

Louisiana Believes

**Grade 8 Mathematics  
Practice Test  
2013-2014**

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For further information, contact:  
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# LEAP Practice Test—Grade 8 Mathematics

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## Test Administrator Instructions

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- ★ This document contains a Practice Test that shows what each part, or session, of an actual grade 8 math assessment is like.

The Practice Test may be used at home or at school for students to become familiar with the LEAP test they will take in spring 2014. It may help students feel more relaxed when they take the actual test.

- ★ The Assessment Structure provides information on the overall design of the actual test. The Assessment Structure and example items can be found on the Louisiana Department of Education's website.

<http://www.louisianabelieves.com/resources/library/assessment-guidance-2013-2014>

The mathematics test has three sessions to be taken separately:

- Session 1 (pages 3 to 19) includes 30 multiple-choice questions—a calculator may not be used.
  - Session 2 (pages 21 to 38) includes 30 multiple-choice questions—a calculator may be used.
  - Session 3 (pages 40 to 43) includes 4 constructed-response questions—a calculator may be used.
- ★ A Mathematics Reference Sheet, which students may use for all sessions, is located on page 46.
  - ★ Students respond to multiple-choice items using the Answer Sheets on pages 44 and 45 and constructed-response items using pages 40 to 43 of Session 3.
  - ★ The Answer Keys and Scoring Rubrics, used to score student responses, are located on pages 47 to 52.

When printing the PDF files for the three Math Sessions, be sure to set the *Page Scaling* drop-down menu on the Print screen to None, No Scaling, or Actual Size depending on the printer you are using. Otherwise, measurement items may not be the correct size, which may impact student responses.



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## Mathematics—Sessions 1, 2, and 3

### GENERAL INSTRUCTIONS

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The Mathematics test has three sessions, two with multiple-choice questions and one with constructed-response questions. You may **not** use a calculator for session 1, but you may use a calculator for sessions 2 and 3.

## Session 1—Mathematics (No Calculator)

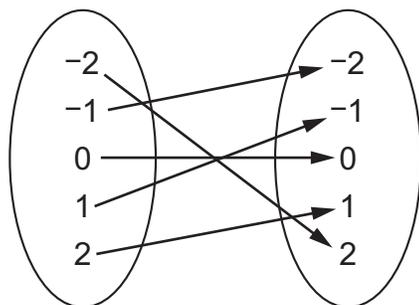
Write your answers for questions 1 through 30 in the spaces provided on page 44, session 1 answer sheet. Write only one answer for each question. You may work problems in your test booklet or on scratch paper, but you must mark your answer on your answer sheet. You may review your work in this session, but do not work on any other session.



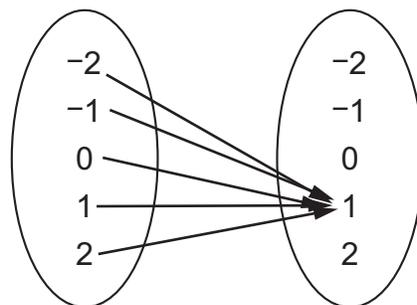
You may **NOT** use a calculator for this session.

1. Which model is **not** a function?

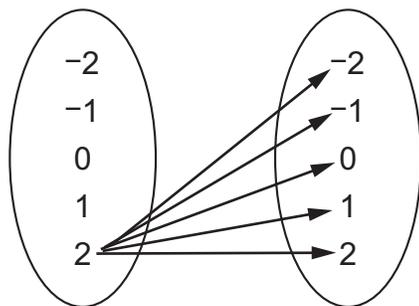
A.



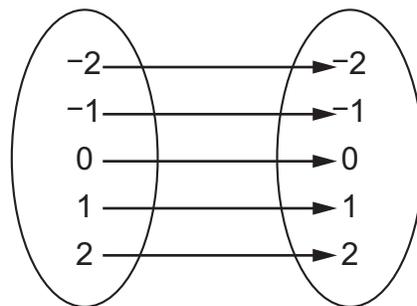
B.



C.

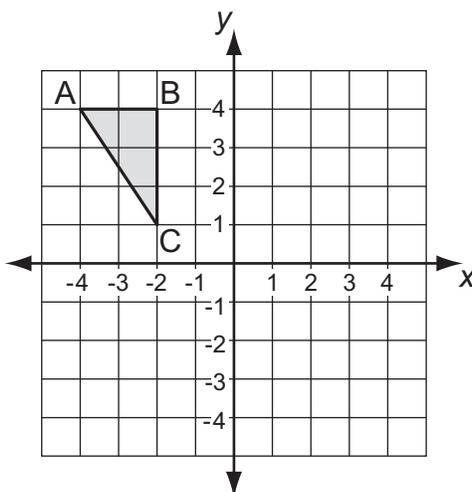


D.



## Session 1—Mathematics (No Calculator)

2. Janet graphed a triangle on the coordinate grid shown.

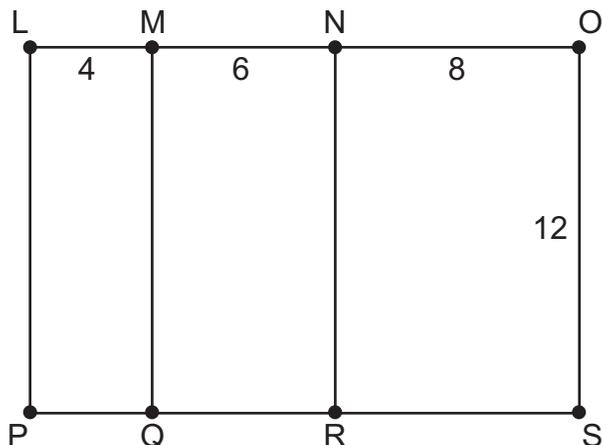


Janet rotated the triangle  $90^\circ$  clockwise about the origin to create figure  $A'B'C'$ . What are the coordinates of the vertices of the figure  $A'B'C'$  after the rotation?

- A.  $A'(-4, -4)$   
 $B'(-4, -2)$   
 $C'(-1, -2)$
- B.  $A'(4, 4)$   
 $B'(2, 4)$   
 $C'(2, 1)$
- C.  $A'(-4, -4)$   
 $B'(-2, -4)$   
 $C'(-2, -1)$
- D.  $A'(4, 4)$   
 $B'(4, 2)$   
 $C'(1, 2)$
3. The choir director set up chairs for the concert with an equal number of rows and columns. The number of chairs in each row and column is represented by the algebraic expression  $\sqrt{y}$ , where  $y$  is the total number of chairs. What is the number of chairs in each row and column if  $y = 81$  chairs?
- A. 3 chairs
- B. 9 chairs
- C. 40.5 chairs
- D. 162 chairs

## Session 1—Mathematics (No Calculator)

4. Rectangle  $LOSP$  is shown below. The lengths, in units, of some of the line segments are also shown. Line segments  $MQ$  and  $NR$  are perpendicular to line segment  $LO$ .

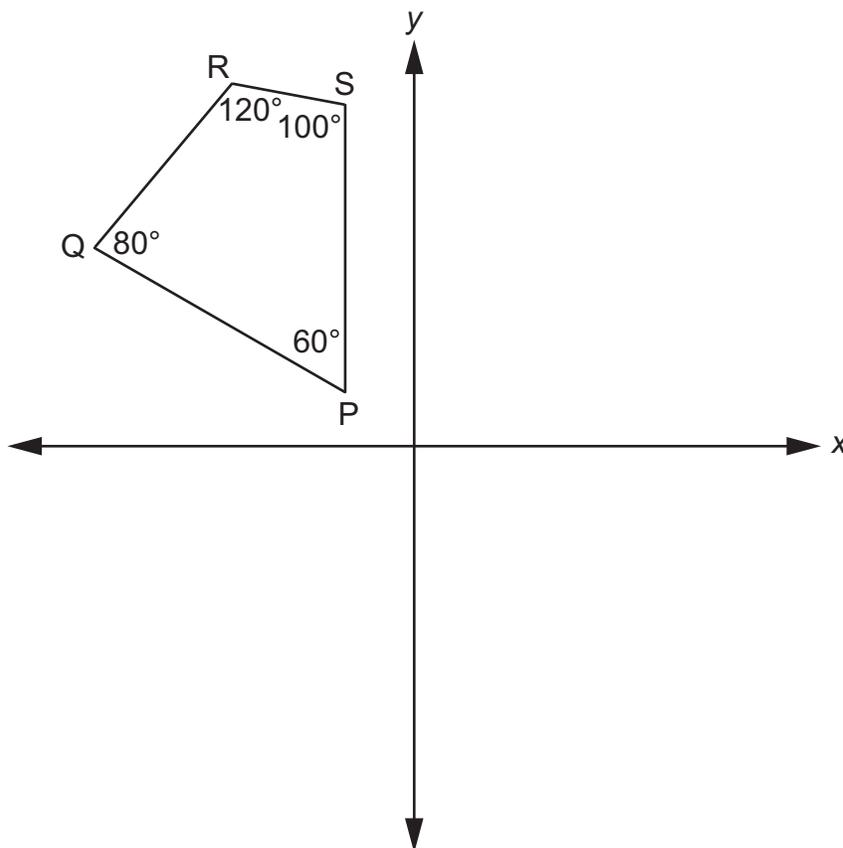


Which shape is similar to rectangle  $LOSP$ ?

- A.  $LMQP$
  - B.  $LNRP$
  - C.  $MNRQ$
  - D.  $OSRN$
5. Paul creates a scatter plot with a negative association. The x-axis of the scatter plot is titled, "Minutes Spent at Mall". Which label is **most likely** the title of the y-axis of Paul's scatter plot?
- A. Distance Walked
  - B. Money Available to Spend
  - C. Number of Movies Seen
  - D. Number of Stores Visited

## Session 1—Mathematics (No Calculator)

6. Use the graph below to answer the question.



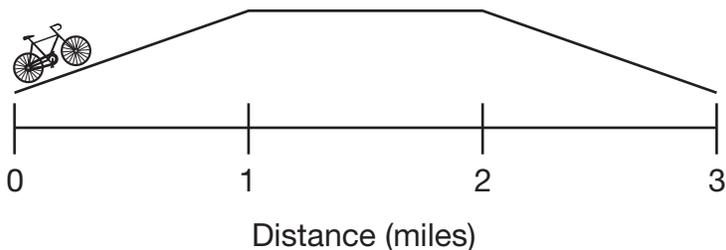
Quadrilateral PQRS will be rotated  $90^\circ$  clockwise about the origin resulting in quadrilateral  $P'Q'R'S'$ . Which statement is true?

- A.  $\overline{RS}$  will be parallel to  $\overline{R'S'}$ .
- B.  $\overline{SP}$  will be parallel to  $\overline{R'S'}$ .
- C. The measure of  $\angle P'$  will be  $80^\circ$ .
- D. The measure of  $\angle Q'$  will be  $80^\circ$ .

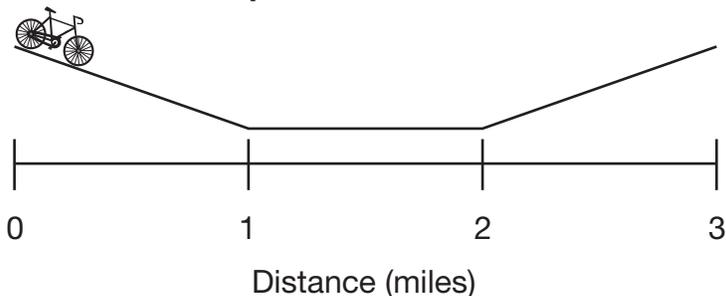
## Session 1—Mathematics (No Calculator)

7. Donna rode her bike for three miles. She traveled 18 miles per hour the first mile, 15 miles per hour the second mile, and 21 miles per hour the third mile. Which diagram shows the most likely landscape of Donna's bike ride?

