Name: _____

New York State Testing Program

2016 Common Core Mathematics Test Book 1

Grade 8

April 13–15, 2016

Released Questions

GRADE 8 MATH BOOK 1

Developed and published under contract with the New York State Education Department by Questar Assessment, Inc., 5550 Upper 147th Street West, Apple Valley, MN 55124.

Book 1

TIPS FOR TAKING THE TEST

Here are some suggestions to help you do your best:

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- Plan your time.

1 Mr. Thomsen is buying two types of gift cards to give as prizes to employees at a company meeting. He will buy restaurant gift cards that each cost $50. He will also buy movie theater gift cards that each cost $20. He has $450 to buy a total of 15 gift cards. How many of each type of gift card can Mr. Thomsen buy?

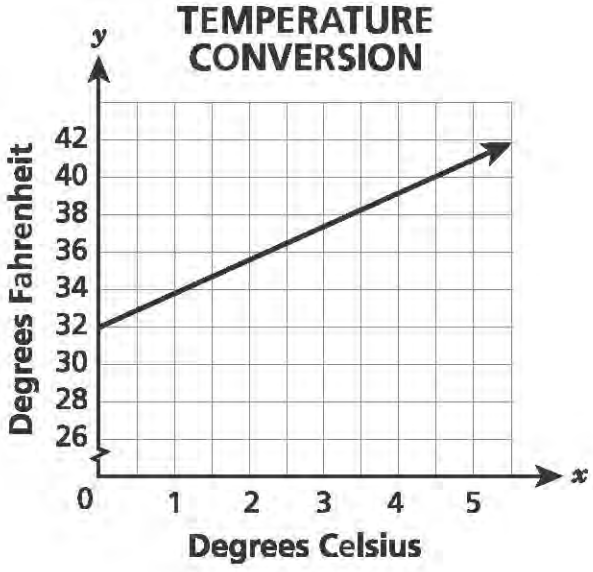
A He can buy 5 restaurant gift cards and 10 movie theater gift cards.

B He can buy 8 restaurant gift cards and 7 movie theater gift cards.

C He can buy 10 restaurant gift cards and 5 movie theater gift cards.

D He can buy 12 restaurant gift cards and 3 movie theater gift cards.

2 The relationship between temperature in degrees Fahrenheit and degrees Celsius is shown in the graph below.



What is the meaning of the *y*-intercept?

A the change in degrees Fahrenheit for every change of one degree Celsius

B the change in degrees Celsius for every change of one degree Fahrenheit

C the temperature in degrees Fahrenheit when the temperature is zero degrees Celsius

D the temperature in degrees Celsius when the temperature is zero degrees Fahrenheit

GO ON

3 Kevin moved from a city to a small town. The population of the city is 6×10^5, which is about 15 times as great as the small town. Which expression could represent the approximate population of the small town?

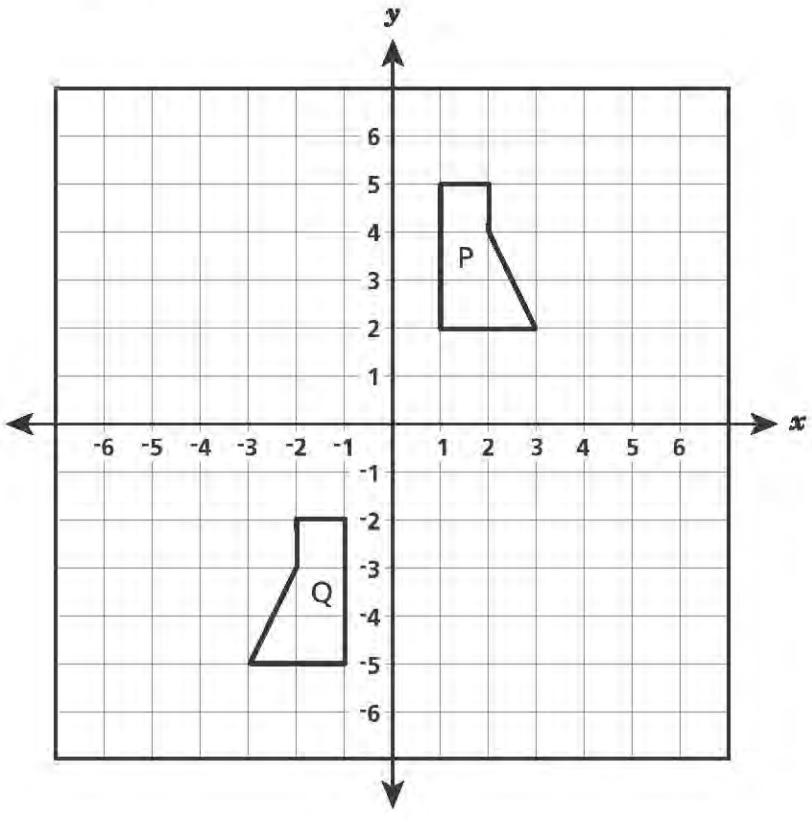
A 4×10^3

B 4×10^4

C 9×10^5

D 9×10^6

4 Pentagon P and pentagon Q, shown below, are congruent.



Which sequence could be used to transform pentagon P to pentagon Q?

