

[Grade 8 Standards](#)

Number Systems

[8.NS.A.01](#)

[8.NS.A.02](#)

Expressions and Equations

[8.EE.A.01](#)

[8.EE.A.02](#)

[8.EE.A.03](#)

[8.EE.A.04](#)

[8.EE.B.05](#)

[8.EE.B.06](#)

[8.EE.C.07](#)

[8.EE.C.08](#)

Functions

[8.F.A.01](#)

[8.F.A.02](#)

[8.F.A.03](#)

[8.F.B.04](#)

[8.F.B.05](#)

Geometry

[8.G.A.01](#)

[8.G.A.02](#)

[8.G.A.03](#)

[8.G.A.04](#)

[8.G.A.05](#)

[8.G.B.06](#)

[8.G.B.07](#)

[8.G.B.08](#)

[8.G.C.09](#)

Statistics and Probability

[8.SP.A.01](#)

[8.SP.A.02](#)

[8.SP.A.03](#)

[8.SP.A.04](#)

Number Systems

8.NS.A.01

Items 1-6

ITEM 1

Which number is irrational?

A. $\frac{4}{3}$

B. $0.\bar{7}$

C. $\sqrt{3}$

D. 3.14

ITEM 2

Which numbers are rational numbers?

- I. π
- II. 120.5
- III. 12
- IV. 7.25468
- V. -56
- VI. $\sqrt{2}$

- A. I and III
- B. II, III, IV, and V**
- C. III only
- D. All of the numbers are rational.

ITEM 3

Which of the following is equivalent to $0.\overline{1}$?

A. $\frac{1}{10}$

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

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

D. $1\frac{1}{9}$

ITEM 4

Jared uses long division to solve this problem:

$$7 \div 3 = 2.3333 \dots$$

He finds that the decimal part of the solution, $.3333 \dots$, could go on forever. Which fraction could Jared use in place of the repeating decimal part of his answer?

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. $\frac{4}{3}$

D. $\frac{7}{3}$

ITEM 5

What fraction is equivalent to 0.625?

A. $\frac{5}{8}$

B. $\frac{11}{16}$

C. $\frac{6}{25}$

D. $\frac{625}{100}$

ITEM 6

Which decimal is the equivalent of $\frac{8}{11}$?

A. $0.\overline{72}$

B. 0.73

C. $0.\overline{81}$

D. 0.82

Number Systems

8.NS.A.02

Items 7-13

ITEM 7

Which set of numbers is ordered from least to greatest?

A. $\frac{7}{3}, \sqrt{8}, 2.5$

B. $\frac{7}{3}, 2.5, \sqrt{8}$

C. $2.5, \frac{7}{3}, \sqrt{8}$

D. $2.5, \sqrt{8}, \frac{7}{3}$

ITEM 8

Between which two integers does the value of $-\sqrt{240}$ lie?

- A. -241 and -239
- B. -121 and -119
- C. -16 and -15
- D. -15 and -14

ITEM 9

Between which two integers does the value of $\sqrt{80}$ lie?

A. 8 and 9

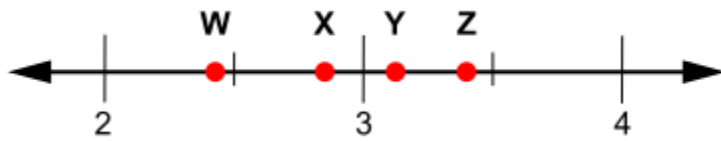
B. 9 and 10

C. 39 and 41

D. 79 and 81

ITEM 10

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

ITEM 11

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

- A. Since half of 2 is 1 and half of π is about 1.5, then $2 < \frac{\pi}{2}$.
- B. Since half of 2 is greater than half of π , then $\frac{\pi}{2} > 2$.
- C. Since half of π is about 1.5, then $2 > \frac{\pi}{2}$.
- D. Since half of π is less than 3, then $2 < \frac{\pi}{2}$.

ITEM 12

Which statement best describes the value of the square root of 12?

- A. The value of the square root of 12 is between 2 and 2.5.
- B. The value of the square root of 12 is between 2.5 and 3.
- C. The value of the square root of 12 is between 3 and 3.5.
- D. The value of the square root of 12 is between 3.5 and 4.

ITEM 13

Given $t = \sqrt{\frac{h}{6}}$, which statement describes the value of h and t ?

- A. If $h = 17$, t is between 1.7 and 2.
- B. If $h = 35$, t is between 2.4 and 2.5.**
- C. If $h = 49$, t is between 2.86 and 2.87.
- D. If $h = 55$, t is between 3.2 and 3.27.

Expressions and Equations

8.EE.A.01

Items 14-25

ITEM 14

Which equation shows equivalent forms of the expression $2^1 \times 2^{-4}$?

A. $2^1 \times 2^{-4} = 2^{-3} = -8$

B. $2^1 \times 2^{-4} = 2^{-4} = -8$

C. $2^1 \times 2^{-4} = 2^{-3} = \frac{1}{2^3} = \frac{1}{8}$

D. $2^1 \times 2^{-4} = 2^{-4} = \frac{1}{2^4} = \frac{1}{8}$

ITEM 15

Simplify this expression.

$$4^{-16} \{ [4^3 (4^6)]^2 \}$$

A. $\frac{1}{16}$

B. $\frac{1}{4}$

C. 4

D. 16

ITEM 16

Select the expression that is equivalent to $(7x^2y^3)^4$.

A. $7x^6y^7$

B. $7^4x^6y^7$

C. $7^4x^8y^{12}$

D. $7x^8y^{12}$

ITEM 17

Which expression is equivalent to $\left(\frac{3}{4}\right)^{-2}$?

A. $-\frac{9}{16}$

B. $-\frac{6}{8}$

C. $\frac{9}{16}$

D. $\frac{16}{9}$

ITEM 18

Lincoln Middle School has a student body of 5^5 students. Each class has approximately 5^2 students. How many classes does the school have?

- A. 5^2
- B. 5^3**
- C. 5^7
- D. 5^{10}

ITEM 19

The volume of a cube that has a side length of 2^5 inches can be represented by the expression $(2^5)^3$. Which of the following expressions are equivalent to the given expression?

- I. 2^8
- II. 2^{15}
- III. $2^5 \times 3$
- IV. 32^3
- V. $(2^3)^5$

A. II, IV and V

B. I and IV

C. III only

D. IV only

ITEM 20

Which expression does **not** have a value between 0 and 1?

A. $5^{-10} \times 5^6$

B. $3^7 \times 3^4$

C. $\left(\frac{1}{3}\right)^4 \times \left(\frac{1}{3}\right)^2$

D. 6^{-3}

ITEM 21

Choose the **two** that are equivalent to 6.23×10^5

A. 623,000

B. 62.3×10^6

C. $.623 \times 10^6$

D. 62,300

E. 623×10^4

ITEM 22

Choose the **two** that are equivalent to $6^4 \times 6^{-5} \times 6$.

A. 6^0

B. 1

C. $\frac{1}{6}$

D. -6

E. 216

ITEM 23

Select the **two** choices that are equivalent to $5^3 \times 5^{-1}$.

A. 625

B. 5^4

C. 25

D. 5^2

E. 25^2

ITEM 24

What is the value of n in the equation below?

$$3^2 \times 3^n = (3^4)^3$$

A. 5

B. 6

C. 10

D. 12

ITEM 25

Which expression is equivalent to $5^2 \times \frac{5}{5^4}$?

- A. 5
- B. 6.25
- C. 0.2
- D. 2.5

Expressions and Equations

8.EE.A.02

Items 26-32

ITEM 26

A square flower garden has an area of 144 square feet. What is the length of one side of the garden?

A. 12 feet

B. 36 feet

C. 72 feet

D. 144 feet

ITEM 27

A square floor tile has an area of 16 square inches. What is the length of one side of the tile?

- A. 4 inches
- B. 8 inches
- C. 16 inches
- D. 256 inches

ITEM 28

What is the value of this expression when $z = 36$?

$$10 - \sqrt{z}$$

- A. 4
- B. 6
- C. 8
- D. -26

ITEM 29

Which equation has both 4 and -4 as possible values of y ?

A. $y^2 = 8$

B. $y^3 = 12$

C. $y^2 = 16$

D. $y^3 = 64$

ITEM 30

Lisa's square garden has an area of 64 square feet. Lisa increases each side of her square garden by 5 feet. What is the **total** area of the enlarged garden?

- A. 25 square feet
- B. 89 square feet
- C. 132 square feet
- D. 169 square feet

ITEM 31

Each edge of a cube measures n feet long. The volume of the cube is 64 cubic feet. What is the length of n ?

- A. 12 feet
- B. 8 feet
- C. 4 feet
- D. 32 feet

ITEM 32

Which equation has **both** 7 and -7 as possible values of y ?

A. $y^3 = 42$

B. $y^2 = 42$

C. $y^3 = 49$

D. $y^2 = 49$

Expressions and Equations

8.EE.A.03

Items 33-41

ITEM 33

The area of Canada is approximately 1×10^7 square miles.

The area of Italy is approximately 3×10^5 square miles.

Which statement **best** describes the relative sizes of the countries?

- A. The area of Italy is approximately 3 times the size of Canada.
- B. The area of Italy is a little more than 2 times the size of Canada.
- C. The area of Canada is approximately 100 times the size of Italy.
- D. The area of Canada is a little more than 30 times the size of Italy.**

ITEM 34

The average adult has 2.5×10^{13} red blood cells and 7×10^9 white blood cells. About how many times greater is the number of red blood cells than the number of white blood cells? Give the answer in scientific notation.

- A. 36×10^4
- B. 3.6×10^3**
- C. 2.8×10^4
- D. 17.5×10^{22}

ITEM 35

The mass of a proton is 2×10^{-27} kg. The mass of an electron is 8×10^{-31} kg. How many times larger is the mass of the proton than the mass of the electron?

A. 2.5×10^3

B. 4

C. 2×10^4

D. 4×10^{-4}

ITEM 36

How many times greater is 3×10^8 than 6×10^5 ? Give the answer in scientific notation.

A. 0.5×10^3

B. 2×10^3

C. 5×10^3

D. 5×10^2

ITEM 37

The geographic area of Louisiana is approximately 5.23×10^4 square miles. The geographic area of the U.S. is approximately 3.79×10^6 square miles. In terms of geographic area, about how many times larger is the U.S. than Louisiana?

- A. 19.82×10^{10} times larger
- B. 7.2×10 times larger**
- C. 1.44×10^2 times larger
- D. 7.3×10^2 times larger

ITEM 38

The Earth is approximately 9.3×10^7 miles from the sun. Uranus is approximately 1.8×10^9 miles from the sun. About how many times farther from the sun is Uranus than Earth?

- A. 1.9×10^1 times farther
- B. 5×10^2 times farther
- C. 2 times farther
- D. 1.6×10^2 times farther

ITEM 39

The diameter of the sun is approximately 1.39×10^6 km. The diameter of Mercury is approximately 4.88×10^3 km. About how many times larger is the diameter of the sun than the diameter of Mercury?

- A. 3×10^3 times larger
- B. 2.8×10^4 times larger
- C. 2.8×10^2 times larger
- D. 0.28×10^3 times larger

ITEM 40

The body of a 154-pound person contains approximately 4×10^{-1} milligrams of gold and 16×10^1 milligrams of aluminum. Based on this information, the number of milligrams of aluminum in the body is how many times the number of milligrams of gold in the body?

Enter your answer below.

400

ITEM 41

Annapolis, Maryland has an approximate population of 36,000. Columbus, Ohio has an approximate population of 7.3×10^5 . Which of the following is true?

- A. Annapolis is approximately twice the size of Columbus.
- B. The difference of the two populations is 6.94×10^5 .
- C. The sum of the two populations is 7.6×10^5 .
- D. Annapolis is approximately 5 times larger than Columbus.

Expressions and Equations

8.EE.A.04

Items 42-53

ITEM 42

There were approximately 1.6×10^{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. 1.2×10^{12}

B. 1.2×10^{13}

C. 2.13×10^{10}

D. 2.13×10^{11}

ITEM 43

A company used about 7.40×10^5 sheets of paper in a month. Of the paper used during the month, the accounting department used about 8.90×10^3 of the sheets. About how many sheets of paper were used by other departments during the month?

A. 1.50×10^2

B. 1.50×10^3

C. 7.30×10^4

D. 7.30×10^5

ITEM 44

The speed of light is approximately 1.86×10^5 miles per second. The distance from the Sun to Mars is about 1.42×10^8 miles. Approximately how many seconds will it take for a beam of light to travel from the Sun to Mars?

A. 2.64×10^{13}

B. 2.64×10^{40}

C. 7.63×10^2

D. 7.63×10^3

ITEM 45

What number is the product of the expression below?

$$(2.35 \times 10^5)(5.92 \times 10^7)$$

A. 1.3912×10^{10}

B. 1.3912×10^{11}

C. 1.3912×10^{12}

D. 1.3912×10^{13}

ITEM 46

Which number represents the value of the quotient below?

$$\frac{5.0 \times 10^8}{2.0 \times 10^4}$$

A. 2.5×10^2

B. 2.5×10^4

C. 3.0×10^2

D. 3.0×10^4

ITEM 47

Simplify $\frac{6.3 \times 10^7}{2.1 \times 10^{-2}}$ using scientific notation.

- A. 3×10^5
- B. 3×10^9**
- C. 8.4×10^5
- D. 3.23×10^9

ITEM 48

How many square meters is 7.2×10^3 meters times 6×10^5 meters? Express your answer in scientific notation.

A. 43.2×10^8

B. 13.2×10^8

C. 4.32×10^{16}

D. 4.32×10^9

ITEM 49

Give the solution to the problem below using scientific notation.

$$(3.1 \times 10^5)(.00000432)$$

- A. 1.3392×10^{-1}
- B. 1.3392×10^{-1}
- C. 1.3392×10^9
- D. $.000013392 \times 10^5$

ITEM 50

What is the sum of $9.5 \times 10^5 + 4.6 \times 10^6$? Give your answer in scientific notation.

A. 43.7×10^{11}

B. 5.55×10^6

C. 55.5×10^{10}

D. 5.55×10^5

ITEM 51

Which of the following shows this product in correct scientific notation?

$$(3.8 \times 10^6)(5.4 \times 10^5)$$

A. 20.52×10^{11}

B. 2.052×10^{12}

C. 9.2×10^{11}

D. 20.52×10^{30}

ITEM 52

Tom entered the mass, in grams, of four substances into a spreadsheet. His spreadsheet converted the masses into scientific notation.

	A	B
	Substance	Mass (gram)
1	Substance E	4.7×10^{-3}
2	Substance F	9.23×10^{-5}
3	Substance G	6.30×10^{-4}
4	Substance H	2.814×10^{-3}

Which list shows the four substances in order from least mass to greatest mass?

- A. Substance E, Substance F, Substance G, Substance H
- B. Substance F, Substance G, Substance H, Substance E**
- C. Substance F, Substance E, Substance H, Substance G
- D. Substance G, Substance H, Substance E, Substance F

ITEM 53

Simplify the expression using scientific notation.

$$\frac{16.8 \times 10^2}{4.2 \times 10^5}$$

- A. 12.6×10^{-3}
- B. 4×10^{-3}**
- C. 12.6×10^3
- D. 4×10^3

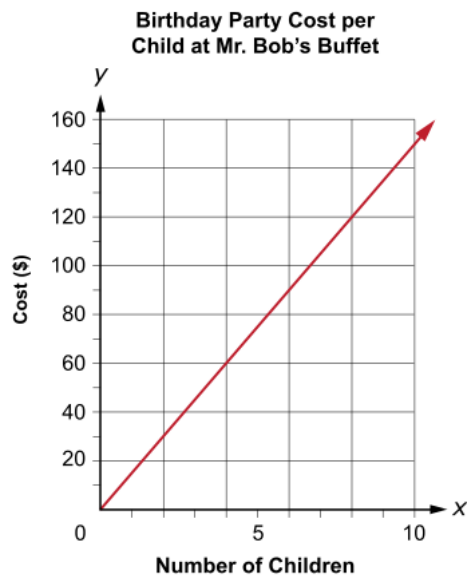
Expressions and Equations

8.EE.B.05

Items 54-62

ITEM 54

Use the graph and table to answer the question.



Birthday Party Cost per Child at Sally's Pizza Safari

Number of Children	Cost (\$)
4	\$50
6	\$75

Calen is comparing the prices per child for hosting a birthday at Mr. Bob's Buffet and Sally's Pizza Safari.

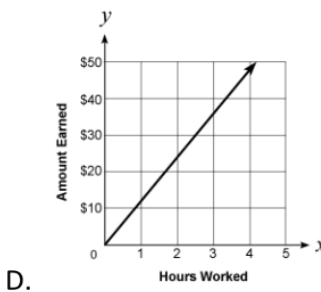
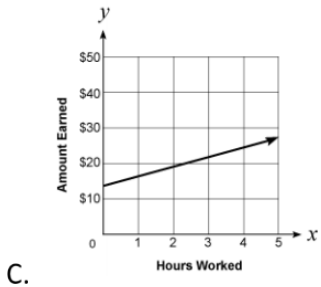
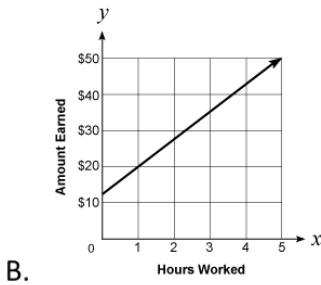
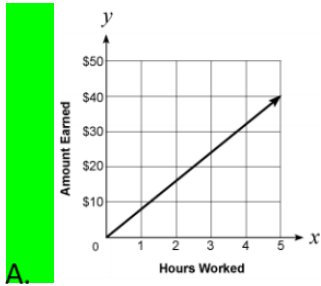
Which statement accurately compares the price per child at the two restaurants?

- A. The cost per child is \$2.50 more at Mr. Bob's Buffet than it is at Sally's Pizza Safari.
- B. The cost per child is \$5.00 more at Mr. Bob's Buffet than it is at Sally's Pizza Safari.
- C. The cost per child is \$10.00 more at Mr. Bob's Buffet than it is at Sally's Pizza Safari.
- D. The cost per child is \$15.00 more at Mr. Bob's Buffet than it is at Sally's Pizza Safari.

ITEM 55

This table shows how much Ethan earns for working a different number of hours. Which graph correctly represents the data in the table?

Hours Worked	Amount Earned
1.5	\$12
3.0	\$24
5.0	\$40
6.5	\$52



ITEM 56

Sue and Tara took a typing test. Sue's number of words typed correctly per minute is represented by $y = 15x$, where y is the number of correct words typed, and x is the number of minutes. Tara's number of words typed correctly is represented in the table below. For both students, the relationship between the words typed correctly and time is proportional.

