Student Name _____

Teacher Name _____

School _____

System _____

ACH

Tennessee Comprehensive Assessment Program

Achievement Test ~ Grade 8

Practice Test

Version B

Mathematics

Part 1

1 What is the value of y in the solution to this system of linear equations?

$$2y - x = -8$$
$$5y + x = -6$$

A 4

B 2

C -2

D -4

2 Four numbers are shown below.

$$2^3,\ 7.5,\ \sqrt{70},\ 2\sqrt{10}$$

Which list shows these numbers in order, from greatest to least value?

F $\sqrt{70},\ 2^3,\ 7.5,\ 2\sqrt{10}$

G $\sqrt{70},\ 2\sqrt{10},\ 2^3,\ 7.5$

H $2\sqrt{10},\ 7.5,\ 2^3,\ \sqrt{70}$

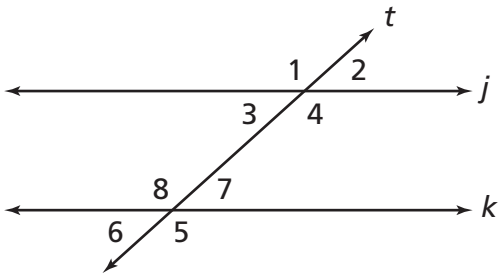
J $2\sqrt{10},\ \sqrt{70},\ 2^3,\ 7.5$

Go On ▶

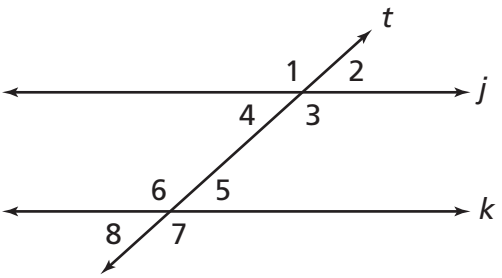
3 Which figure appears to contain all the characteristics below?

- Line *j* and Line *k* are parallel lines.
- Line *j* and Line *k* are cut by a transversal, *t*.
- The measure of Angle 2 is equal to the measure of Angle 4.
- The measure of Angle 5 is equal to the measure of Angle 7.

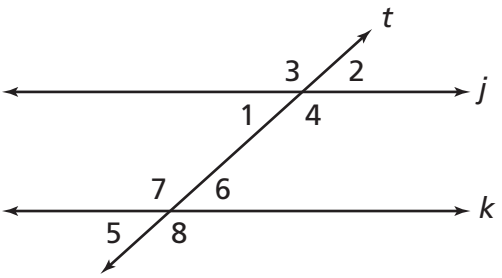
A



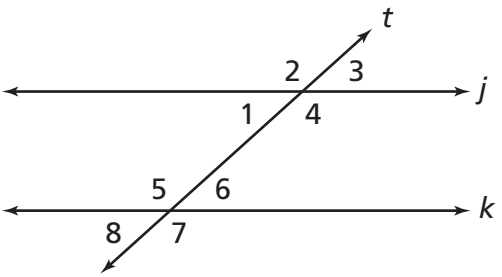
B



C



D



4 Which equation represents a linear function?

F $y = 5x^2 + 12$

G $y = \sqrt{4x} + 4$

H $y = -2x - 3$

J $y = |3x| + 7$

5 Which statement is <u>true</u>?

A The number $\frac{9}{10}$ is irrational.

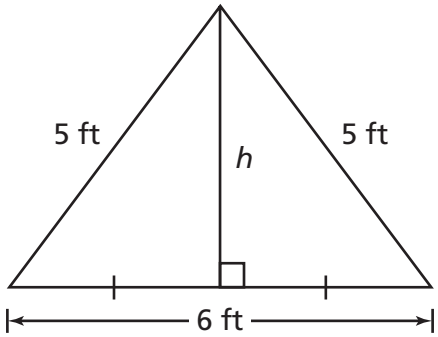
B The number $\left(\sqrt{2}\right)^2$ is rational.

C The number $\sqrt{44}$ is rational.

D The number $\frac{6\pi}{15\pi}$ is irrational.

Go On ▶

6 A triangular face of a dog house is represented in the diagram below.



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

Which measurement is closest to the height, *h*, of this dog house?

F 3.3 feet

G 4 feet

H 5.8 feet

J 11 feet

7 The speed of a space shuttle is 17,321 miles per hour. At this speed, without stopping, what is the total number of miles the space shuttle will travel in five days?

$$\text{distance} = \text{rate} \times \text{time}$$

A 86,605 miles

B 415,704 miles

C 2,078,520 miles

D 5,196,300 miles

8 Which expression is equivalent to the product of 231,000,000,000 and 42,000,000,000,000?

F $(2.31 + 4.2) \times 10^{(11 \times 13)}$

G $(2.31 + 4.2) \times 10^{(11 + 13)}$

H $(2.31 \times 4.2) \times 10^{(11 \times 13)}$

J $(2.31 \times 4.2) \times 10^{(11 + 13)}$

9 Given:

$$\begin{cases} f(x) = \dfrac{6}{x - 4} \\ \\ g(x) = \dfrac{5}{x + 4} \end{cases}$$

For what value of x does $f(x) = g(x)$?

A 4

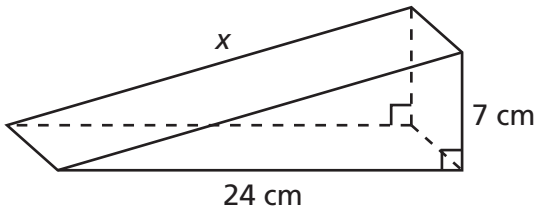
B 0

C -8

D -44

Go On ▶

10 The lengths of two edges of the figure below are shown in centimeters.



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

What is the length of Edge *x*?

F 25 cm

G 31 cm

H 569 cm

J 625 cm

11 The sponsor of a math club is ordering shirts for club members. The table below shows the total price for a number of shirts from each of four vendors.