A a 180° clockwise rotation about the origin

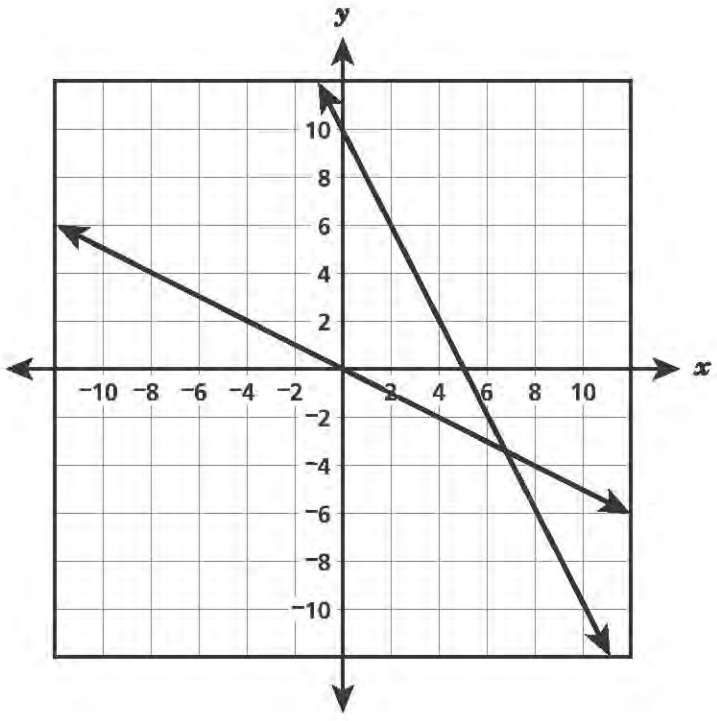
B a translation four units left and then a reflection over the *x*-axis

C a reflection over the *y*-axis and then a translation seven units down

D a translation seven units down and then a 90° clockwise rotation about the origin

GO ON

5 The graph of a system of equations is shown below.



What system of equations represents the graph?

A $y = -2x + 10$
$y = -\frac{1}{3}x$

B $y = -2x + 10$
$y = -\frac{1}{2}x$

C $y = -\frac{1}{2}x + 10$
$y = -2x$

D $y = -\frac{1}{3}x + 10$
$y = -2x$

6 A cylinder and a cone have congruent heights and radii. What is the ratio of the volume of the cone to the volume of the cylinder?

A 1 : 1

B 1 : 3

C 1 : 6

D 1 : 9

7 Which of the equations listed below are linear equations?

Equation I: $C = 2\pi r$

Equation II: $A = \pi r^2$

Equation III: $V = \frac{4}{3}\pi r^3$

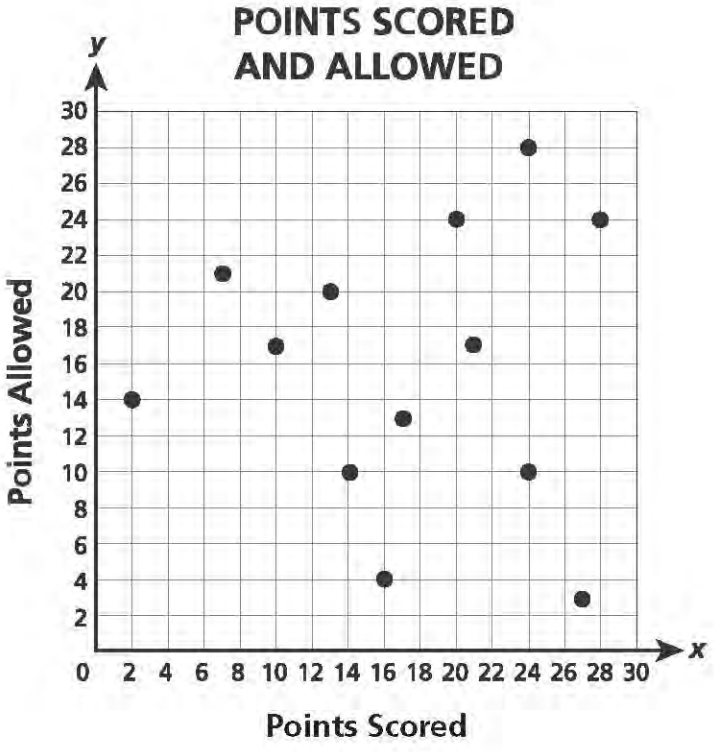
A equation I only

B equation II only

C equations I and III

D equations II and III

8 The scatter plot below shows the points scored and the points allowed by the Bulldogs football team for several games.



Which association (correlation) best describes the data?

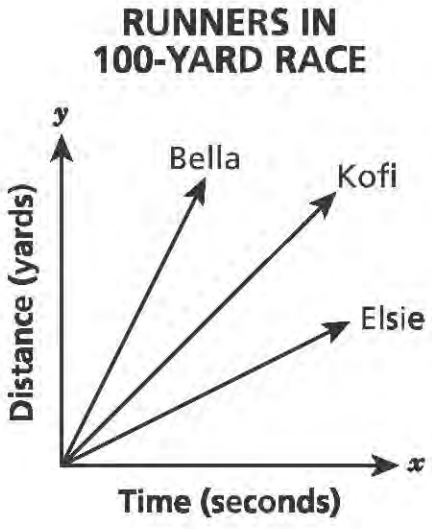
A no association (correlation)

B positive association (correlation)

C negative association (correlation)

D nonlinear association (correlation)

9 The graph below shows the relationship between the distances run and the time for three people in a 100-yard race.



The relationship between the distance run and the time for Kofi can be represented by the equation $y = 15.55x$, where he ran y yards in x seconds. Which two equations could be used to represent this relationship for Bella and Elsie?

A Bella: $y = 15.15x$; Elsie: $y = 15.85x$

B Bella: $y = 15.85x$; Elsie: $y = 15.65x$

C Bella: $y = 15.45x$; Elsie: $y = 15.15x$

D Bella: $y = 15.85x$; Elsie: $y = 15.15x$

10 Which table of values represents a linear function?

A

x	y
0	0
1	1
4	16
9	81

C

x	y
0	0
1	2
4	8
9	18

B

x	y
0	1
1	3
4	9
9	20

D

x	y
0	0
1	2
4	4
9	6

11 Simplify.

$$5^{-8} \times 5^{4}$$

A $\frac{1}{5^4}$

B $\frac{1}{5^{32}}$

C -5^2

D -5^{12}

12 What is the value of t that satisfies the equation below?

$$3(t + 4) - 2(2t + 3) = -4$$

A $-\frac{11}{3}$

B $-\frac{4}{5}$

C 10

D 11

19 Ellentown College has approximately 3×10^3 students and Pengrove University has approximately 30,000 students. How many times as much is the number of students at Pengrove University as the number of students at Ellentown College?

