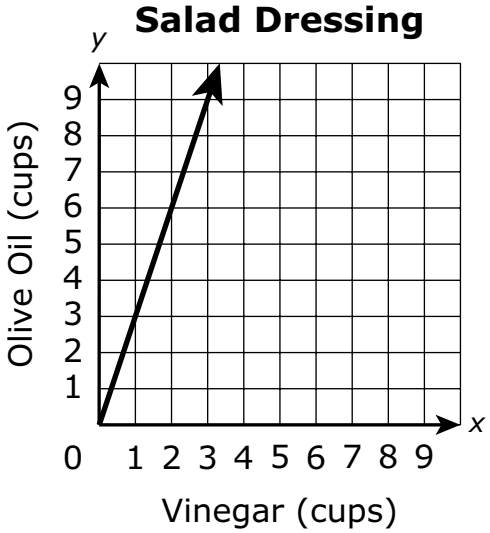
Ⓑ



Ⓒ



Ⓓ



Grade 8 Mathematics
SESSION 2

This session contains 10 questions.

You may use your reference sheet during this session.
You may use a calculator during this session.

Directions

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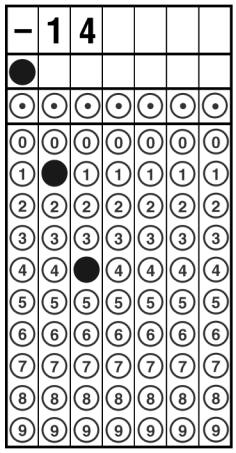
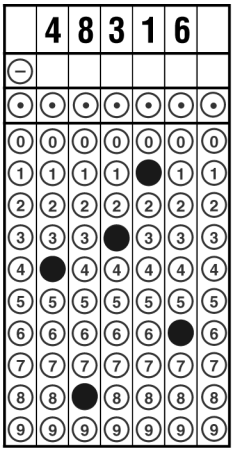
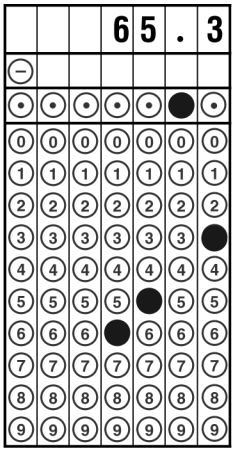
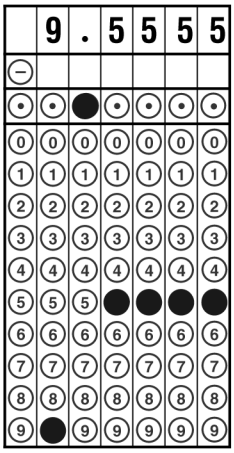
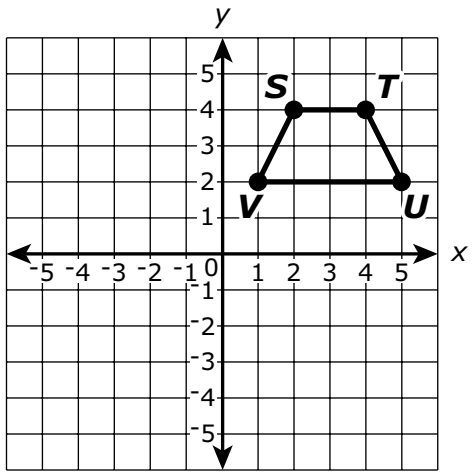








11 Quadrilateral *STUV* is shown.



A sequence of transformations will be performed on quadrilateral *STUV*.

Which of the following transformations will result in an image that is congruent to quadrilateral *STUV*?

Ⓐ a translation 5 units down and a dilation by a scale factor of 3

Ⓑ a dilation by a scale factor of 3 and a reflection over the line $y = x$

Ⓒ a translation 5 units down and a 90° clockwise rotation about the origin

Ⓓ a 90° clockwise rotation about the origin and a dilation by a scale factor of 3

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

12 All of the employees at a small company answered the following survey questions about their weekday mornings:

- Do you exercise in the morning?
- Do you wake up before 7 a.m.?