Shirt Vendors

Vendor	Number of Shirts	Total Price
Q	50	$320.00
R	60	$380.00
S	75	$530.00
T	80	$560.00

Which vendor offers the lowest price per shirt?

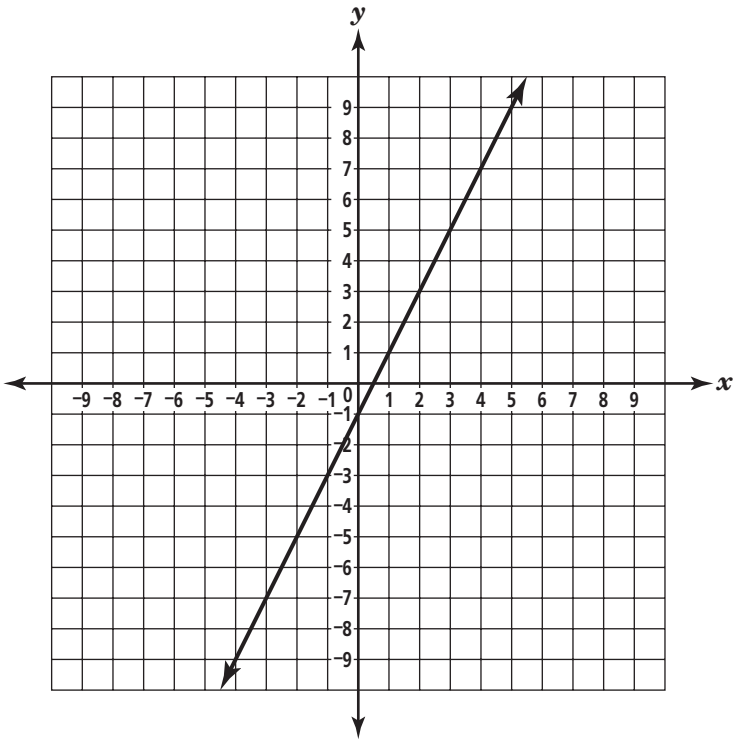
A Vendor Q

B Vendor R

C Vendor S

D Vendor T

12 Which equation is best represented by the graph below?



F $y = -x + 2$

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

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

J $y = 2x - 1$

Go On ▶

13 Steven's morning workout consists of jogging 8 miles per hour for 0.75 hour and then walking at a rate of 3 miles per hour for 0.5 hour. How many miles does Steven travel during his morning workout?

$$\boxed{\text{distance} = \text{rate} \times \text{time}}$$

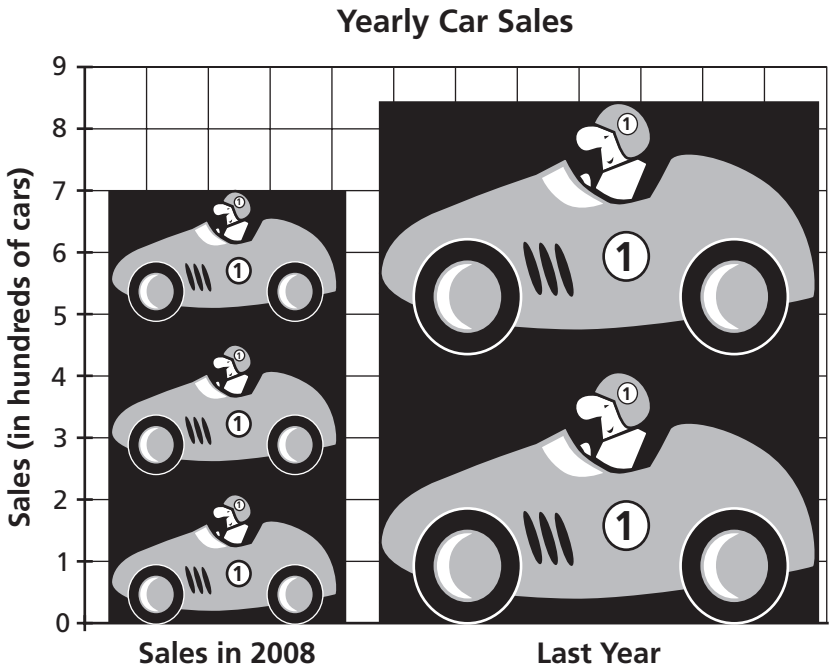
A 7.5 miles

B 8.8 miles

C 13.8 miles

D 16.7 miles

14 The manager of a car dealership wanted to show that his dealership sold more cars last year than in 2008. The manager created the graph below to show this increase in sales.



Which statement best describes how this graph misrepresents the change in sales?

F The graph actually shows a decrease in the number of cars sold because the dealership went from selling three small cars to selling two large cars.

G Using differently sized cars for each year makes it appear as if the sales last year were much greater than they actually were.

H Sales should have been reported in the number of dollars spent instead of the number of units sold.

J The graph does not show the sales between 2008 and last year.

Go On ▶

15 Four numbers are shown below.

$$3.9,\ \frac{31}{7},\ \sqrt{15},\ \frac{15}{4}$$

Which list shows these numbers in order, from least to greatest value?

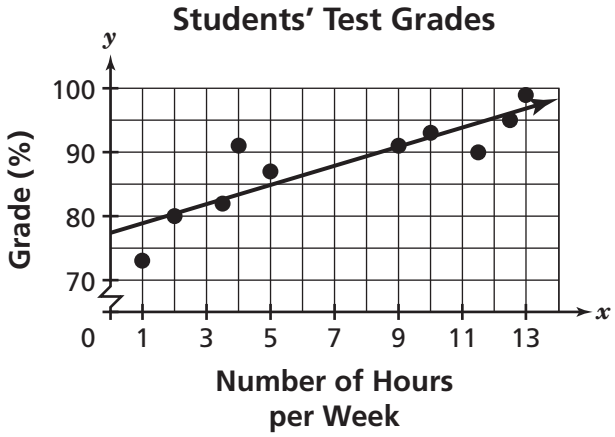
A $\frac{15}{4}, \frac{31}{7}, 3.9, \sqrt{15}$

B $\frac{31}{7}, 3.9, \sqrt{15}, \frac{15}{4}$

C $\sqrt{15}, \frac{15}{4}, 3.9, \frac{31}{7}$

D $\frac{15}{4}, \sqrt{15}, 3.9, \frac{31}{7}$

16 The scatterplot below shows the relationship between the test grades for 10 students and the numbers of hours they studied per week.