A 1

B 10

C 30

D 100

20 A series of transformations on quadrilateral S resulted in quadrilateral T.

- The angle measures of quadrilateral T are congruent to those of quadrilateral S.
- The side lengths of quadrilateral T are twice as long as those of quadrilateral S.

Which transformation on quadrilateral S **must** be included to result in quadrilateral T?

A dilation

B rotation

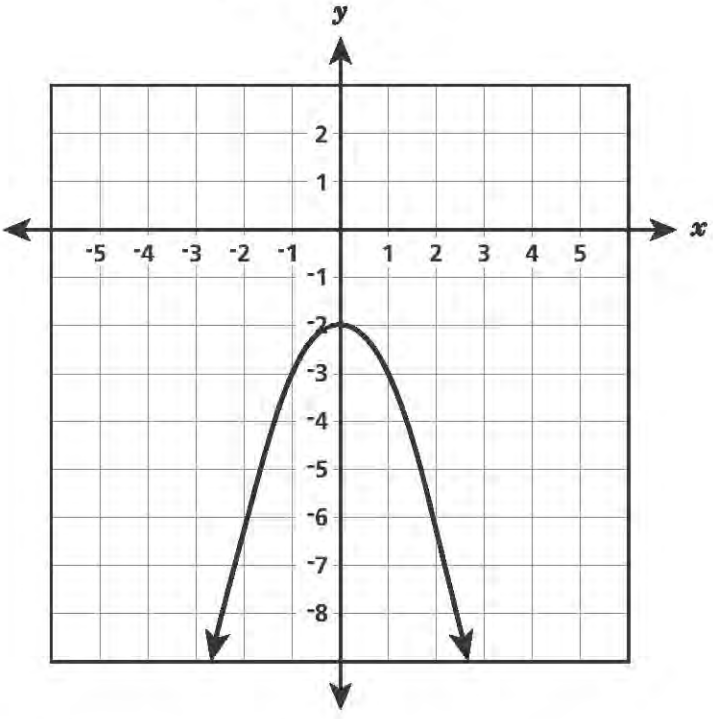
C reflection

D translation

GO ON

21 Function 1 is represented by the equation $y = -\frac{4}{5}x - 2$, and function 2 is represented by the graph below.

FUNCTION 2



For which of the functions are all the output values less than -1?

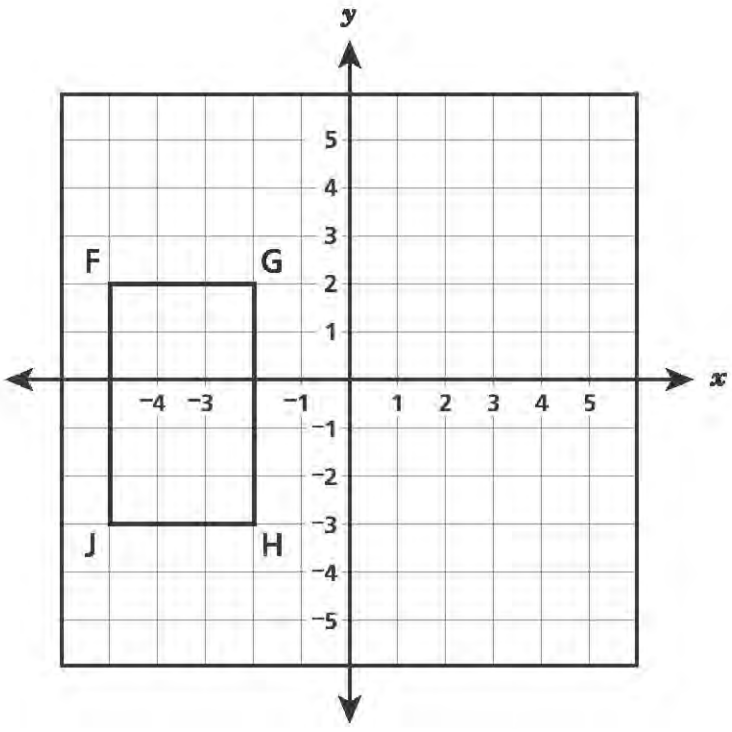
A both functions

B only function 1

C only function 2

D neither function

22 Rectangle FGHJ, shown below, is translated 6 units right and 1 unit up to produce rectangle F'G'H'J'.



Which statement about the side lengths of rectangle F'G'H'J' is true?

A F'G' = **3** and G'H' = **5**

B F'G' = **3** and G'H' = **6**

C F'G' = **9** and G'H' = **5**

D F'G' = **9** and G'H' = **6**

Grade 8
2016 Common Core Mathematics Test
Book 1
April 13–15, 2016

Name: _____

New York State Testing Program

2016 Common Core Mathematics Test Book 2

Grade 8

April 13–15, 2016

Released Questions

Book 2

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- Plan your time.