The responses to the survey questions are shown in this table.

Responses to Survey Questions

	Exercises in the Morning	**Does Not Exercise in the Morning**
Wakes Up before 7 a.m.	50	20
Does Not Wake Up before 7 a.m.	35	45

A. Based on the table, what is the total number of employees who exercise in the morning? Show or explain how you got your answer.

B. Based on the table, what percentage of the employees who exercise in the morning also wake up before 7 a.m.? Show or explain how you got your answer.

C. Based on the table, what is the **probability** that a randomly selected employee from the company does not wake up before 7 a.m. **and** does not exercise in the morning?

Mark your answer by filling in the appropriate circle on the next page.

A $\frac{45}{65}$

B $\frac{45}{80}$

C $\frac{45}{95}$

D $\frac{45}{150}$

D. The owner of the company says that employees who exercise in the morning are more likely to wake up before 7 a.m. than employees who do not exercise in the morning.

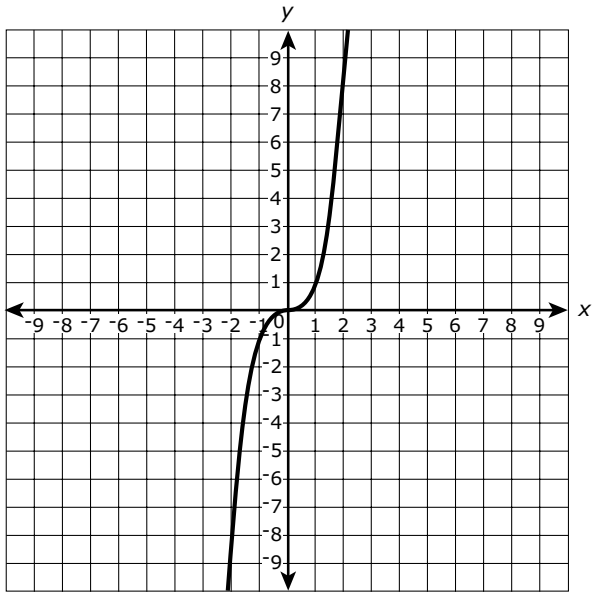
Based on the table, is the owner of the company correct? Explain your reasoning.

12

C. Ⓐ $\frac{45}{65}$ Ⓑ $\frac{45}{80}$

Ⓒ $\frac{45}{95}$ Ⓓ $\frac{45}{150}$

13 The graph of a function is shown on this coordinate plane.



Based on the graph, which of the following statements about the function are true?

Select the **two** correct answers.

Ⓐ The function is linear.

Ⓑ The function passes through (1, 1).

Ⓒ The function passes through (−2, 8).

Ⓓ The function decreases from $x = 0$ to $x = 2$.

Ⓔ The y-intercept and the x-intercept of the function are equivalent.

14 A large barrel contains 10 liters of water. A landscaper begins to add more water to the barrel at a constant rate.

This table shows the linear relationship between x, the number of minutes the landscaper has been adding water to the barrel, and y, the total number of liters of water in the barrel.

x	y
0	10
13	42.5
18	55

Based on the table, what is the rate of change, in liters per minute, at which the landscaper is adding water to the barrel?