Based on the scatterplot, which is the best prediction of the test grade for a student who studied for 7 hours?

F 98%

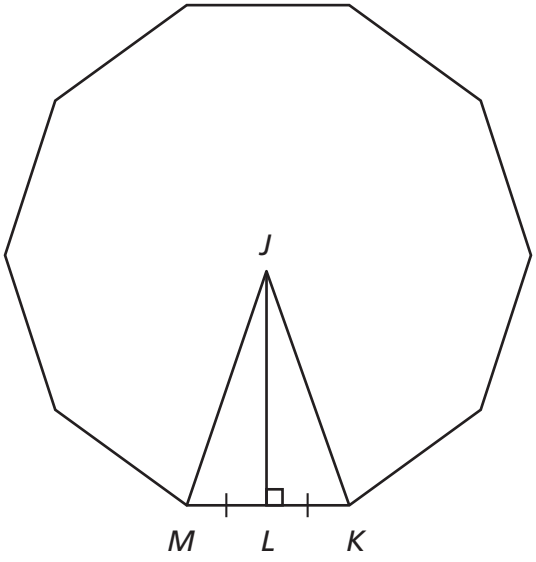
G 91%

H 88%

J 82%

Go On ▶

17 The regular decagon below has the Center *J*.



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

The length of Line Segment *JK* is 4 feet and the length of Line Segment *JL* is 3.8 feet. Which is closest to the perimeter of the regular decagon?

A 31.2 ft

B 25.0 ft

C 15.6 ft

D 12.5 ft

18 Given the equations below, what is the value of x when $f(x) = g(x)$?

$$f(x) = 3(x - 2)$$
$$g(x) = 0.5(4x - 8)$$

F -10

G -6

H -2

J 2

19 The list below shows the size and price of four different packages of pet snacks.

- 32 ounces for $29
- 24 ounces for $22
- 18 ounces for $16
- 16 ounces for $15

Which size package has the lowest price per ounce for pet snacks?

A 32 ounces

B 24 ounces

C 18 ounces

D 16 ounces

20 A red blood cell is 8×10^{-6} meters long. A skin cell is 3×10^{-5} meters long. How many times longer is the skin cell than the red blood cell?

F 3.75×10^{-1}

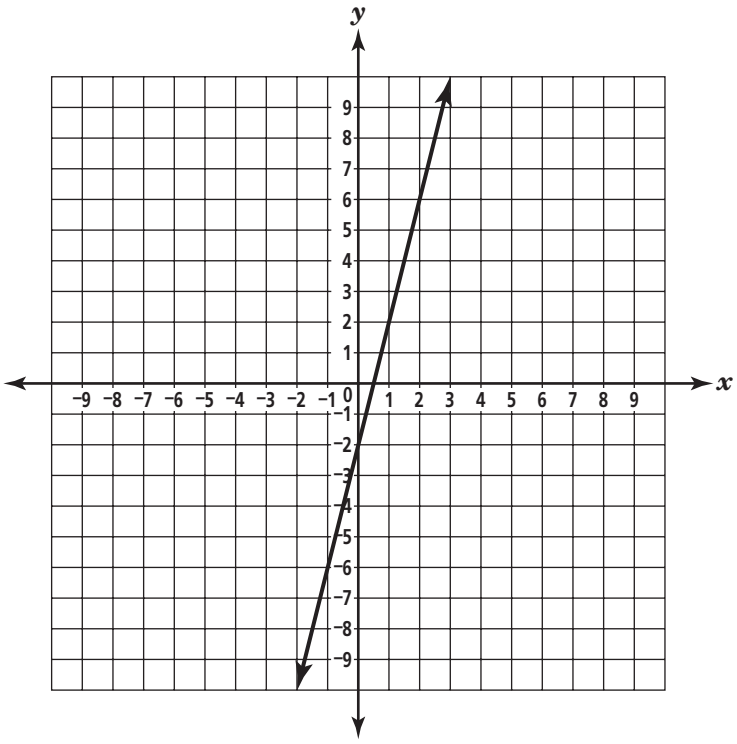
G 2.67×10^{0}

H 3.75×10^{0}

J 2.67×10^{1}

Go On ▶

21 The graph of the function $y = 4x - 2$ is shown below.



What is the value of y in this function when $x = 2$?

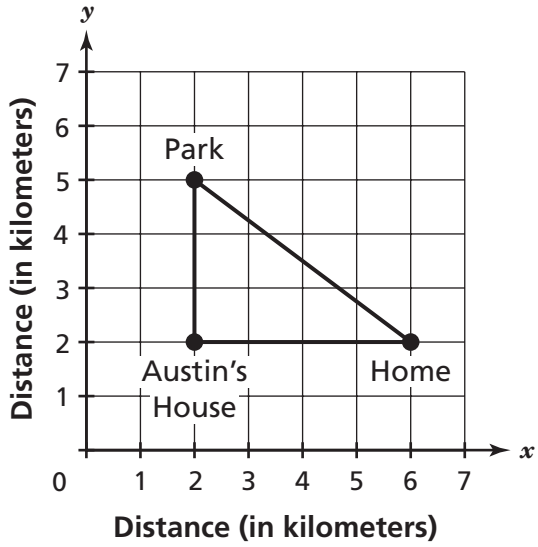
A -10

B -4

C 1

D 6

22 Jamal rode his bike from his home to Austin's house. From Austin's house, he rode to the park and then directly back home. The path on the coordinate grid below represents the path Jamal took.



