

Name: _____



New York State Testing Program

2016 Common Core Mathematics Test Book 1

Grade 8

April 13–15, 2016

Released Questions

The scoring rubric for short and extended constructed-response questions can be found in the grade-level Educator Guides at <http://www.engageny.org/resource/test-guides-for-english-language-arts-and-mathematics>.

New York State P-12 Learning Standards Alignment

The alignment(s) to the New York State P-12 Learning Standards for Mathematics is/are 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 procedure and conceptual understanding. For example, two-point and three-point constructed-response questions require students to show an understanding of mathematical procedures, concepts, and applications.

These Released Questions Do Not Comprise a "Mini Test"

To ensure future valid and reliable tests, some content must remain secure for possible use on future exams. As such, this document is *not* intended to be representative of the entire test, to show how operational tests look, or to provide information about how teachers should administer the test; rather, its purpose is to provide an overview of how the test reflects the demands of the New York State P-12 Learning Standards.

The released questions do not represent the full spectrum of the standards assessed on the State tests, nor do they represent the full spectrum of how the standards should be taught and assessed in the classroom. It should not be assumed that a particular standard will be measured by an identical question in future assessments. Specific criteria for writing test questions, as well as additional assessment information, are available at <http://www.engageny.org/common-core-assessments>.

Grade 8 Mathematics Reference Sheet

CONVERSIONS

1 inch = 2.54 centimeters

1 meter = 39.37 inches

1 mile = 5,280 feet

1 mile = 1,760 yards

1 mile = 1.609 kilometers

1 kilometer = 0.62 mile

1 pound = 16 ounces

1 pound = 0.454 kilogram

1 kilogram = 2.2 pounds

1 ton = 2,000 pounds

1 cup = 8 fluid ounces

1 pint = 2 cups

1 quart = 2 pints

1 gallon = 4 quarts

1 gallon = 3.785 liters

1 liter = 0.264 gallon

1 liter = 1,000 cubic centimeters

FORMULAS

Triangle

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

Parallelogram

$$A = bh$$

Circle

$$A = \pi r^2$$

Circle

$$C = \pi d \text{ or } C = 2\pi r$$

General Prisms

$$V = Bh$$

Cylinder

$$V = \pi r^2 h$$

Sphere

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

Cone

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

Pythagorean Theorem

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

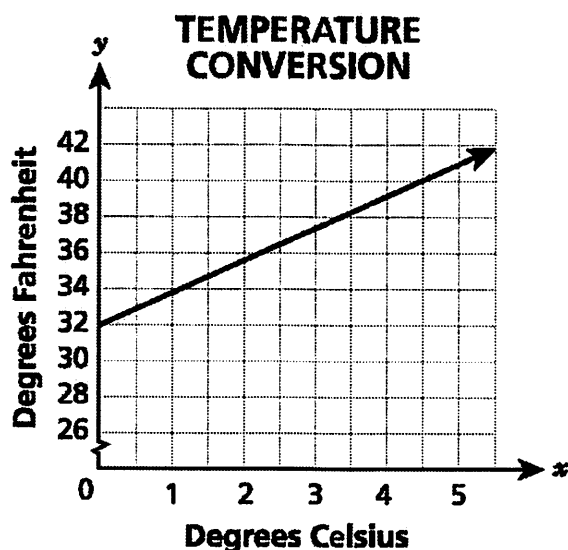
1

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

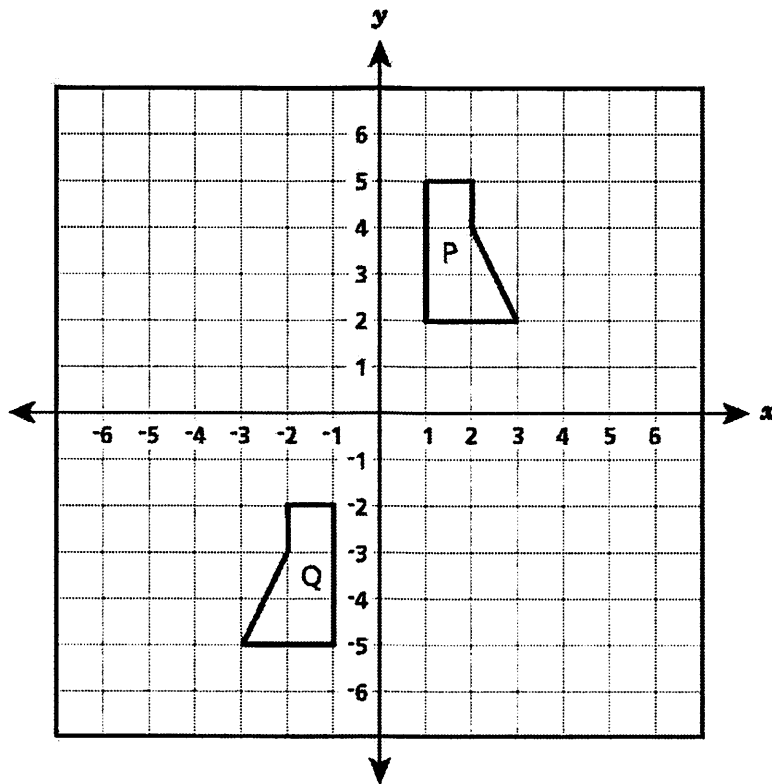
C 9×10^5

D 9×10^6

GO ON

4

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



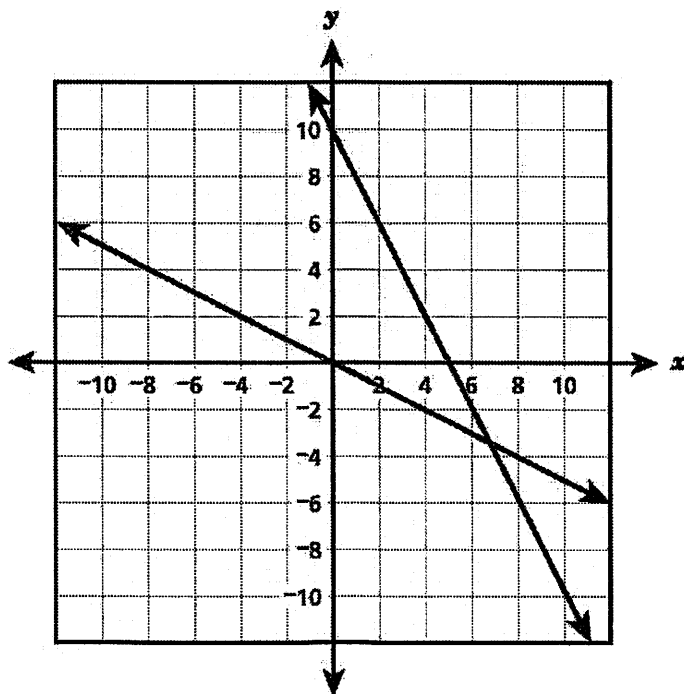
Which sequence could be used to transform pentagon P to pentagon Q?