Tara's Typing Test Results				
Minutes	3	6	9	12
Words	60	120	180	240

Which girl typed more correct words per minute?

- A. Sue typed more.
- B. Tara typed more.**
- C. They both typed the same number of correct words per minute.
- D. It is not possible to determine this with the given information.

ITEM 57

A snail travels 10 cm in 2 minutes.

The data for a slug is shown in the table below:

Slug Data				
Minutes	0	3	6	9
Distance (cm)	0	12	24	36

Which creature moves the faster?

- A. The snail
- B. The slug
- C. They both travel at the same rate.
- D. It is not possible to tell with the given information.

ITEM 58

A yellow line train travels at a rate of $y = \frac{450}{2}x$, where y is the number of miles traveled and x is the number of hours. Data for a green line train in miles and number of hours are shown in the table below:

Miles (y)	525	875	1050
Hours (x)	3	5	6

Which train is traveling at a faster average speed?

- A. The yellow line train.
- B. The green line train.
- C. Both trains have the same average speed.
- D. It is not possible to tell with the given information.

ITEM 59

Two toy cars are put on a downhill ramp. One car, Car A, travels at a speed represented as $y = 6x$, where y is the number of meters traveled and x is the number of seconds. The distances and times of the second car, Car B, are shown in the following table.

Car B				
x (seconds)	0	2	4	6
y(meters)	0	10	20	30

Which car is faster?

- A. Car A is faster, traveling 6 meters per second.
- B. Car B is faster, traveling 10 meters per second.
- C. Car B is faster by 2 meters per second.
- D. They both travel at the same speed.

ITEM 60

Jimmy and Jack were qualifying for the Indy 500 race. Jimmy wrote an equation to represent the relationship between his miles and hours, $m = 218h$

Jack put his miles and hours in this table.

Miles, m	420	840	1260	1680
Hours, h	2	4	6	8

Which statement is true about their speeds?

- A. Jack's average speed is greater.
- B. Jimmy is driving an average of 18 miles per hour faster than Jack.
- C. Jack is driving 420 miles per hour.
- D. Jimmy's average speed is 218 miles per hour.

ITEM 61

Katie types 325 words in 6 minutes.

She compared her typing speed to the record typing speed for her school shown in this table:

Number of minutes	$2\frac{1}{2}$	$3\frac{1}{3}$	5
Number of words typed	150	200	300

Choose the statement that correctly compares Katie's typing speed to the record typing speed for her school.

- A. Katie types faster than the school record speed.
- A. Katie types slower than the school record speed.**
- B. Katie's typing rate is the same as the record speed for her school.

ITEM 62

During the Indy 500, the winning car traveled at an average constant speed of 232 miles per hour. The equation $d = 232t$ represents the relationship between the distance, d , traveled by the race car in miles and the time, t , in hours since the driver started the race.

What is the meaning of 232 in the equation and what does it tell us about the car?

- A. The car traveled 232 miles that day.
- B. The car traveled 232 miles in one hour.**
- C. The car traveled 232 miles since the race started.
- D. The car traveled 232 miles in one minute.

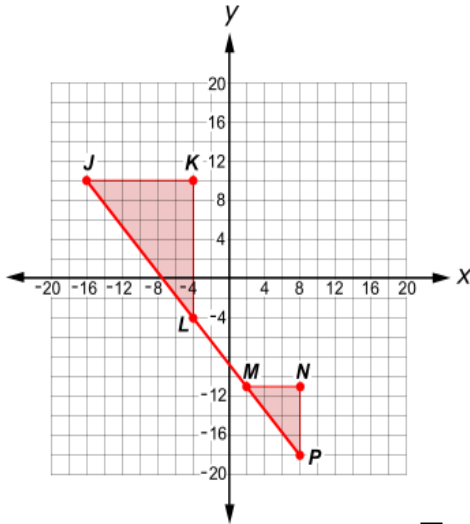
Expressions and Equations

8.EE.B.06

Items 63-70

ITEM 63

JKL and MNP are shown on the coordinate plane below.



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 JKL is similar to 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 JKL is 4 times the area of 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.

ITEM 64

Two vertices of $\triangle ABC$ are $(0, 4)$ and $(2, 6)$. Two vertices of a similar triangle on the same coordinate plane are $(0, 4)$ and $(-2, 2)$. What is the equation of the line that all these points are on?

A. $y = x + 4$

B. $y = 2$

C. $y = x$

D. They are not on the same line.

ITEM 65

The vertices of $\triangle ABC$ are $(0, 0)$, $(3, 2)$, and $(4, 0)$. The vertices of similar $\triangle LMN$ are $(0, 0)$, $(1, -2)$, and $(-3, -2)$. What is the slope of the line formed by the line segments connecting $(-3, -2)$, $(0, 0)$ and $(3, 2)$?

A. 2

B. $\frac{2}{3}$

C. 1

D. 0

ITEM 66

Alexa had \$100.00 in her bank account. She adds \$15.00 to her account each month. What is the equation that can be used to find how much money she has at the end of x months?

A. $y = x + 15$

B. $y = 15x + 100$

C. $y = 115$

D. $y = 100x + 15$

ITEM 67

Derive the equation of the line that goes through (-3, 1) and (0, -5).

A. $y = -2x$

B. $y = 2x - 5$

C. $y = -2x - 5$

D. $y = 2x + 5$

ITEM 68

\overline{AB} goes through points (0,-7) and (-1, 4) What is the equation of \overline{AB} ?

A. $y = 11x - 7$

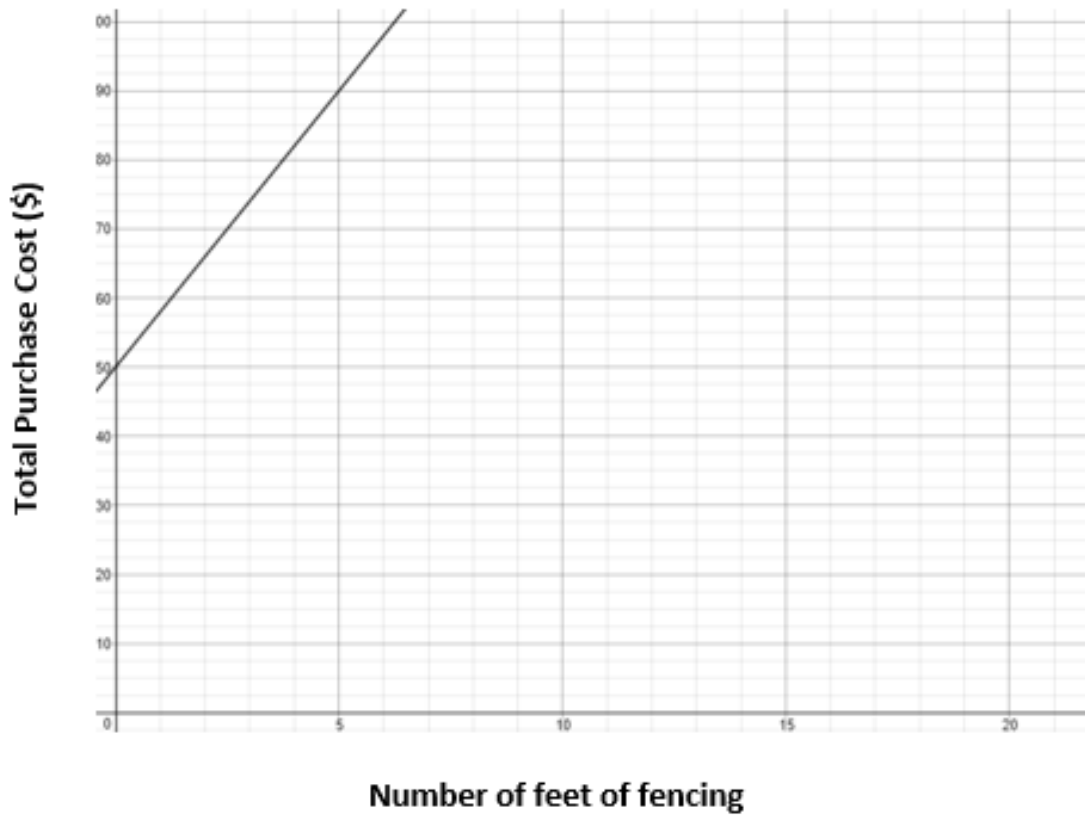
B. $y = -11x - 7$

C. $y = x + 4$

D. $y = -\frac{7}{5}x - 7$

ITEM 69

A store sells fencing by the foot and gates for a fixed price. The graph below shows the relationship between the number of feet of fencing (x) and the total cost (y) based a purchase that Larry made.



- Determine the equation of the line using slope-intercept form.
- Explain the meanings of the slope and y-intercept in the context of the problem.
- If a customer spends \$370.00, how much fencing did he buy? Show your work.

Enter your responses below.

ITEM 70

Write the equation of the line that goes through (4,-3) and (5,1).

A. $y = 4x - 19$

B. $y = 4x$

C. $y = 4x + 21$

D. $y = 4x - 3$

Expressions and Equations

8.EE.C.07

Items 71-109

ITEM 71

A moving company rents trucks for \$19.95 per day plus \$0.25 per mile for the first 50 miles. The company charges \$0.40 per mile after the first 50 miles. How much will it cost a person to rent the truck for two days and drive 75 miles?

A. \$42.45

B. \$62.40

C. \$62.45

D. \$68.70

ITEM 72

Solve the equation.

$$4(2x + 9) = 4(2x + 6)$$

- A. $x = -3$
- B. $x = -5$
- C. no solution
- D. infinitely many solutions

ITEM 73

Which of the following equations have infinitely many solutions?

I. $6(2x + 4) = 3(4x + 8)$

II. $0.5(8x + 4) = 4x + 2$

III. $7x + 8 = 7(x + 8)$

IV. $3x + 4 = 7x - 2$

V. $2(6x + 4) = 4(3x + 2)$

A. I and II

B. I and III

C. I, II, and V

D. I, II, III, and V

ITEM 74

Solve the equation: $3x + 10 = 4(2x - 3)$.

A. $x = \frac{13}{3}$

B. $x = \frac{22}{3}$

C. $x = \frac{22}{5}$

D. $x = \frac{13}{5}$

ITEM 75

Solve the following equation for x.

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

A. 18

B. $35\frac{5}{11}$

C. $39\frac{3}{5}$

D. 78

ITEM 76

Solve the following equation for x .

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

A. $x = -10$

B. $x = -6$

C. $x = -2$

D. $x = 14$

ITEM 77

Solve for x .

$$-8(3x - 4) + 51x = 8$$

A. $x = -\frac{8}{25}$

B. $x = -\frac{8}{9}$

C. $x = \frac{4}{9}$

D. $x = \frac{40}{27}$

ITEM 78

Solve the following equation:

$$-5(x+3) + 3\left(x - \frac{1}{3}\right) = -24$$

A. $x = -4$

B. $x = 4$

C. $x = 5$

D. $x = 20$

ITEM 79

Solve.

$$7(12 - 2x) = 4(3 - 3x)$$

A. -36

B. -72

C. 48

D. 36

ITEM 80

Solve for x .

$$6(5 - 3x) = 7(10 - 2x)$$

A. -40

B. -10

C. 2.5

D. 10

ITEM 81

Solve the following equation:

$$4(-3h + 2) = 2(6h - 21)$$

A. $h = -2\frac{1}{12}$

B. $h = -\frac{23}{24}$

C. $h = \frac{23}{24}$

D. $h = \frac{1}{12}$

ITEM 48

What is the value of x in this equation?

$$6x - 2x = 24$$

A. 3

B. 4

C. 6

D. 12

ITEM 83

Viveca and her friend are buying some crawfish. The equation below can be used to find the cost per pound, x , of the crawfish.

$$1.5x + x = 10$$

What is the value of x ?

- A. 4
- B. 6
- C. 7.5
- D. 8.5

ITEM 84

What is the value of n in this equation?

$$-35 = 4n + 1$$

A. $n = 8.5$

B. $n = -8.5$

C. $n = 9$

D. $n = -9$

ITEM 85

What is the value of x in this equation?

$$22 + 3x = 16 + 5x$$

A. $x = 19$

B. $x = \frac{6}{8}$

C. $x = 3$

D. $x = \frac{38}{8}$

ITEM 86

Solve $6(x + 4) + 10 = 22$ for x .

A. $x = -2$

B. $x = 8$

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

D. $x = 6$

ITEM 87

The perimeter of a square is represented by the equation, $P = 4n$. The perimeter of an equilateral triangle is represented by the equation, $P = 3n + 9$. The perimeters of the square and the triangle are the same.

Write and solve an equation to determine slide length, n .
What is the common perimeter? Show your work.

Enter your equation, the solution, and work to find the common perimeter below.

ITEM 88

Find the value of n in the equation $\frac{1}{3}n + 12 = 2n - 3$.

- A. 3
- B. 9
- C. $\frac{45}{7}$
- D. 15

ITEM 89

Solve this equation for x . $5(x+2) = 2x + 16 + 2x$

A. 6

B. 14

C. 26

D. 2

ITEM 90

What is the solution to the equation $6x-2+x+4=2x-3$?

Enter your answer below.

-1

ITEM 91

Solve this equation for m .

$$20m + 50 = 350$$

A. 15

B. 20

C. 7

D. 5

ITEM 92

Solve this equation for n .

$$n + 5 = 6n$$

A. 30

B. 5

C. 1

D. 1.2

ITEM 93

Find the solution to the equation $\frac{4}{7}x + 5 = 1$.

A. 10.5

B. -7

C. $-\frac{16}{7}$

D. $\frac{16}{7}$

ITEM 94

Which equation has no solution?

A. $3n + .02(3n) = 32.40$

B. $x + 2x + 1 = 0$

C. $5(n + 2) = 5n - 10$

D. $\frac{n}{2} + 7 = n - 7$

ITEM 95

Which of the following equations has only one solution?

A. $7(x - 4) = 7x - 28$

B. $9x + 3 = 2x + 24$

C. $12 + 3x - x = 2(x + 6)$

D. $4x + 3 = -3 + 4x$

ITEM 96

Which of these equations has no solution?

A. $2n + 4 = 2(n + 2)$

B. $3n - 8 = 8 + 3n$

C. $24 = 5n + 4$

D. $4n + 1 + 2n = 1 + 6n$

ITEM 97

Consider the equation: $2(2x + 2) = ax + b$

Part A

Find a value for a and one for b so that the equation has one solution. Show all work.

Part B

Find a value for a and one for b so that the equation has no solution. Show all work.

Part C

Find a value for a and one for b so that the equation has an infinite number of solutions. Show all work.

Enter your work for each part below. Be sure to label each part.

ITEM 98

Describe the solution set for the equation, $4(x + 3) = 6x + 12 - 2x$.

- A. No solution
- B. One solution
- C. Infinite number of solutions

ITEM 99

Determine whether this equation has one solution, infinitely many solutions, or no solution. Show all work and explain how you know the number of solutions, if any.

$$2(2x + 3) + 2x + 4 = 2(4x + 5) - 2x.$$

Enter your work and your explanation below.

ITEM 100

Does this equation have no solution, one solution, or infinitely many solutions?

$$-2(10 - 10x) = -5(1 - 4x)$$

- A. No solution
- B. One solution
- C. Infinitely many solutions

ITEM 101

How many solutions does the equation $5x + 20 + x = 10x - 7x + 32 + 3x - 12$ have?

- A. no solution
- B. one solution
- C. two solutions
- D. an infinite number of solutions

ITEM 102

Solve this equation and determine if it has one solution, no solution, or an infinite number of solutions.

$$8x + 20 = 4x - 10$$

- A. One solution
- B. No solution
- C. Infinite number of solutions

ITEM 103

The sum of three numbers is 39. The second number is two more than the three times the first number. The third number is $\frac{1}{2}$ the sum of the first two numbers. What are the three numbers? Show all work and label any variables used.

Enter your work below.

ITEM 104

Solve the equation $4(x + 3) = 3(3x - 1)$ for x .

A. $x = \frac{4}{5}$

B. $x = 3$

C. $x = \frac{9}{5}$

D. $x = 10$

ITEM 105

Solve the equation $3(n + 10) = 60$ for n .

- A. $\frac{50}{3}$
- B. 30
- C. 10**
- D. 50

ITEM 106

John solved this equation as follows:

$$2(2x - 1) = 5x + x - 6$$

$$4x - 2 = 6x - 6$$

$$8 = 2x$$

$$4 = x$$

Part A

John made an error. Explain his error.

Part B

Correctly solve John's equation. Show all your steps.

Enter your explanation about John's error and show your steps to correctly solve the equation below. Be sure to label each part.

ITEM 107

What is the value of a the equation, $10a + 8 = 4(a - 10)$?

A. -8

B. -3

C. 3

D. 8

ITEM 108

Which of the following values of x is the solution to the equation shown below?

$$\frac{1}{4}(8x - 16) + 12x = -2(x + 4)$$

A. $\frac{1}{4}$

B. $\frac{1}{2}$

C. 1

D. $\frac{6}{7}$

Expressions and Equations

8.EE.C.08

Items 109-140

ITEM 109

Determine the solution to the system of equations below.

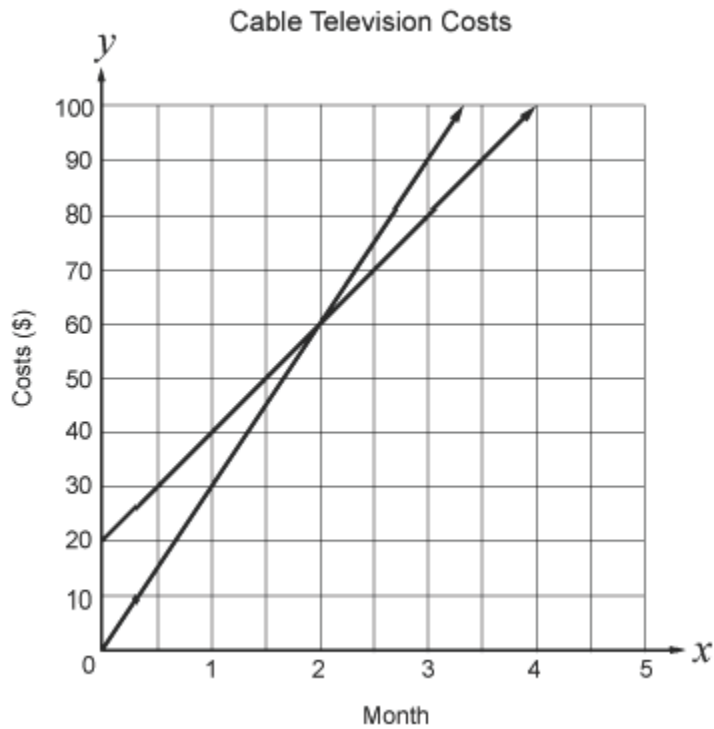
$$6x - 3y = 24$$

$$8x + y = 42$$

- A. (2, 5)
- B. (9, 10)
- C. (5, 2)**
- D. (10, 9)

ITEM 110

The total monthly costs, including an installation fee, charged by two cable television companies are shown on the graph below.