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

What is the total distance that Jamal rode his bike?

F 4 km

G 5 km

H 12 km

J 25 km

Go On ▶

23 Which expression can be used to find the quotient of 0.000000048 and 16,000,000?

A $\frac{4.8}{1.6} \times 10^{(-8-7)}$

B $\frac{4.8}{1.6} \times 10^{(8-7)}$

C $(4.8 - 1.6) \times 10^{(-8-7)}$

D $(4.8 - 1.6) \times 10^{(8-7)}$

24 Which set of ordered pairs <u>best</u> represents the linear function $f(x) = \frac{1}{2}x + 2$?

F $\{(-4, -7.5), (-1, -1.5), (2, 4.5), (4, 8.5)\}$

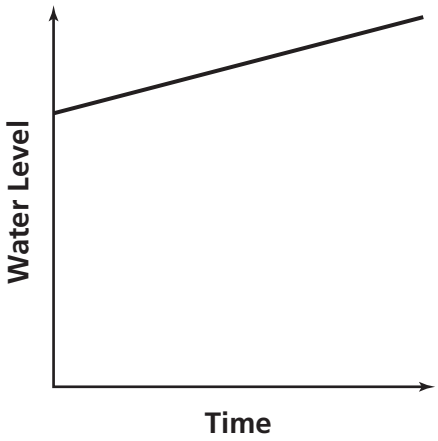
G $\{(-4, -1), (-1, 0.5), (2, 2), (4, 3)\}$

H $\{(-4, 0), (-1, 1.5), (2, 3), (4, 4)\}$

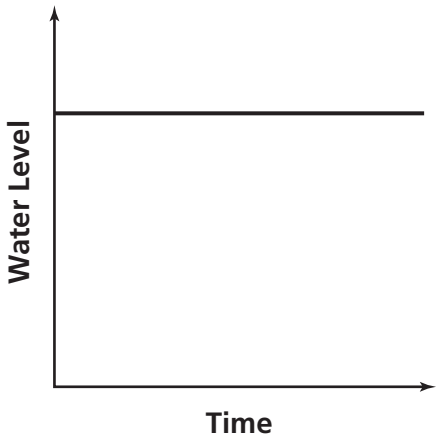
J $\{(-4, 0), (-1, 3), (2, 6), (4, 8)\}$

25 Which graph best represents the relationship between the water level in a swimming pool and the time that has passed since the pool began draining?

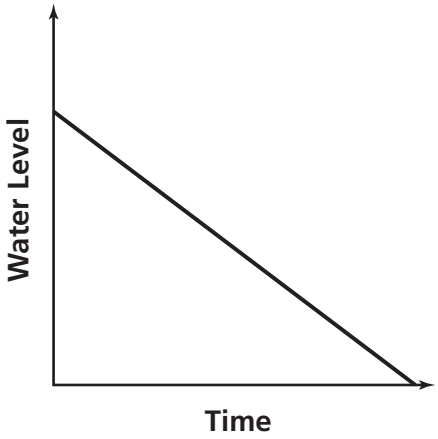
A



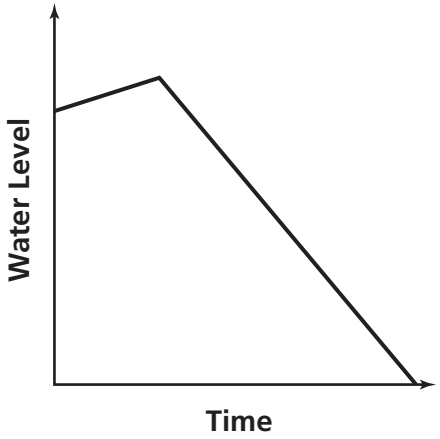
C



B



D



26 Which number is rational?

F $\frac{7\pi}{4}$

G $\sqrt{18}$

H 2.121121112 . . .

J $\frac{\sqrt{44}}{\sqrt{99}}$

Go On ▶

27 What is the solution to this system of linear equations?

$$2x - 2y = 10$$
$$x + 4y = 30$$

A $(10, 5)$

B $(50, -5)$

C $(0, 5)$

D $(10, -5)$

28 What is the slope of the line represented by the equation $\frac{3}{7}y + \frac{3}{4}x = \frac{3}{5}$?

F $-\frac{21}{4}$

G $-\frac{7}{4}$

H $\frac{3}{4}$

J $\frac{7}{4}$

STOP

Part 2

29 Which quotient is equivalent to the expression below?

$$\frac{3.6 \times 10^{-6}}{4.5 \times 10^{2}}$$

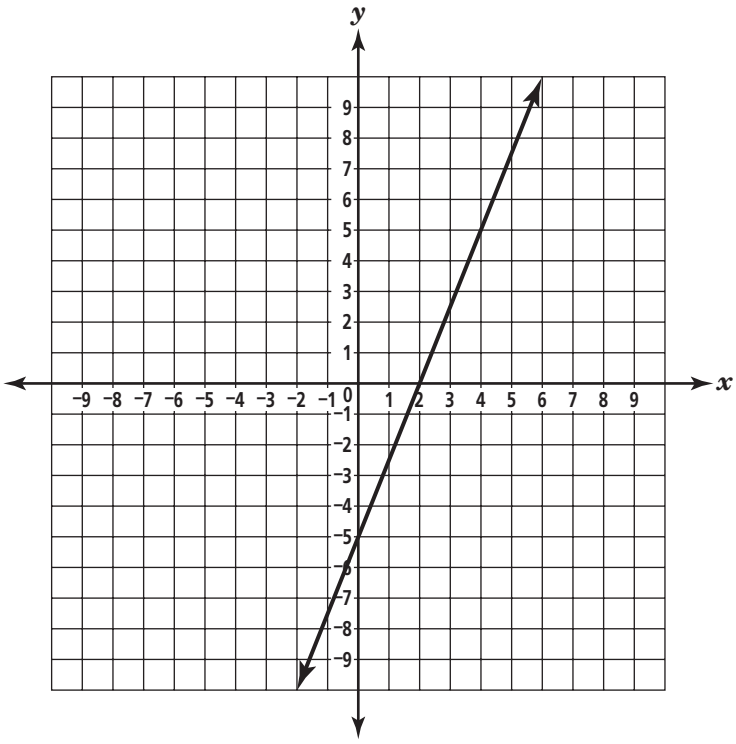
A 8.0×10^{-8}

B 8.0×10^{-9}

C -8.0×10^{-8}

D -8.0×10^{-9}

30 What appears to be the *y*-intercept of this function?



F (2, 0)

