MASSACHUSETTS COMPREHENSIVE ASSESSMENT SYSTEM

PRACTICE TEST

Mathematics

Grade 8

Student Name

School Name

District Name

MASSACHUSETTS DEPARTMENT OF
ELEMENTARY AND SECONDARY
EDUCATION

Grade 8 Mathematics
SESSION 1

This session contains 6 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 Practice Test Booklet.

For some questions, you will mark your answers by filling in the circles in your Practice Test 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.

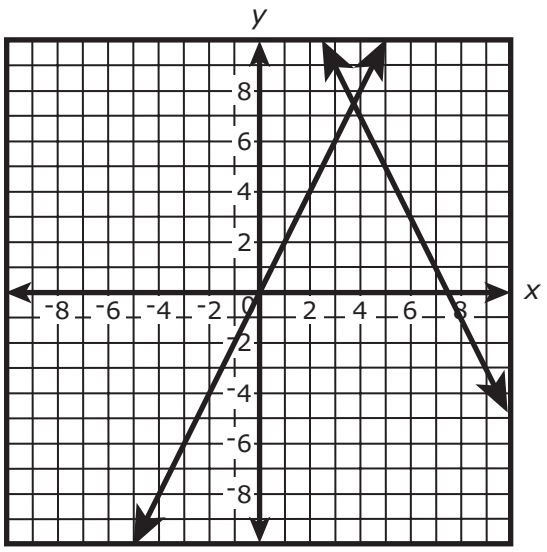
1 Consider this system of equations.

$$y = 2x$$

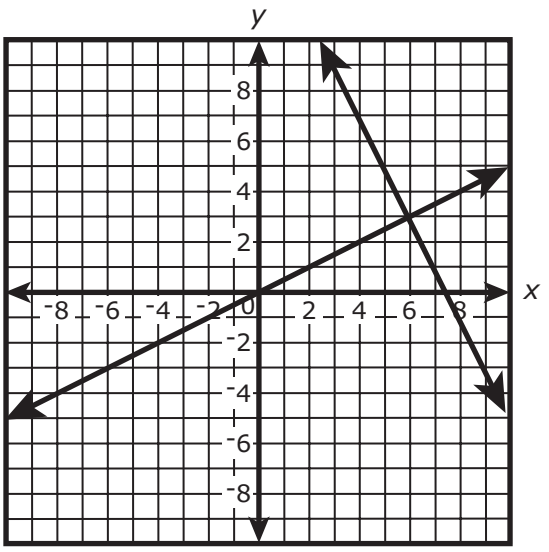
$$x + 2y = 15$$

Which of the following shows the system of equations graphed on a coordinate plane?