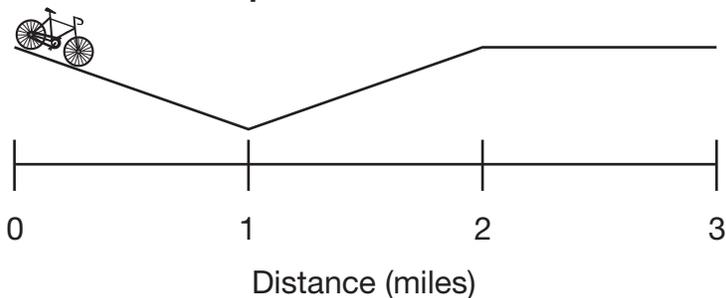
A. Landscape of Donna's Bike Ride



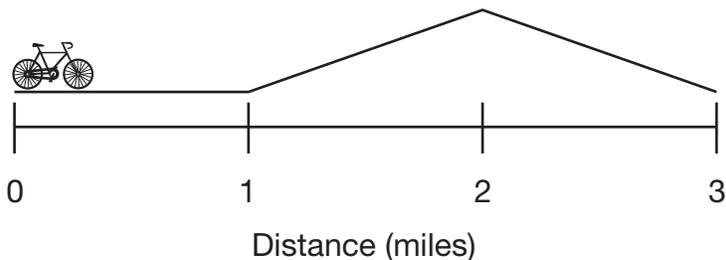
B. Landscape of Donna's Bike Ride



C. Landscape of Donna's Bike Ride

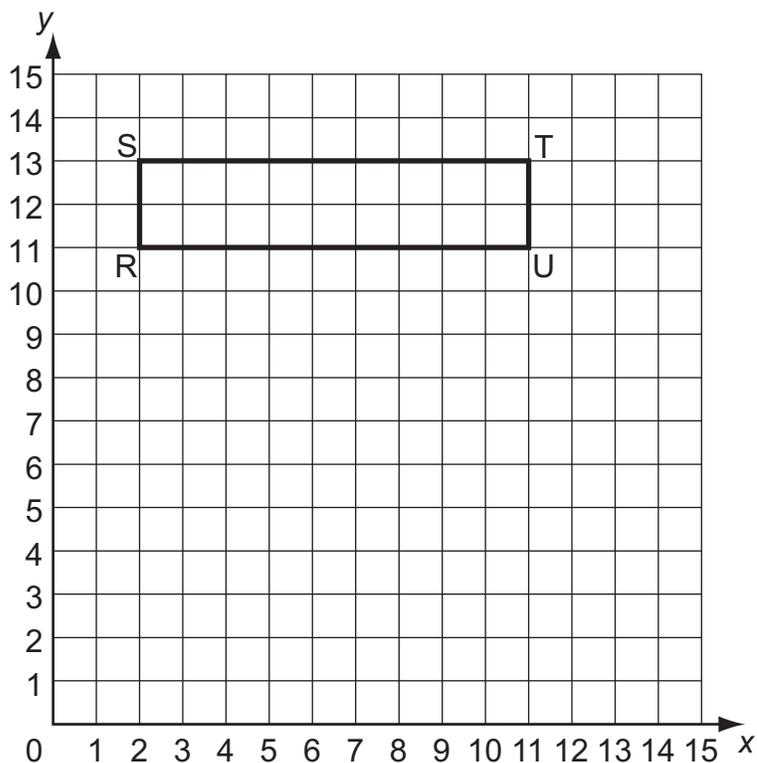


D. Landscape of Donna's Bike Ride



## Session 1—Mathematics (No Calculator)

8. Camille placed blocks on a table in rows and columns. All the rows and columns had the same number of blocks in them and formed a square. Which could be the total number of blocks Camille placed on the table?
- A. 111 blocks  
B. 121 blocks  
C. 181 blocks  
D. 222 blocks
9. Use the grid below to answer the question.

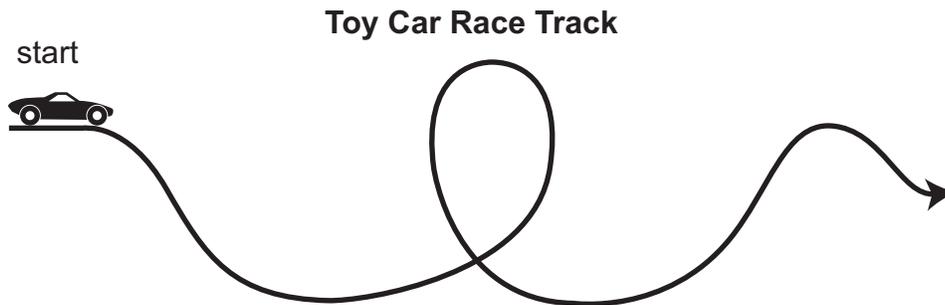


Rectangle RSTU is rotated around point T to create rectangle R'S'T'U'. The x-coordinate of point T' is less than the x-coordinate of point U', and their y-coordinates are equal. What are the coordinates of point R'?

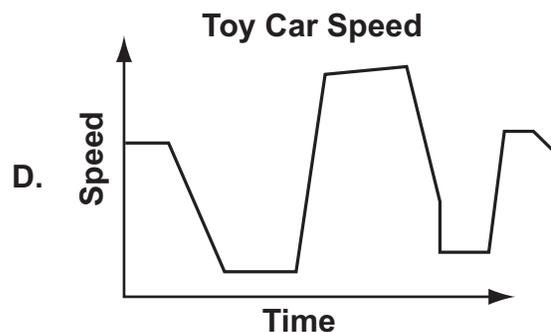
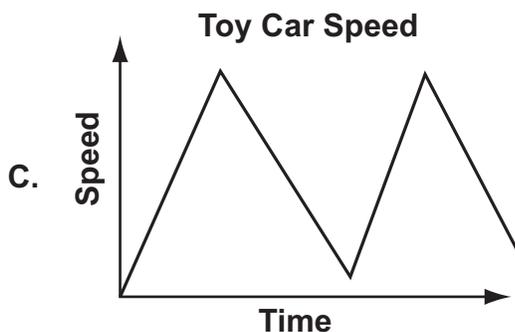
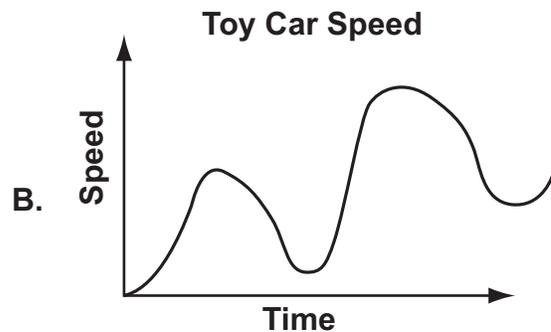
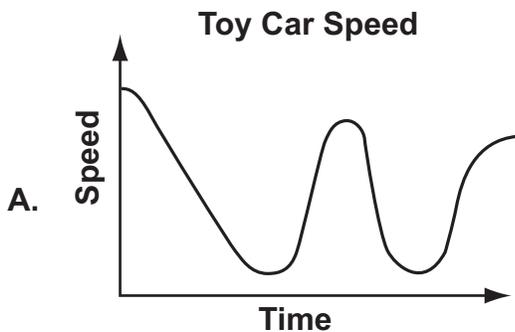
- A. (9, 22)  
B. (11, 4)  
C. (13, 4)  
D. (20, 15)

## Session 1—Mathematics (No Calculator)

10. Use the picture to answer the question below.



The picture shows the beginning of a racetrack for a toy car. Which graph models the estimated speed of the toy car as it moves through the racetrack?



11. The United States exported approximately 30,000,000 metric tons of wheat over an entire year. What is the number of metric tons of wheat written in scientific notation?

- A.  $3 \times 10^4$
- B.  $3 \times 10^5$
- C.  $3 \times 10^6$
- D.  $3 \times 10^7$

## Session 1—Mathematics (No Calculator)

12. Which expression is equivalent to  $(9^{-2})^8$ ?

A.  $-81^{32}$

B.  $\frac{1}{9^{16}}$

C.  $\frac{1}{9^{10}}$

D.  $81^8$

13. What is  $5 \times 10^{-4}$  written in standard notation?

A. 0.00005

B. 0.0005

C. 5,000

D. 50,000

14. Which statement about  $\sqrt{2}$  and  $\frac{\pi}{2}$  is true?

A. Since half of 2 is 1 and half of 3 is 1.5, then  $\sqrt{2} < \frac{\pi}{2}$ .

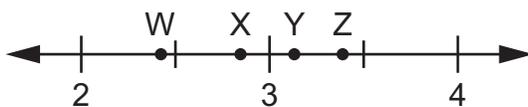
B. Since half of 2 is greater than  $\frac{1}{2}$  of 3.14, then  $\sqrt{2} > \frac{\pi}{2}$ .

C. Since  $\sqrt{2}$  is slightly less than 1.5 and half of  $\pi$  is slightly more than 1.5, then  $\sqrt{2} < \frac{\pi}{2}$ .

D. Since  $\sqrt{2}$  is slightly greater than 1 and half of  $\pi$  is slightly less than 2, then  $\sqrt{2} > \frac{\pi}{2}$ .

## Session 1—Mathematics (No Calculator)

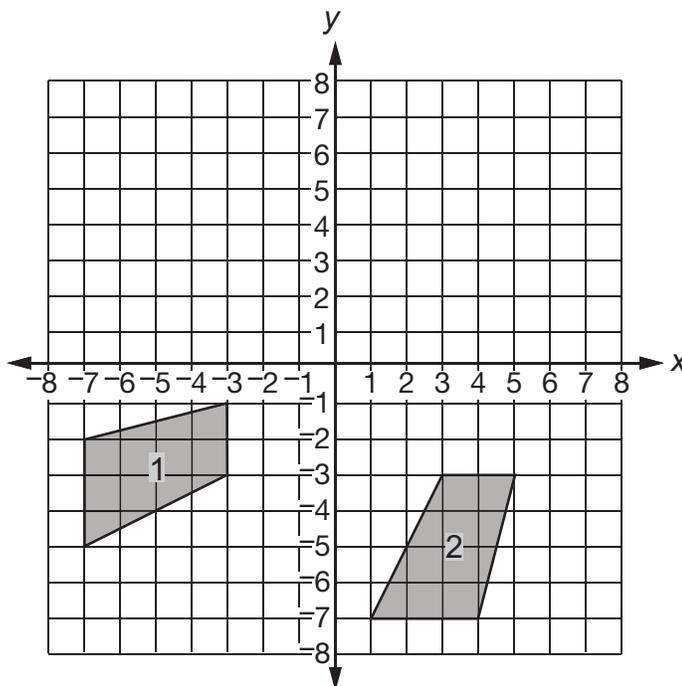
15. Use the number line below to answer the question.



Which point on the number line is the **best** approximation for  $\sqrt{6}$ ?