What are the coordinates of the point where the total costs for both companies are the same?

- A. (0, 0)
- B. (0, 20)
- C. (2, 60)
- D. (3, 90)

ITEM 111

John's teacher gave him the following system of equations and asked him to find the point of intersection.

$$4x + 7 = y$$

$$2x - 6 = y$$

Select the ordered pair that represents the intersection of the lines represented by the two equations.

A. (-6.5, -19)

B. (-6.5, 33)

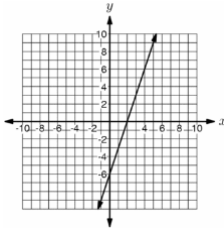
C. (0.5, 9)

D. (0.5, -5)

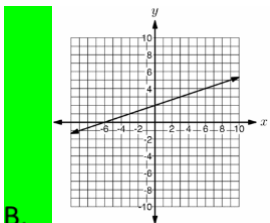
ITEM 112

Which shows the graph of this line?

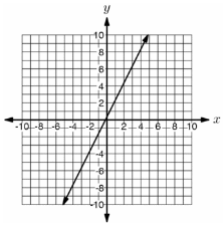
$$y = \frac{1}{3}x + 2$$



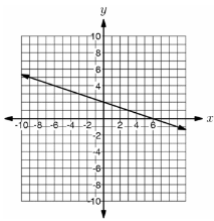
A.



B.



C.

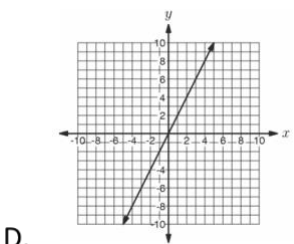
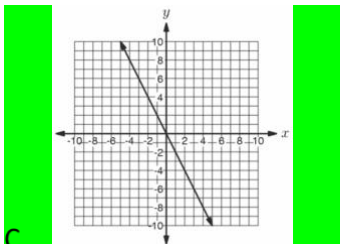
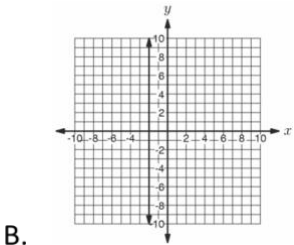
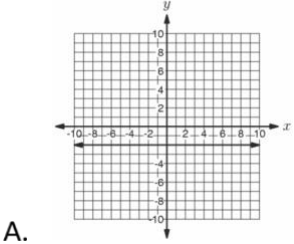


D.

ITEM 113

Which shows the graph of this line?

$y = -2x$



ITEM 114

Which answer best describes the solution set for the following system of equations?

$$\begin{aligned}4x + 2y &= 6 \\x + 4y &= 12\end{aligned}$$

- A. (1, 1)
- B. (0, 3)**
- C. No solution
- D. Infinitely many solutions

ITEM 115

Determine which system has infinitely many solutions.

A. $3x + 2y = 15$ and $3x + 4y = 30$

B. $3x + 2y = 15$ and $6x + y = 30$

C. $3x + 2y = 15$ and $6x + 4y = 30$

D. $3x + 2y = 15$ and $3x + 2y = 30$

ITEM 116

Find the solution to the following system of equations.

$$\begin{aligned}6x - 3y &= 21 \\ 5x - 4y &= 10\end{aligned}$$

A. (6, 19)

B. (6, 5)

C. $\left(-\frac{17}{3}, -\frac{55}{3}\right)$

D. $\left(\frac{38}{3}, \frac{55}{3}\right)$

ITEM 117

A system of equations is shown.

$$4x + 20 = 5y$$

$$x + 15 = 3y$$

What is the solution for the given system of equations?

A. $\left(\frac{40}{7}, \frac{15}{7}\right)$

B. $\left(\frac{15}{7}, \frac{40}{7}\right)$

C. $\left(-\frac{135}{7}, -\frac{80}{7}\right)$

D. $\left(-\frac{80}{7}, -\frac{135}{7}\right)$

ITEM 118

In one week, Jenny worked a total of 22 hours at a movie theater and a car wash. Jenny earned \$8.50 per hour at the movie theater and \$8.00 per hour at the car wash. She earned a total of \$181 for the week.

How many hours did Jenny work at the car wash?

- A. 8
- B. 10
- C. 11
- D. 12**

ITEM 119

Mark drank a total of 10 glasses of water and iced tea yesterday. Each glass of water contained 8 ounces. Each glass of iced tea contained 12 ounces. Altogether, he drank 96 ounces. The system of equations below models this situation.

$$x + y = 10$$

$$8x + 12y = 96$$

How many glasses of water did Mark drink yesterday?

- A. 3 glasses
- B. 4 glasses
- C. 5 glasses
- D. 6 glasses**

ITEM 120

The sum of two numbers is 5. The difference between the two numbers is 11. The equations below model this situation.

$$\begin{aligned}x + y &= 5 \\x - y &= 11\end{aligned}$$

What is the value of one of these numbers?

A. -3

B. -2

C. 2

D. 3

ITEM 121

The sum of two numbers, x and y , is 32. The first number, x , is 7 more than the second number, system of equations:

y . This problem is represented by the following

$$x + y = 32$$

$$x = y + 7$$

What is the solution set for the given system?

- A. (12, 20)
- B. (12.5, 19.5)
- C. (19, 13)
- D. (19.5, 12.5)

ITEM 122

David has twenty dimes (d) and quarters (q). These coins total \$2.75. How many of each type of coin does he have?

- Write a systems of equations to model this scenario.
- Show your work and state how many of each type of coin he has.

Enter your systems of equations, your work, and your statement of how many of each type coin David has below.

ITEM 123

What is the point of intersection of these two lines?

$$\begin{aligned} -4x + y &= 8 \\ 2x - y &= 4 \end{aligned}$$

A. $\left(-\frac{2}{3}, -\frac{16}{3}\right)$

B. $(-2, -8)$

C. $(2, 5)$

D. $(-6, -16)$

ITEM 124

Which coordinate point is the point of intersection of these two lines?

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

$$x - 4y = 11$$

A. $(-10, 0)$

B. $(-3, -\frac{13}{2})$

C. $(0, -5)$

D. $(-3, -\frac{7}{2})$

Item 125

Which coordinate point is the point of intersection of these two lines?

$$y - 6x = -4$$

$$y - 2x = 8$$

A. $(3, 14)$

B. $(-\frac{1}{2}, 7)$

C. $(\frac{12}{8}, 11)$

D. $(\frac{9}{6}, 5)$

ITEM 126

What is the solution to this system of equations?

$$y = x - 20$$

$$x + y = 84$$

- A. (20, 0)
- B. (40, 44)
- C. (52, 32)**
- D. (50, 30)

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ITEM 127

Which system of equations has (0, 3) as its solution?

A. $y = 3x$
 $y = 3x - 2$

B. $y + 2 = 2x$
 $y = 2(x - 1)$

C. $y = 3x - 2$
 $2y - 4 = x$

D. $y = x + 3$
 $y = -2x + 3$

ITEM 128

Fastest Ride Taxi Company charges an initial fee of \$3.50 plus \$1.50 per mile traveled. Comparative Taxi Company charges \$2 per mile traveled and an initial fee of \$2.00.

Part A

Write equations for each company that could be used to calculate the total cost for any number of miles traveled.

Part B

If the equations were graphed in the coordinate plane with miles graphed on the x-axis and cost graphed on the y-axis, what ordered pair represents the taxi company charges being equal? Be sure to show all your steps to find the ordered pair.

Enter your equations, your work, and your ordered pair below. Label each part of your response.

ITEM 129

Which coordinate pair satisfies both of these equations?

$$\begin{aligned} -4x - 2y &= -12 \\ 4x + 8y &= -24 \end{aligned}$$

- A. (6, -6)
- B. (2, -2)
- C. (-13.2, 3.6)
- D. (-3, -2)

ITEM 130

Which point is the intersection of the graphs of this system of equations?

$$\begin{aligned}6x + 2y &= -4 \\3x + 2y &= 8\end{aligned}$$

A. $(-4, 10)$

B. $(1.33, 2)$

C. $(10, -4)$

D. $(0, -5)$

ITEM 131

How many solutions are there to the following system of equations?

$$5x + 2.5y = 28$$

$$5\left(x + \frac{1}{2}y\right) = 37$$

- A. One solution
- B. Infinitely many solutions
- C. No solutions**
- D. Two solutions

ITEM 132

What is the solution to this system of equations?

$$4x + 6y = 12$$

$$x - 3y = 9$$

A. $\left(5, -\frac{4}{3}\right)$

B. $\left(-5, \frac{4}{3}\right)$

C. $\left(-\frac{4}{3}, 5\right)$

D. $\left(\frac{4}{3}, 5\right)$

ITEM 133

A system of equations is shown.

$$x = 5,$$

$$14x - 2y = 34$$

In the system of equations, what is the value of y ?

Enter your answer below.

18

ITEM 134

Points (3, 4) and (0, 0) are on \overleftrightarrow{CD} . \overleftrightarrow{GH} goes through points (0, 3) and (-1, 1). Do these lines intersect?

- A. No, the lines are parallel.
- B. Yes, they intersect at a point.**
- C. They are the same line.
- D. It is not possible to determine this from the given information.

ITEM 135

- Cell phone plan 1 costs a flat monthly fee of \$10.00 plus \$0.05 per minute. Its equation is
 $y = .05x + 10$.
- Cell phone plan 2 has no flat monthly fee, but charges \$0.10 per minute. Its equation is
 $y = 0.10x$.

Is there a certain number of minutes where the cost will be the same for both plans?

- A. Yes, at 66.7 minutes they cost the same.
- B. Yes, at 200 minutes they cost the same.**
- C. No, there is not a number of minutes where they are the same cost.
- D. It is not possible to determine this with the given information.

ITEM 136

Line X goes through the points (6, 1) and (0,4). Line R goes through the points (0, -3) and (-2, -2). Do these lines intersect?

- A. They are the same line.
- B. They do not intersect because the lines are parallel.**
- C. Yes, they have one point in common.
- D. It is not possible to determine based on the given information.

ITEM 137

A line goes through the points (0, 7) and (1, 4). A second line goes through the points (1, 2) and (0, 5). Do these lines intersect?

- A. Yes, they do intersect at one point.
- B. No, they do not intersect.**
- C. They are the same line.
- D. It is not possible to tell with the given information.

ITEM 138

A line goes through the points (5, 0) and (2, 5). Another line goes through the points (-1, 7) and (1, 9). Do these lines intersect?

- A. They are the same line.
- B. They do not intersect because they are parallel.
- C. Yes, they have one point in common
- D. It is not possible to tell with the given information.

ITEM 139

Two different printing companies will print T-shirts if the design is submitted by the customer. Magic Printing Company charges a \$50 set up fee plus \$8 per shirt. Print-It-All Company charges a \$70 set up fee plus \$6 per shirt.

Write an equation for each company that shows the total cost, C , for any number of T-shirts, t . How many shirts must be printed for the cost to be the same at each company? Show all work.

Enter your equations, your work, and your answer below.

ITEM 140

Kerri sells her hand stitched quilts to make money for her senior trip. The variable x represents the number of quilts. In the equation $y = 30x$, y represents the amount of money she charges her customers when she sells a quilt. The cost of making a quilt, y , is given by the equation $y = 5x + 100$.

How many quilts does Kerri have to sell in order for the profit and her cost are equal?

A. 20

B. 12

C. 4

D. 5

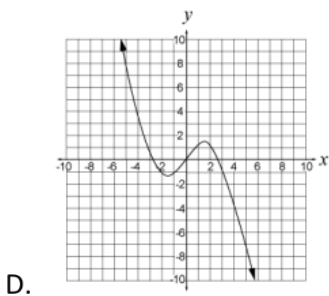
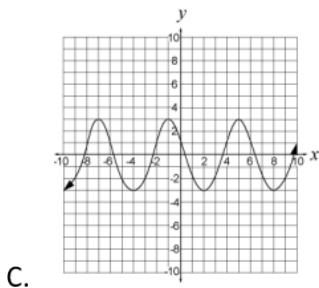
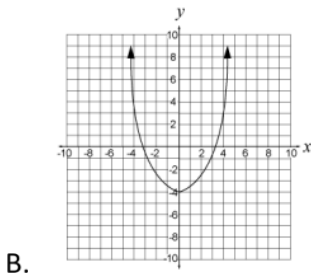
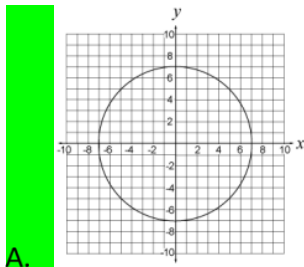
Functions

8.F.A.01

Items 141-149

ITEM 141

In which graph is y **not** a function of x ?



ITEM 142

Which relation is also a function?

A.

x	y
1	2
1	3
1	4
1	5

B.

x	y
1	2
3	4
5	6
1	8

C.

x	y
1	1
2	2
3	3
2	4

D.

x	y
2	1
3	1
4	1
5	1

ITEM 143

Which relation is also a function?

A. $\{(3, -2), (-4, -1), (0, 3), (0, 5)\}$

B. $\{(5, 6), (2, 6), (-3, 4), (-1, 4)\}$

C. $\{(0, 0), (2, 3), (1, -4), (2, -2)\}$

D. $\{(-5, 1), (-4, 2), (-5, 3), (-4, 4)\}$

ITEM 144

Use the table below to answer this question.

Used Car Prices

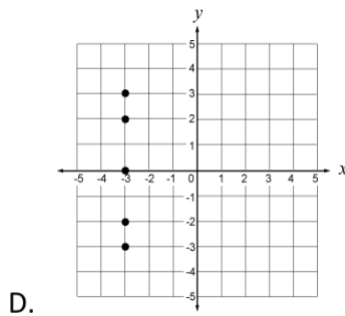
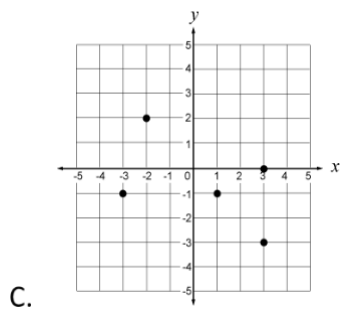
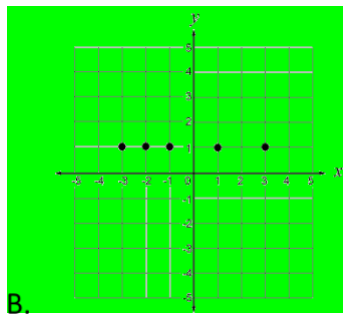
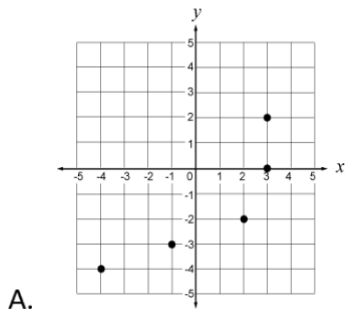
Age of Car (yrs.)	Price (\$)
5	6,000
1	11,500
2	7,500
4	7,500
1	10,750

This table shows the relationship between the age of a used car and its price. Which statement **best** explains whether or not the relationship is a function?

- A. The relationship is a function of age since two ages are the same.
- B. The relationship is a function of age since two prices are the same.
- C. The relationship is **not** a function of age since two ages are the same.**
- D. The relationship is **not** a function of age since two prices are the same.

ITEM 145

Which relation graphed below is also a function?



ITEM 146

Which set of ordered pairs represents a function?

A. $\{(0, 0), (1, 0), (-1, 1)\}$

B. $\{(0, 0), (1, 0), (0, 1)\}$

C. $\{(1, 0), (-1, 0), (1, 1)\}$

D. $\{(-1, 0), (-1, -1), (-1, 1)\}$

ITEM 147

Which table has data that represents a function?

A.

Input	Output
50	5
100	10
150	15
200	20

B.

Input	Output
50	2
100	4
100	6
150	8

C.

Input	Output
50	3
50	6
100	6
150	9

D.

Input	Output
50	3
100	6
150	9
150	12

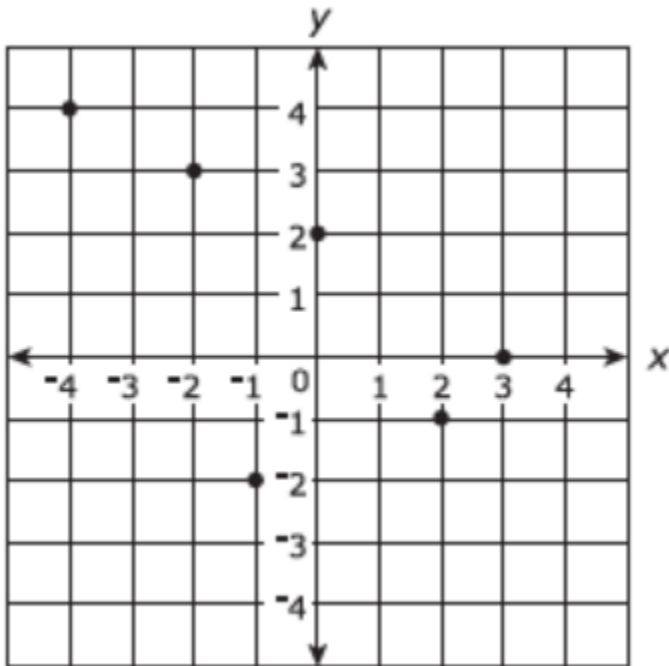
ITEM 148

Which of the ordered pair does **not** represent a function?

- A. (3,8) (4,9) (5,12) (6,8) (7,15)
- B. (3,8) (3,9) (4,12) (5,13) (6,14)**
- C. (4,12) (5,14) (6,16) (7,18) (8,20)
- D. (3,8) (6,16) (9,32) (12,64) (15,128)

ITEM 149

The graph represents y as a function x .



Which additional point can be plotted so that the graph continues to represent y as a function x ?

- A. (3, 2)
- B. (4, 2)**
- C. (0, 1)
- D. (2, 2)

Functions

8.F.A.02

Items 150-161

ITEM 150

Karen and Henry each sold food at the fair on Saturday. 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 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 the rates, in number sold per hour, of Karen's corn dog sales and Henry's hot dog sales 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.

ITEM 151

Cindy joined a music club.

- During the first year she paid a \$25 membership fee and got CDs for \$5 each.
- During the second year the membership fee increased to \$35, but the price of individual CDs remained the same.

Cindy graphed two functions, showing the total cost of buying x CDs in each of the two years

Which statement is true of the graphs for year 1 and year 2?