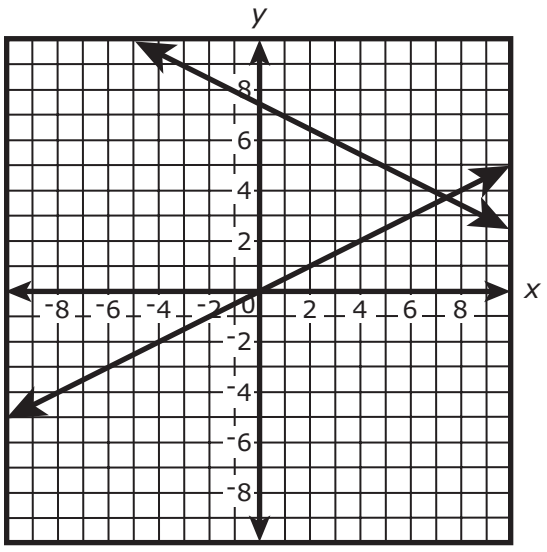
Ⓐ



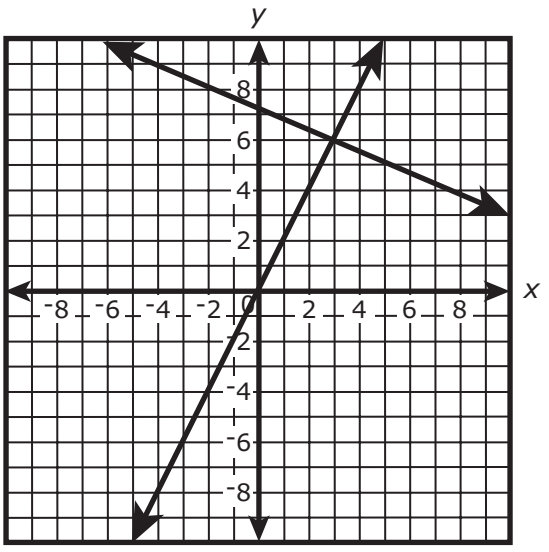
Ⓑ



Ⓒ



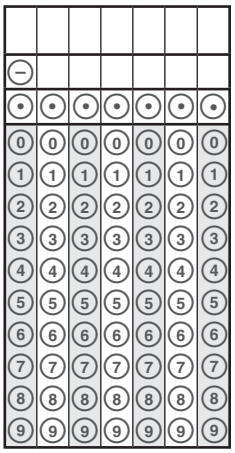
Ⓓ



2 What is the value of this expression?

$$\sqrt{25} - 9(2)^3$$

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



3 Which of the following equations are linear functions?

Select the **three** equations that are linear functions.

Ⓐ $y = \frac{2}{3}x + 4$

Ⓑ $y = (x - 6)^2$

Ⓒ $y = -3x$

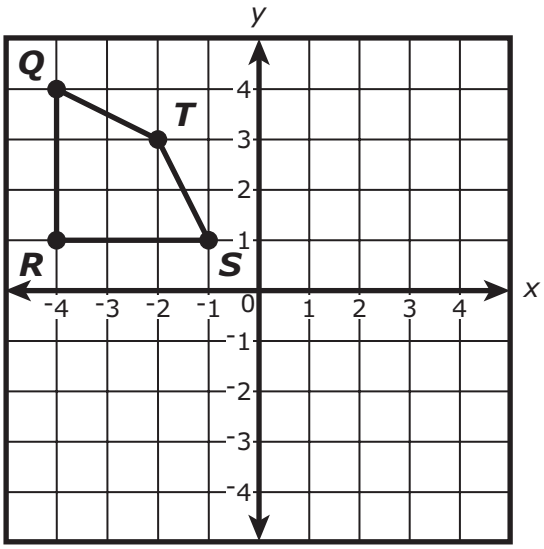
Ⓓ $y = x$

Ⓔ $y = x^2$

Ⓕ $y = x^3$

This question has two parts.

4 Quadrilateral *QRST* is shown on this coordinate plane. Richard and Haley will complete two different transformations on quadrilateral *QRST*.



Part A

Richard will rotate quadrilateral *QRST* 180° clockwise about the origin to form quadrilateral *Q′R′S′T′*.

Which of the following statements about the coordinates (*x*, *y*) of point *Q′* is true?

Ⓐ Both *x* and *y* will be positive.

Ⓑ Both *x* and *y* will be negative.

Ⓒ *x* will be negative and *y* will be positive.

Ⓓ *x* will be positive and *y* will be negative.

Part B

Haley's transformation of quadrilateral *QRST* will form quadrilateral *Q''R''S''T''.* The coordinates (*x*, *y)* of point *T''* will both be negative.

Which of the following could be Haley's transformation?

Ⓐ Quadrilateral *QRST* will be reflected across the *y*-axis.

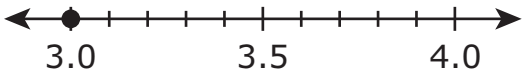
Ⓑ Quadrilateral *QRST* will be reflected across the *x*-axis.

Ⓒ Quadrilateral *QRST* will be rotated 90° clockwise about the origin.

Ⓓ Quadrilateral *QRST* will be translated 3 units to the right and then 5 units down.