- A. point W
- B. point X
- C. point Y
- D. point Z

16. Use the graph to answer the question.

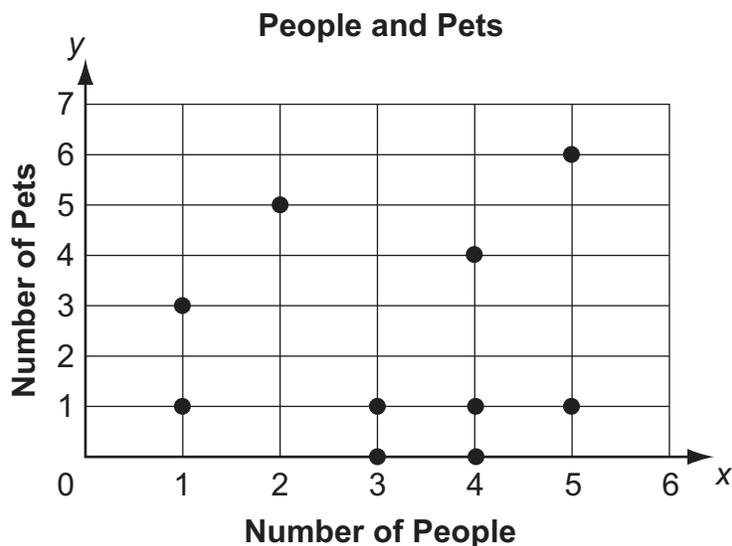


Which pair of transformations moves quadrilateral 1 to quadrilateral 2?

- A. reflect it over the line  $y = -3$ , then rotate it  $90^\circ$  counterclockwise about the origin
- B. reflect it over the  $x$ -axis, then rotate it  $180^\circ$  about the origin
- C. rotate it  $90^\circ$  counterclockwise about point  $(-3, -3)$ , then translate it 8 units to the right
- D. translate it 8 units to the right, then reflect it over the line  $y = -3$

## Session 1—Mathematics (No Calculator)

17. Misha asked ten different coworkers how many people and pets are living in their homes. She used the responses to create the scatter plot shown.



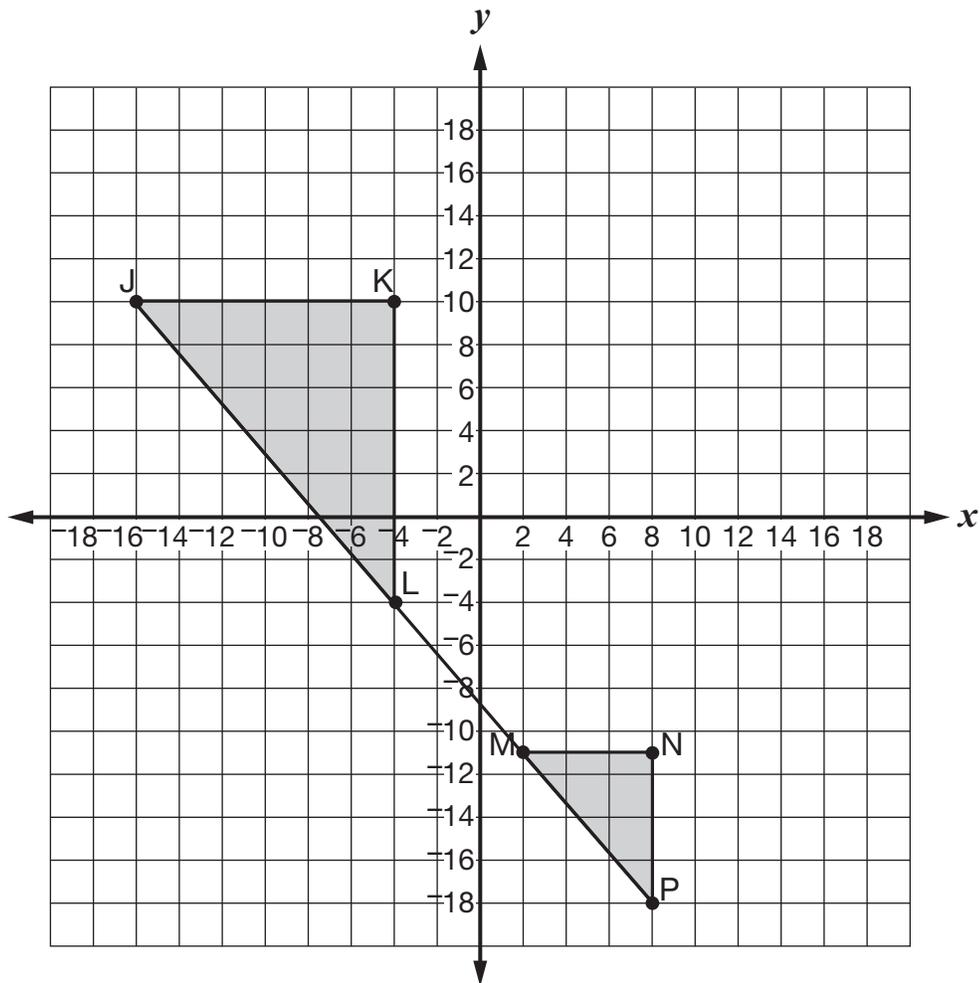
Which statement about the numbers of people and pets living in the homes of Misha's ten coworkers is true?

- A. As the number of people living in the home increases, the number of pets increases.
  - B. As the number of people living in the home increases, the number of pets decreases.
  - C. As the number of people living in the home decreases, the number of pets decreases.
  - D. There is no relationship between the numbers of people and pets living in the home.
18. What is the value of  $5^4 \times 5^{-6}$ ?

- A.  $-25$
- B.  $-\frac{1}{25}$
- C.  $\frac{1}{25}$
- D.  $25$

## Session 1—Mathematics (No Calculator)

19. The diagram below shows  $\triangle JKL$  and  $\triangle MNP$ .



Which statement about the slopes of  $\overline{JL}$  and  $\overline{MP}$  is true?

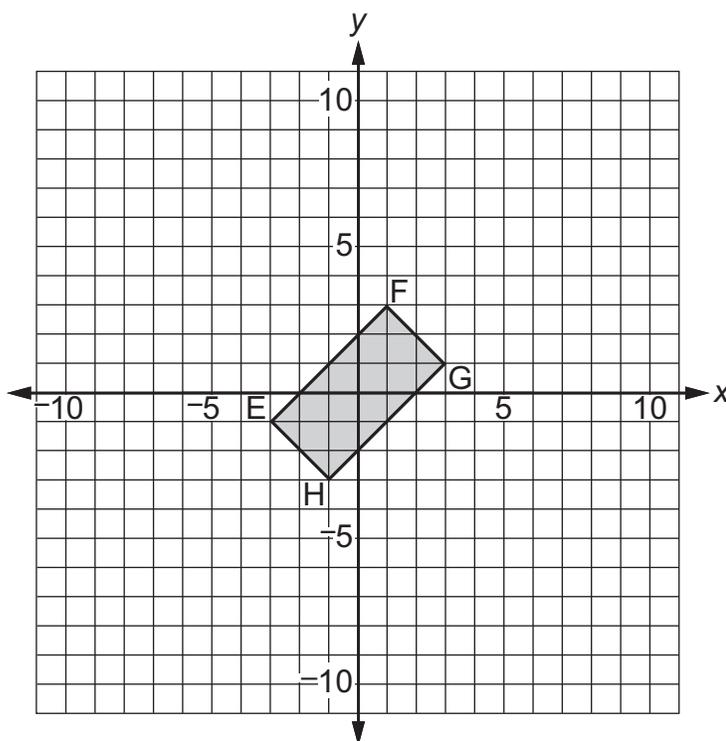
- A. The slope of  $\overline{JL}$  is the same as the slope of  $\overline{MP}$  because  $\triangle JKL$  is similar to  $\triangle MNP$ .
- B. The slope of  $\overline{JL}$  is twice the slope of  $\overline{MP}$  because the length of  $\overline{JL}$  is twice the length of  $\overline{MP}$ .
- C. The slope of  $\overline{JL}$  is 4 times the slope of  $\overline{MP}$  because the area of  $\triangle JKL$  is 4 times the area of  $\triangle MNP$ .
- D. The slope of  $\overline{JL}$  is 8 more than the slope of  $\overline{MP}$  because the difference between the short legs of the triangles is 6 and the difference between the long legs of the triangles is 7.

## Session 1—Mathematics (No Calculator)

20. Which comparison is true?

- A.  $4 < \sqrt{18} < 4.5$
- B.  $4.5 < \sqrt{18} < 5$
- C.  $8.5 < \sqrt{18} < 9.5$
- D.  $17 < \sqrt{18} < 19$

21. Use the coordinate grid below to answer the question.

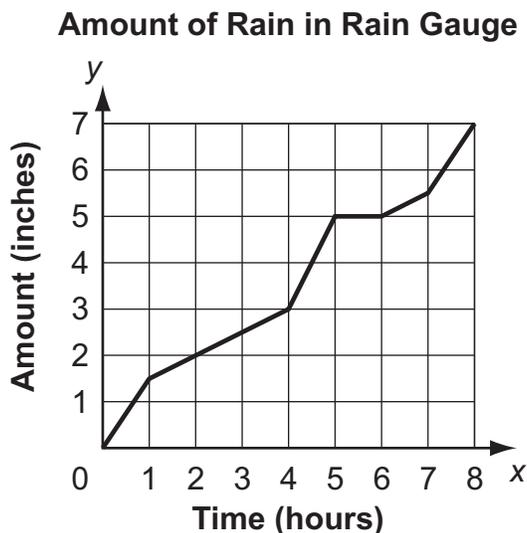


Rectangle EFGH is dilated with its center at the origin and a scale factor of 3. The dilation is then rotated  $90^\circ$  clockwise about the origin to create rectangle E'F'G'H'. What are the coordinates of the vertices of rectangle E'F'G'H'?

- |   |   |
|---|---|
| A. E' (-4, 6)<br>F' (6, -4)<br>G' (4, -6)<br>H' (-6, 4) | B. E' (4, -6)<br>F' (-6, 4)<br>G' (-4, 6)<br>H' (6, -4) |
| C. E' (-3, 9)<br>F' (9, -3)<br>G' (3, -9)<br>H' (-9, 3) | D. E' (3, -9)<br>F' (-9, 3)<br>G' (-3, 9)<br>H' (9, -3) |

## Session 1—Mathematics (No Calculator)

22. A weather station recorded the amount of rain that fell during an 8-hour time frame using a rain gauge. The findings are recorded in the graph below.



Between which hours was the rate at which the rain fell **greater** than the rate at which the rain fell between hours 0 and 1?