27 Solve the system of equations below.

$$2x + 4y = 10$$
$$2x + 4y = -10$$

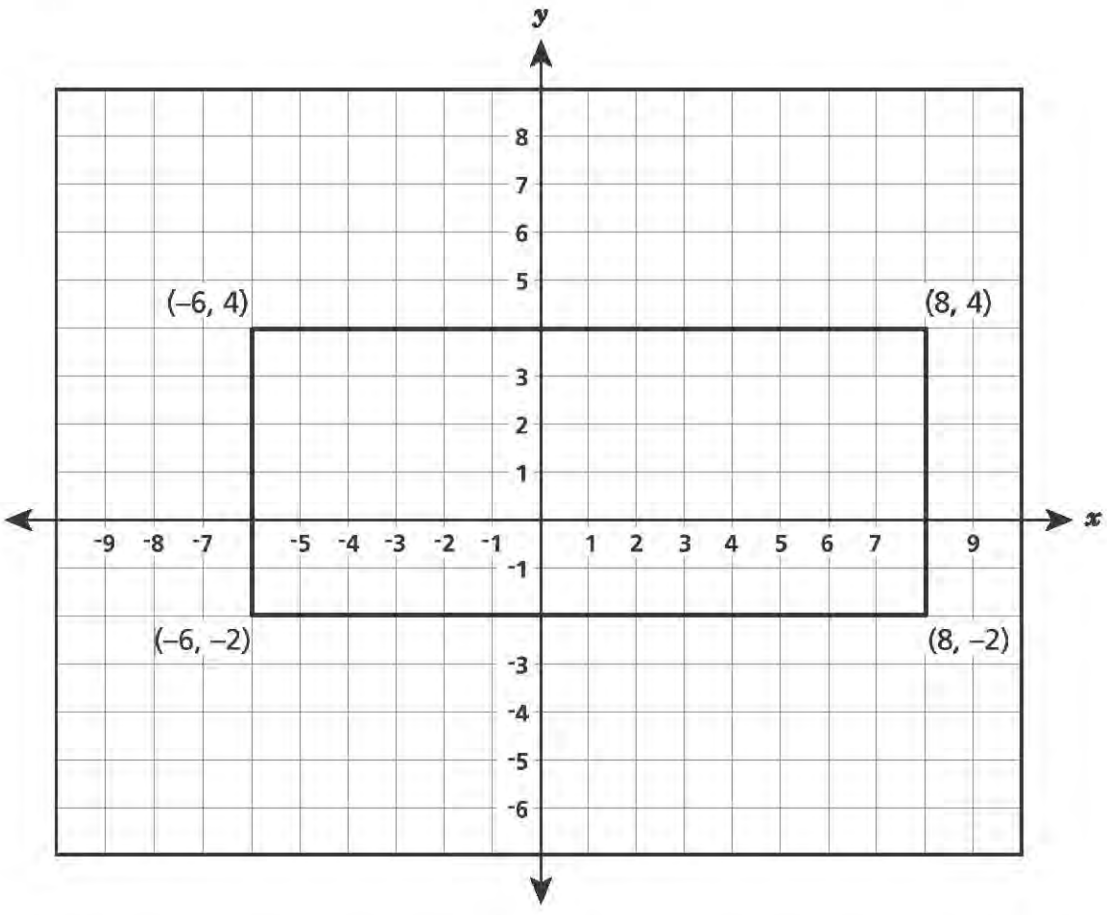
A $x = 3, y = 1$

B $x = 6, y = -4$

C No solution

D Infinitely many solutions

28 Mia enlarged a plan for an outdoor stage. The original plan is shown below.



She dilated the outdoor stage by a scale factor of four with the center of dilation at the origin. Which ordered pair will be the coordinates of one of the new vertices?

A (2, 1)

B (8, 16)

C (32, 4)

D (32, 16)

29 Bianca and Nick are both musicians who sell their songs online. During the same year, Bianca sold 8×10^5 downloads of her songs and Nick sold 4×10^6 downloads of his songs. How many times as much is the number of songs that Nick sold than the number of songs that Bianca sold?

A 2

B 5

C 20

D 40

30 Which table represents a relation that is **not** a function?

A

Input	Output
1	1
2	1
3	1
4	1

C

Input	Output
−1	−7
−2	11
−3	13
−4	105

B

Input	Output
2	0
4	1
6	2
8	0

D

Input	Output
3	0
5	2
7	1
3	−4

34 The Ecology Club was planning to take a field trip either to the seacoast or the mountains. The club president surveyed all of the members to determine the preferred trip. The results are displayed in the table below.

FIELD TRIP SURVEY

Students	Seacoast	Mountains	Total
Seventh-Grade	42	28	70
Eighth-Grade	30	50	80
Total	72	78	150

Which statement is true about the results of the survey?

A 20% of eighth-grade students preferred the seacoast

B 32% of seventh-grade students preferred the mountains

C 40% of students preferred the mountains

D 48% of students preferred the seacoast

35 A cylinder has a radius of 3 inches and a height of $4\frac{3}{4}$ inches. A sphere has a radius of 3 inches. What is the difference between the volumes, to the nearest tenth of a cubic inch, of the cylinder and the sphere?

A 21.2

B 51.8

C 68.3

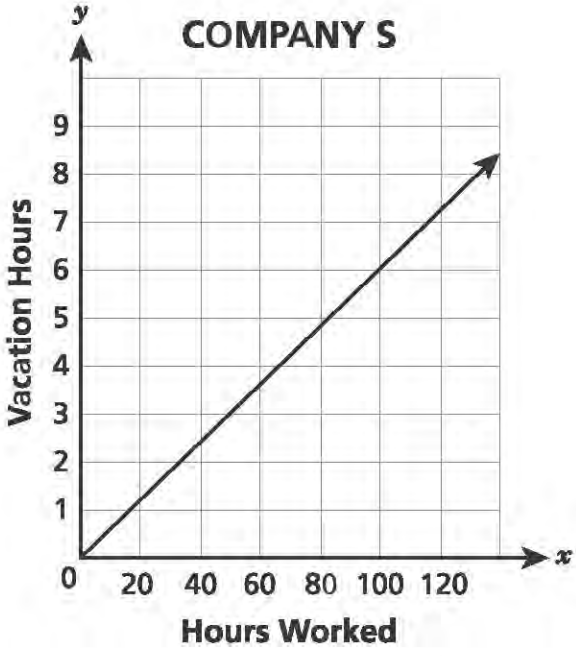
D 96.6

36 Two friends work at different companies, P and S. Both companies use the number of hours that an employee works to calculate that employee's vacation hours. The relationship between the number of hours worked and the number of vacation hours for employees at each company is shown in the table and graph, respectively.

COMPANY P

Hours Worked	Vacation Hours
10	0.4
20	0.8
30	1.2
40	1.6
50	2.0

COMPANY S



Which statement describes the difference in each friend's vacation hours if both work 2,080 hours?

A The friend at company S will have about 42 more vacation hours than the friend at company P.

B The friend at company S will have about 46 more vacation hours than the friend at company P.

C The friend at company P will have about eight more vacation hours than the friend at company S.

D The friend at company P will have about nine more vacation hours than the friend at company S.