5 Which number line shows the plotted value, to the nearest **tenth**, of $\sqrt{11}$?

Ⓐ



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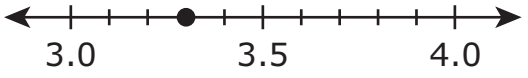

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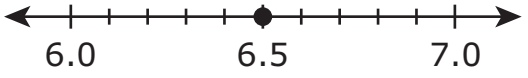

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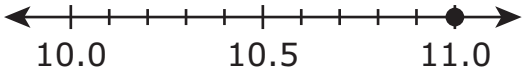
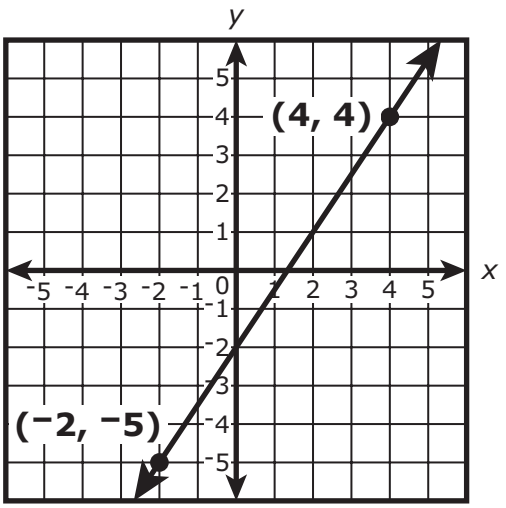


6 Functions H and K each show a relationship between x and y.

Function H:



Function K:

x	y
−2	4
0	6
2	8
4	10
6	12

Which of the following statements about functions H and K are true?

Select the **three** correct answers.

Ⓐ The slope of the line that represents function H is $\frac{2}{3}$.

Ⓑ The slope of the line that represents function H is $\frac{3}{2}$.

Ⓒ The y-intercept of the line that represents function H is 1.

Ⓓ The y-intercept of the line that represents function H is -2.

Ⓔ The rate of change of function K is less than the rate of change of function H.

Ⓕ The rate of change of function K is greater than the rate of change of function H.

STOP!

Grade 8 Mathematics
SESSION 2

This session contains 6 questions.

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You may use a calculator during this session.

Directions

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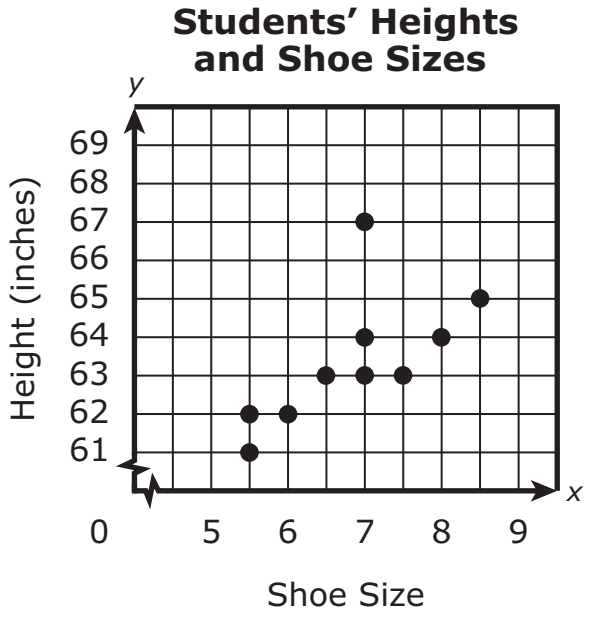
7 This scatter plot shows the relationship between the height, in inches, and the shoe size of each of 10 students in a class.



Based on the scatter plot, which ordered pair represents the outlier in the data?