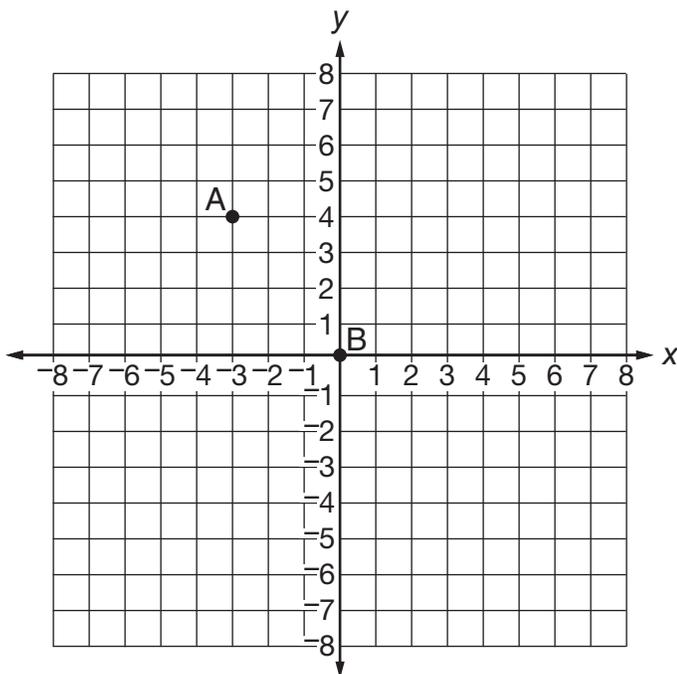
- A. between hours 1 and 4
  - B. between hours 4 and 5
  - C. between hours 5 and 6
  - D. between hours 7 and 8
23. Each day of the month, Carl earns an allowance, in cents, equal to the square of that date of the month. Which is a number of cents Carl could earn in a single day?
- A. 21
  - B. 31
  - C. 64
  - D. 111

## Session 1—Mathematics (No Calculator)

24. Which set of ordered pairs models a function?
- A.  $\{(2, 9), (7, 5), (3, 14), (2, 6)\}$
  - B.  $\{(5, 10), (5, 15), (5, 20), (5, 25)\}$
  - C.  $\{(-\frac{1}{2}, -\frac{1}{3}), (\frac{1}{2}, -\frac{1}{4}), (-\frac{1}{2}, -\frac{1}{5}), (\frac{1}{2}, -\frac{1}{6})\}$
  - D.  $\{(-10, 20), (-20, 30), (-30, 40), (-40, 10)\}$
25. A company used about  $7.4 \times 10^5$  sheets of paper in a month. Of the paper used during the month, the accounting department used about  $8.9 \times 10^3$  of the sheets. About how many sheets of paper were used by other departments during the month?
- A.  $1.5 \times 10^2$
  - B.  $1.5 \times 10^3$
  - C.  $7.3 \times 10^4$
  - D.  $7.3 \times 10^5$
26. Which number is irrational?
- A.  $-\frac{4}{3}$
  - B.  $\sqrt{121}$
  - C. 16.121314...
  - D.  $0.00\overline{71}$

## Session 1—Mathematics (No Calculator)

27. Use the graph below to answer the question.



Which equation represents a line that passes through points A and B plotted on the graph?

A.  $y = -\frac{4}{3}x$

B.  $y = -\frac{3}{4}x$

C.  $y = \frac{3}{4}x$

D.  $y = \frac{4}{3}x$

28. For which equation is  $\sqrt[3]{36}$  the solution?

A.  $x^3 = 36$

B.  $x^2 = 36$

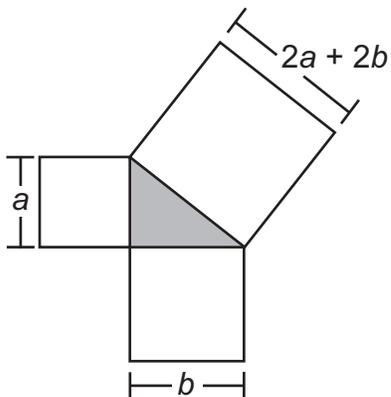
C.  $\sqrt[3]{x} = 36$

D.  $\sqrt{x} = 36$

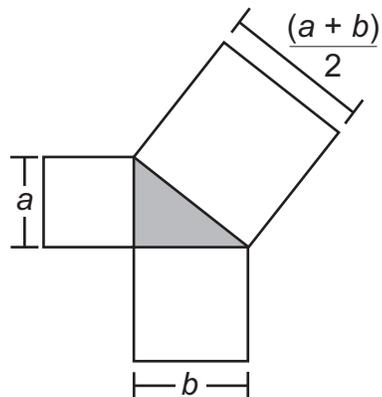
## Session 1—Mathematics (No Calculator)

29. Raneer is creating a diagram to prove that a certain triangle is a right triangle. In her diagram she uses three white quadrilaterals that are squares. Which diagram could be the one that Raneer is creating?

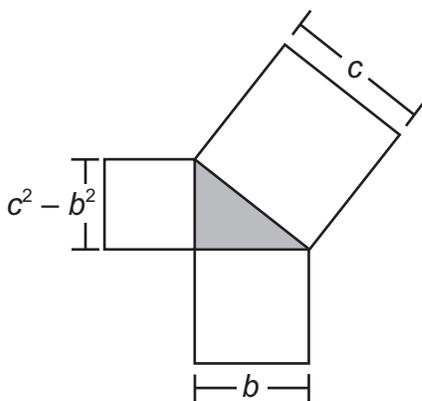
A.



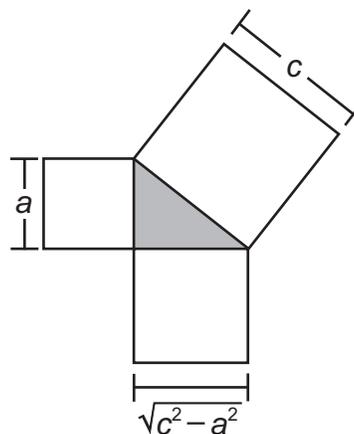
B.



C.

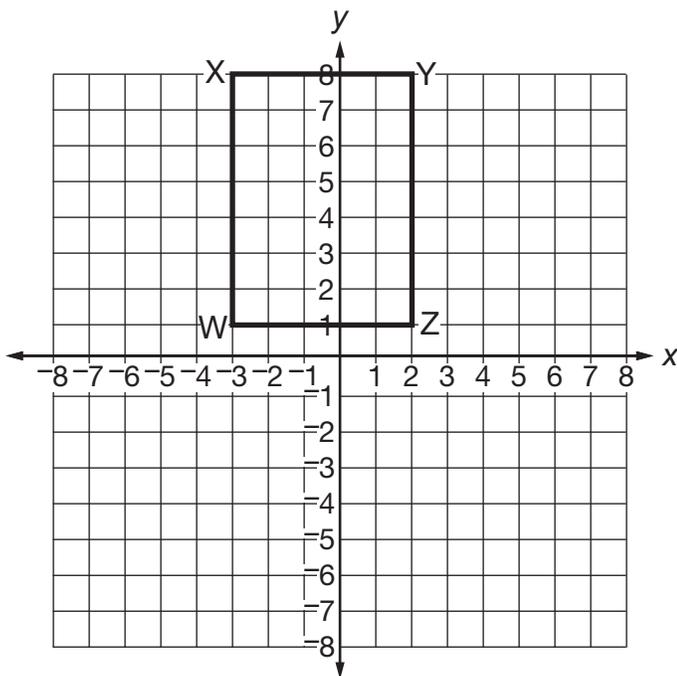


D.



## Session 1—Mathematics (No Calculator)

30. Use the graphic below to answer the question.



Rectangle WXYZ will be transformed so that  $W'$  is located at  $(-3, -1)$  and  $Z'$  is located at  $(2, -1)$ . Which could be the coordinates of  $X'$  and  $Y'$  so that  $W'X'Y'Z'$  is congruent to WXYZ?

- A.  $X'$  is located at  $(-3, -6)$  and  $Y'$  is located at  $(2, -6)$
- B.  $X'$  is located at  $(3, 8)$  and  $Y'$  is located at  $(-2, 8)$
- C.  $X'$  is located at  $(-3, 6)$  and  $Y'$  is located at  $(2, 6)$
- D.  $X'$  is located at  $(2, -8)$  and  $Y'$  is located at  $(-3, -8)$



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## Mathematics—Sessions 1, 2, and 3

### GENERAL INSTRUCTIONS

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The Mathematics test has three sessions, two with multiple-choice questions and one with constructed-response questions. You may **not** use a calculator for session 1, but you may use a calculator for sessions 2 and 3.

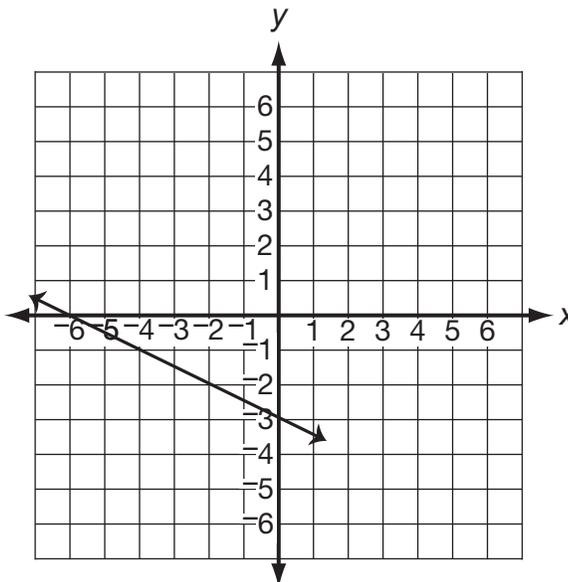
## Session 2—Mathematics (Calculator)

Write your answers for questions 31 through 60 in the spaces provided on page 45, session 2 answer sheet. Write only one answer for each question. You may work problems in your test booklet or on scratch paper, but you must mark your answer on your answer sheet. You may review your work in this session, but do not work on any other session.



**You MAY use a calculator for this session.**

31. Use the graph below to answer the question.



Which equation has the same  $y$ -intercept as the line in the graph, and a slope that is the opposite of the slope in the graph?

A.  $y = \frac{1}{2}x - 3$

B.  $y = \frac{1}{2}x + 3$

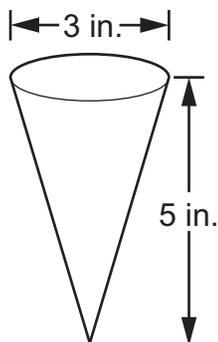
C.  $y = -2x - 3$

D.  $y = 2x - 3$

## Session 2—Mathematics (Calculator)

32. Cecil has a paper cup in the shape of a cone, as shown below.

**Cecil's Paper Cup**



What is the volume of Cecil's paper cup?

- A.  $2\frac{1}{2}\pi$  cubic in.
- B.  $3\frac{3}{4}\pi$  cubic in.
- C.  $15\pi$  cubic in.
- D.  $60\pi$  cubic in.
33. For a few months, Dexter recorded the amounts, in fluid ounces, of laundry detergent remaining,  $y$ , after he and his family washed  $x$  loads of laundry. The equation of the line of best fit for his data is shown below.

$$y = -1.6x + 50$$

Which statement correctly describes the slope of Dexter's equation of the line of best fit in the context of the situation?

- A. The bottle Dexter's family buys holds about 50 fluid ounces of detergent.
- B. For each load of laundry, Dexter's family uses about 1.6 fluid ounces of detergent.
- C. With 50 fluid ounces of detergent, Dexter's family can wash about 1.6 loads of laundry.
- D. With 1.6 bottles of laundry detergent, Dexter's family can wash about 50 loads of laundry.

## Session 2—Mathematics (Calculator)

34. Use the two functions below to answer the question.

**Function A**

$$y = \frac{1}{4}x - \frac{2}{3}$$

**Function B**

$x$	$y$
2	-8
4	-9
6	-10
8	-11

Which statement about the slopes of the functions is true?

- A. The slopes of both functions are negative.
  - B. The slopes of both functions are positive.
  - C. The slope of function A is negative and the slope of function B is positive.
  - D. The slope of function A is positive and the slope of function B is negative.
35. Eastview Junior High students order sweatshirts and T-shirts in either purple or gold. Of the students who ordered a sweatshirt, the relative frequency of ordering a gold one is half of the relative frequency of ordering a purple one. Which two-way table could show the data from the orders?