37 Which equation represents a nonlinear function?

A $y = -3x + 1$

B $y = x^2 + 1$

C $y = \frac{x}{2} + 1$

D $y = 2x + \frac{1}{2}$

38 What is the value of the expression below?

$$\frac{(4.8 \times 10^8)}{(1.2 \times 10^4)} \times (2.2 \times 10^{-6})$$

A 0.88

B 0.088

C 0.0088

D 0.00088

39 A crane is lowering a concrete block from a height of 270 feet above the ground at a constant rate of 2.5 feet per second. Which function can be used to determine h, the height, in feet, above the ground of the concrete block after s seconds?

A $h = 270s + 2.5$

B $h = 2.5s + 270$

C $h = 270 - 2.5s$

D $h = 2.5s - 270$

40 Function P is a linear function with a y-intercept of 5. Function Q is defined by the equation $y = -\frac{1}{3}x + 4$. Which statement **must** be true about functions P and Q?

A Both functions have the same slope.

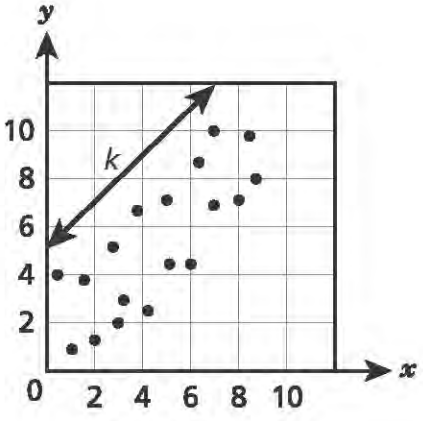
B Both functions have a negative slope.

C The functions will have the same input when $y = 0$.

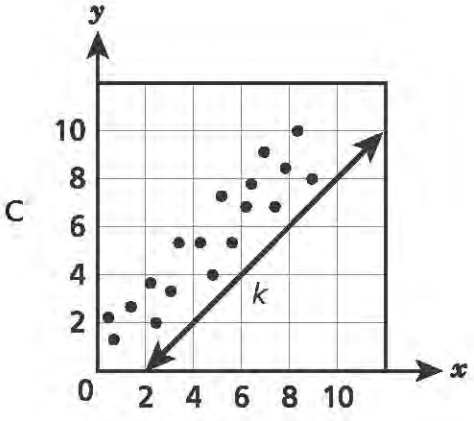
D The functions will have different outputs when $x = 0$.

41 Line k is the line of best fit for a set of data on a scatter plot. The data show a strong linear association. Which scatter plot **best** represents these data and line k?

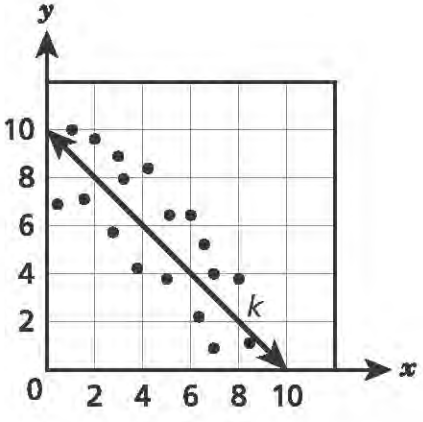
A



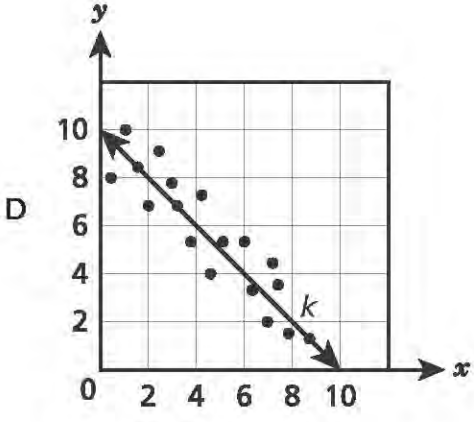
C



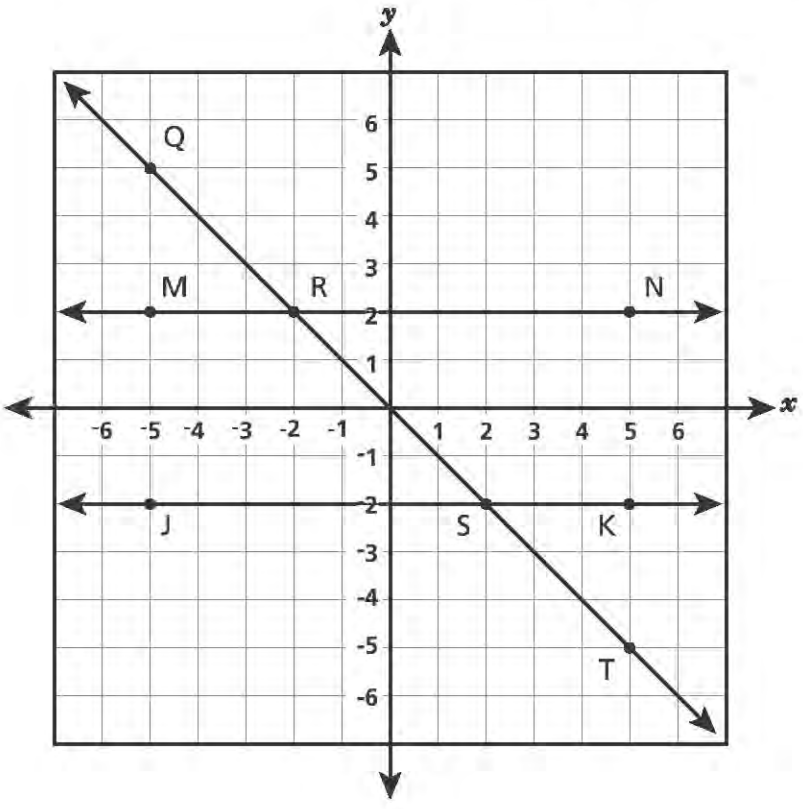
B



D



47 In the diagram below, lines MN and JK are parallel and are intersected by line QT.



Which transformation could be used to show that ∠**MRS** is congruent to ∠**JST**?