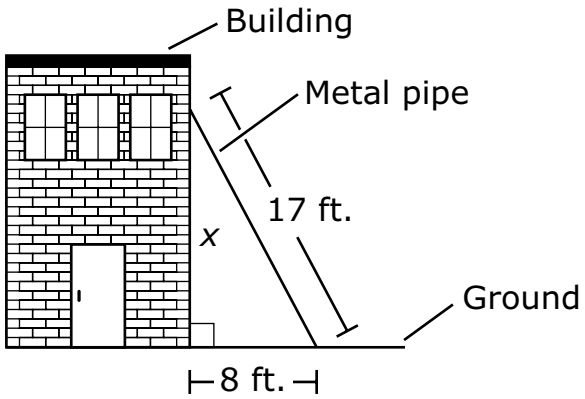
Ⓐ 2.5

Ⓑ 0.4

Ⓒ −2.5

Ⓓ −0.4

15 A construction worker leans a metal pipe that is 17 feet long against the side of a building so that the bottom of the pipe is 8 feet from the base of the building, as shown in this diagram.



Based on the diagram, what is x, the height, in feet, at which the pipe touches the building?

Ⓐ 9 feet

Ⓑ 12.5 feet

Ⓒ 15 feet

Ⓓ 18.8 feet

16 Which sets of ordered pairs represent y as a function of x?

Select the **two** correct answers.

Ⓐ (5, 6), (5, 7), (5, 8), (5, 9)

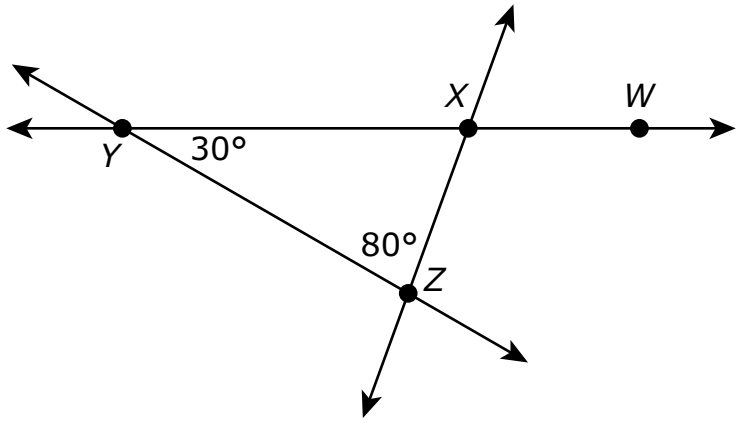
Ⓑ (5, 6), (6, 6), (7, 6), (8, 6)

Ⓒ (5, 6), (6, 5), (7, 8), (8, 7)

Ⓓ (5, 6), (6, 7), (7, 6), (6, 5)

Ⓔ (5, 6), (7, 8), (7, 9), (9, 5)

17 Lines *YZ*, *XZ*, and *WY* intersect to form triangle *XYZ*. The lines and some of the angle measures of triangle *XYZ* are shown in this diagram.



What is the measure, in degrees, of $\angle WXZ$?

Enter your answer in the answer boxes at the top of the answer grid **and** completely fill the matching circles.

⊖						
⊙	⊙	⊙	⊙	⊙	⊙	⊙
0	0	0	0	0	0	0
1	1	1	1	1	1	1
2	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6
7	7	7	7	7	7	7
8	8	8	8	8	8	8
9	9	9	9	9	9	9

18 A system of equations is shown.

$$3x + 2y = 5$$

$$x + y = 3$$

What is the value of x in the solution to this system of equations?