A. **Sweatshirt and T-Shirt Orders**

	Sweatshirt	T-Shirt
Purple	12	18
Gold	24	15

B. **Sweatshirt and T-Shirt Orders**

	Sweatshirt	T-Shirt
Purple	28	26
Gold	22	44

C. **Sweatshirt and T-Shirt Orders**

	Sweatshirt	T-Shirt
Purple	70	17
Gold	35	93

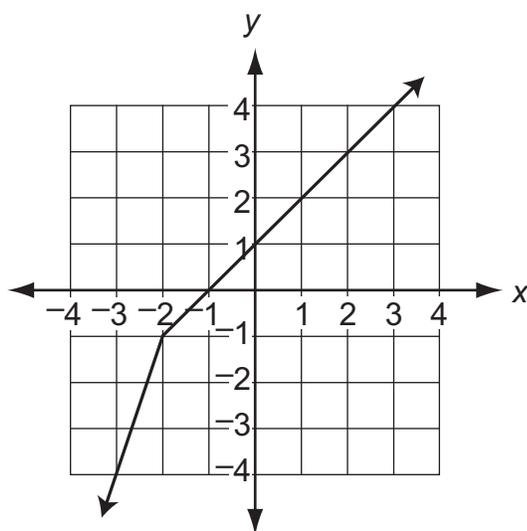
D. **Sweatshirt and T-Shirt Orders**

	Sweatshirt	T-Shirt
Purple	45	50
Gold	25	25

## Session 2—Mathematics (Calculator)

36. Caleb has a piece of rectangular paper that is 12 inches wide by 16 inches long. He drew a straight line along the diagonal of the paper. What is the length of the line Caleb drew?
- A.  $\sqrt{28}$  inches
  - B.  $\sqrt{112}$  inches
  - C. 20 inches
  - D. 28 inches

37. Use the graph of the function below to answer the question.

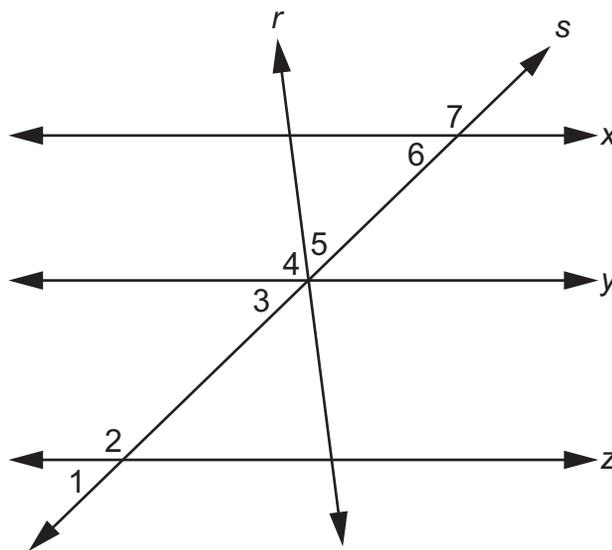


Which description of the function is true?

- A. The function is linear and always increasing.
- B. The function is nonlinear and always increasing.
- C. The function is decreasing from negative infinity to  $-1$  and increasing from  $-1$  to infinity.
- D. The function is decreasing from negative infinity to  $-2$  and increasing from  $-2$  to infinity.

## Session 2—Mathematics (Calculator)

38. In the diagram below, lines  $x$ ,  $y$ , and  $z$  are all parallel, and lines  $r$  and  $s$  intersect at line  $y$ .

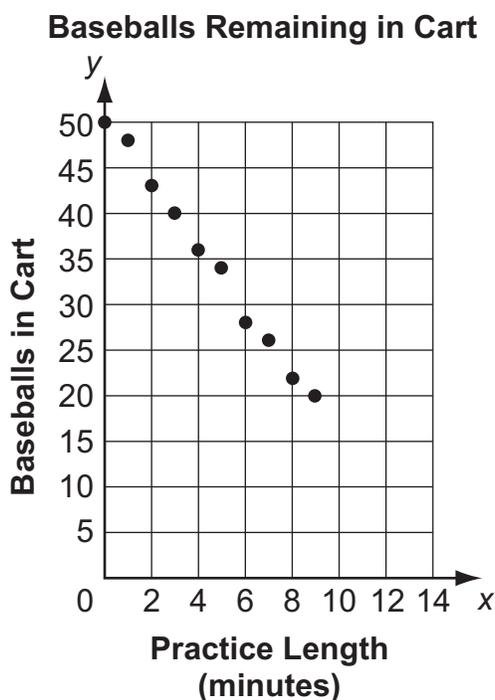


Which equation must be true?

- A.  $m\angle 1 = 180^\circ - m\angle 7$
  - B.  $m\angle 2 = 90^\circ + m\angle 5$
  - C.  $m\angle 3 + m\angle 4 = m\angle 7$
  - D.  $m\angle 5 + m\angle 6 = m\angle 7$
39. Which equation is **not** a linear function?
- A.  $y = xy + 2$
  - B.  $y = x + 2y$
  - C.  $y = -x - \frac{y}{2}$
  - D.  $y = x - y + 2$

## Session 2—Mathematics (Calculator)

40. A baseball coach places baseballs in a cart. He uses the baseballs to pitch to the players during practice. The number of baseballs remaining in the cart after different practice lengths, in minutes, are displayed in the scatter plot below.



Which statement about the scatter plot is true?

- A. The scatter plot shows a positive association because all of the points have positive coordinates.
- B. The scatter plot shows a positive association because the points on the graph go towards 50 baseballs.
- C. The scatter plot shows a negative association because the practice length is always less than the number of baseballs in the cart.
- D. The scatter plot shows a negative association because as the practice length increases, the number of baseballs in the cart decreases.

## Session 2—Mathematics (Calculator)

41. Which equation has infinitely many solutions?

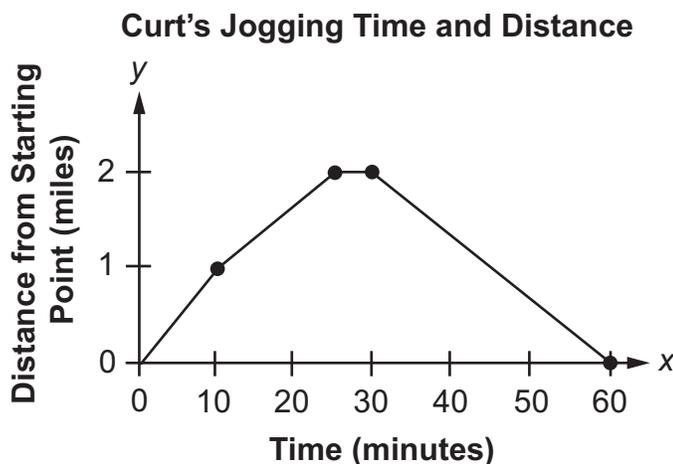
A.  $x = \frac{1}{4}x + \frac{3}{4}$

B.  $\frac{1}{3}x - 5 = \frac{2}{3}x - 5$

C.  $\frac{1}{2}(1 + 4x) = 2x - 3$

D.  $3 - 4x = -6\left(\frac{2}{3}x - \frac{1}{2}\right)$

42. Curt jogged on a path that was 2 miles long, took a break, and then jogged back along the same path to where he started. He jogged at different speeds for different distances along the path as shown in the graph.



Between which times did Curt jog the fastest?

- A. 0 minutes and 10 minutes
- B. 10 minutes and 25 minutes
- C. 25 minutes and 30 minutes
- D. 30 minutes and 60 minutes

## Session 2—Mathematics (Calculator)

43. Karen and Henry each sold food at the fair. The table below shows the total number of corn dogs Karen sold at different times of the day.

**Karen's Corn Dog Sales**

Time	Total Corn Dogs Sold
12:00 P.M.	42
2:00 P.M.	56
4:00 P.M.	70
6:00 P.M.	84

Henry uses the equation below to show the number of hot dogs,  $h$ , he has sold after  $t$  hours.

$$h = 14t$$

Which statement about Karen and Henry is true?

- A. The rate that Henry sells hot dogs is half the rate that Karen sells corn dogs.
  - B. The rate that Henry sells hot dogs is double the rate that Karen sells corn dogs.
  - C. The rate that Karen sells corn dogs is 7 times the rate that Henry sells hot dogs.
  - D. The rate that Karen sells corn dogs is the same as the rate that Henry sells hot dogs.
44. A group of four friends each mowed lawns after school and on the weekends for a month. The total number of lawns mowed can be represented by the equation below.

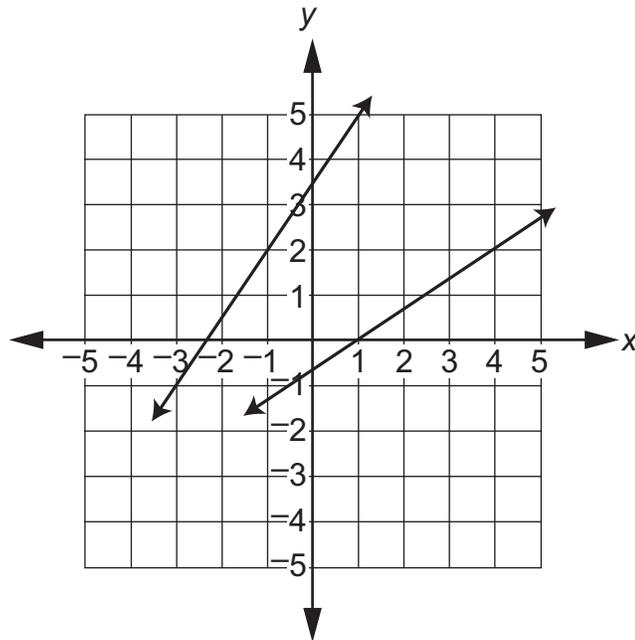
$$x + \frac{1}{3}x + \frac{1}{2}x + 16 = 49$$

Each friend is represented by a term in the equation. How many lawns,  $x$ , did the first friend mow?

- A. 11
- B. 18
- C. 27
- D.  $31\frac{1}{6}$

## Session 2—Mathematics (Calculator)

45. Use the system of two linear equations graphed below to answer the question.

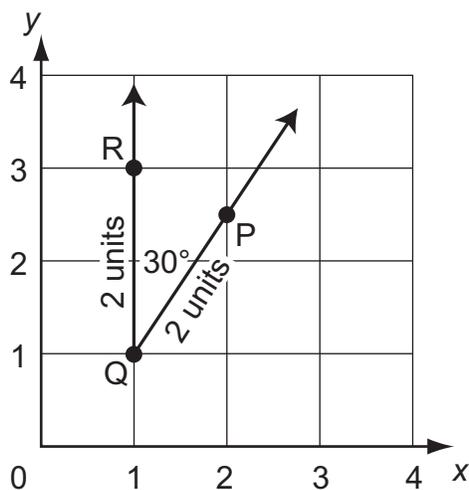


What is the solution to the system of linear equations?