A reflect ∠**MRS** over the *x*-axis

B rotate ∠**MRS** about the origin

C translate ∠**MRS** down and to the right

D dilate ∠**MRS** by a scale factor of two with the center at point R

GO ON

48 What is the equation of the line that passes through points $(-3, 0.5)$ and $(3, -0.5)$?

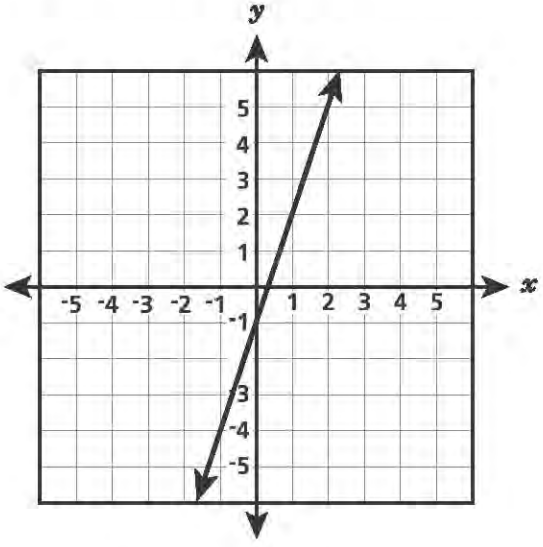
A $y = -\frac{1}{6}x$

B $y = -6x$

C $y = -\frac{1}{6}x + 1$

D $y = -6x - 17.5$

49 Function J is shown on the coordinate grid below.



If the y-intercept of Function R is $\frac{3}{2}$ greater than the y-intercept of Function J, which equation could represent Function R?

A $y = -x + 4.5$

B $y = 0.5x + 3$

C $y = 3x + 0.5$

D $y = 4.5x - 1$

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- Be sure to show your work when asked.
- Plan your time.

52 Jude incorrectly simplified the expression $\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$, as shown below.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 = \left(\frac{1}{8}\right)^6 = \frac{1}{262{,}144}$$

Describe the mistake that Jude made.

Answer

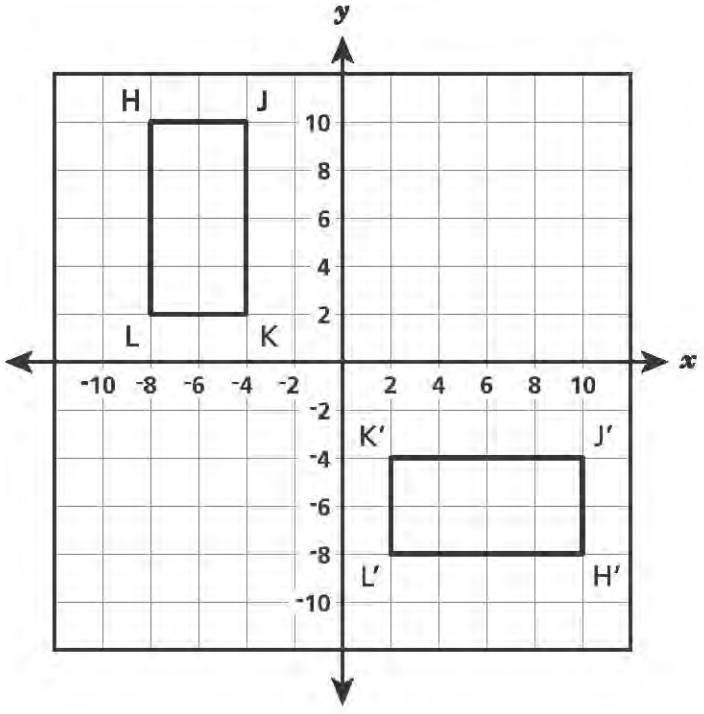
Correctly simplify the expression.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$$

Answer _____

GO ON

53 Congruent rectangles HJKL and H'J'K'L' are shown on the coordinate grid below.



Describe a sequence of transformations on rectangle HJKL that would result in rectangle H'J'K'L'.

Answer

_____

_____

_____

54 Write an equation of a function that is not linear.

Answer _____

Use your equation to explain why your function is not linear.

Answer

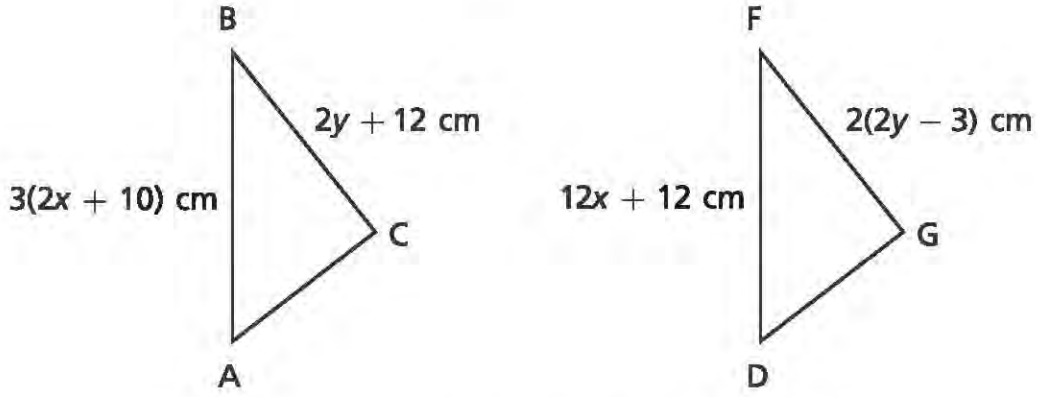
_____

_____

_____

GO ON

55 Triangle ABC is translated to create triangle DFG, as shown below.



In these triangles, side AB is congruent to side DF, and side BC is congruent to side FG. Determine the values of x and y.

Show your work.

Answer $x =$_____ and $y =$_____

56 A reporter collected data on y, the current market value, in dollars, of a certain car for various years, x, after it had been purchased new. The equation below was fit to the data.

$$y = 16{,}500 - 1{,}500x$$

What does the slope of the graph of this equation represent?