- A. The graphs for year 1 and year 2 have opposite slopes.
- B. The graphs for year 1 and year 2 have the same slope.**
- C. The graph for year 1 is steeper than the graph for year 2.
- D. The graph for year 2 is steeper than the graph for year 1.

ITEM 152

Ronny and Jean-Claude each borrowed \$100 from their parents. They both pay back this amount in equal monthly payments. The functions below show y , the amount each still owes after x months.

$$\text{Ronny: } y = -10x + 100$$

$$\text{Jean-Claude: } y = -8x + 100$$

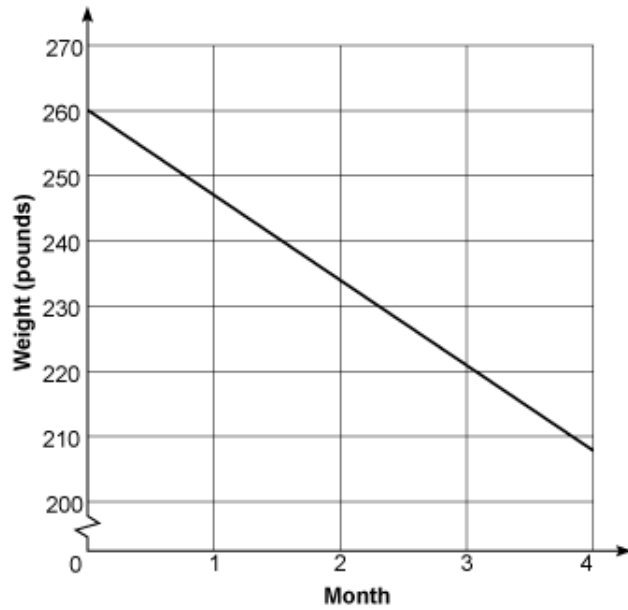
Which statement is true of the graphs of these functions?

- A. The x -intercept of Ronny's graph is greater than the x -intercept of Jean-Claude's graph.
- B. The x -intercept of Jean-Claude's graph is the same as the x -intercept of Ronny's graph.
- C. The graph showing Ronny's amount owed is steeper than the graph showing Jean-Claude's amount owed.
- D. The graph showing Jean-Claude's amount owed is steeper than the graph showing Ronny's amount owed.

ITEM 153

This graph shows the weight of a black bear during hibernation.

Bear Weight During Hibernation



Which table is consistent with the graph?

A.

Month	Weight (in pounds)
1	250
2	235
3	220
4	210

C.

Month	Weight (in pounds)
1	260
2	243
3	225
4	208

B.

Month	Weight (in pounds)
1	260
2	247
3	234
4	225

D.

Month	Weight (in pounds)
1	247
2	234
3	221
4	208

ITEM 154

Shacarla made this table to show how two of her comic books have increased in value.

Shacarla's Comics

Comic Book	Value in 2004	Value in 2005	Value in 2006	Value in 2007
<i>Turtle Power</i> , Issue 13	\$2.00	\$5.00	\$8.00	\$11.00
<i>Kid Geniuses</i> , Issue 1	\$10.00	\$11.00	\$12.00	\$13.00

Which conclusion can Shacarla make if the patterns in the table continue?

- A. *Turtle Power* will never be worth exactly \$20.
- B. *Kid Geniuses* will never be worth more than \$20.
- C. *Turtle Power* will eventually be worth more than *Kid Geniuses* .
- D. *Kid Geniuses* will always be worth a little more than *Turtle Power* .

ITEM 155

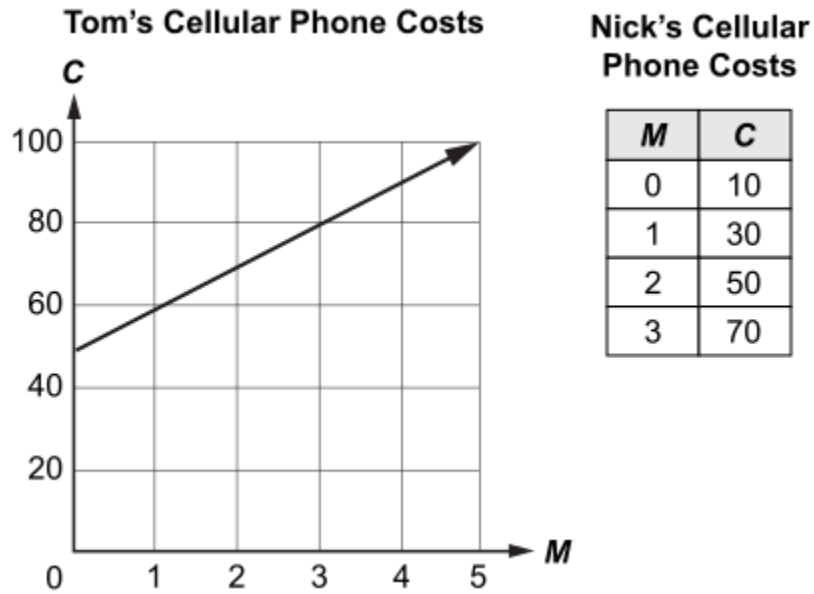
Paul graphs the line of the equation $y = 2x + 6$. Stuart graphs a line with the same x -intercept and a y -intercept of 2.

Which statement regarding their graphs is true?

- A. The slope of Paul's line is greater than Stuart's line.
- B. The slope of Stuart's line is greater than Paul's line.
- C. The y -intercept of Stuart's line is greater than Paul's line.
- D. The y -intercept of Paul's line is the same as Stuart's line.

ITEM 156

Tom and Nick each have a different cellular phone plan. The two graphs below show the cost, in cents(C), of a phone call lasting M minutes.



Which person pays a greater amount per minute?

- A. Tom, because the slope on his graph is greater.
- B. Nick, because the slope on his table is greater.**
- C. Tom, because the y -intercept on his graph is greater.
- D. Nick, because the y -intercept on his table is greater.

ITEM 157

Mary went on a trip and kept track of how much gasoline she used and how many miles she had driven. Her data is recorded in the table below.

Gallons of gas, x	0	5	10	15	20
Miles driven, y	0	125	250	375	500

Jackie said she got better gas mileage than Mary. Jackie expressed her mileage using the equation $y = 28x$.

Which car gets better gas mileage? Show your work and explain how you know by comparing the two mileages.

Based on the table and the equation, how many times farther can the car with better gas mileage travel than the car with lower gas mileage when they both use 10 gallons of gasoline? Show all work and round your answer to the nearest hundredth.

Enter all work and your explanation below.

ITEM 158

Carlos is going to buy a new cell phone. The company from which he will get his phone offers two monthly plans.

Carlos determines the equation for Plan 1 to be $C = 0.05m + 20$, where C is the monthly cost and m is the number of minutes used.

The company representative described Plan 2 as a monthly fee of \$50.00 plus \$0.02 per minute.

Part A

Write the equation for Plan 2.

Part B

For what number of minutes will the two plans cost the same? Show your work. Enter your equation and your work in the box. Be sure to label all parts.

ITEM 159

Jana went on a trip and kept track of the gallons of gasoline she used. Her cumulative data is displayed in the table below.

Miles	81	216	297	405
Gallons	3	8	11	15

Stephen wrote the equation, $y = 32x$, which represents his gas mileage on a similar trip. How many more miles per gallon did Stephen get on his trip than Jana?

- A. 27 miles per gallon
- B. 32 miles per gallon
- C. 5 miles per gallon**
- D. 0 miles per gallon

02/14/2020

ITEM 160

The table provides information about function C.

x	y
8	40
10	50
12	60
14	70

The equation $y = 3x + 4$ represents function D. Which statement regarding their rate is true?

- A. The rate of change of Function C is less than the rate of Function D.
- B. The rate of change of Function D is greater than the rate of change of Function C.
- C. The rate of change of Function D is less than the rate of change of Function C.**
- D. The rate of change for each function is the same.

ITEM 161

Function A is a linear function. Some values of Function A are shown in the table.

Function A

x	y
-2	-3
2	1
4	2
9	6

Function B is a linear function with a y -intercept of 4 and an x -intercept of -1. Which statement is true?

- A. The slope of Function A is greater than the slope of Function B, and the y -intercept of Function A is greater than the y -intercept of Function B.
- B. The slope of Function A is less than the slope of Function B, and the y -intercept of Function A is greater than the y -intercept of Function B.
- C. The slope of Function A is greater than the slope of Function B, and the y -intercept of Function A is less than the y -intercept of Function B.
- D. The slope of Function A is less than the slope Function B, and the y -intercept of Function A is less than the y -intercept of Function B.**

Functions

8.F.A.03

Items 162-171

ITEM 162

A company charges \$75 for handheld computers plus a service charge of \$25 per month. The following equation describes the total cost c after m months.

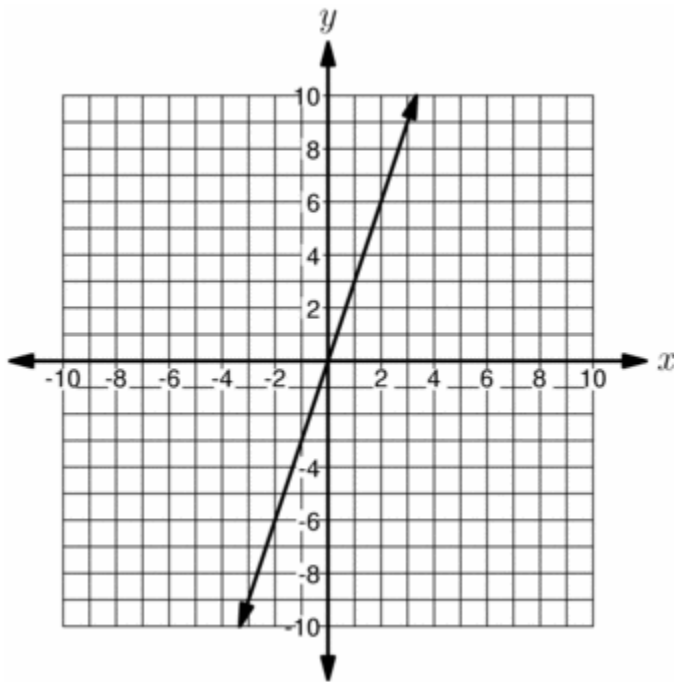
$$c = 25m + 75$$

Which statement best describes the relationship between c and m ?

- A. The relationship is not a function.
- B. The relationship is a linear function whose graph passes through the origin.
- C. The relationship is a linear function whose graph does not pass through the origin.**
- D. The relationship is a nonlinear function.

ITEM 163

Kyle created this graph of a function using his graphing calculator.



What is the equation of Kyle's graph?

A. $y = 3x$

B. $y = x^3$

C. $y = x^2$

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

ITEM 164

Given the points W (4,4), X (6,6), Y (8,8) and Z (10, 10), which of the following statements is true?

- A. The slopes between any two of the given points are the same.
- B. The slope of segment XY is greater than the slope of segment YZ .
- C. The slope of segment YZ is greater than the slope of segment WX .
- D. The slopes of segment WX and segment YZ are negative.

02/14/2020

ITEM 165

Which of the following is a linear function?

A.

x	0	2	4	6
y	0	6	12	18

B.

x	-1	-3	-5	-7
y	1	9	25	49

C.

x	8	10	12	14
y	0.125	0.1	0.08333...	0.07142857...

D.

x	0	2	3	4
y	4	9	-2	4

ITEM 166

Choose **two** choices whose equation shows a nonlinear function.

A. $y = 3x - 7$

B. $y = 2x^2 + 4$

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

D. $y = x + 3$

E. $y = \frac{1}{x} - 8$

ITEM 167

Which of the following functions is linear?

x	0	2	4	6
y	0	4	16	36

A.

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

C.

$$y = 2x^2 - 4$$

D.

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

ITEM 168

Which function is nonlinear?

A. $y = -2x + 3$

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

C. $y = 7$

D. $x = -1$

ITEM 169

Which of the following is nonlinear?

A. $y = x + 3$

x	0	2	4	6	8
y	4	12	20	28	36

B.

C.

x	0	1	2	3	4
y	0	1	4	9	16

D. $y = 7$

ITEM 170

Which equation represents the function whose data is shown in the table?

x	0	1	2	3	4
y	-1	1	3	5	7

A. $y = x + 1$

B. $y = 2x + 1$

C. $y = x - 1$

D. $y = 2x - 1$

ITEM 171

Determine which **two** equations have nonlinear graphs.

A. $y = 2x^3$

B. $y = 3x$

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

D. $y = x^2 + 2$

E. $y = 0.5x + 3$

Functions

8.F.B.04

Items 172-187

ITEM 172

Kay sells personalized photo frames. She charges \$12 for the frame plus \$0.25 for each letter the customer wants engraved on the frame. Which function represents the relationship between the number of letters engraved on a frame, n , and the total cost of a frame, c ?

A. $c = 12 + 0.25 n$

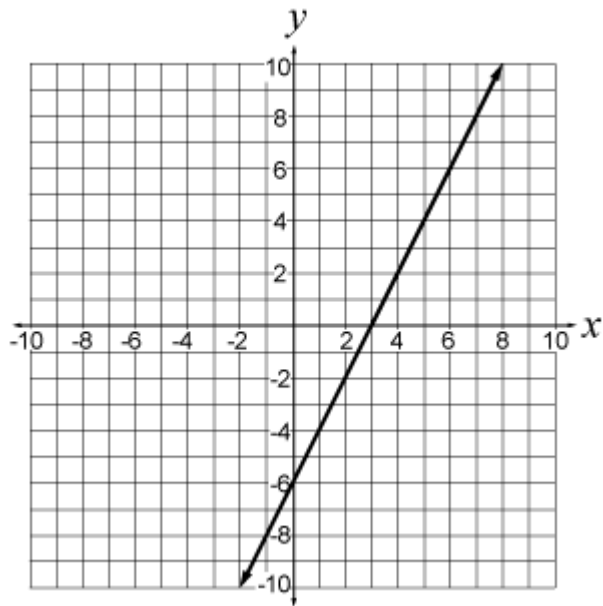
B. $c = 12 n + 0.25$

C. $n = 12 c + 0.25$

D. $n = 12 + 0.25 c$

ITEM 173

Use the graph below to answer this question.



What is the slope of the line that is graphed on the coordinate grid?

- A. -6
- B. -3
- C. 2**
- D. 3

ITEM 174

Samantha charges an initial fee plus an hourly fee to repair computers. The table below shows the amounts Samantha charges for the first three hours of repair.

Computer Repair

Hours	Fee (\$)
1	50
2	75
3	100

What amount does Samantha charge per hour?

- A. \$25
- B. \$50
- C. \$75
- D. \$100

ITEM 175

Terrence is playing pinball. After each turn, he records how much time he played and his score.

- First turn: 10 minutes; 1,234,560 points
- Second turn: 20 minutes; 2,232,780 points

Terrence connects these two data points with a line on a graph. What does the slope of Terrence's line represent?

- A. the average number of turns
- B. the number of points per minute**
- C. the number of turns per minute
- D. the average amount of time spent playing per turn

ITEM 176

Use the table below to answer this question.

Number of Business Cards	Total Cost (\$)
100	15
200	20
300	25
400	30

The table above shows the price for different numbers of business cards. Which equation models the total cost, C , of b business cards?

- A. $C = b - 85$
- B. $C = 5b + 10$
- C. $C = 0.10b + 5$
- D. $C = 0.05b + 10$**

ITEM 177

x	y
5	10
10	15
15	20
20	25

Which equation shows the relationship between the x and y values in the table?

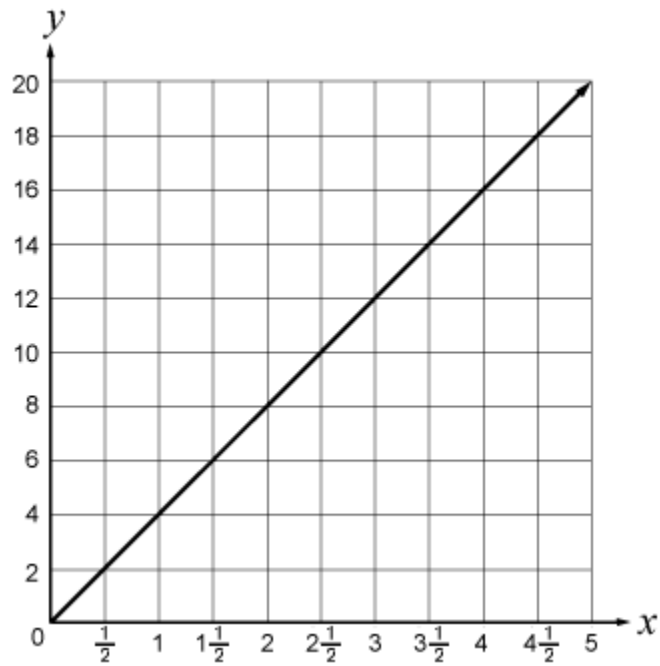
A. $y = x + 5$

B. $y = x + 10$

C. $y = 5x + 5$

D. $y = 5x + 10$

ITEM 178



Which equation shows the same relationship as the one in the graph?

- A. $y = \frac{1}{4}x$
- B. $y = \frac{1}{2}x$
- C. $y = 2x$
- D. $y = 4x$

ITEM 179

Which equation contains the points (5, 3) and (2, 6)?

A. $y = x + 2$

B. $y = x - 2$

C. $y = -x + 8$

D. $y = -x - 8$

ITEM 180

The intercepts of a line are shown below.

$$x\text{-intercept} = 4$$

$$y\text{-intercept} = -2$$

What is the slope of this line?

A. -2

B. $-\frac{1}{2}$

C. $\frac{1}{2}$

D. 2

ITEM 181

This table compares men's shoe sizes in Japan (J) to shoe sizes in the United States (U).

Shoe Sizes

Japan	23	23.5	24	24.5	25	25.5	26	26.5
United States	5	5.5	6	6.5	7	7.5	8	8.5

Which equation represents the relationship between men's shoe sizes in Japan and the United States?

- A. $J = U \times 4.6$
- B. $J = U \div 4.6$
- C. $J = U - 18$
- D. $J = U + 18$**

ITEM 182

Select the correct rate of change and y -intercept for the linear function that contains the points (4, 6) and (5, 3).

A. The rate of change is 3, and the y -intercept is -6 .

B. The rate of change is $-\frac{1}{3}$, and the y -intercept is $7\frac{1}{3}$.

C. The rate of change is -3 , and the y -intercept is 18.

D. The rate of change is $\frac{1}{3}$, and the y -intercept is $4\frac{2}{3}$.

ITEM 183

Kyle wants to find the equation of the line that passes through the points $(1, -7)$ and $(-1, 1)$.

Which set of calculations will help Kyle find the equation of the line?