Ⓐ −2

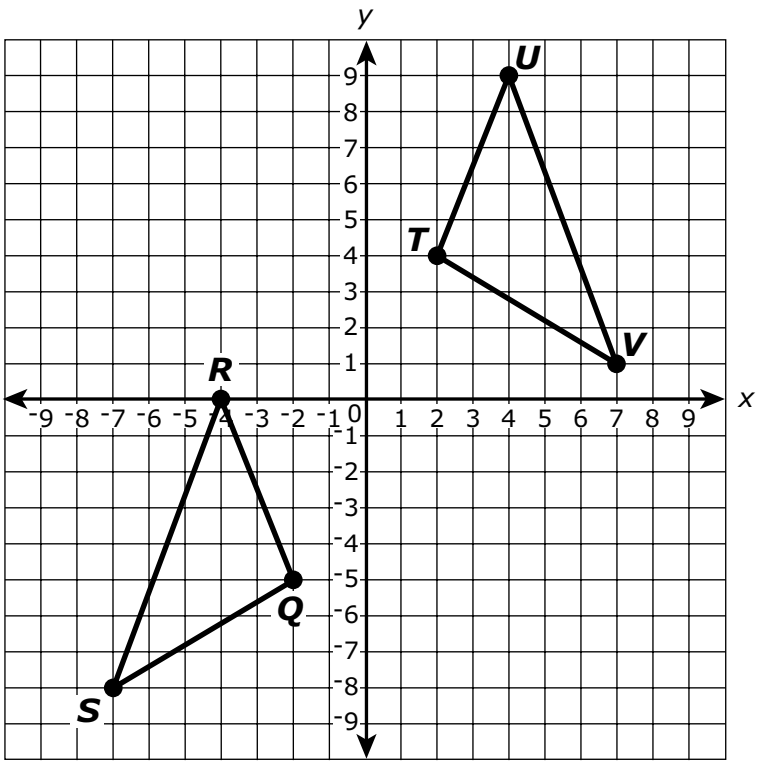
Ⓑ −1

Ⓒ 1

Ⓓ 2

This question has two parts.

19 Congruent triangles *QRS* and *TUV* are shown on this coordinate plane.



Part A

Which sequence of transformations, when performed on triangle *QRS*, will map triangle *QRS* onto triangle *TUV*?

Ⓐ Triangle *QRS* can be translated 9 units up and then reflected over the *x*-axis to map it onto triangle *TUV*.

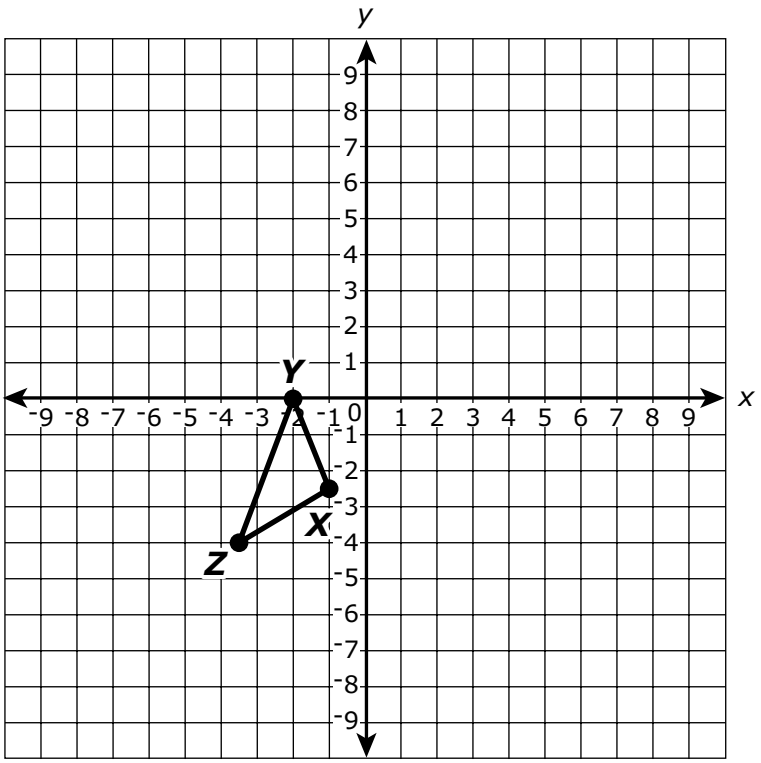
Ⓑ Triangle *QRS* can be translated 9 units down and then reflected over the *x*-axis to map it onto triangle *TUV*.

Ⓒ Triangle *QRS* can be translated 9 units up and then reflected over the *y*-axis to map it onto triangle *TUV*.