Answer

What does the y-intercept of the graph of this equation represent?

Answer

GO ON

57 A triangle with vertices at A(−1, 1), B(−2, 1), and C(−1, 4) is translated. The image of vertex A has coordinates at (3, −1).

Determine the coordinates of either the image of vertex B or the image of vertex C.

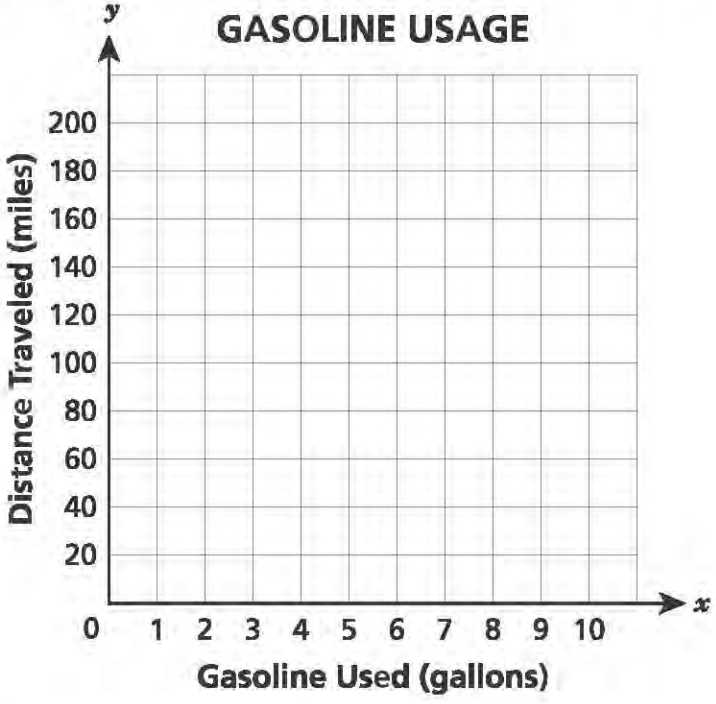
Show your work.

Answer _____

58 Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

Draw a graph on the grid below to show the relationship between gasoline used, x, and the distance traveled, y, during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.



How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

Answer

_____

_____

GO ON

59 Tim is selling tickets to a school sporting event to raise money for his club. He put some extra money in his box before he began. As he sells tickets, he records the number of tickets he has sold and the total amount of money in the box. Some of his data are shown below.

TOTAL AMOUNT OF MONEY FROM TICKET SALES

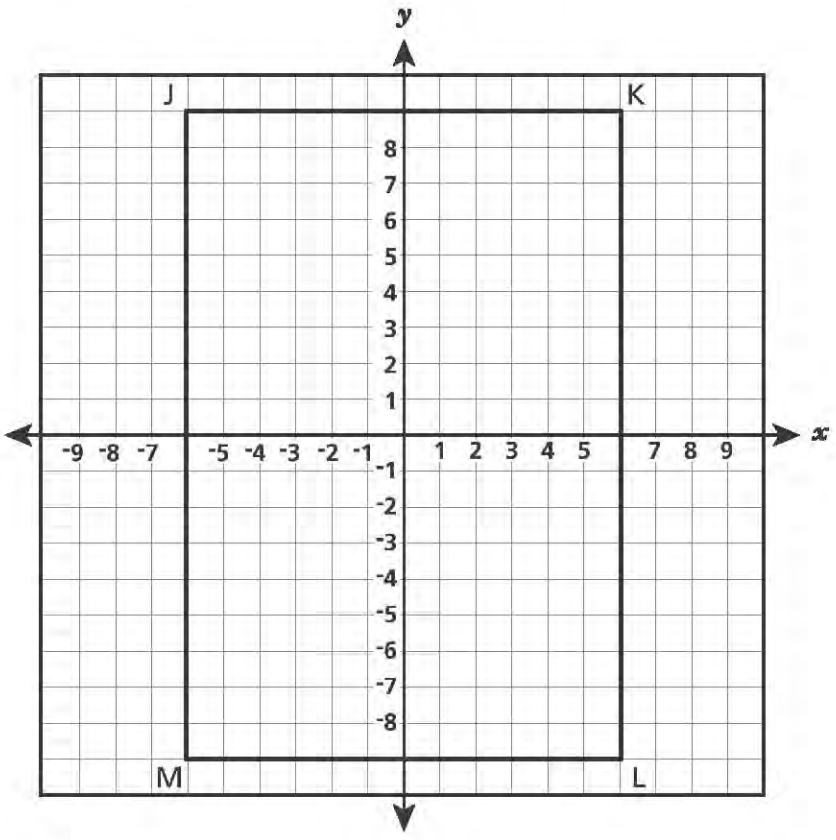
Number of Tickets Sold	Total Money in Box (dollars)
7	108.75
13	146.25
18	177.50

Assuming all the tickets are the same price, write an equation that represents the situation in the table. Explain how to use your equation to determine the amount of money originally in the box before any tickets were sold and the price of each ticket.

Show your work.

Answer

60 Rectangle JKLM is shown on the coordinate grid below.



GO ON

Rectangle JKLM undergoes a sequence of transformations, resulting in rectangle J'K'L'M'.

The length of side K'L' is 6 units. The coordinates of vertex K' are **(−3, 2)**, and the coordinates of vertex M' are **(3, −2)**.

Describe a sequence of transformations to rectangle JKLM that would result in rectangle J'K'L'M'.

Show your work.

Answer

61 Oliver works at a bookstore. He packed 20 identical paperbacks and 9 identical textbooks in a box. The total mass of the books was 44.4 pounds. After he put 1 more textbook and 5 more paperbacks in the box, the total mass of the books was 51 pounds.

Write a system of equations that can be used to determine p, the mass, in pounds, of one paperback, and t, the mass, in pounds, of one textbook.

Answer

Solve the system of equations to find the two masses.

Show your work.