A. $\frac{1-7}{-1-1} = 3; \quad -7 = 3(1) + b$

B. $\frac{1-7}{-1-1} = 3; \quad 1 = 3(-7) + b$

C. $\frac{1+7}{-1-1} = -4; \quad -7 = -4(1) + b$

D. $\frac{1+7}{-1-1} = -4; \quad 1 = -4(-7) + b$

ITEM 184

Mr. Jackson is a plumber. When he makes an emergency repair, he charges a fee of \$50 plus \$35 per hour for the work. Which equation shows the relationship between the total charge (c) and the number of hours (h) it takes Mr. Jackson to make the repair?

A. $c = 50 + 35$

B. $c = 50 + 35h$

C. $c + 50 = 35h$

D. $50c = 35h$

ITEM 185

Tom eats a breakfast that contains 200 calories. After he eats, Tom exercises for x minutes at a rate that burns 35 calories every 3 minutes. Which equation represents the net number of calories, y , that Tom accumulates after eating breakfast and exercising?

A. $y = -\frac{35}{3}x + 200$

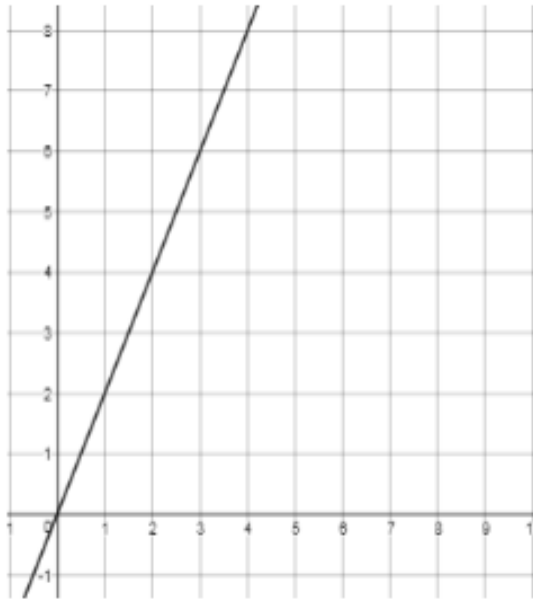
B. $y = \frac{35}{3}x + 200$

C. $y = -\frac{3}{35}x + 200$

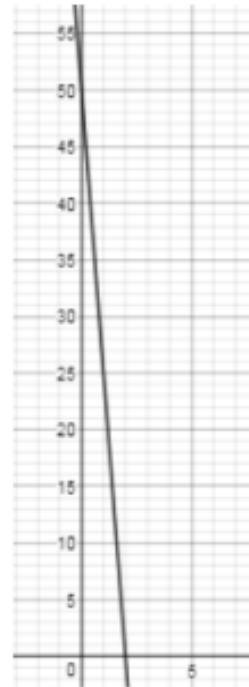
D. $y = \frac{3}{35}x + 200$

ITEM 186

Which function has the greatest rate of change?



A.



B.

x	1	2	3	4	5	6
y	2	4	6	8	10	12

C.



D.

ITEM 187

The eighth-grade class at Middleton Middle School opened a bank account with \$1000 from a class car wash fundraiser they had over the weekend. After the initial deposit, they deposited the same amount of money each month. The table shows the total amount of money, t , they deposited into the account after a certain number of months, m , since opening the account.

Number of months (m)	Total amount of money (t)
4	\$1600
8	\$2200
10	\$2500
13	\$2950

Which equation can be used to model this situation?

- A. $t = 150m$
- B. $t = 250m$
- C. $t = 150m + 1000$**
- D. $t = 250m + 1000$

Functions

8.F.B.05

Items 188- 193

ITEM 188

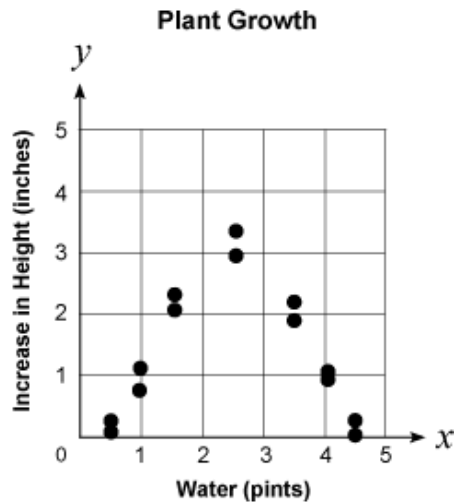
Kristin runs a half-marathon at a constant rate. The race path is a straight line approximately 13.1 miles long. Her friend Ryan watches the whole race from the 5.5 mile point.

Which graph could show Kristin's distance from Ryan as a function of time?



ITEM 189

Suzy watered her plants using different amounts of water. She recorded the increase in height after one month. This graph shows her data.

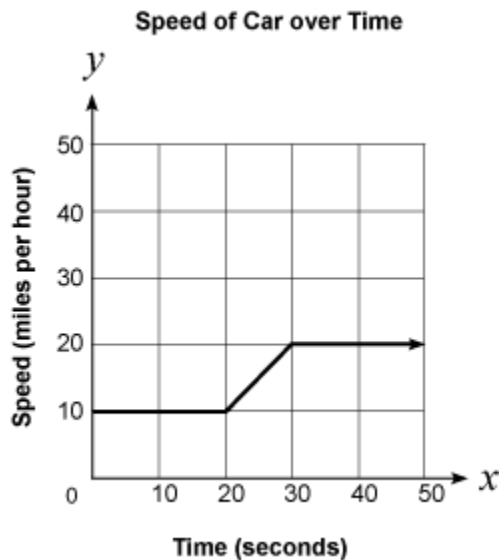


Which statement gives the best summary of the data?

- A. As the amount of water given decreased, the plants grew taller.
- B. As the amount of water given increased, the plants grew taller.
- C. Plants given a small amount of water were tall. Plants given a medium amount of water were short. Plants given a large amount of water were tall.
- D. Plants given a small amount water were short. Plants given a medium amount of water were the tallest. Plants given a large amount of water were short.

ITEM 190

This graph shows the speed of a car over time.



Which statement gives the **best** summary of the data?

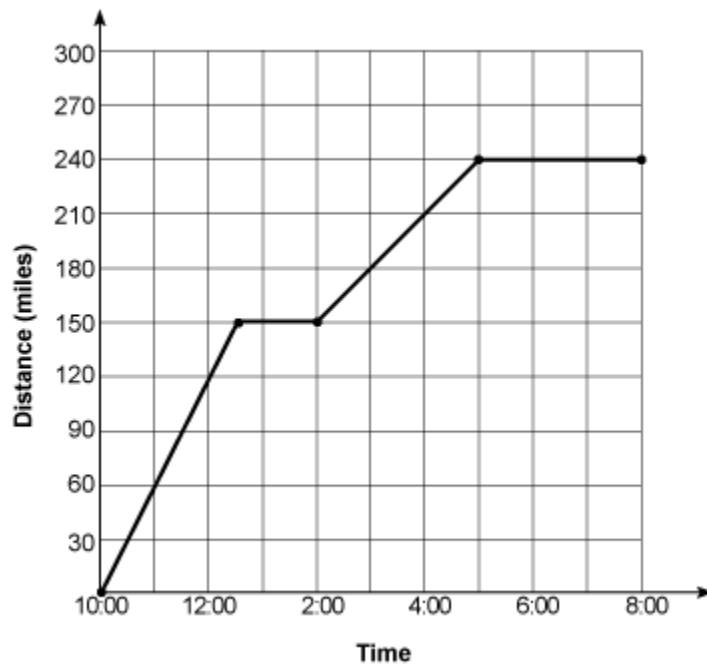
- A. The car was stopped for the first 20 seconds, drove forward for 10 seconds, then stopped again.
- B. The car drove due east for 20 seconds, turned northeast for 10 second, then continued driving due east.
- C. The car drove straight for 20 seconds, made a 45° left turn, drove for 10 seconds, then made a 45° right turn.
- D. The car drove at 10 miles per hour for 20 seconds, then accelerated for 10 seconds, and then continued driving at 20 miles per hour.

ITEM 191

This table shows Julia's average speed at different times during her drive to her aunt's house.

Time	Speed (miles per hour)	Action
10:00–12:30	60	driving
12:30–2:00	0	lunch
2:00–5:00	50	driving
after 5:00	0	arrival

Julia drew this graph to represent the data from the table.

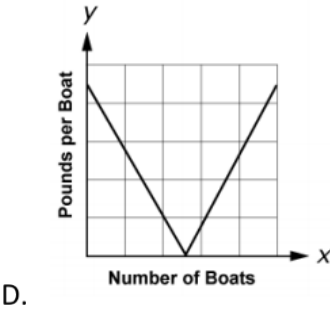
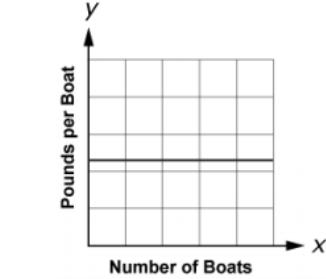
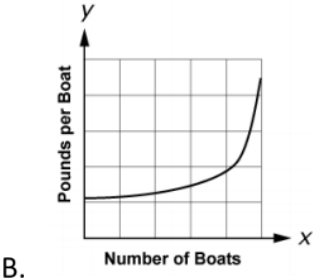
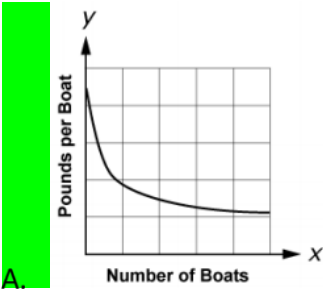


Which error did Julia make when drawing the graph?

- A. The slope of the first segment is too steep.
- B. The slope of the third segment is not steep enough.**
- C. The segment representing the stop for lunch is too long.
- D. The segments representing each interval should be horizontal

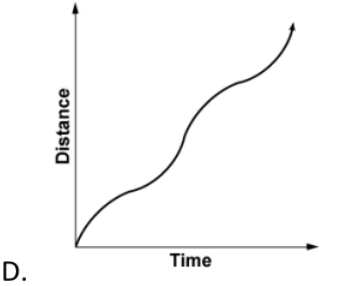
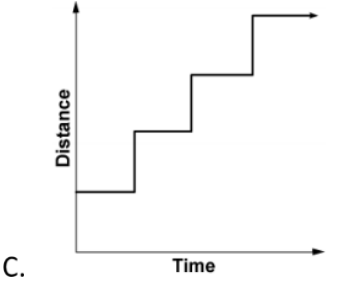
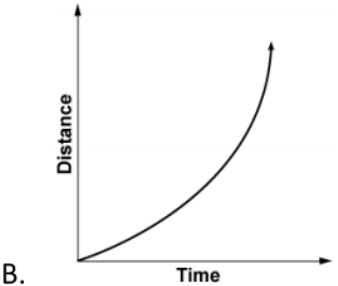
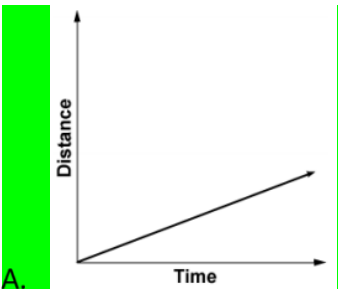
ITEM 192

Mr. Allain is studying the relationship between the number of shrimp boats and the pounds of shrimp caught per boat. He found that the number of pounds of shrimp caught per boat is highest when the number of shrimp boats is lowest. Which graph shows Mr. Allain's findings?



ITEM 193

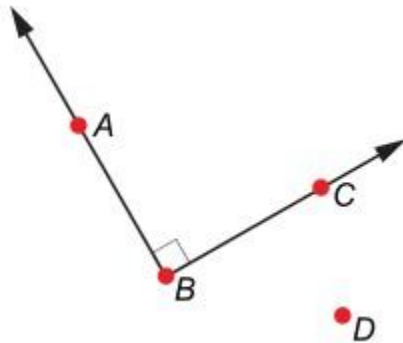
Jorge walked on a treadmill at a constant rate of speed. Which graph shows a constant rate of speed?



Geometry
8.G.A.01
Items 194-212

ITEM 194

Use the picture to answer the question.



Angle ABC is rotated 50° around point D .

What is the measure of angle $A'B'C'$?

- A. 40°
- B. 50°
- C. 90°
- D. 130°

ITEM 195

Line segment CQ is 5 cm long on the coordinate grid. It intersects line segment YZ, which is 9 cm long, at its midpoint. Both lines are dilated by a scale factor of 2.

What results from this dilation? Choose the **two** correct choices.

- A. Line segment CQ is now 10 cm long and line segment YZ is now 18 cm long.
- B. The line segments no longer intersect.
- C. Line segment CQ still intersects line segment YZ at its midpoint.
- D. Line segment CQ is now 2.5 cm long and line segment YZ is now 4.5 cm long.
- E. The measures of the angles formed by the intersection have doubled.

ITEM 196

Line segment CM is graphed on the coordinate plane. It is translated 5 units left and 2 units up. It is then reflected across the y-axis. What is the change in its length?

- A. It is 7 times longer.
- B. It is $\frac{1}{7}$ times as long.
- C. It is 10 times longer.
- D. It is the same length.

ITEM 197

Line segment XY is plotted on the coordinate plane. It is translated up 2 units and right 5 units. It is then reflected over the y -axis. Which statement is true about the lengths of line segment XY and its image.

- A. The image of the line segment is in the same location as the original line segment after the transformations.
- B. The image of the line segment is now 7 units longer than the original line segment.
- C. The image of the line segment is now 7 units shorter than the original line segment.
- D. Line segment XY and its image are congruent.

ITEM 198

\overline{NP} is 6 units long and graphed on the coordinate plane. The line segment is reflected across the y -axis, translated 2 units down, and then rotated 45 degrees. How does the length of the image of \overline{NP} compare to the original line segment.

- A. It is twice as long, 12 units.
- B. It is half as long, 3 units.
- C. It is now a ray with an infinite length.
- D. It is the same length.**

ITEM 199

\overline{LM} lies on the coordinate plane, It is translated \overline{LM} 4 units left and 2 units up and then reflected across the X -axis. What is the change in the length of \overline{LM} once the transformations have been completed?

- A. It is 8 times as longer than the original.
- B. It is 8 times shorter than the original.
- C. It is the same length as the original.
- D. It is twice as long as the original.

ITEM 200

Segment RT lies on the coordinate plane and is rotated 90 degrees, then reflected across the y-axis. What is the change in the segment's length?

- A. It is twice as long.
- B. It is half as long.
- C. It is 90 times as long.
- D. It is the same length.

ITEM 201

A star is drawn on the coordinate plane. It has five points, all of which are 30 degree angles. The star is dilated by a scale factor of 2. What is the measure of each of the five angles now?

- A. 60 degrees
- B. 30 degrees**
- C. 150 degrees
- D. It cannot be determined without a picture of the dilated star.

ITEM 202

Angle CQR is graphed on the coordinate plane. It has a measure of 46 degrees. The angle is dilated by $\frac{1}{2}$ and then rotated 45 degrees clockwise. What is the measure of its image, $\angle C'Q'R'$?

- A. 23 degrees
- B. 46 degrees
- C. 91 degrees
- D. 92 degrees

ITEM 203

Angle WER measures 60° . Angle JKL also measures 60° . Both angles are rotated 90 degrees counterclockwise and then translated left 6 units. Which of the following statements is true about these two angles?

- A. The image of Angle JKL is larger than the original Angle JKL .
- B. The images of the two angles are congruent.**
- C. The image of Angle WER is smaller than the original Angle WER .
- D. The images of the angles are in the same locations as the original angles after the transformations.

ITEM 204

$\angle QRS$ and $\angle ABC$ are congruent and plotted on the coordinate plane. Both angles are reflected across the x -axis. $\angle QRS$ is then rotated 45° . $\angle ABC$ is rotated 135° . Which statement is true about the images of the angles?

- A. The angles are no longer congruent.
- B. $\angle ABC$ is now larger than $\angle QRS$.
- C. The angles are still congruent.
- D. The angles cannot be rotated differently.

ITEM 205

Angle ABC measures 30 degrees. It is rotated 90 degrees to create Angle A'B'C'. What is the measure of Angle A'B'C'?

- A. 15 degrees
- B. 30 degrees**
- C. 60 degrees
- D. 90 degrees

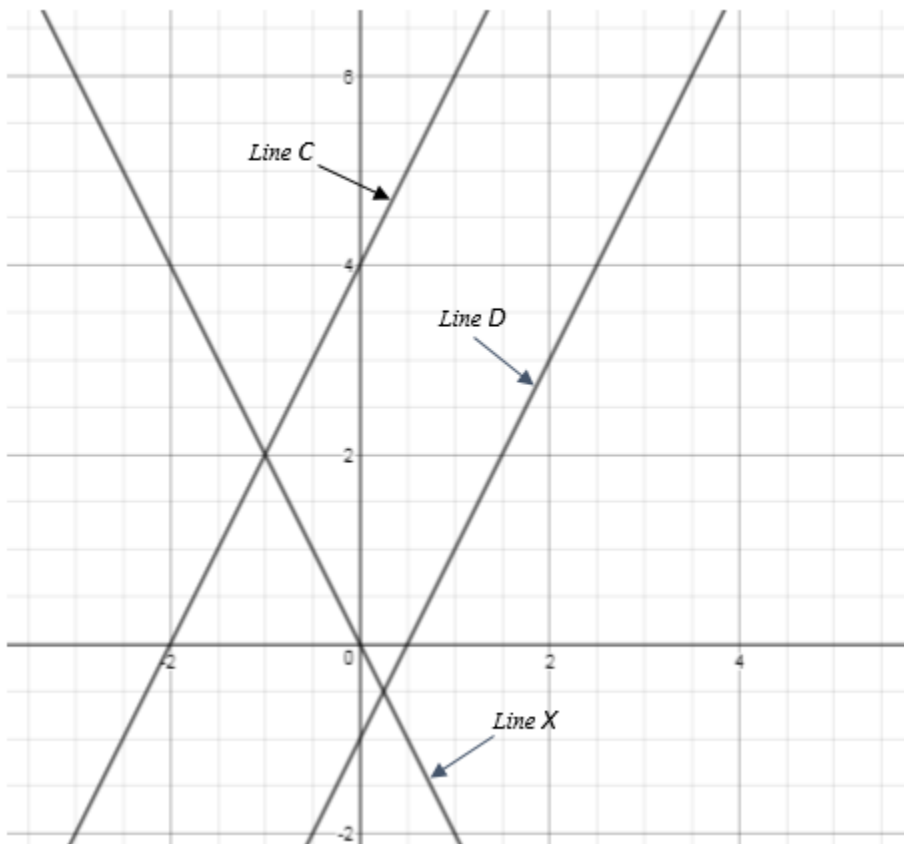
ITEM 206

A right triangle ABC with the measure of Angle A = 30° , the measure of Angle B = 60° and Angle C is the right angle. The triangle is rotated 240° and then translated up 4 units and right 2 units. What is the measure of Angle B' in the image of the triangle?