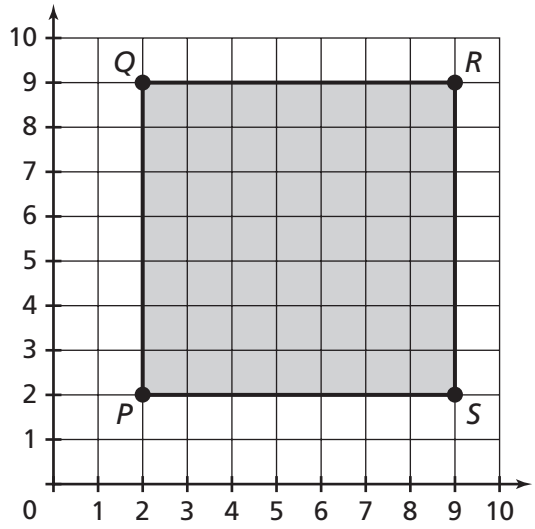
G (0, 2)

H (0, −5)

J (−5, 0)

Go On ▶

31 Square *QRSP* is shown on the grid below.



$$\boxed{a^2 + b^2 = c^2}$$

Which is the closest to the straight-line distance between Points *Q* and *S*?

A 14 units

B 10 units

C 9 units

D 7 units

32 What is the solution to this system of linear equations?

$$3y + 2x = 4$$
$$y - 4x = 20$$

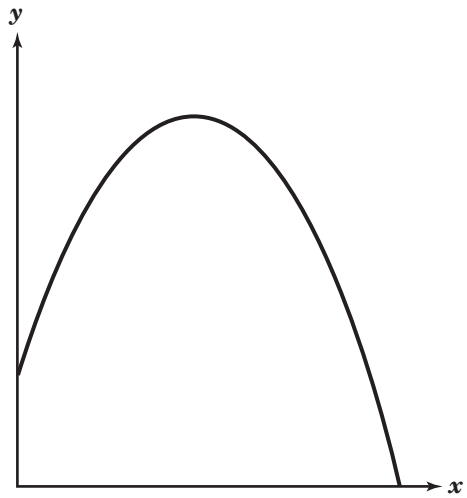
F $(4, -4)$

G $(4, 4)$

H $(-4, -4)$

J $(-4, 4)$

33 Which situation is best represented by the graph below?



A the volume of a balloon from the time the balloon is filled with helium to the time the balloon bursts

B the height of a rock from the time the rock falls from the top of a cliff to the time the rock lands on the ground below

C the distance between a ball and the ground from the time the ball is thrown into the air to the time the ball falls to the ground

D the distance of a hiker from the start of a trail from the time he starts walking to the time he rests in the middle of the trail

34 The star Vega is approximately 2.38×10^{14} kilometers from Earth. The star Antares is approximately 4.94×10^{15} kilometers from Earth. How much farther from Earth is the star Antares than the star Vega?

F 2.56×10^{1}km

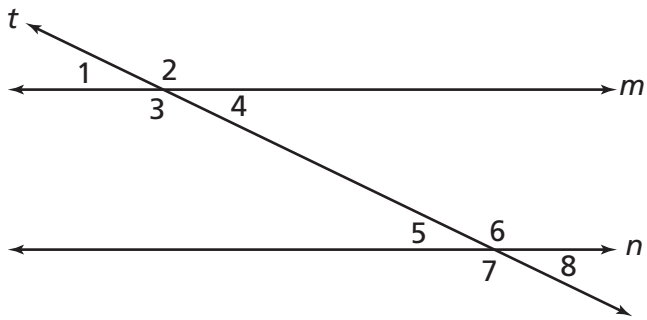
G 2.56×10^{14}km

H 4.702×10^{14}km

J 4.702×10^{15}km

Go On ▶

35 Lines *m* and *n* are parallel and cut by Transversal *t*, as shown in the figure below.



Based on this figure, which statement is not true?

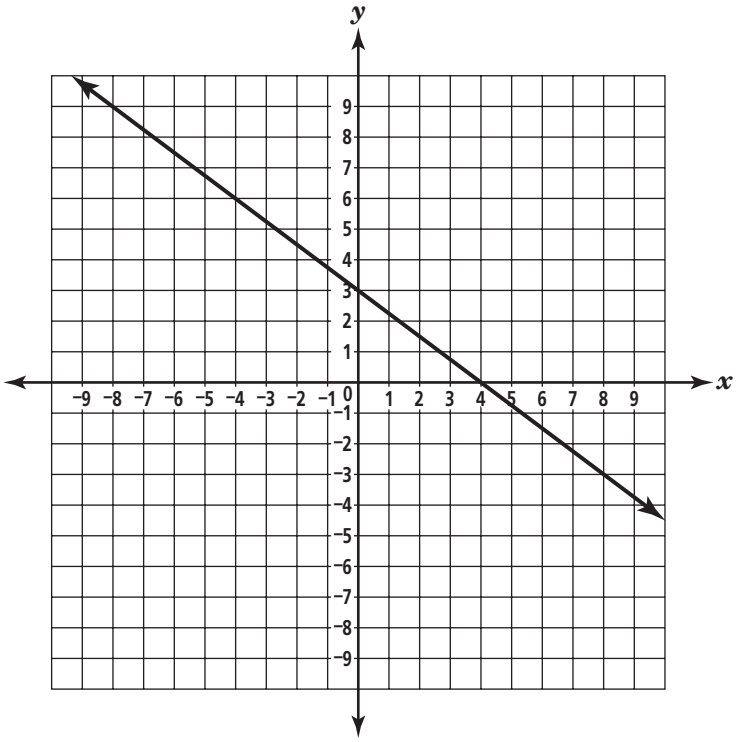
A $m\angle 1 + m\angle 8 = 180°$

B $m\angle 3 = m\angle 6$

C $m\angle 2 + m\angle 5 = 180°$

D $m\angle 4 = m\angle 5$

36 The graph of $y = -\frac{3}{4}x + 3$ is shown below.



What is the value of x in this function when $y = 6$?