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

GO ON

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

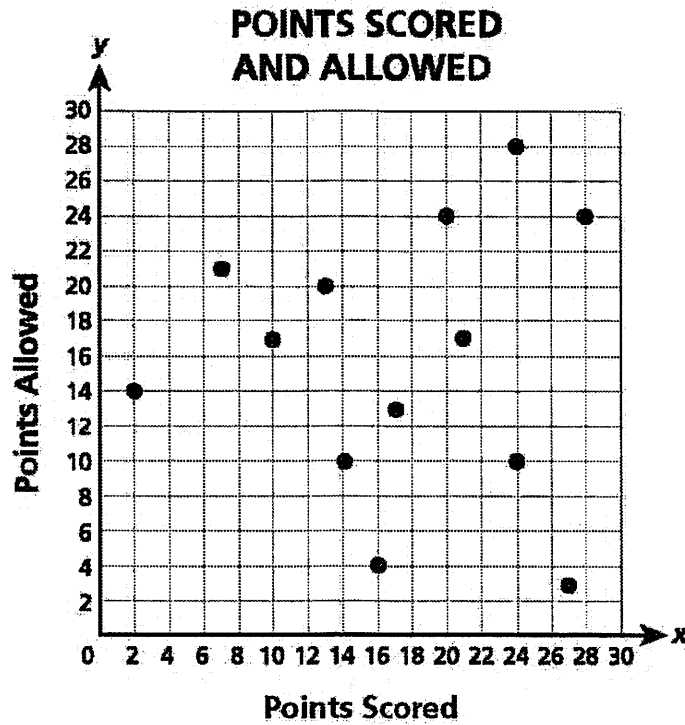
C equations I and III

D equations II and III

GO ON

8

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

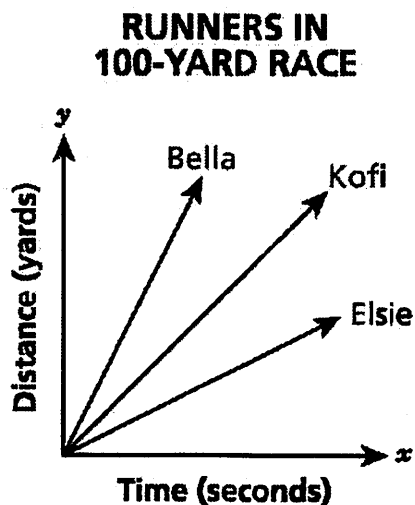


Which association (correlation) best describes the data?

- 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: $y = 15.15x$

GO ON

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

GO ON

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?

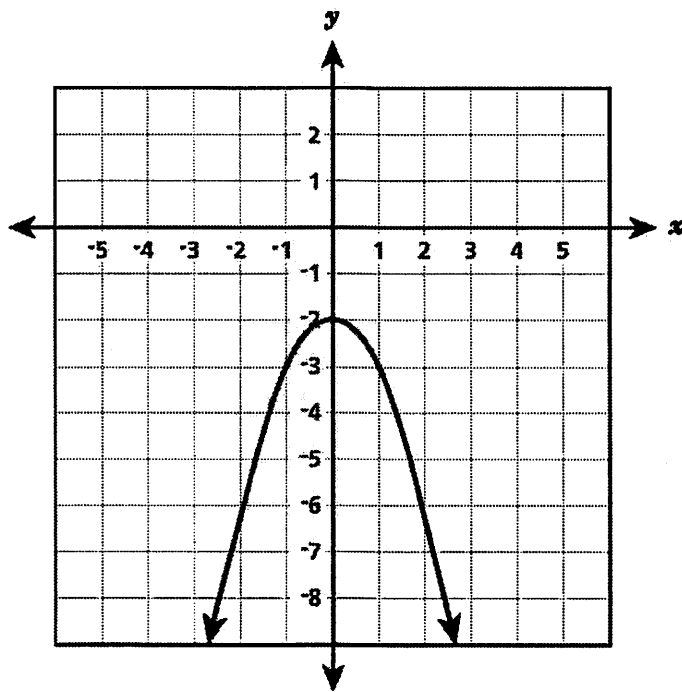
- A dilation
- B rotation
- C reflection
- D translation