Ⓓ Triangle *QRS* can be translated 9 units down and then reflected over the *y*-axis to map it onto triangle *TUV*.

Part B

Another transformation was performed on triangle *QRS* to create triangle *XYZ*, as shown on this coordinate plane.



Which statement about the relationship between triangle *QRS* and triangle *XYZ* is true?

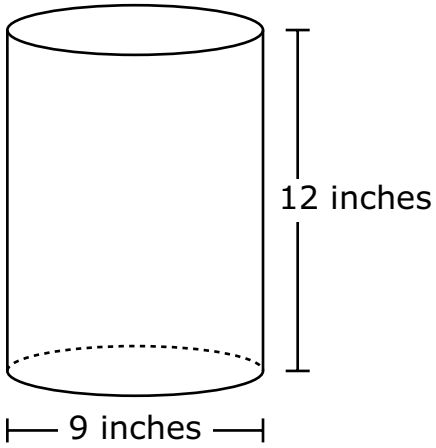
Ⓐ Triangle *QRS* is similar to triangle *XYZ* because triangle *QRS* was dilated by a scale factor of $\frac{1}{2}$ centered at the origin.

Ⓑ Triangle *QRS* is not similar to triangle *XYZ* because triangle *QRS* was dilated by a scale factor of $\frac{1}{2}$ centered at the origin.

Ⓒ Triangle *QRS* is similar to triangle *XYZ* because triangle *QRS* was dilated by a scale factor of 2 centered at the origin.

Ⓓ Triangle *QRS* is not similar to triangle *XYZ* because triangle *QRS* was dilated by a scale factor of 2 centered at the origin.

20 A cylinder and its dimensions are shown.



What is the volume, in cubic inches, of the cylinder? (Use 3.14 for π.)

Enter your answer in the answer boxes at the top of the answer grid **and** completely fill the matching circles.

⊖						
•	•	•	•	•	•	•
0	0	0	0	0	0	0
1	1	1	1	1	1	1
2	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6
7	7	7	7	7	7	7
8	8	8	8	8	8	8
9	9	9	9	9	9	9

Grade 8 Mathematics
Spring 2026 Released Operational Items

PBT Item No.	Page No.	Reporting Category	Standard	Item Type*	Item Description	Correct Answer**
1	6	*Number System & Expressions/Equations*	8.EE.A.2	SR	Evaluate the square root of a small perfect square.	B
2	6	*Number System & Expressions/Equations*	8.EE.B.6	SR	Determine the *y*-intercept and slope of an equation given in the form of $y = mx + b$.	C
3	7	*Functions*	8.F.A.3	SR	Determine which equations represent functions that are not linear.	C,D,E
4	8–9	*Number System & Expressions/Equations*	8.EE.A.1	CR	Apply properties of integer exponents to generate equivalent expressions.	
5	10	*Number System & Expressions/Equations*	8.EE.A.4	SR	Find the quotient of two numbers written in scientific notation.	A
6	10	*Functions*	8.F.A.3	SR	Determine whether given equations are linear or nonlinear functions.	A
7	10	*Number System & Expressions/Equations*	8.NS.A.1	SR	Identify which radical expression is a rational number.	C
8	11	*Geometry*	8.G.B.8	SR	Determine which expression can be used to find the distance between two points on a coordinate plane using the Pythagorean Theorem.	C
9	11	*Number System & Expressions/Equations*	8.NS.A.2	SR	Determine between which pair of integers a square root of a given number lies.	A
10	12	*Number System & Expressions/Equations*	8.EE.B.5	SR	Determine which graph shows a proportional relationship based on a given real-world context.	D
11	15	*Geometry*	8.G.A.2	SR	Determine which series of transformations will result in a figure that is congruent to a given figure.	C
12	16–17	*Statistics and Probability*	8.SP.A.4	CR	Use relative frequencies from a two-way frequency table to solve real-world problems.	
13	18	*Functions*	8.F.B.5	SR	Given a graph of a function, determine which statements about the function are true.	B,E
14	19	*Functions*	8.F.B.4	SR	Determine the rate of change of a function from data represented in a table.	A
15	20	*Geometry*	8.G.B.7	SR	Determine the length of a leg of a right triangle in a real-world scenario by using the Pythagorean theorem.	C
16	20	*Functions*	8.F.A.1	SR	Determine whether sets of ordered pairs represent functions.	B,C
17	21	*Geometry*	8.G.A.5	SA	Determine the measure of an exterior angle of a triangle.	110
18	22	*Number System & Expressions/Equations*	8.EE.C.8	SR	Determine the *x*-value in the solution of a linear system of equations.	B