Ⓐ (5.5, 61)

Ⓑ (7, 67)

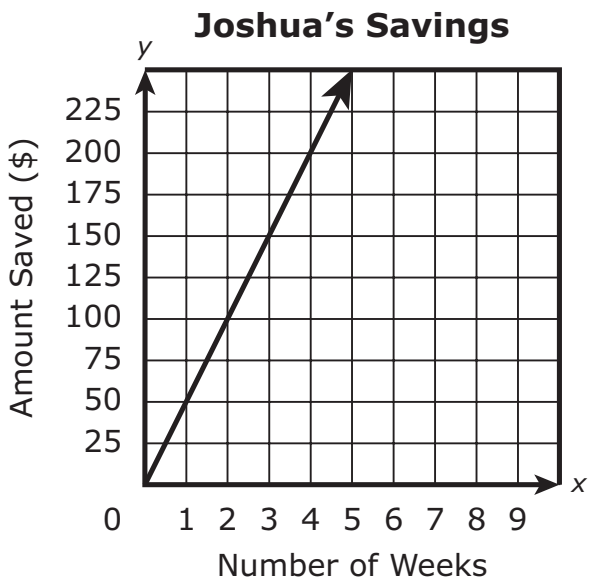
Ⓒ (8, 64)

Ⓓ (8.5, 65)

8 Joshua saves $50 every 2 weeks he works. The total amount of money Joshua saves is proportional to the number of weeks he works.

Which of the following graphs shows the amount of money, *y*, Joshua saves when he works for *x* weeks?

Ⓐ



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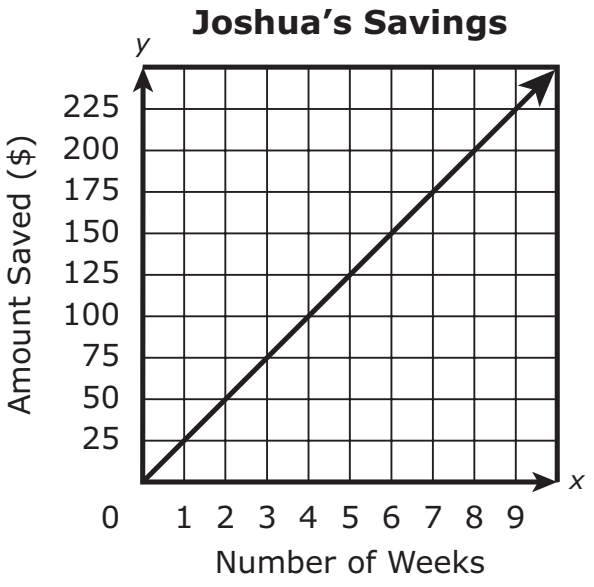
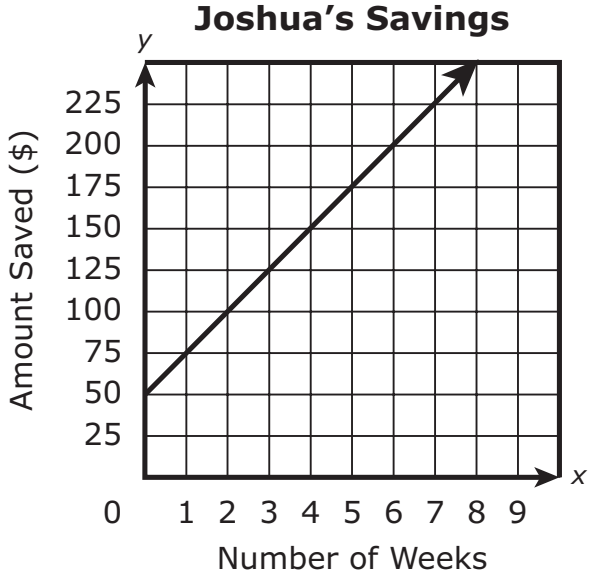
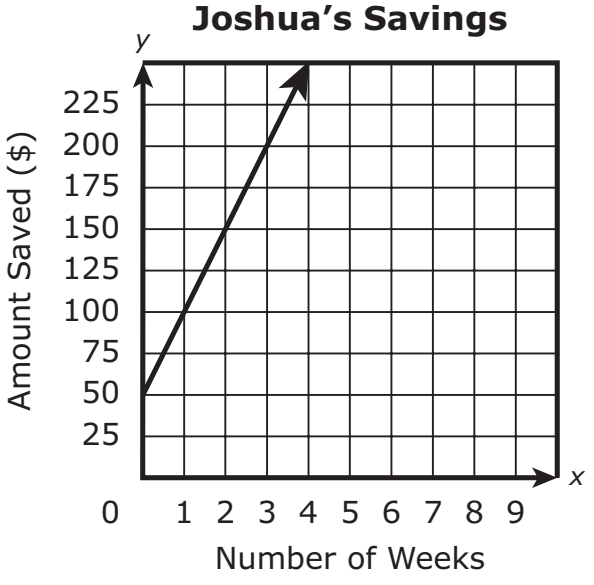