- A. 10 degrees
- B. 60 degrees**
- C. 90 degrees
- D. 240 degrees

ITEM 207

Line C and *Line D* are parallel and are cut by a transversal, *Line X*.
This figure is reflected over the x -axis and is dilated by a scale factor of 3.



Which of the following statements about these transformations is true?

- A. The angles formed by the transversal intersection are three times as large after the dilation.
- B. *Line C* and *Line D* are still parallel.**
- C. The angles formed by the transversal intersection are not the same size after the sequence of basic rigid motions.
- D. The reflection changed the length of the lines.

ITEM 208

Angle RST is dilated by a scale factor of 4 to create Angle $R'S'T'$. Which of the following is true?

- A. The angle size remains the same.
- B. The vertex of the dilated angle is R' .
- C. The angle is 4 times its original size.
- D. An angle cannot be dilated.

ITEM 209

Line Q is plotted on the coordinate plane and is parallel to Line C. Both lines are rotated -90 degrees, translated down 2 units, and then reflected across the x -axis.

After these transformations, which of the following statements is true?

- A. The lines are now perpendicular.
- B. The lines remain parallel.**
- C. Both lines are now twice as long.
- D. The lines no longer have a geometric relationship.

ITEM 210

Line X is parallel to Line Y. They are intersected by a transversal, Line Z, and all three lines are graphed on the coordinate plane. Line Z is translated 2 units left and 2 units down. Lines X and Y are reflected across the x-axis and then rotated 180 degrees. What is the change in the position or lengths of the images of these lines?

- A. Lines X and Y are no longer parallel.
- B. Lines X and Y are 4 times longer.
- C. Line Z is 4 times longer.
- D. Lines X and Y are still parallel.

ITEM 211

Line M is parallel to Line R. The two lines are rotated 90 degrees. Which statement about the images of the two lines is true?

- A. The images of the lines end up in their starting position.
- B. The images of the lines are now perpendicular.
- C. The images of the lines are 90 times longer than the original lines.
- D. The images of the lines remain parallel.

ITEM 212

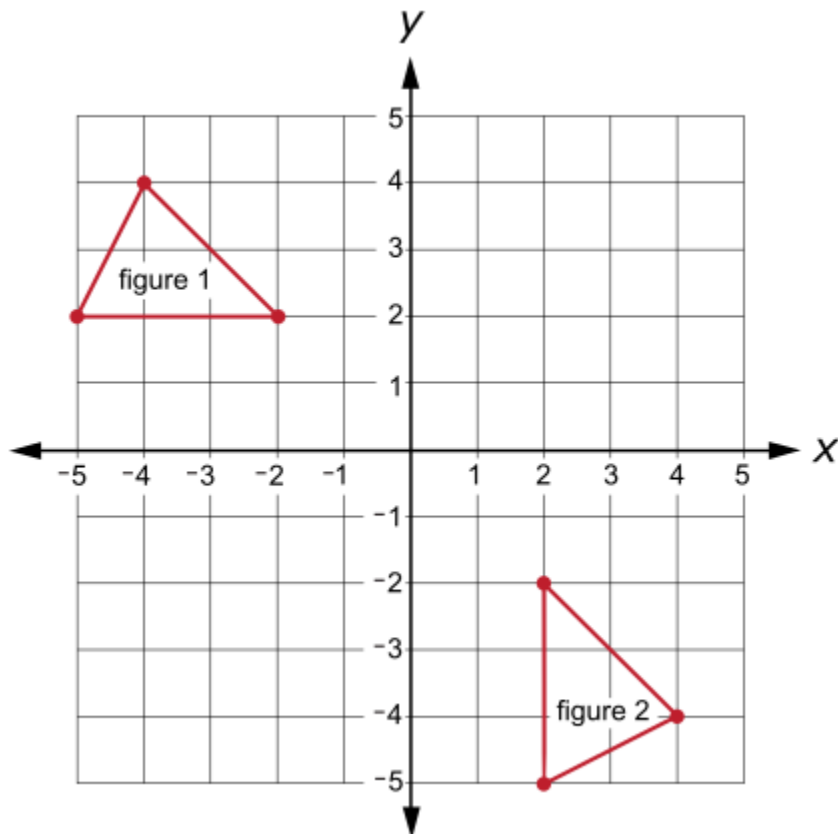
Line C is parallel to *Line X* which is parallel to *Line R*. All three lines are plotted on a coordinate grid. They are rotated 90 degrees and then reflected across the *y*-axis. Which statement about the images of the 3 lines is true?

- A. The images of the lines are perpendicular to each other.
- B. The images of the lines remain parallel.**
- C. The image of the lines ends up in their starting position.
- D. Two of the lines in the image are parallel and one is perpendicular to those two lines.

Geometry
8.G.A.02
Items 213-218

ITEM 213

Use the graph to answer the question.



Which set of transformations does not map figure 1 onto figure 2?

- A. reflect figure 1 across the line $y = x$
- B. rotate figure 1 clockwise about the origin by 180°**
- C. rotate figure 1 clockwise about the origin by 90° and reflect over the x -axis
- D. rotate figure 1 counterclockwise about the origin by 90° and reflect over the y -axis

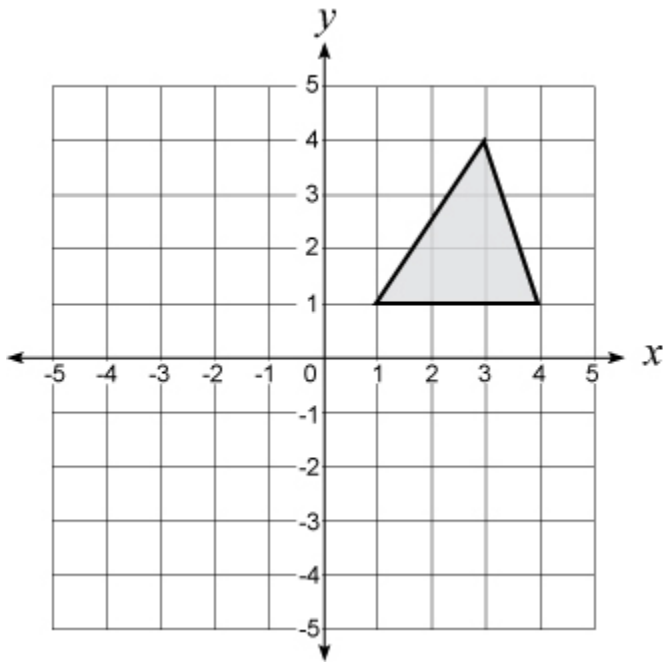
ITEM 214

For any figure, which of the following transformations would not produce a figure congruent to the original figure?

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

ITEM 215

Brooke wants to rotate this triangle 90° clockwise about the origin.

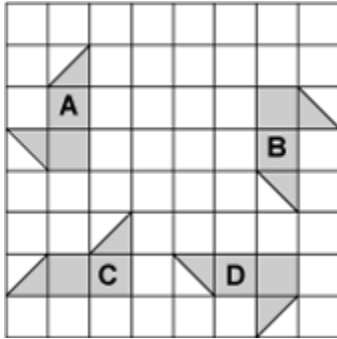


Which other transformation would give exactly the same result as Brooke's rotation?

- A. reflection across the x -axis
- B. reflection across the y -axis
- C. rotation 270° clockwise about the origin
- D. rotation 270° counter-clockwise about the origin**

ITEM 216

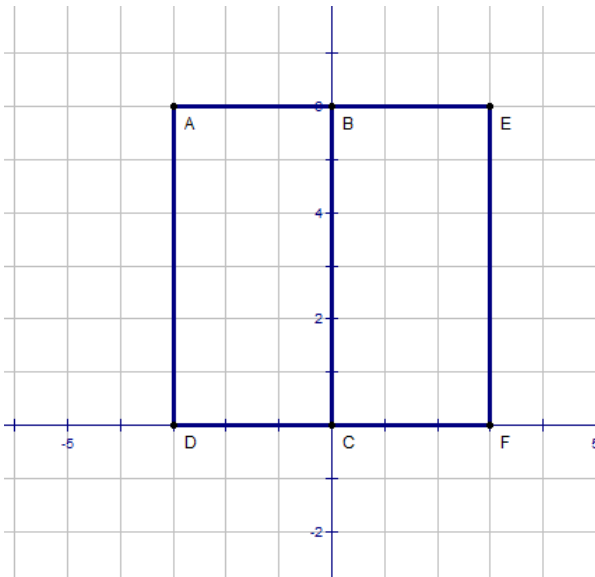
Which statement about these figures on the grid is true?



- A. Figures A and B are congruent.
- B. Figures A and D are congruent.**
- C. Figures B and C are congruent.
- D. Figures C and D are congruent.

ITEM 217

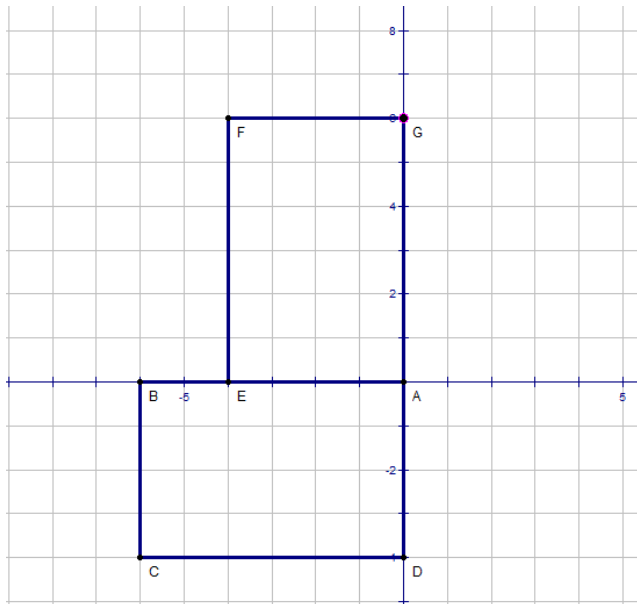
What transformation is needed to show that Rectangle ABCD is congruent to Rectangle EBCF?



- A. Reflection across the y -axis
- B. Ninety-degree rotation clockwise around Point A
- C. One hundred eighty-degree rotation
- D. The rectangles are not congruent.

ITEM 218

What transformation would indicate that Rectangle GFEA is congruent to BCDA?

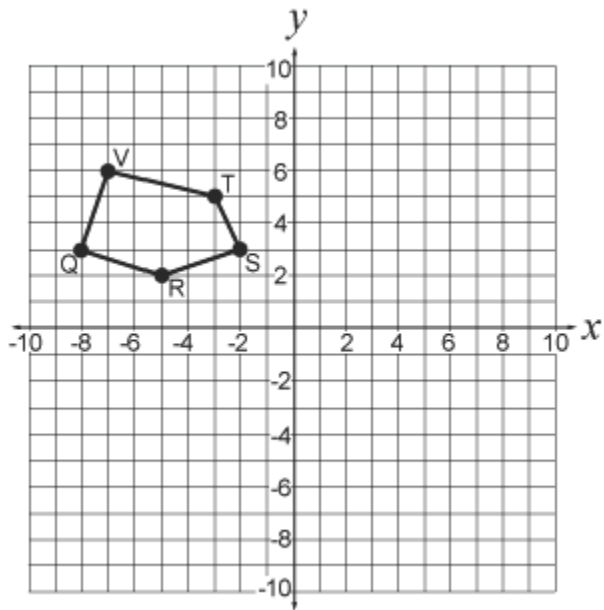


- A. A reflection across the y -axis.
- B. A rotation of 180 degrees.
- C. A reflection across the x -axis.
- D. A rotation of 90 degrees counterclockwise about Point A**

Geometry
8.G.A.03
Items 219-233

ITEM 219

Figure QRSTV is reflected across the x -axis.

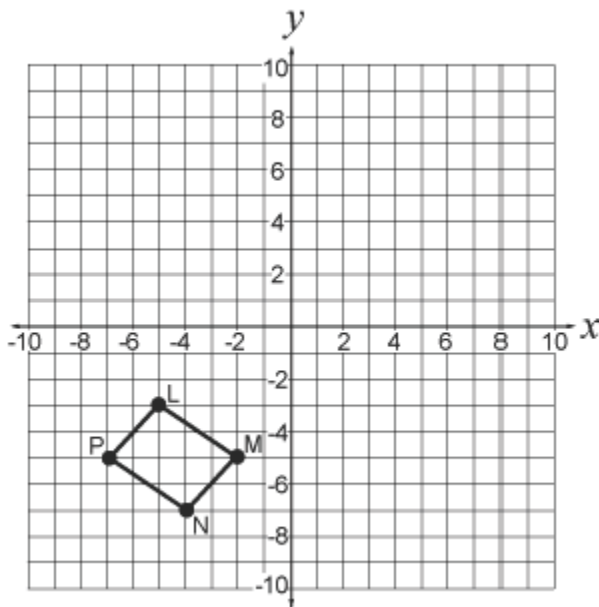


What are the coordinates of point Q after this reflection?

- A. (-8, -3)
- B. (-3, -8)
- C. (-8, 3)
- D. (8, 3)

ITEM 220

Quadrilateral $LMNP$ is translated 4 units up and 2 units right.

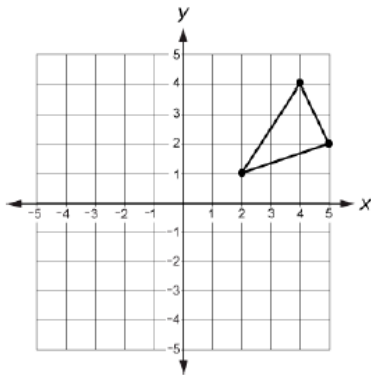


What are the coordinates of vertex N after this translation?

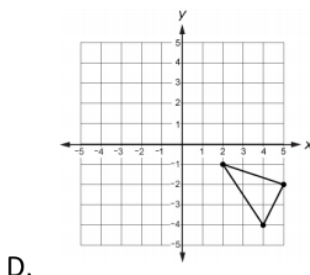
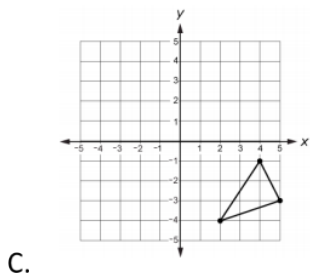
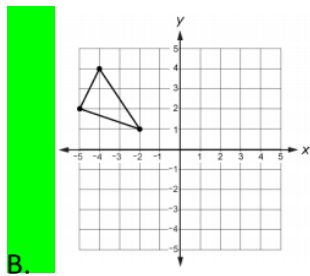
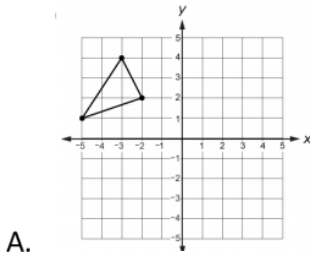
- A. $(-6, -3)$
- B. $(-3, -6)$
- C. $(-3, -2)$
- D. $(-2, -3)$

ITEM 221

Use the triangle on the grid below to answer this question.

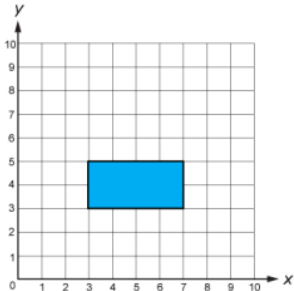


Which grid shows the same triangle reflected over the y-axis?

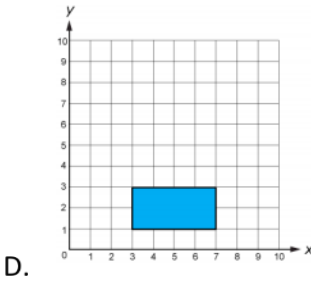
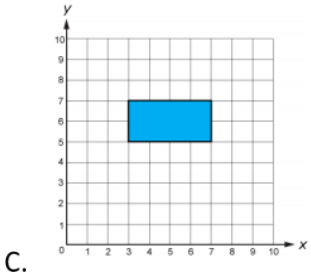
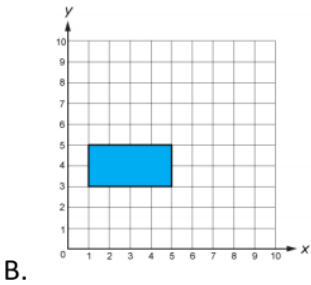
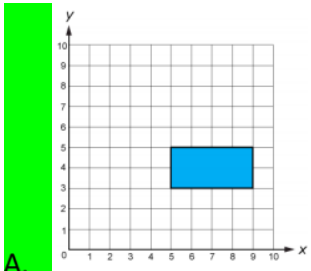


ITEM 222

Emily moves this rectangle 2 units to the right.

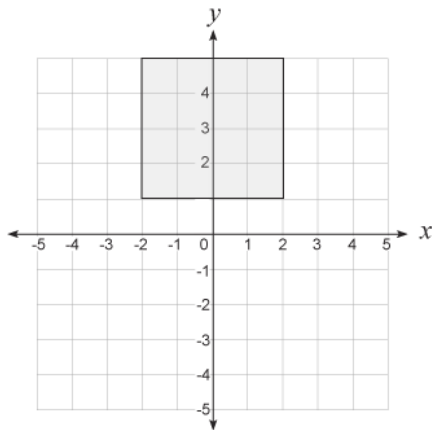


Which picture shows the result of this move?

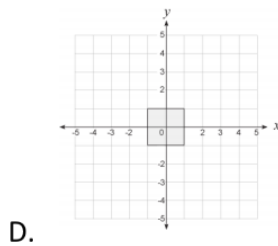
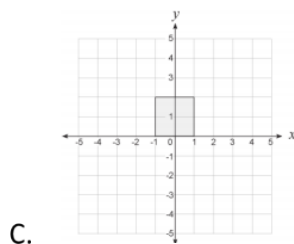
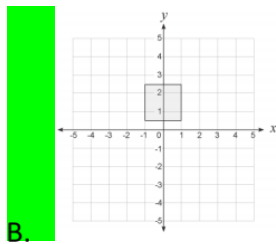
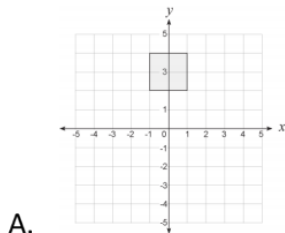


ITEM 223

Lenny dilates this square by a factor of $\frac{1}{2}$ using the origin as the center of dilation.