F -4

G -1.5

H 7.5

J 12

Go On ▶

37 An insect traveled at a speed of 100 yards per hour for 90 minutes. Then it traveled for 15 minutes at twice its original speed. What is the total number of yards this insect traveled?

$$\boxed{\text{distance} = \text{rate} \times \text{time}}$$

A 300 yards

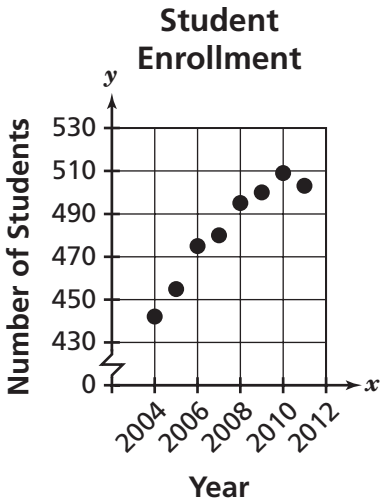
B 200 yards

C 150 yards

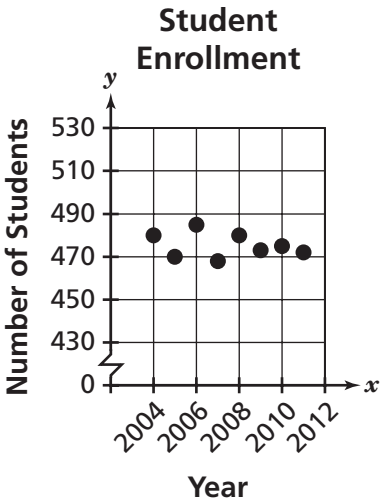
D 140 yards

38 The graphs show the student enrollment at a school from 2004 through 2011. Which graph best shows a negative correlation between the number of students and the years from 2004 through 2011?

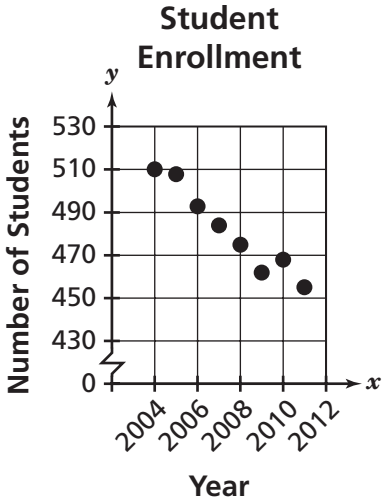
F



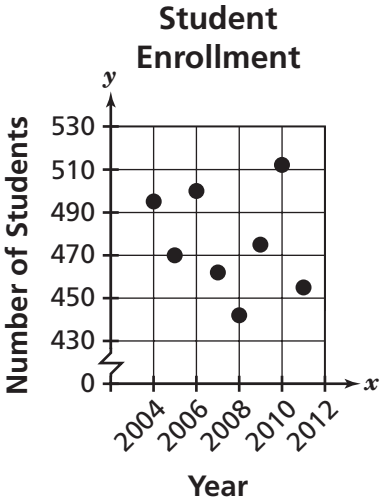
H



G



J



Go On ▶

39 Which number has the greatest value?

A 8.5

B $3\sqrt{8}$

C $\frac{15}{2}$

D 1^9

40 Given: $\begin{cases} f(x) = 2x - 8 \\ g(x) = 4(x + 6) \end{cases}$

For what value of x does $f(x) = g(x)$?

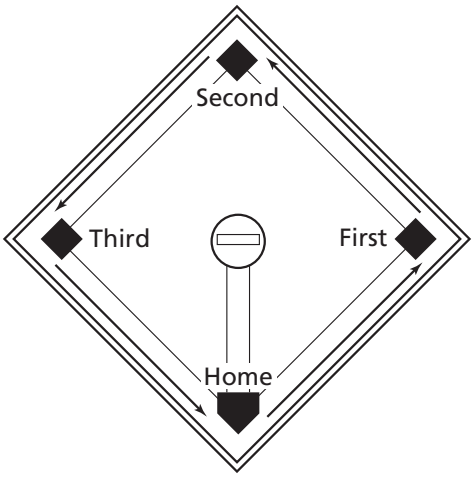
F -16

G -8

H -7

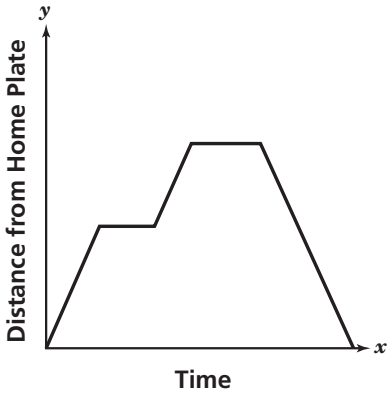
J -1

41 A baseball player hits a home run by being able to run in a straight line from home plate, to first base, second base, third base and back to home plate in one play. A diagram of a baseball diamond and the path the player must run is shown below.