Ⓒ



Ⓓ



9 A principal surveyed 75 seventh-grade and eighth-grade students. She asked them if they prefer to obtain news from the Internet or to obtain news from television. She created a table to display the data, as shown.

		News Preference	
		Internet	**Television**
Students	**Seventh Grade**	16	34
	Eighth Grade	10	15

Based on the table, select the **three** correct statements.

Ⓐ 49 eighth-grade students participated in the survey.

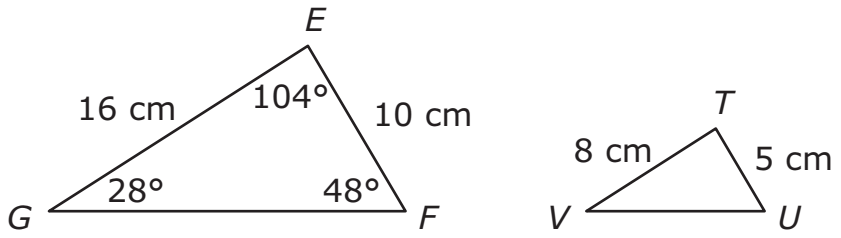
Ⓑ 50 seventh-grade students participated in the survey.

Ⓒ 26 out of 49 students prefer to obtain news from the Internet.

Ⓓ 3 out of 5 eighth-grade students prefer to obtain news from television.

Ⓔ 8 out of 25 seventh-grade students prefer to obtain news from the Internet.

10 Triangle *EFG* is similar to triangle *TUV*, as shown.



Based on the measurements of the triangles, what is the measure of angle *U*?

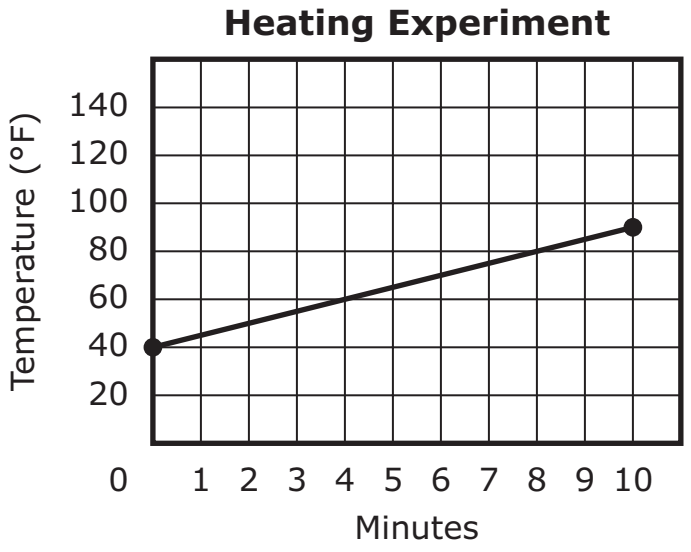
Ⓐ 24°

Ⓑ 28°

Ⓒ 48°

Ⓓ 52°

11 This graph shows the temperature, in degrees Fahrenheit, of a liquid for the first ten minutes of a heating experiment.



Based on the graph, which of the following functions could be used to determine T, the temperature of the liquid after m minutes?