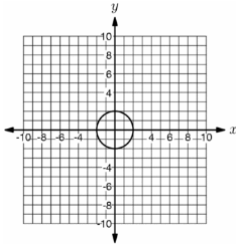


Which graph shows the dilated square?

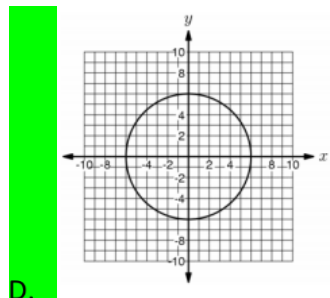
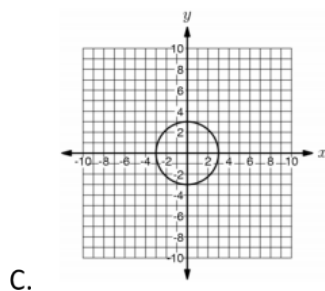
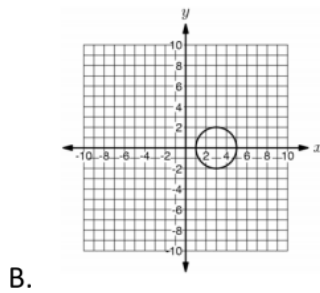
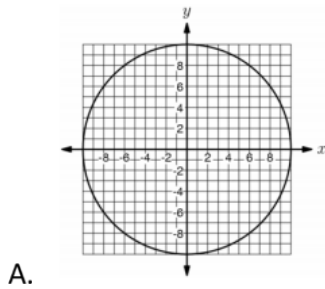


ITEM 224

Look at the circle on this coordinate plane.

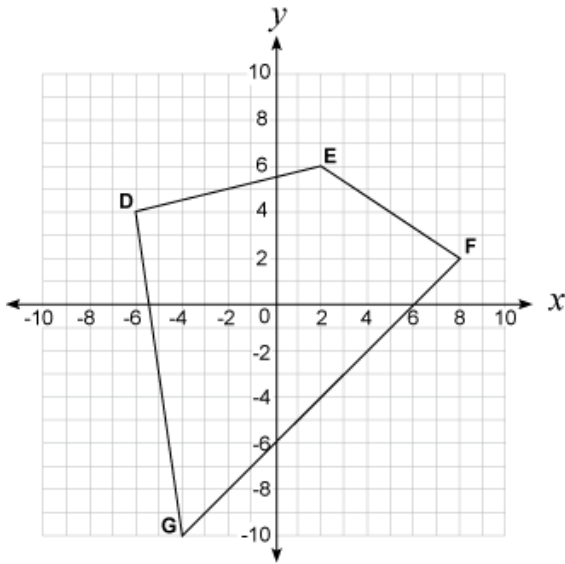


Which graph shows the circle dilated by a factor of 3, with the origin as the center of dilation?



ITEM 225

Quadrilateral DEFG is dilated by a factor of 0.5 with center $(0, 0)$.

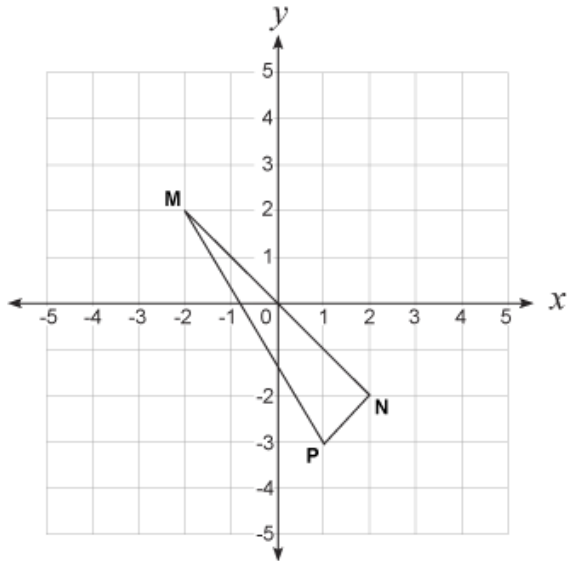


What are the new coordinates of point D?

- A. $(-3, 2)$
- B. $(-2, 3)$
- C. $(2, -3)$
- D. $(-3, -2)$

ITEM 226

Triangle MNP is dilated by a factor of 2 with a center of dilation at $(0, 0)$.

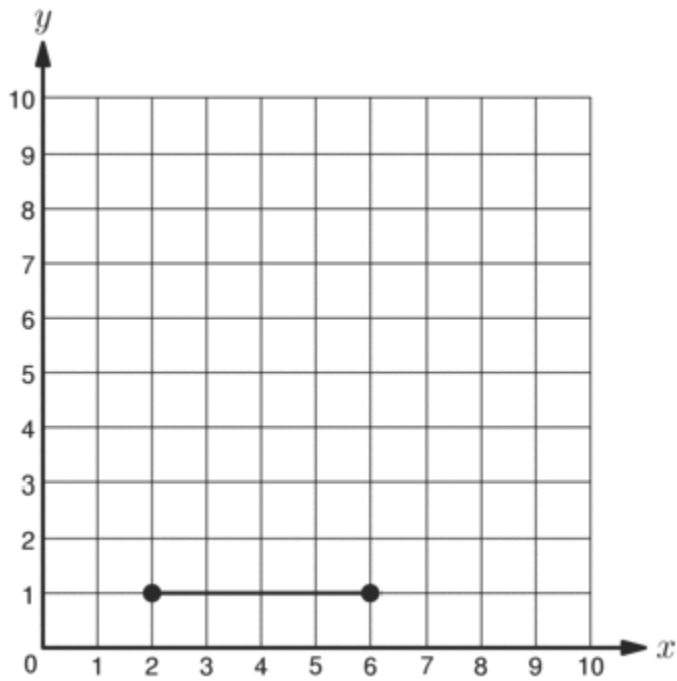


What are the new coordinates of point N?

- A. $(1, -1)$
- B. $(-4, 4)$
- C. $(4, 0)$
- D. $(4, -4)$

ITEM 227

This graph shows a line segment.

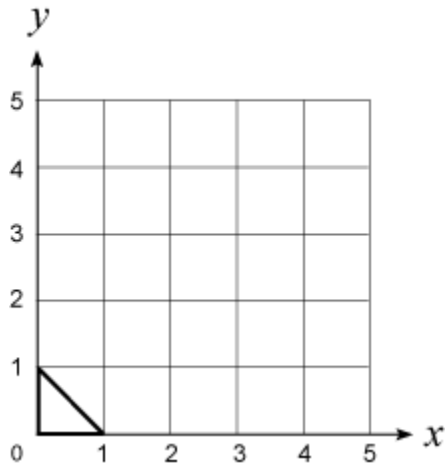


The line segment is dilated by a factor of $\frac{1}{2}$ with respect to the origin. What is the length of the dilated line segment?

- A. 1 unit
- B. 2 units**
- C. 3 units
- D. 4 units

ITEM 228

The vertices of a right triangle are $(0, 0)$, $(1, 0)$, and $(0, 1)$.



If the triangle is dilated by a factor of 3 with respect to the origin, which coordinate pair cannot be one of the vertices?

- A. $(0, 0)$
- B. $(3, 0)$
- C. $(3, 3)$
- D. $(0, 3)$

ITEM 229

The coordinates of point P are $(-3, 5)$. After a reflection across the x -axis, what are the new coordinates of point P?

- A. $(3, 5)$
- B. $(-5, -3)$
- C. $(5, -3)$
- D. $(-3, -5)$

ITEM 230

Henry plots triangle UVW on a coordinate grid. The coordinates of U are $(4, 3)$. After the triangle is translated 3 units to the left, what are the new coordinates of U ?

A. $(1, 3)$

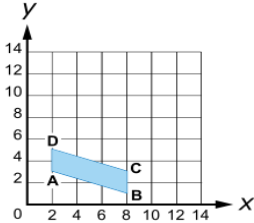
B. $(4, 0)$

C. $(4, 6)$

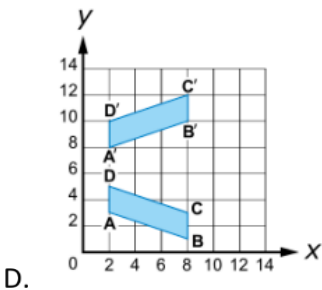
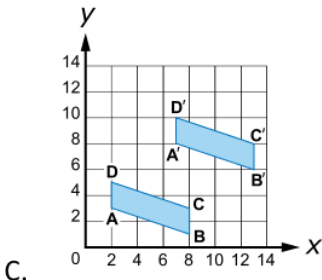
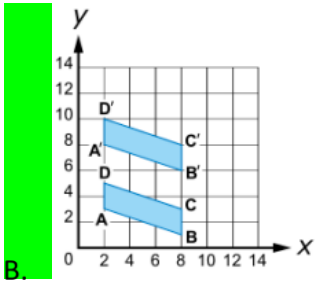
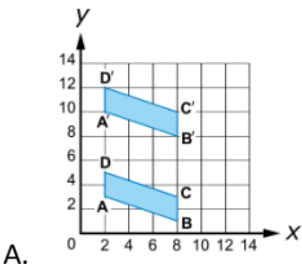
D. $(7, 3)$

ITEM 231

Use the graph below to answer the question.

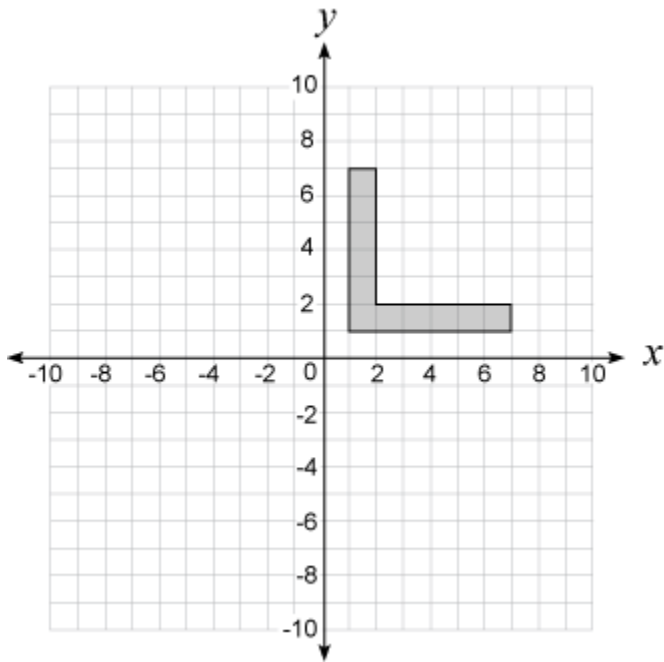


Parallelogram ABCD is translated up 5 units to form parallelogram A'B'C'D'. Which graph shows parallelogram A'B'C'D' after the translation?



ITEM 232

The letter L is shown on this grid.

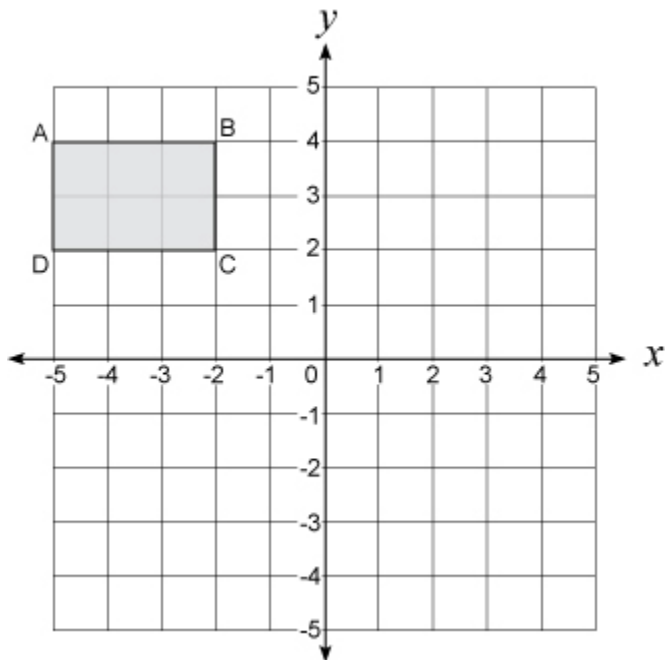


Which rotation would place the L entirely in the third quadrant?

- A. 90° clockwise rotation about $(1, 1)$
- B. 90° clockwise rotation about $(0, 0)$
- C. 180° rotation about $(1, 1)$
- D. 180° rotation about $(0, 0)$**

ITEM 233

Ryan drew rectangle ABCD on the grid.



Ryan translated ABCD 2 units to the right, then reflected it across the y -axis. What are the new coordinates of vertex A?

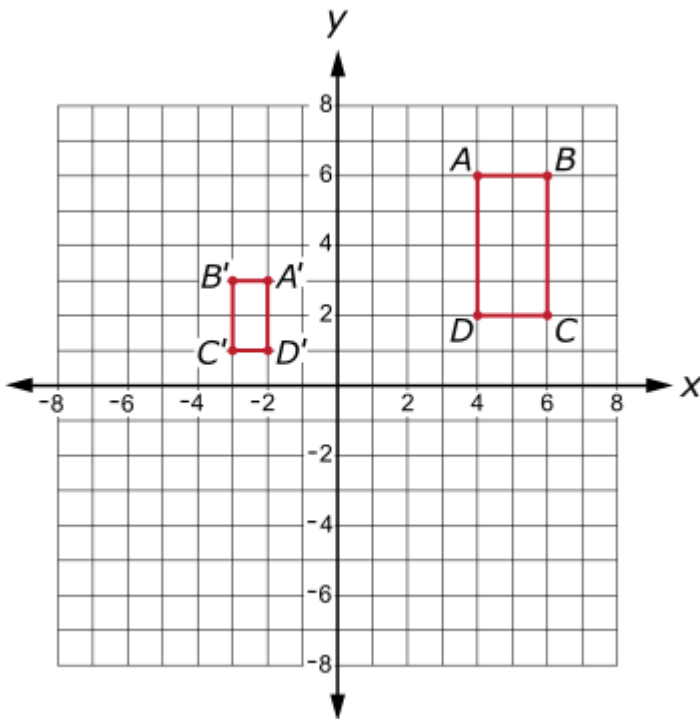
- A. $(-3, -4)$
- B. $(-3, 4)$
- C. $(3, -4)$
- D. $(3, 4)$

Geometry
8.G.A.04
Items 234-236

ITEM 234

Use the graph to answer the question.

Which series of transformations maps $ABCD$ to $A'B'C'D'$?



A. dilate $ABCD$ by a factor of 2 about the origin and reflect across the y -axis

B. dilate $ABCD$ by a factor of $\frac{1}{2}$ about the origin and reflect across the y -axis

C. dilate $ABCD$ by a factor of 2 about the origin and translate 5 units to the left

D. dilate $ABCD$ by a factor of $\frac{1}{2}$ about the origin and translate 5 units to the left

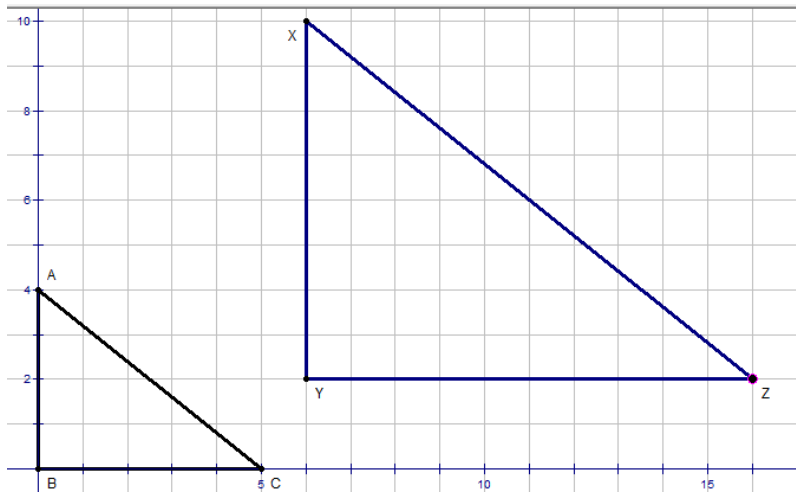
ITEM 235

Rectangle ABCD is plotted on the coordinate plane. It is reflected across the y -axis and then dilated by a scale factor of 2 to get image $A'B'C'D'$. What is the relationship between these two figures?

- A. They are congruent.
- B. They are similar.**
- C. They are no longer related after the transformations.
- D. It is not possible to determine the relationship with the given information.

ITEM 236

Triangle ABC is similar to Triangle XYZ. The triangles are shown below:



Part A

- What is the scale factor for the dilation of triangle ABC?
- Explain how you determined your answer.

Part B

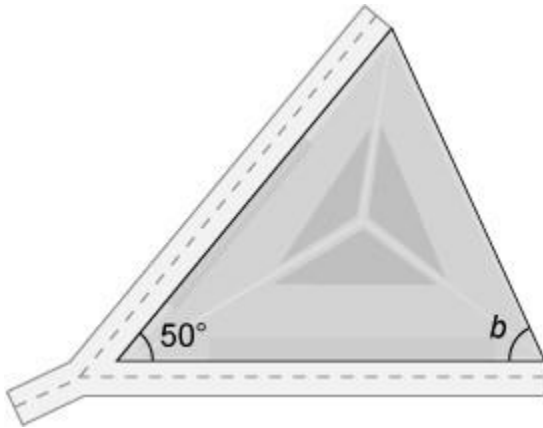
- Write the sequence of transformations that exhibits the similarity between the two triangles.

Enter your responses for Part A and Part B below. Be sure to label each part.

Geometry
8.G.A.05
Items 237-247

ITEM 237

Terry works in a triangular building. An overhead view of the building is shown below.

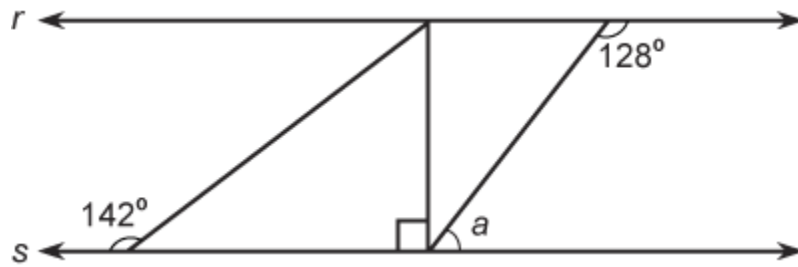


One corner of the building is at the intersection of two streets and has an angle measure of 50° . The other two corners have angle measures that are equal to each other. What is the measure of angle b ?

- A. 45°
- B. 50°
- C. 65°
- D. 90°

ITEM 238

Lines r and s are parallel.