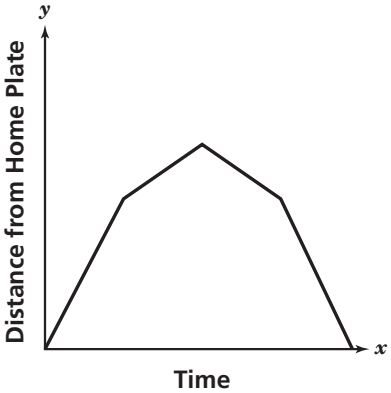


Which graph best represents the distance between the baseball player and home plate as he runs the bases after hitting a home run?

A

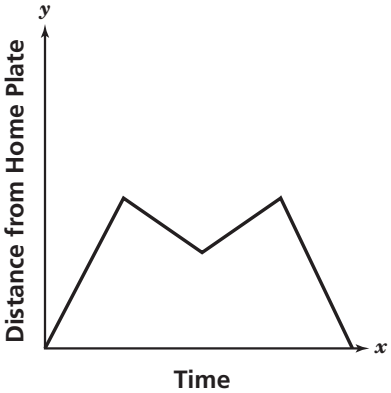


C



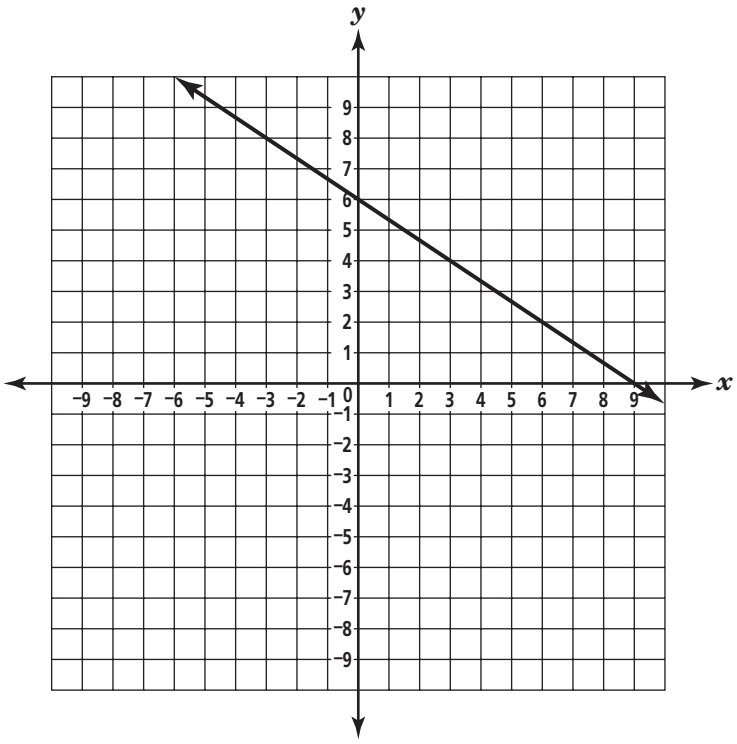
B

D



Go On ▶

42 What is the slope of the line represented by the graph below?



F $-\frac{3}{2}$

G $-\frac{2}{3}$

H $\frac{2}{3}$

J $\frac{3}{2}$

43 The table below compares a snack manufactured by Brand X and a snack manufactured by Brand Y.

Brand X and Brand Y Snacks

Description	Brand X	Brand Y
Container Size (ounces)	12	18
Number of Servings per Container	6	6
Cost per Container	$2.10	$2.00
Calories per Serving	300	450

Brand X claims that their snack is lower in calories than the snack manufactured by Brand Y. Which statement best explains why this claim is misleading?

A One serving of the Brand X snack costs more than one serving of the Brand Y snack.

B One container of the Brand X snack weighs less than one container of the Brand Y snack.

C One container of the Brand X snack has fewer calories than one container of the Brand Y snack.

D One ounce of the Brand X snack has the same number of calories as one ounce of the Brand Y snack.

44 Which number is an irrational number?

F 8.23

G $\frac{\sqrt{56}}{2}$

H $\frac{\sqrt{144}}{6}$

J 0.0079

Go On ▶

45 What is the slope, m, of the line that passes through the ordered pairs $(4, -6)$ and $(-5, 7)$?

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

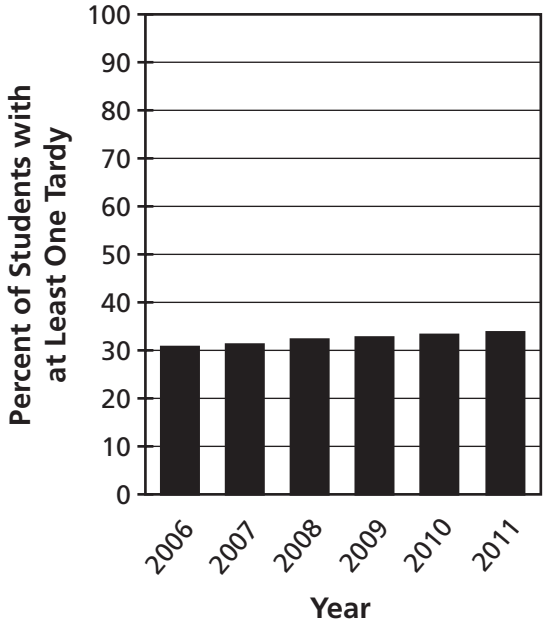
A $-\frac{13}{9}$

B $-\frac{6}{5}$

C $-\frac{5}{6}$

D $-\frac{9}{13}$

46 A school newspaper published an article titled "Percent of Students Tardy to Class Remains Unchanged Since 2006." The graph below was used to support the school newspaper's claim.



Which statement best explains why this graph is misleading?

F The bars on the graph should have more space between them.

G The scale on the horizontal axis does not include years prior to 2006.

H The graph does not include the percent of students who are absent.

J The scale on the vertical axis makes it difficult to see that the percent is increasing.