Mass of one paperback _____ pound(s)

Mass of one textbook _____ pound(s)

STOP

Place Student Label Here

Grade 8
2016 Common Core Mathematics Test
Book 3
April 13–15, 2016

THE STATE EDUCATION DEPARTMENT

THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, NY 12234

2016 Mathematics Tests Map to the Standards

Grade 8 **Released Questions Available on EngageNY**

Question	Type	Key	Points	Standard	Cluster	Secondary Standard(s)	Multiple Choice Questions: Percentage of Students Who Answered Correctly (P-Value)	Constructed Response Questions: Average Points Earned	Constructed Response Questions: P-Value (Average Points Earned ÷ Total Possible Points)
Book 1									
1	Multiple Choice	A	1	CCSS.Math.Content.8.EE.C.8c	Expressions and Equations		0.83		
2	Multiple Choice	C	1	CCSS.Math.Content.8.F.B.4	Functions		0.51		
3	Multiple Choice	B	1	CCSS.Math.Content.8.EE.A.3	Expressions and Equations		0.46		
4	Multiple Choice	C	1	CCSS.Math.Content.8.G.A.2	Geometry		0.61		
5	Multiple Choice	B	1	CCSS.Math.Content.8.EE.C.8b	Expressions and Equations		0.58		
6	Multiple Choice	B	1	CCSS.Math.Content.8.G.C.9	Geometry		0.51		
7	Multiple Choice	A	1	CCSS.Math.Content.8.F.A.3	Functions		0.44		
8	Multiple Choice	A	1	CCSS.Math.Content.8.SP.A.1	Statistics and Probability		0.49		
9	Multiple Choice	D	1	CCSS.Math.Content.8.EE.B.5	Expressions and Equations		0.39		
10	Multiple Choice	C	1	CCSS.Math.Content.8.F.A.3	Functions		0.55		
11	Multiple Choice	A	1	CCSS.Math.Content.8.EE.A.1	Expressions and Equations		0.57		
12	Multiple Choice	C	1	CCSS.Math.Content.8.EE.C.7b	Expressions and Equations		0.51		
19	Multiple Choice	B	1	CCSS.Math.Content.8.EE.A.3	Expressions and Equations		0.55		
20	Multiple Choice	A	1	CCSS.Math.Content.8.G.A.4	Geometry		0.72		
21	Multiple Choice	C	1	CCSS.Math.Content.8.F.A.2	Functions		0.31		
22	Multiple Choice	A	1	CCSS.Math.Content.8.G.A.1a	Geometry		0.76		
Book 2									
27	Multiple Choice	C	1	CCSS.Math.Content.8.EE.C.8b	Expressions and Equations		0.66		
28	Multiple Choice	D	1	CCSS.Math.Content.8.G.A.3	Geometry		0.52		
29	Multiple Choice	B	1	CCSS.Math.Content.8.EE.A.3	Expressions and Equations		0.58		
30	Multiple Choice	D	1	CCSS.Math.Content.8.F.A.1	Functions		0.53		
34	Multiple Choice	D	1	CCSS.Math.Content.8.SP.A.4	Statistics and Probability		0.50		
35	Multiple Choice	A	1	CCSS.Math.Content.8.G.C.9	Geometry		0.60		
36	Multiple Choice	A	1	CCSS.Math.Content.8.EE.B.5	Expressions and Equations		0.48		
37	Multiple Choice	B	1	CCSS.Math.Content.8.F.A.3	Functions		0.67		
38	Multiple Choice	B	1	CCSS.Math.Content.8.EE.A.4	Expressions and Equations		0.54		

Grade 8 **Released Questions Available on EngageNY**

Question	Type	Key	Points	Standard	Cluster	Secondary Standard(s)	Multiple Choice Questions: Percentage of Students Who Answered Correctly (P-Value)	Constructed Response Questions: Average Points Earned	Constructed Response Questions: P-Value (Average Points Earned ÷ Total Possible Points)
39	Multiple Choice	C	1	CCSS.Math.Content.8.F.B.4	Functions		0.41		
40	Multiple Choice	D	1	CCSS.Math.Content.8.F.A.2	Functions		0.48		
41	Multiple Choice	D	1	CCSS.Math.Content.8.SP.A.2	Statistics and Probability		0.74		
47	Multiple Choice	C	1	CCSS.Math.Content.8.G.A.5	Geometry	CCSS.Math.Content.8.G.A.1	0.42		
48	Multiple Choice	A	1	CCSS.Math.Content.8.EE.B.6	Expressions and Equations		0.43		
49	Multiple Choice	C	1	CCSS.Math.Content.8.F.A.2	Functions		0.45		
Book 3									
52	Constructed Response		2	CCSS.Math.Content.8.EE.A.1	Expressions and Equations			0.80	0.40
53	Constructed Response		2	CCSS.Math.Content.8.G.A.2	Geometry			0.74	0.37
54	Constructed Response		2	CCSS.Math.Content.8.F.A.3	Functions			0.76	0.38
55	Constructed Response		2	CCSS.Math.Content.8.EE.C.7a	Expressions and Equations	CCSS.Math.Content.8.G.A.1a		0.89	0.45
56	Constructed Response		2	CCSS.Math.Content.8.SP.A.3	Statistics and Probability			0.52	0.26
57	Constructed Response		2	CCSS.Math.Content.8.G.A.3	Geometry			0.76	0.38
58	Constructed Response		3	CCSS.Math.Content.8.EE.B.5	Expressions and Equations			0.82	0.27
59	Constructed Response		3	CCSS.Math.Content.8.F.B.4	Functions			0.68	0.23
60	Constructed Response		3	CCSS.Math.Content.8.G.A.4	Geometry	CCSS.Math.Content.8.G.A.3		0.74	0.25
61	Constructed Response		3	CCSS.Math.Content.8.EE.C.8c	Expressions and Equations			0.56	0.19

*This item map is intended to identify the primary analytic skills necessary to successfully answer each question. However, some questions measure proficiencies described in multiple standards, including a balanced combination of procedural and conceptual understanding.