- A.  $(-5, -4)$
  - B.  $(1, 3.5)$
  - C.  $y = -x + 1$
  - D.  $y = 3.5x + 1$
46. There were approximately  $1.6 \times 10^{11}$  pieces of mail processed by the United States Postal Service in 2012. This is about 75% of the number of pieces of mail processed in 2006. Approximately how many pieces of mail were processed by the United States Postal Service in 2006?
- A.  $1.2 \times 10^{10}$
  - B.  $1.2 \times 10^{11}$
  - C.  $2.13 \times 10^{10}$
  - D.  $2.13 \times 10^{11}$

## Session 2—Mathematics (Calculator)

47. Use the figure below to answer the question.

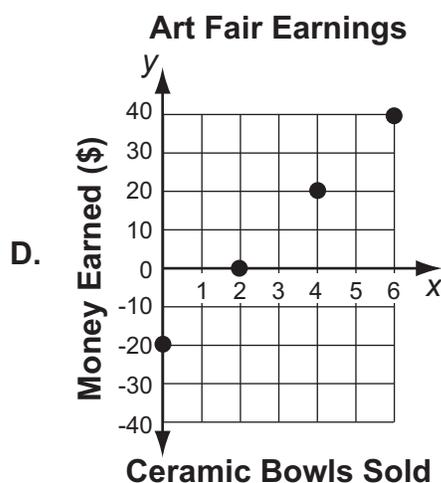
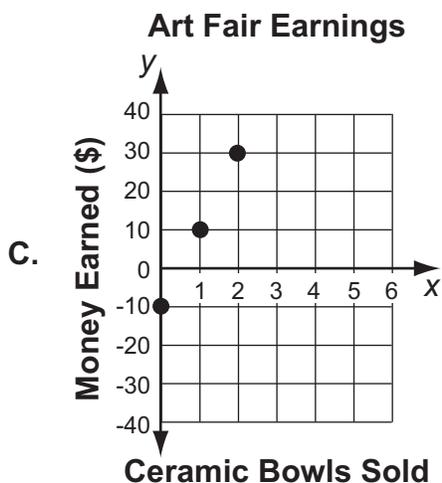
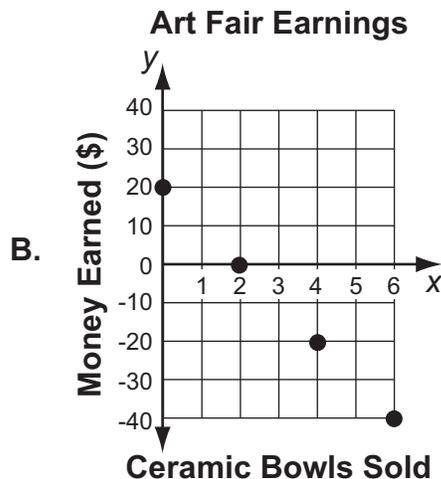
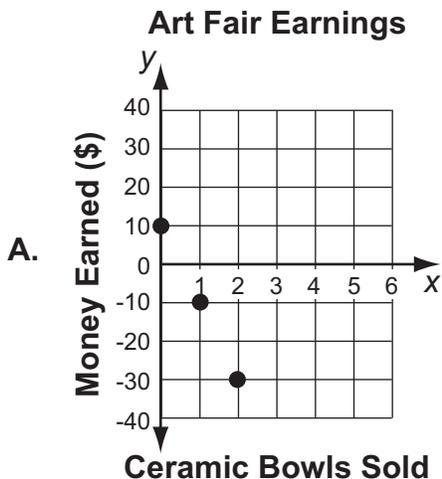


A dilation of angle PQR will make the length of line segment Q'R' equal to 6 units. What is the measure of angle P'Q'R' after the dilation?

- A.  $10^\circ$
  - B.  $30^\circ$
  - C.  $60^\circ$
  - D.  $90^\circ$
48. Parker states that any function written **without** exponents must be linear. Which function proves Parker's statement is incorrect?
- A.  $y = 5x + 3$
  - B.  $y = x^5 + 3$
  - C.  $y = \frac{x}{3} + 5$
  - D.  $y = \frac{3}{x} + 5$

## Session 2—Mathematics (Calculator)

49. Ayan paid a \$20 fee for a booth at an art fair so she could sell her ceramic bowls. She will earn \$10 for every ceramic bowl she sells. The equation  $y = 10x - 20$  represents the amount of money,  $y$ , that Ayan will earn selling  $x$  ceramic bowls at the art fair. Which graph represents the amount of money Ayan could earn at the art fair?

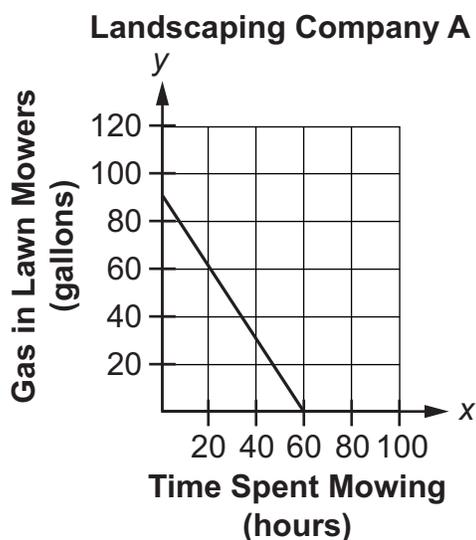


## Session 2—Mathematics (Calculator)

50. What is the solution to the equation  $\frac{1}{3}(x + 2) = \frac{2}{3}x + 4$ ?

- A.  $x = -10$
- B.  $x = -3$
- C.  $x = 6$
- D.  $x = 12$

51. The graph and table below show information about two landscaping companies.



**Landscaping Company B**

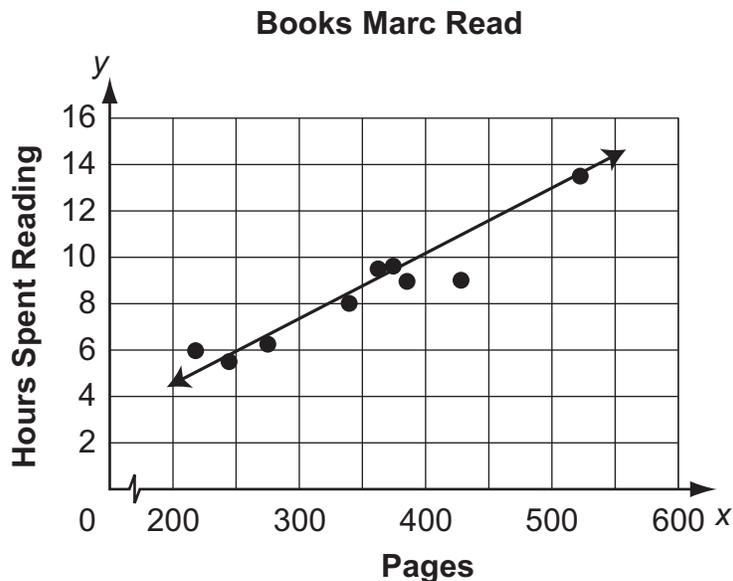
Time Spent Mowing (hours)	Gas in Lawn Mowers (gallons)
0	110
24	80
48	50
72	20
88	0

Which statement about the two landscaping companies is true?

- A. Landscaping company A mows for 20 more hours than landscaping company B.
- B. Landscaping company B mows for 20 more hours than landscaping company A.
- C. Landscaping company A uses 0.25 of a gallon more gasoline per hour than landscaping company B.
- D. Landscaping company B uses 0.25 of a gallon more gasoline per hour than landscaping company A.

## Session 2—Mathematics (Calculator)

52. Marc read 9 books over the summer. He recorded the number of pages he read and the number of hours he spent reading each book. This information and a line of best fit are shown in the scatter plot.



Based on the scatter plot, which statement about the time Marc spent reading would most likely be true?

- A. Marc read at a rate of about 50 pages per hour.
- B. Marc read at a rate of about 75 pages per hour.
- C. It would take Marc about 2 hours to read a 150-page book.
- D. It would take Marc about 12 hours to read a 470-page book.

## Session 2—Mathematics (Calculator)

53. Rudy surveyed 80 people about whether they prefer blueberry or cherry pie and whether they prefer the pie with or without ice cream. The results are shown in the table below.

**Pie and Ice-Cream Preferences**

	Blueberry Pie	Cherry Pie
With Ice Cream	29	24
Without Ice Cream	15	12

Which conclusion can be made based on the results shown in the table?

- A. About  $\frac{1}{3}$  of the people prefer pie without ice cream.
  - B. There are 2 times as many people who prefer blueberry pie to cherry pie.
  - C. Fewer people prefer cherry pie with ice cream than blueberry pie without ice cream.
  - D. The ratio of people who prefer blueberry pie to cherry pie is equivalent to the ratio of people who prefer pie with ice cream to pie without ice cream.
54. A company puts 36 cans into each box they send to a store. Each can has a radius of 1.5 inches and a height of 6 inches. What is the approximate total volume, in cubic inches, of the cans in each box the company sends to a store? Use 3.14 for  $\pi$ .
- A. 42.39 cubic inches
  - B. 56.25 cubic inches
  - C. 1,526.04 cubic inches
  - D. 2,034.72 cubic inches

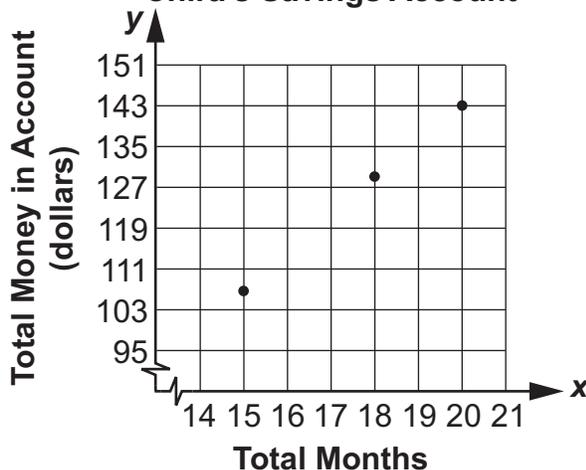
## Session 2—Mathematics (Calculator)

55. Wyatt and Chira both open savings accounts on the same day. The table and graph below show their individual savings after several months.

Wyatt's Savings Account

Total Months	Total Money in Account (dollars)
5	30.75
8	49.20
13	79.95

Chira's Savings Account



Their saving patterns continue. Which statement about how much Wyatt and Chira are saving is true?

- A. Wyatt will have more in his savings than Chira after 50 months.
  - B. Each month Chira has exactly \$1 more in her savings than Wyatt.
  - C. Chira will have about \$30 more in her savings than Wyatt after 30 months.
  - D. Chira has more money in her savings than Wyatt, but she saves less per month.
56. Which table represents a linear function?

A.

$x$	$y$
-4	8
-2	0
0	-4
2	-6

B.

$x$	$y$
-4	2
-2	0
0	2
2	4

C.

$x$	$y$
-4	2
-2	0
0	-4
0	-2

D.

$x$	$y$
-4	4
-2	2
0	0
2	-2

## Session 2—Mathematics (Calculator)

57. Use the linear function in the table below to answer the question.

x	y
5	-6
10	-6
15	-6
20	-6
25	-6
30	-6

Which statement about the function in the table and the line represented by  $y = 6$  is true?

- A. The lines do not intersect.
  - B. The lines have the same  $y$ -intercept.
  - C. The lines both cross through the origin.
  - D. The lines both cross the  $x$ -axis but not the  $y$ -axis.
58. Glen spends a total of 9 hours writing a paper and finishing a project. He spends  $x$  hours on the paper and  $y$  hours finishing the project. Glen spends  $1\frac{1}{2}$  more hours on the paper than he spends on the project. The equations below can be used to find how many hours he spends on the paper and finishing the project.

$$x + y = 9$$

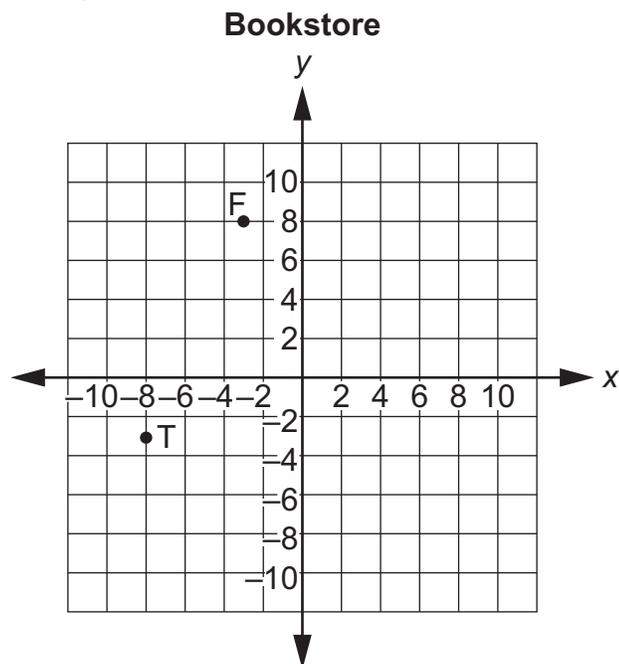
$$x - y = 1\frac{1}{2}$$

How many hours does Glen spend writing the paper?