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

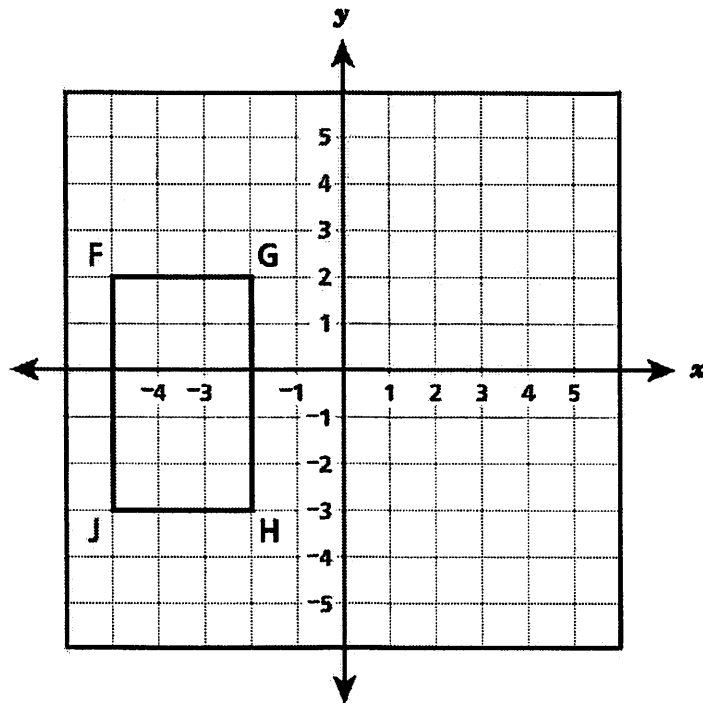


For which of the functions are all the output values less than -1 ?

- 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 $G'H' = 6$

GO ON

27

Solve the system of equations below.

$$2x + 4y = 10$$

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

A $x = 3, y = 1$

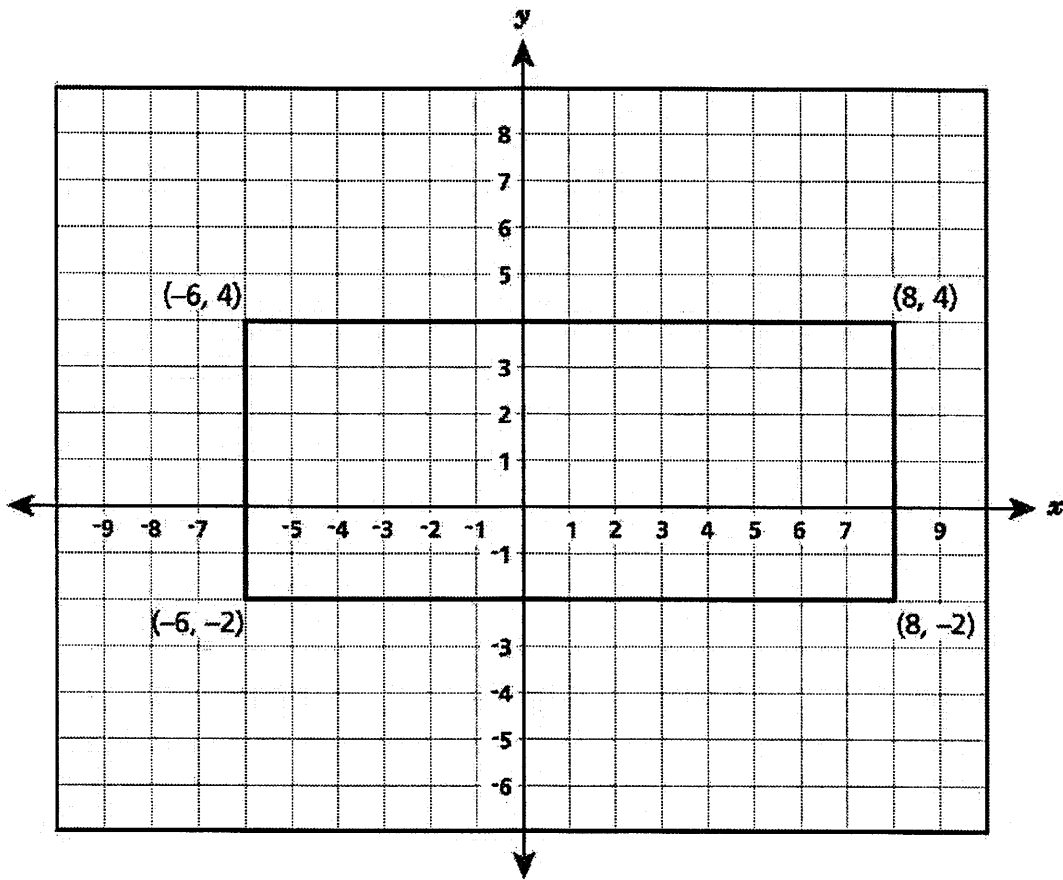
B $x = 6, y = -4$

C No solution

D Infinitely many solutions

GO ON

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 4×10^8 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