Ⓐ $T = 5m + 40$

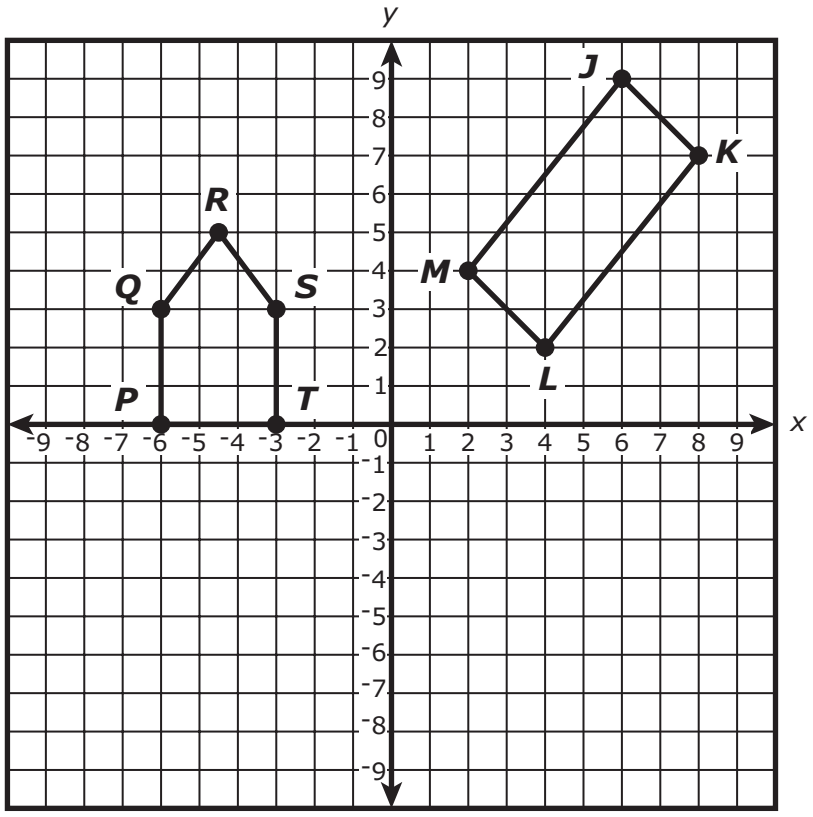
Ⓑ $T = -5m + 40$

Ⓒ $T = 5m + (-40)$

Ⓓ $T = -5m + (-40)$

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

12 A student plotted pentagon *PQRST* and quadrilateral *JKLM* on a coordinate plane, as shown.



A. What are the coordinates of vertex *T* in pentagon *PQRST*?

The student will translate pentagon *PQRST* 6 units to the right.

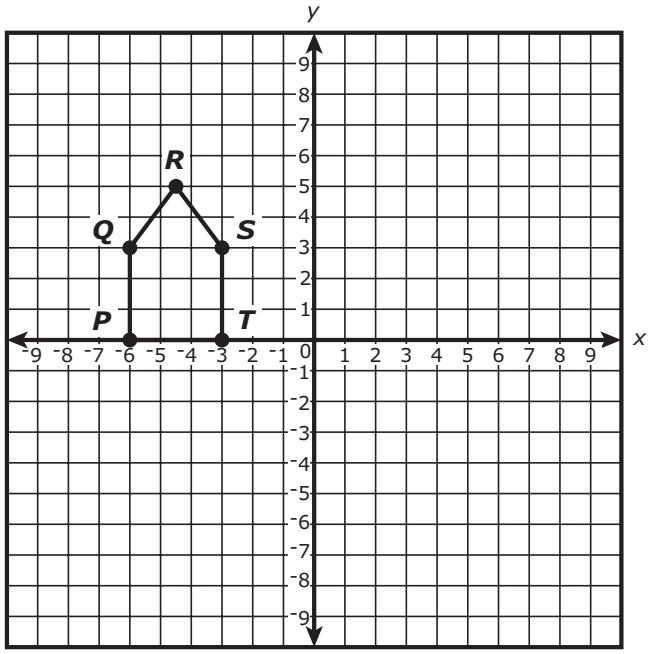
B. On the coordinate plane provided in your answer space, draw the image of pentagon *PQRST* after it has been translated 6 units to the right. Label the image *P′Q′R′S′T′*.

C. What are the coordinates of vertex *T′*?

The student will reflect quadrilateral *JKLM* over the *x*-axis, and then translate it 4 units to the left to create quadrilateral *J′K′L′M′*.