PBT Item No.	Page No.	Reporting Category	Standard	Item Type*	Item Description	Correct Answer**
19	23–24	*Geometry*	8.G.A.4	SR	Determine the sequence of transformations that shows two figures are congruent and determine whether a dilation still preserves similarity.	C;A
20	25	*Geometry*	8.G.C.9	SA	Determine the volume of a cylinder given the diameter of the base and the height.	763.02

* 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 2026 Unreleased Operational Items

PBT Item No.	Reporting Category	Standard	Item Type*	Item Description
21	*Number System & Expressions/Equations*	8.EE.A.4	SR	Compare the values of numbers written in scientific notation.
22	*Number System & Expressions/Equations*	8.EE.C.8	SR	Determine the coordinates of the solution of a system of equations.
23	*Number System & Expressions/Equations*	8.EE.A.2	SR	Use a cube root symbol to represent the value of x in an equation in the form $x^3 = p$.
24	*Number System & Expressions/Equations*	8.EE.B.6	SR	Determine the equation of a line.
25	*Geometry*	8.G.A.1	CR	Identify which corresponding parts are congruent between a triangle and its image after a given transformation and determine what transformations of the original triangle would result in the same image.
26	*Number System & Expressions/Equations*	8.EE.B.5	SR	Determine the unit rate from the graph of a line.
27	*Number System & Expressions/Equations*	8.EE.A.3	SR	Convert a number in standard notation to scientific notation, and determine how many times as much one number is than the other when both numbers are written in scientific notation.
28	*Number System & Expressions/Equations*	8.EE.C.7	SR	Determine which equations have an infinite number of solutions.
29	*Number System & Expressions/Equations*	8.NS.A.2	SR	Identify a point on a number line that corresponds to the approximate location of an irrational number.
30	*Number System & Expressions/Equations*	8.NS.A.1	SR	Determine the decimal equivalent of a rational number expressed as a fraction.
31	*Geometry*	8.G.A.3	SR	Determine the coordinates of the image of a vertex of a quadrilateral after it has been translated.
32	*Statistics and Probability*	8.SP.A.1	SR	Identify a scatter plot that displays a negative linear relationship.
33	*Geometry*	8.G.B.6	SR	Given a diagram of a triangle created by the sides of three squares, determine how it relates to the Pythagorean Theorem.
34	*Number System & Expressions/Equations*	8.EE.C.7	SR	Use the distributive property to determine which linear equations share a given solution.
35	*Functions*	8.F.A.2	CR	Determine the initial values, rates, equations and solutions of linear relationships represented in different ways.
36	*Geometry*	8.G.B.8	SR	Determine the length of a line segment on a coordinate plane using the Pythagorean Theorem.
37	*Functions*	8.F.B.4	SR	Determine the rate of change and the initial value of a function from data represented in a graph.
38	*Geometry*	8.G.B.7	SA	Determine an unknown side length of a right triangle using the Pythagorean Theorem.
39	*Geometry*	8.G.A.3	SR	Identify a quadrilateral graphed on a coordinate plane after a sequence of transformations.
40	*Functions*	8.F.B.5	SR	Analyze the qualitative features of a graph that represents a real-world situation.

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