GO ON

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

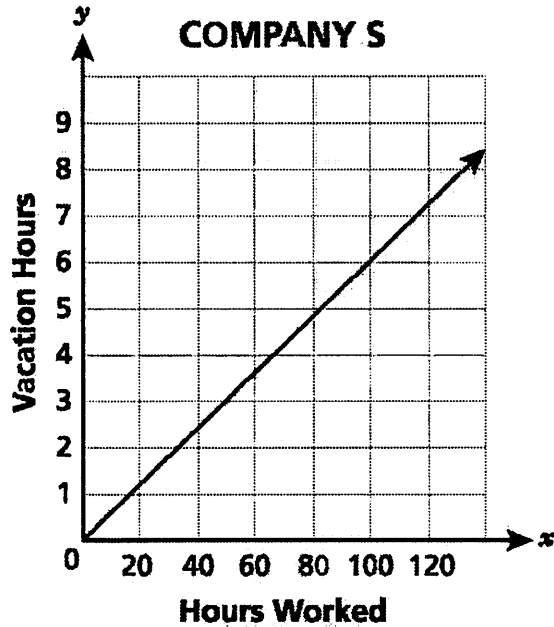
GO ON

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



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.

GO ON

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?

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

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 $h = 2.5s - 270$

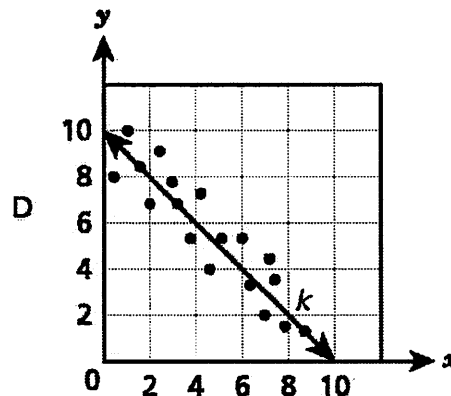
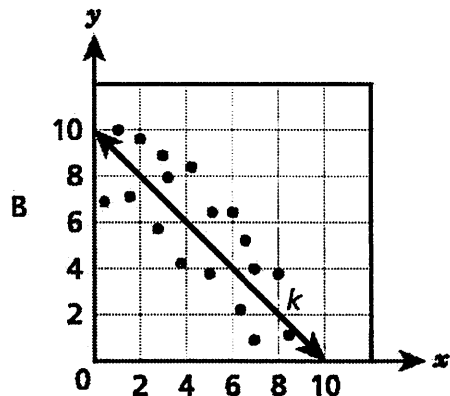
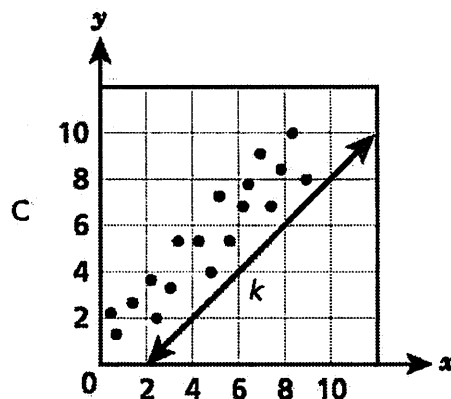
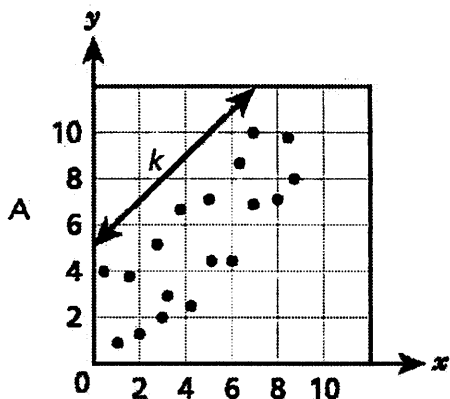
40