Go On ▶

47 Which equation does not represent a linear function?

A $y = 7x$

B $y = x^2 - 6$

C $y = \frac{2}{3}x + \frac{7}{3}$

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

48 The speed of sound is approximately 343 meters per second. What is the total amount of time it will take a sound wave to travel 2 kilometers?

$$\boxed{\text{distance} = \text{rate} \times \text{time}}$$

F 0.006 second

G 1.72 seconds

H 2.92 seconds

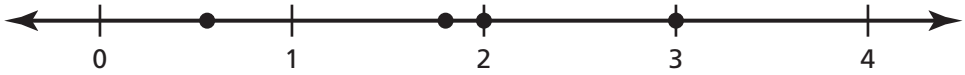
J 5.83 seconds

49 Look at the list of values.

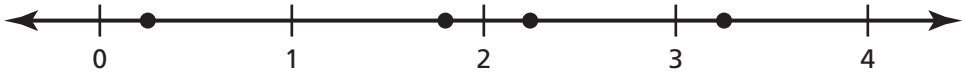
$$\frac{5}{9},\ \frac{9}{5},\ \sqrt{5},\ \text{and}\ \frac{13.5}{4.5}$$

Which number line has all four values plotted correctly?

A

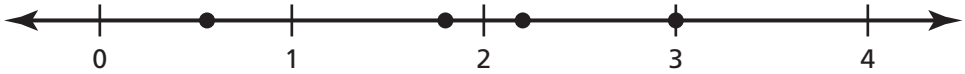


B



C

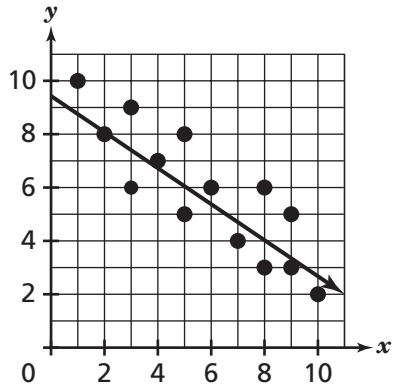
D



Go On ▶

50 Which graph shows the most accurate line of best fit for the given data?

F



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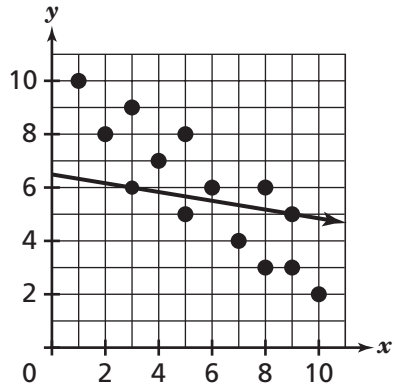
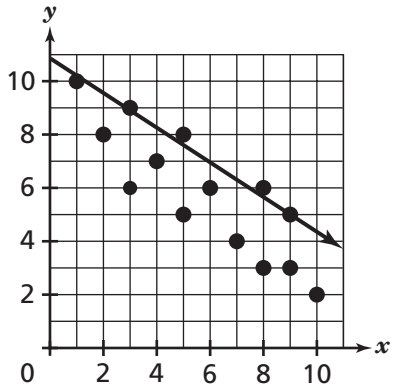
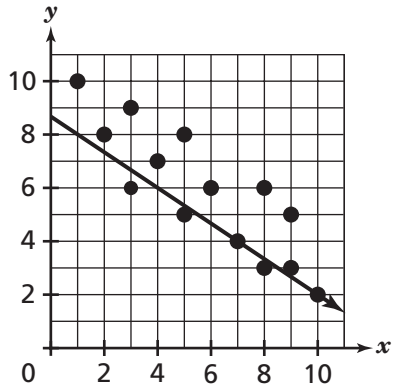


G



J



51 A soccer field is 100 yards long and 60 yards wide. A different soccer field is 30 yards long and 15 yards wide. Which measurement is closest to the difference between the lengths of the diagonals of these soccer fields?

$$\boxed{a^2 + b^2 = c^2}$$

A 6 yards

B 54 yards

C 74 yards

D 83 yards

52 One mole of an element is defined as a sample containing 6.0×10^{23} atoms of that element. Based on this information, how many atoms are there in 1.5×10^{-6} mole of an element?

F 9.0×10^{29}

G 7.5×10^{29}

H 9.0×10^{17}

J 7.5×10^{17}

53 The list below shows the specials being offered by two different pizza restaurants.

- The Pizza Shack: Buy 6 large pizzas for $34, and get one free.
- Donatello's Pizza: Buy 4 large pizzas for $21.

Based on this information, which statement is true?

A The Pizza Shack offers the best buy at a price of $4.86 per large pizza.

B The Pizza Shack offers the best buy at a price of $5.67 per large pizza.

C Donatello's Pizza offers the best buy at a price of $5.25 per large pizza.

D Donatello's Pizza offers the best buy at a price of $3.50 per large pizza.

Go On ▶

54 Four functions are shown below.

$$f(x) = -2$$
$$g(x) = 10^x$$
$$h(x) = x^2 - 25$$
$$k(x) = |x + 6|$$

Based on these functions, which statement is true?

F Function k is linear because it does not contain a term with an exponent.

G Function g is linear because the function is increasing at a constant rate.

H Function h is nonlinear because the exponent of x is greater than one.

J Function f is nonlinear because there is no slope.

55 Which equation is best represented by the table of values below?

x	y
–6	–6
–4	–3
–1	1.5
0	3
3	7.5
7	13.5

A $2y - 3x = 6$

B $2x - 3y = 6$

C $3y + 2x = 6$

D $3x + 2y = 6$

STOP

Mathematics
Answer Key

1	C
2	F
3	D
4	H
5	B
6	G
7	C
8	J
9	D
10	F
11	B
12	J
13	A
14	G

15	D
16	H
17	B
18	J
19	C
20	H
21	D
22	H
23	A
24	H
25	B
26	J
27	A
28	G

29	B
30	H
31	B
32	J
33	C
34	J
35	A
36	F
37	B
38	G
39	A
40	F
41	C
42	G

43	D
44	G
45	A
46	J
47	B
48	J
49	D
50	F
51	D
52	H
53	A
54	H
55	A