- A.  $3\frac{1}{4}$  hours
- B.  $3\frac{3}{4}$  hours
- C.  $5\frac{1}{4}$  hours
- D.  $5\frac{3}{4}$  hours

## Session 2—Mathematics (Calculator)

59. Stanley marked two points on the grid below to show the locations of the fiction section, point F, and the travel section, point T, in a bookstore.

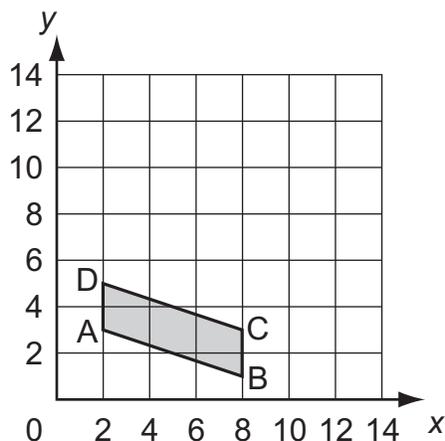


What is the shortest distance, in units, between the fiction section and the travel section in the bookstore?

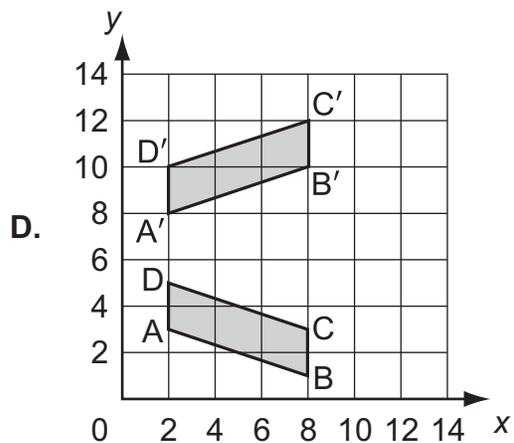
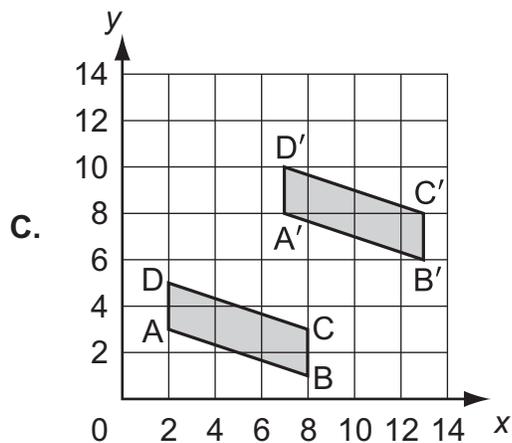
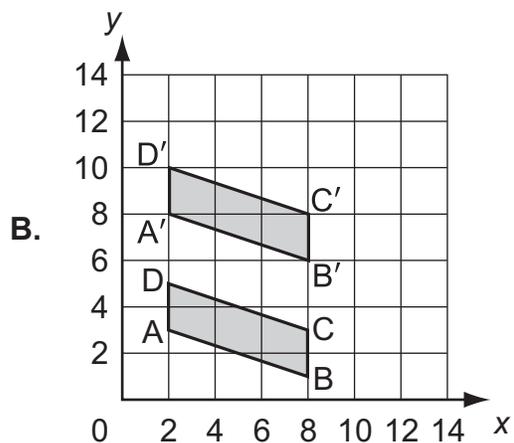
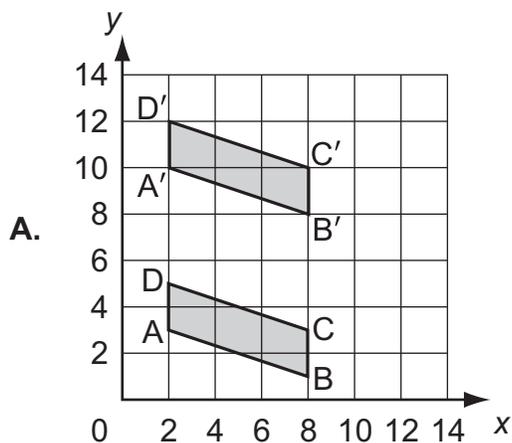
- A.  $\sqrt{146}$
- B.  $\sqrt{242}$
- C. 16
- D. 25

## Session 2—Mathematics (Calculator)

60. Zane graphed a parallelogram on the coordinate grid shown.



Zane then translated the parallelogram up 5 units. Which coordinate grid shows the figure after the translation?



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## Mathematics—Sessions 1, 2, and 3

### GENERAL INSTRUCTIONS

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The Mathematics test has three sessions, two with multiple-choice questions and one with constructed-response questions. You may **not** use a calculator for session 1, but you may use a calculator for sessions 2 and 3.

## Session 3—Mathematics (Calculator)

Write your answers for questions 61 to 64 in the spaces provided below. The questions have more than one part. Show all the work you do to find your answers. Even if you cannot answer all parts, answer as many as you can. You may still get points for answering part of a question. Be sure to write clearly. You may review your work in this session, but do not work on any other session.

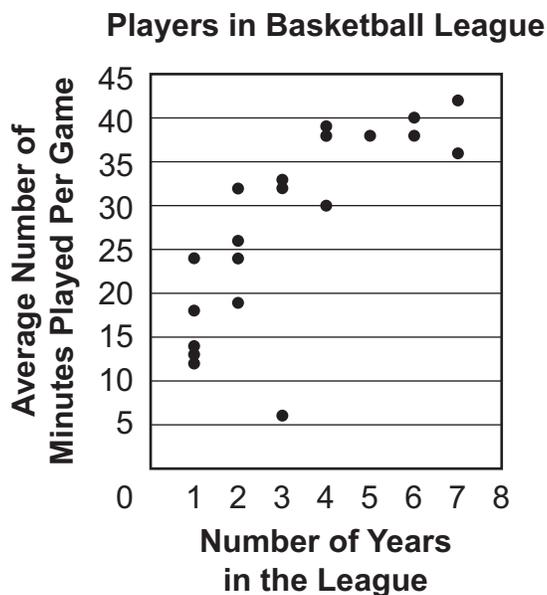


**You MAY use a calculator for this session.**

- 61.** Greg started with a certain number of quarters. He then decided on a number of quarters he would save each day. He added the quarters he saved to the amount with which he started. At the end of day 2, Greg had a total of 26 quarters saved. At the end of day 5, he had a total of 35 quarters saved.
- A.** How many quarters does Greg start with? Show or explain your work.
- B.** Write an equation to model the number of quarters Greg has saved,  $y$ , after  $x$  days.
- C.** Using the rate at which Greg is saving, explain why he can never have exactly 100 quarters saved by the end of any given day.
- D.** Starting with day 2 and going through day 20, Greg created a graph to show the relationship between the day and the total number of quarters he had saved by the end of that day. Greg plotted each of the 19 data points and then connected them. Describe what Greg's graph looked like.

## Session 3—Mathematics (Calculator)

62. The standard length of a game in a basketball league is 48 minutes. For 20 basketball players, a reporter plotted the number of years each has been in the league against the average number of minutes each plays per game. The scatter plot the reporter made is shown below.



- A. Draw a line of best fit on the scatter plot.
- B. What is one way the line of best fit would change if you removed the data point representing the player who has been in the league for 3 years and plays an average of 6 minutes per game?
- C. Based on the line of best fit you drew, what is the average number of minutes per game a player who has never played in the league before could expect to play?
- D. Explain why the line of best fit would not provide a valid approximation of the average number of minutes per game a player who has been in the league for 15 years would play.

## Session 3—Mathematics (Calculator)

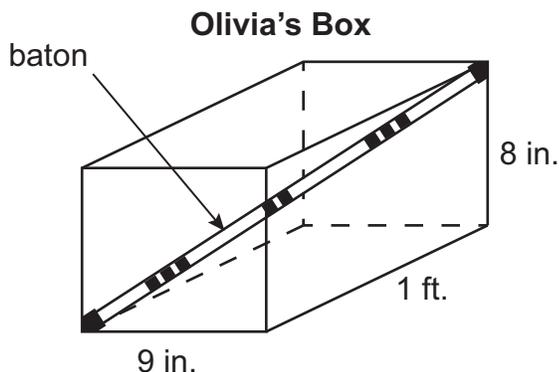
63. Consider the family of linear equations of the form shown below, where  $z$  is a rational number.

$$\frac{2}{3}(3x + 2) = zx$$

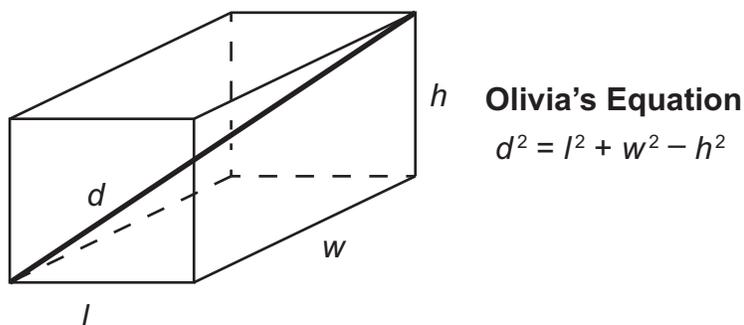
- A. Solve the equation when  $z = 1$ .
- B. Find a value for  $z$  such that the equation has no solution. Explain how you know the equation has no solution for the value of  $z$  you specified.
- C. Using what you know about constants and coefficients, explain why there is **no** value of  $z$  that will force the equation to have infinitely many solutions.

## Session 3—Mathematics (Calculator)

64. Olivia is shipping a baton and a few other things to a friend as a gift. The box measures 8 inches, by 9 inches, by 1 foot. She places the baton in the box as shown below.



- A. What is the length, in inches, of the baton that she placed in the box? Show or explain your work.
- B. Olivia thinks that the relationship between the longest diagonal in any rectangular prism, and the dimensions of length, width, and height of the rectangular dimension can be modeled by the diagram and equation below.



Without substituting in numbers for variables, show or explain why Olivia's equation is incorrect.