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

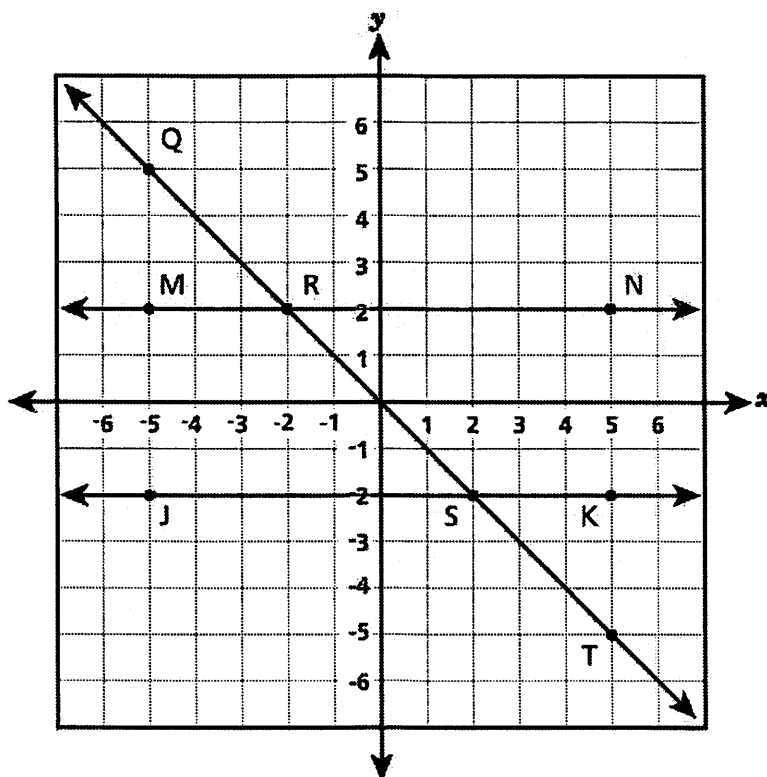
Line k is the line of best fit for a set of data on a scatter plot. The data show a strong linear association. Which scatter plot best represents these data and line k ?



GO ON

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 $\angle MRS$ is congruent to $\angle JST$?

- A reflect $\angle MRS$ over the x -axis
- B rotate $\angle MRS$ about the origin
- C translate $\angle MRS$ down and to the right
- D dilate $\angle MRS$ 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 $y = -\frac{1}{6}x$

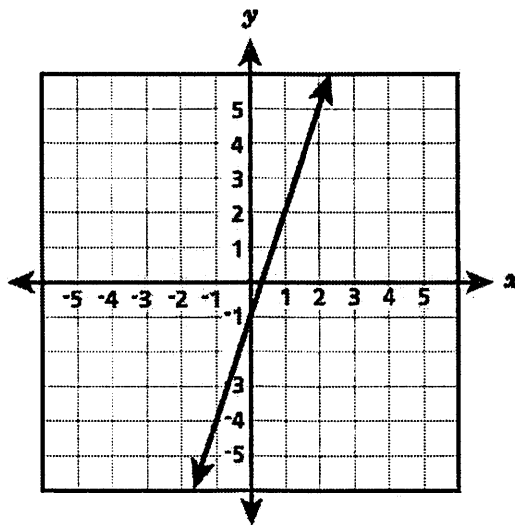
B $y = -6x$

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 $y = 4.5x - 1$

GO ON

Grade 8
2016 Common Core
Mathematics Test
Book 2
April 13–15, 2016