D. What will be the coordinates of vertices *J′* and *M′*? Show or explain how you got your answer. Be sure to label your coordinates.

12



STOP!

Grade 8 Paper-Based Practice Test Answer Key

The following pages include the answer key for all machine-scored items, followed by rubrics for the hand-scored items. The rubrics also show sample student responses; other valid methods for solving the problem can earn full credit unless a specific method is required by the item. In items where the scores are awarded for full and partial credit, students can still earn points for reasoning or modeling even if they make a computation error.

Session 1

Item Number	Item Type	Answer Key	Number of Points	Standard
1	SR	D	1	8.EE.C.8
2	SA	-67	1	8.EE.A.2
3	SR	A, C, D	1	8.F.A.3
4	SR	Part A: D Part B: B	2	8.G.A.3
5	SR	B	1	8.NS.A.2
6	SR	B, D, E	1	8.F.A.2

Session 2

Item Number	Item Type	Answer Key	Number of Points	Standard
7	SR	B	1	8.SP.A.1
8	SR	B	1	8.EE.B.5
9	SR	B, D, E	1	8.SP.A.4
10	SR	C	1	8.G.A.4
11	SR	A	1	8.F.B.4
12	CR	*See Rubric*	4	8.G.A.3

Rubric is on the next page.

Scoring Rubric for Grade 8 Practice Test **Session 2 – Question #12**

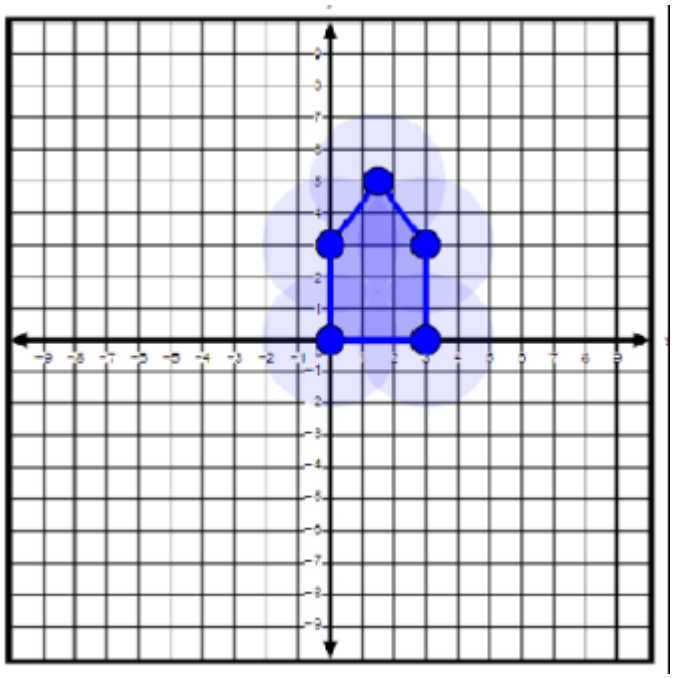
Scoring Guide	
Score	Description
4	The student response demonstrates an exemplary understanding of the Geometry concepts involved in describing the effects of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. The student identifies coordinates, plots the image of a pentagon after it has been translated, and identifies the coordinates of the images of two vertices of a quadrilateral after two transformations.
3	The student response demonstrates a good understanding of the Geometry concepts involved in describing the effects of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. 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 Geometry concepts involved in describing the effects of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. 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 minim al understanding of the Geometry concepts involved in describing the effects of dilations, translations, rotations , and reflect ions on two-dimensional figures using coordinates.
0	The student response contains insufficient evidence of an understanding of the Geometry concepts involved in describing the effects of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates to merit any points.

Sample Response is on the next page.

Sample Response:

a. $(-3, 0)$

b.



c. $(3, 0)$

d. J' (2, -9). It is (6, -9) after it is reflected over the x-axis, and then (2, -9) when it is translated four units to the left.

M' (-2, -4). It is (2, -4) after it is reflected over the x-axis, and then (-2, -4) when it is translated four units to the left.