---

# Multiple-Choice Answer Sheet

---

Name: \_\_\_\_\_



## Session 1

- |           |           |
|-----------|-----------|
| 1. _____  | 16. _____ |
| 2. _____  | 17. _____ |
| 3. _____  | 18. _____ |
| 4. _____  | 19. _____ |
| 5. _____  | 20. _____ |
| 6. _____  | 21. _____ |
| 7. _____  | 22. _____ |
| 8. _____  | 23. _____ |
| 9. _____  | 24. _____ |
| 10. _____ | 25. _____ |
| 11. _____ | 26. _____ |
| 12. _____ | 27. _____ |
| 13. _____ | 28. _____ |
| 14. _____ | 29. _____ |
| 15. _____ | 30. _____ |

---

# Multiple-Choice Answer Sheet

---

Name: \_\_\_\_\_



## Session 2

31. \_\_\_\_\_

46. \_\_\_\_\_

32. \_\_\_\_\_

47. \_\_\_\_\_

33. \_\_\_\_\_

48. \_\_\_\_\_

34. \_\_\_\_\_

49. \_\_\_\_\_

35. \_\_\_\_\_

50. \_\_\_\_\_

36. \_\_\_\_\_

51. \_\_\_\_\_

37. \_\_\_\_\_

52. \_\_\_\_\_

38. \_\_\_\_\_

53. \_\_\_\_\_

39. \_\_\_\_\_

54. \_\_\_\_\_

40. \_\_\_\_\_

55. \_\_\_\_\_

41. \_\_\_\_\_

56. \_\_\_\_\_

42. \_\_\_\_\_

57. \_\_\_\_\_

43. \_\_\_\_\_

58. \_\_\_\_\_

44. \_\_\_\_\_

59. \_\_\_\_\_

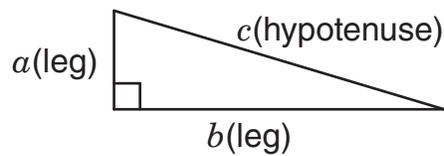
45. \_\_\_\_\_

60. \_\_\_\_\_

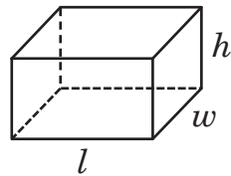
# LEAP MATHEMATICS REFERENCE SHEET—GRADE 8

Use the information below to answer questions on the Mathematics test.

**Pythagorean Theorem:**  $a^2 + b^2 = c^2$



**Rectangular Prism**

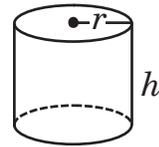


$$\text{Volume} = lwh$$

Surface

$$\text{Area} = 2wl + 2lh + 2wh$$

**Cylinder**

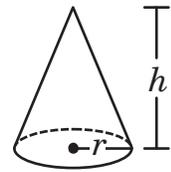


$$\text{Volume} = \pi r^2 h$$

Surface

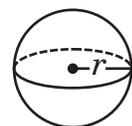
$$\text{Area} = 2\pi r^2 + 2\pi rh$$

**Cone**



$$\text{Volume} = \frac{1}{3}\pi r^2 h$$

**Sphere**



$$\text{Volume} = \frac{4}{3}\pi r^3$$

---

# Multiple-Choice Answer Key

---

Name: \_\_\_\_\_



## Session 1

- |     |          |     |          |
|-----|----------|-----|----------|
| 1.  | <u>C</u> | 16. | <u>A</u> |
| 2.  | <u>D</u> | 17. | <u>D</u> |
| 3.  | <u>B</u> | 18. | <u>C</u> |
| 4.  | <u>D</u> | 19. | <u>A</u> |
| 5.  | <u>B</u> | 20. | <u>A</u> |
| 6.  | <u>D</u> | 21. | <u>C</u> |
| 7.  | <u>D</u> | 22. | <u>B</u> |
| 8.  | <u>B</u> | 23. | <u>C</u> |
| 9.  | <u>C</u> | 24. | <u>D</u> |
| 10. | <u>B</u> | 25. | <u>D</u> |
| 11. | <u>D</u> | 26. | <u>C</u> |
| 12. | <u>B</u> | 27. | <u>A</u> |
| 13. | <u>B</u> | 28. | <u>A</u> |
| 14. | <u>C</u> | 29. | <u>D</u> |
| 15. | <u>A</u> | 30. | <u>C</u> |

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# Multiple-Choice Answer Key

---

Name: \_\_\_\_\_



## Session 2

- |     |          |     |          |
|-----|----------|-----|----------|
| 31. | <u>A</u> | 46. | <u>D</u> |
| 32. | <u>B</u> | 47. | <u>B</u> |
| 33. | <u>B</u> | 48. | <u>D</u> |
| 34. | <u>D</u> | 49. | <u>D</u> |
| 35. | <u>C</u> | 50. | <u>A</u> |
| 36. | <u>C</u> | 51. | <u>C</u> |
| 37. | <u>B</u> | 52. | <u>D</u> |
| 38. | <u>A</u> | 53. | <u>A</u> |
| 39. | <u>A</u> | 54. | <u>C</u> |
| 40. | <u>D</u> | 55. | <u>C</u> |
| 41. | <u>D</u> | 56. | <u>D</u> |
| 42. | <u>A</u> | 57. | <u>A</u> |
| 43. | <u>B</u> | 58. | <u>C</u> |
| 44. | <u>B</u> | 59. | <u>A</u> |
| 45. | <u>A</u> | 60. | <u>B</u> |

# Constructed-Response Scoring Rubrics



## Session 3

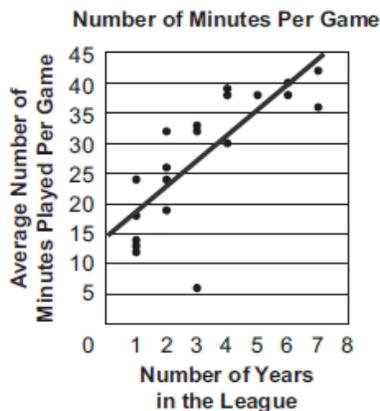
61.	<b>Scoring Rubric</b>	
	4	The student earns 5 points.
	3	The student earns 3 or 4 points.
	2	The student earns 2 points.
	1	The student earns 1 point OR demonstrates minimal understanding of the standard being measured.
	0	The student's response is incorrect, irrelevant to the skill or standard being measured, or blank.
<b>Sample Answer:</b>		
<p>Part A. Greg starts with 20 quarters. Over 3 days (5 – 2) Greg added 9 quarters (35 – 26). So he added 3 quarters each day (9 divided 3). Since he had 26 quarters on day 2, I subtracted 3 twice (once for each day) to get his starting number of quarters.</p> <p>Part B. <math>y = 3x + 20</math></p> <p>Part C. Greg adds 3 quarters each day and has 26 quarters in his bank on day 2. If he added 72 quarters, which is a multiple of 3, he would have 98 quarters. If he added 3 more, he would have 101 quarters, skipping over 100.</p> <p>Part D. Greg's graph would be a series of points on a straight line.</p>		
<b>Points Assigned:</b>		
<p>Part A. 2 points 1 point for correctly determining how many quarters Greg started with <b>AND</b> 1 point for providing complete and accurate work or explanation of how they know Greg started with 20 quarters</p> <p>Part B. 1 point 1 point for providing a correct equation</p> <p>Part C. 1 point 1 point for providing complete and accurate work or explanation of why Greg would never have exactly 100 quarters</p> <p>Part D. 1 point 1 point for correctly describing the graph as a straight line or as having all the points lying on a straight line</p>		

**Note:** Scorers should follow along with the student's work throughout. If the student makes an error in a previous part and subsequent answers are correct based on the earlier error, the student should not be penalized again.

<b>62.</b>	<b>Scoring Rubric</b>
<b>4</b>	The student earns 4 points.
<b>3</b>	The student earns 3 points.
<b>2</b>	The student earns 2 points.
<b>1</b>	The student earns 1 point OR demonstrates minimal understanding of the standard being measured.
<b>0</b>	The student's response is incorrect, irrelevant to the skill or standard being measured, or blank.

**Sample Answer:**

Part A. (For the line  $y = mx + b$ ;  $3 \leq m \leq 6$  and  $13 \leq b \leq 17$ )



Part B. The slope would decrease OR the line would shift upward OR the  $y$ -intercept would increase.

Part C. 14 minutes (13 – 17 minutes)

Part D. The line wouldn't provide a valid approximation because there are only 48 minutes in a basketball game for this league and the  $y$ -value of the line would be above 48 when  $x = 15$ .

**Points Assigned:**

Part A. 1 point

1 point for drawing a valid line of best fit

Part B. 1 point

1 point for providing one way in which the line of best fit would change if (3, 6) were removed from the data set

Part C. 1 point

1 point for providing the  $y$ -intercept of the line of best fit drawn in part A

Part D. 1 point

1 point for explaining that the  $y$ -value would exceed the number of minutes in a basketball game when  $x = 15$

**Note:** Scorers should follow along with the student's work throughout. If the student makes an error in a previous part and subsequent answers are correct based on the earlier error, the student should not be penalized again.

63.

<b>Scoring Rubric</b>	
<b>4</b>	The student earns 4 points.
<b>3</b>	The student earns 3 points.
<b>2</b>	The student earns 2 points.
<b>1</b>	The student earns 1 point OR demonstrates minimal understanding of the standard being measured.
<b>0</b>	The student's response is incorrect, irrelevant to the skill or standard being measured, or blank.
<b>Sample Answer:</b>	
Part A. $x = -\frac{4}{3}$ (or equivalent)	
Part B. $z = 2$ . When $z = 2$ , the equation is $2x + \frac{4}{3} = 2x$ . When you subtract $2x$ from both sides, you get $\frac{4}{3} = 0$ , which is never true.	
Part C. In order for the equation to have an infinite number of solutions, both sides must simplify to the same constant <b>and</b> coefficient of $x$ . It is not possible to have the same constant ( $\frac{4}{3}$ or $0$ ) because we can only change the value of the coefficient, $z$ .	
<b>Points Assigned:</b>	
Part A. 1 point 1 point for providing a correct answer	
Part B. 2 points 1 point for providing a correct answer	
<b>AND</b> 1 point for providing a complete and accurate explanation of why $z = 2$ results in an equation that has no solution	
Part C. 1 point 1 point for providing a complete and accurate explanation of why there is no value of $z$ that will force the equation to have infinitely many solutions	

64.

<b>Scoring Rubric</b>	
<b>4</b>	The student earns 4 points.
<b>3</b>	The student earns 3 points.
<b>2</b>	The student earns 2 points.
<b>1</b>	The student earns 1 point OR demonstrates minimal understanding of the standard being measured.
<b>0</b>	The student's response is incorrect, irrelevant to the skill or standard being measured, or blank.
<b>Sample Answer:</b>	
<p>Part A. 17 inches; First I found the diagonal of the base by solving <math>\sqrt{9^2 + 12^2}</math>, which equals 15 inches. I then used that measure as the base of the right triangle, and 8 inches as the height to find the hypotenuse, or the length of the baton. I found the length of the baton by solving <math>\sqrt{15^2 + 8^2}</math>, which equals 17 inches.</p> <p>Part B. I'll name the base leg to the right triangle for which <math>d</math> is the hypotenuse <math>x</math>. So then we know that <math>x^2 + h^2 = d^2</math>. The length of <math>x</math> can be found by using the equation <math>l^2 + w^2 = x^2</math>. Then I substitute <math>(l^2 + w^2)</math> for <math>x^2</math> to find the equation for the length of <math>d</math>. That equation becomes <math>(l^2 + w^2) + h^2 = d^2</math>. I can now take off the parenthesis around <math>l^2 + w^2</math> because they are not necessary and the correct equation is <math>l^2 + w^2 + h^2 = d^2</math>. So you add <math>h^2</math> and not subtract it.</p>	
<b>Points Assigned:</b>	
<p>Part A. 2 points 1 point for providing the correct length of the baton <b>AND</b> 1 point for providing complete and accurate work or explanation of why 17 inches (or equivalent) is correct</p> <p>Part B. 2 points 2 points for providing complete and accurate work or explanation of why Olivia's equation is incorrect <b>OR</b> 1 point for providing partially correct work (e.g. incorrectly substituting in <math>l^2 + w^2</math>) or substitutes in numbers instead of using variables to show why Olivia's equation is incorrect <b>OR</b> 1 point for providing partially complete work (e.g. identifies that you need to add <math>h^2</math> and not subtract it but does not explain why)</p>	