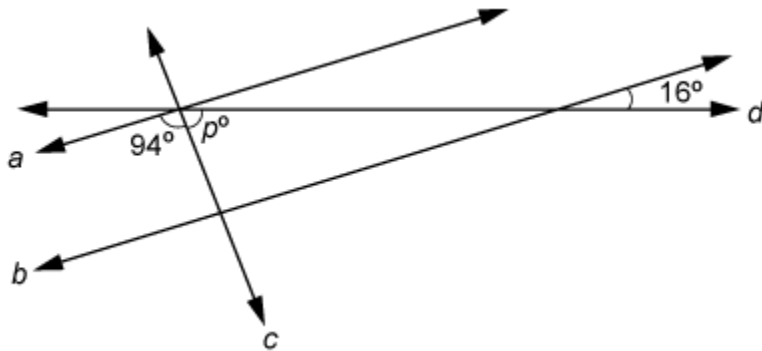


What is the measure of angle a ?

- A. 28°
- B. 38°
- C. 42°
- D. 52°

ITEM 239

In this figure, lines a and b are parallel.

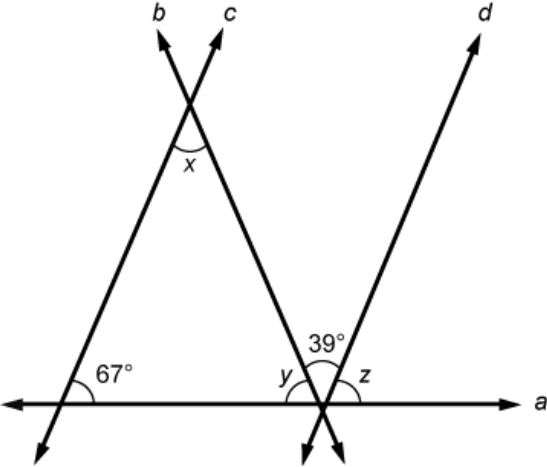


What is the measure of angle p ?

- A. 70°
- B. 72°
- C. 76°
- D. 78°

ITEM 240

Lines c and d are parallel in this diagram.

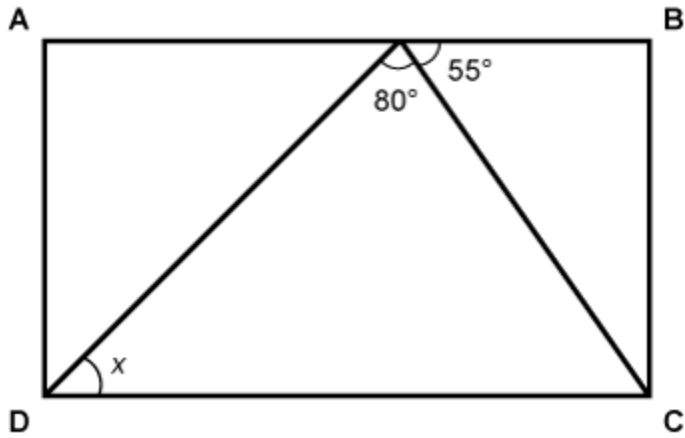


What is the measure of angle x ?

- A. 28°
- B. 39°**
- C. 53°
- D. 74°

ITEM 241

Rectangle ABCD is shown.

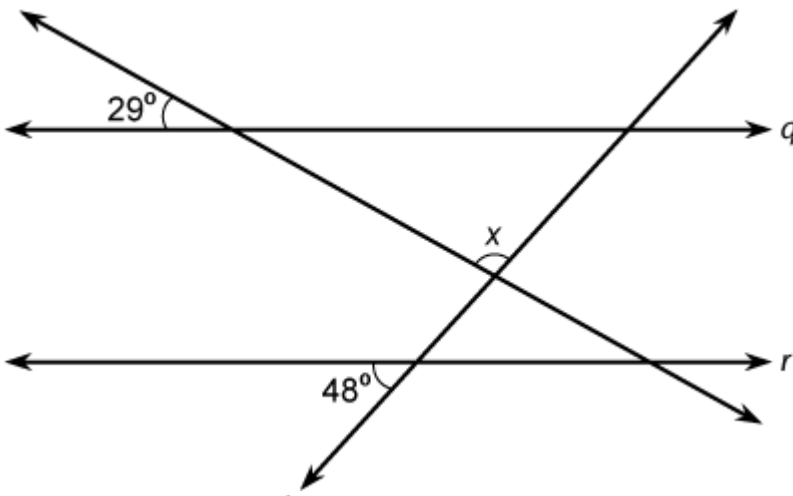


What is the measure of $\angle x$?

- A. 25°
- B. 35°
- C. 45°
- D. 55°

ITEM 242

Lines q and r are parallel in this diagram.

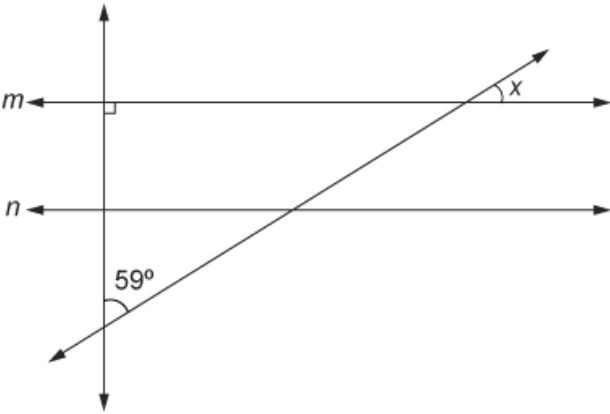


What is the measure of $\angle x$?

- A. 48°
- B. 77°
- C. 103°
- D. 132°

ITEM 243

Line m is parallel to line n in this diagram.

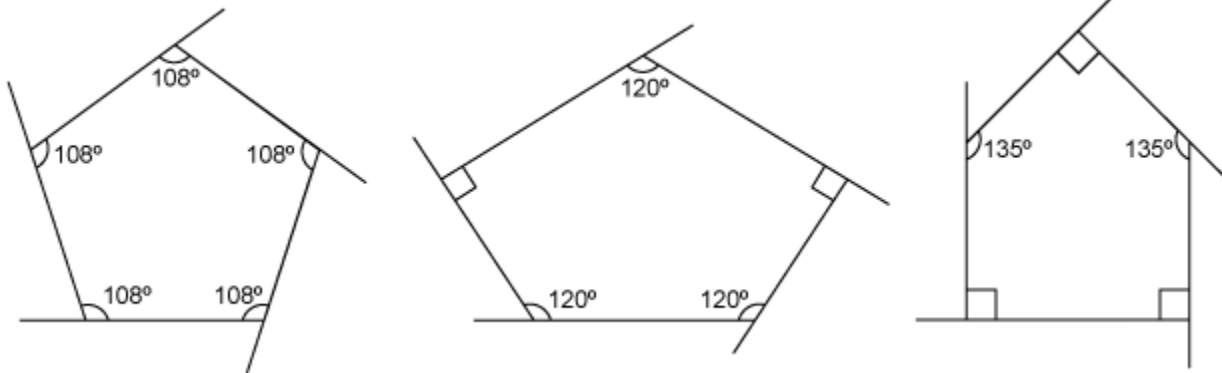


What is the measure of $\angle x$?

- A. 31°
- B. 59°
- C. 121°
- D. 211°

ITEM 244

Lucia studies the interior and exterior angles of these pentagons.

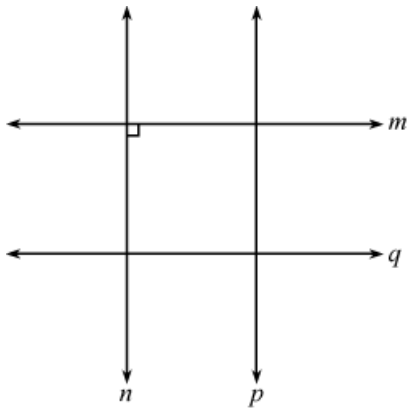


What can Lucia conclude about pentagons?

- A. The sum of the exterior angles is 180° .
- B. The sum of the interior angles is 180° .
- C. The sum of the exterior angles is 360° .
- D. The sum of the interior angles is 360° .

ITEM 245

Cara knows that line m is perpendicular to line n in this diagram.

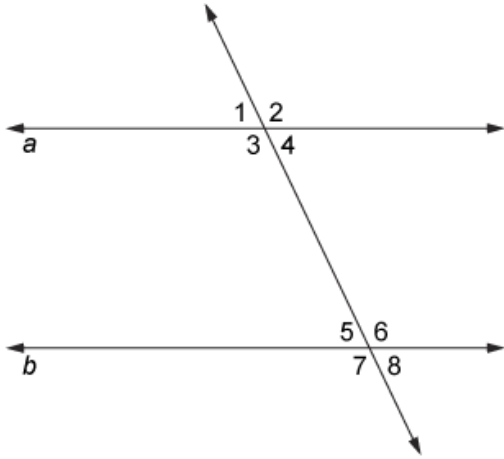


What other information does Cara need in order to show that line n is parallel to line p ?

- A. Line q is parallel to line p .
- B. Line m is parallel to line p .
- C. Line q is perpendicular to line n .
- D. Line m is perpendicular to line p .

ITEM 246

Lines a and b are parallel.

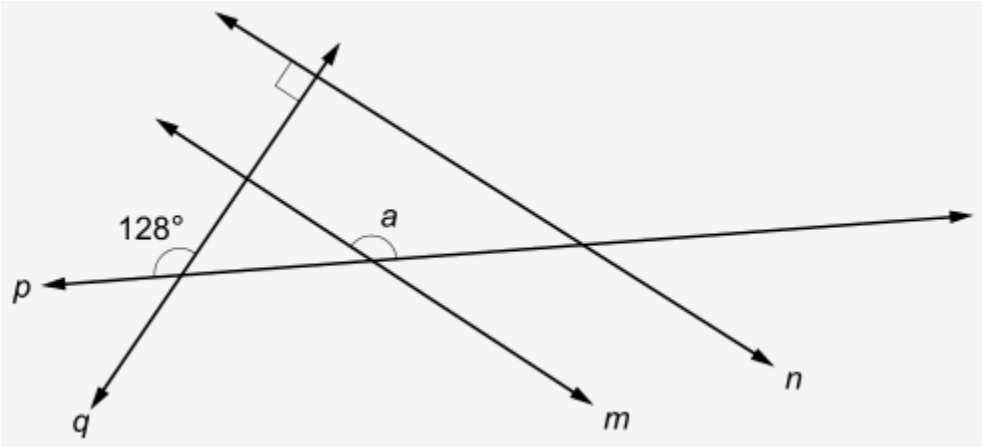


What is the relationship between angles 2 and 8?

- A. complementary
- B. corresponding
- C. supplementary
- D. vertical

ITEM 247

In the diagram below, line m is parallel to line n .



What is the measure of a ?

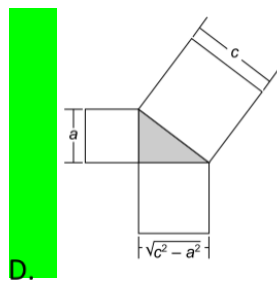
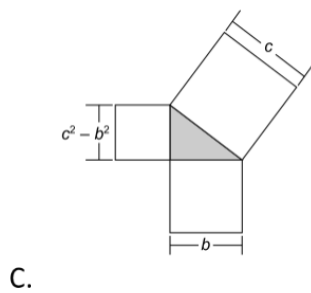
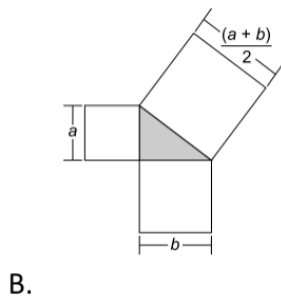
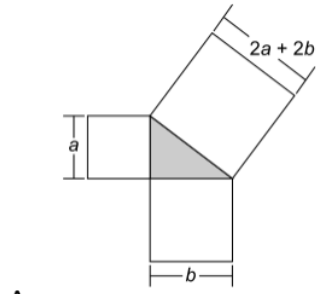
- A. 38°
- B. 52°
- C. 90°

D. 142°

Geometry
 8.G.B.06
 Items 248-254

ITEM 248

Which diagram could be used to prove that a certain triangle is a right triangle?



ITEM 249

The side lengths of four triangles are given below. Which of them is not a right triangle?

- A. 3, 4, 5
- B. 6, 8, 10
- C. 10, 24, 26
- D. 7, 8, 9

ITEM 250

The side lengths of four triangles are given below. Which of them is not a right triangle?

A. 2, 3, 4

B. 5, 12, 13

C. 4, 5, $\sqrt{41}$

D. 8, 9, $\sqrt{145}$

ITEM 251

Based on the converse of the Pythagorean Theorem, which of the following sets of side lengths is **not** a right triangle?

A. $6^2 + 8^2 = 10^2$

B. $10^2 + 12^2 = (\sqrt{244})^2$

C. $1^2 + 2^2 = 3^2$

D. $3^2 + 4^2 = 5^2$

ITEM 252

Based on the converse of the Pythagorean Theorem, which of the following sets of side lengths is **not** a right triangle?

A. $6^2 + 8^2 = 10^2$

B. $10^2 + 24^2 = 26^2$

C. $2^2 + 3^2 = 4^2$

D. $3^2 + 4^2 = 5^2$

ITEM 253

The following shows the use of the converse of the Pythagorean Theorem using side lengths of four different triangles. Based on the converse, which of the following sets of side lengths is a right triangle?

A. $2^2 + 3^2 = 4^2$

B. $5^2 + 12^2 = 13^2$

C. $6^2 + 9^2 = 10^2$

D. $10^2 + 11^2 = 15^2$

ITEM 254

The following shows the use of the converse of the Pythagorean Theorem using side lengths of four different triangles. Based on the converse, which of the following sets of side lengths is **not** a right triangle?

A. $1^2 + 1^2 = \sqrt{2}^2$

B. $3^2 + 4^2 = 5^2$

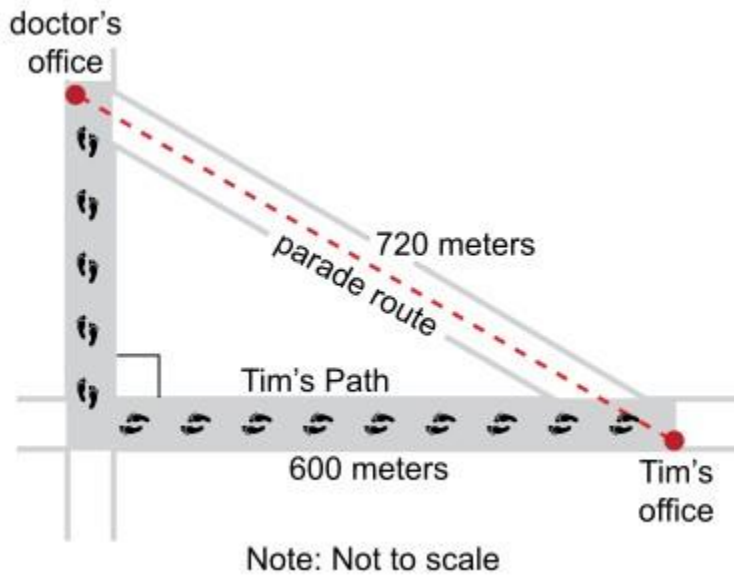
C. $4^2 + 4^2 = 32^2$

D. $9^2 + 12^2 = 15^2$

Geometry
8.G.B.07
Items 255-268

ITEM 255

Use the picture to answer the question.



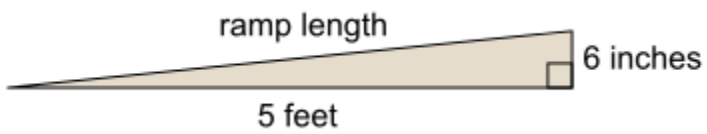
Tim needs to travel from his office to the doctor's office. However, the direct path is blocked off for a parade. So, Tim will travel along the other path shown.

How many fewer meters would Tim travel if he could take the direct path? Round your answer to the nearest meter.

- A. 217
- B. 322
- C. 278
- D. 398

ITEM 256

Use the picture to answer the question.

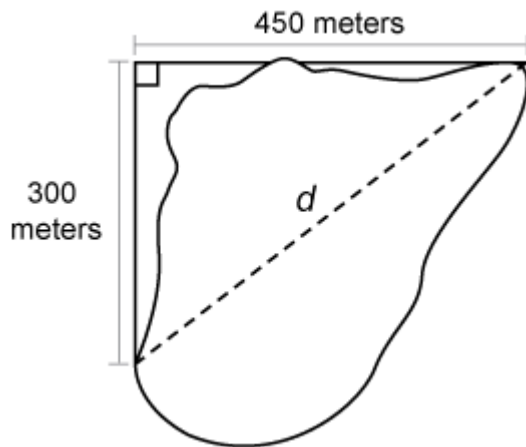


A contractor makes plans for a wheelchair ramp that has a vertical rise of 6 inches as shown. What is the length of the ramp in inches? Round your answer to the nearest tenth of an inch.

- A. 7.8
- B. 18.3
- C. 59.7
- D. 60.3**

ITEM 257

This diagram represents a lake and the bridge, d , that will be built across it.

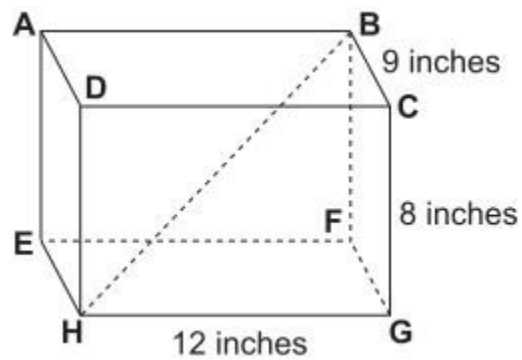


Which measurement is closest to the length of the bridge?

- A. 550 meters
- B. 650 meters
- C. 750 meters
- D. 850 meters

ITEM 258

Maribelle bought this shipping box at the post office.

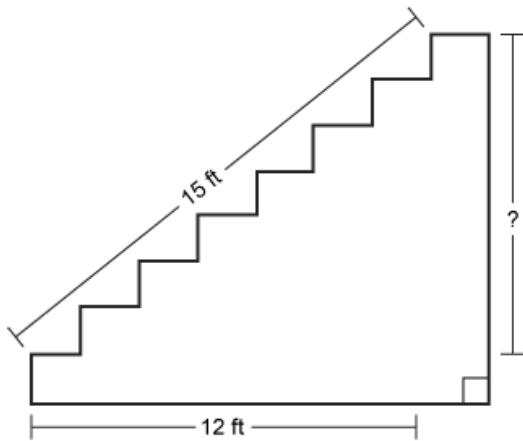


What is the distance from point B to point H?

- A. 15 inches
- B. 17 inches**
- C. 19 inches
- D. 21 inches

ITEM 259

This diagram shows a staircase in Jason's office building.

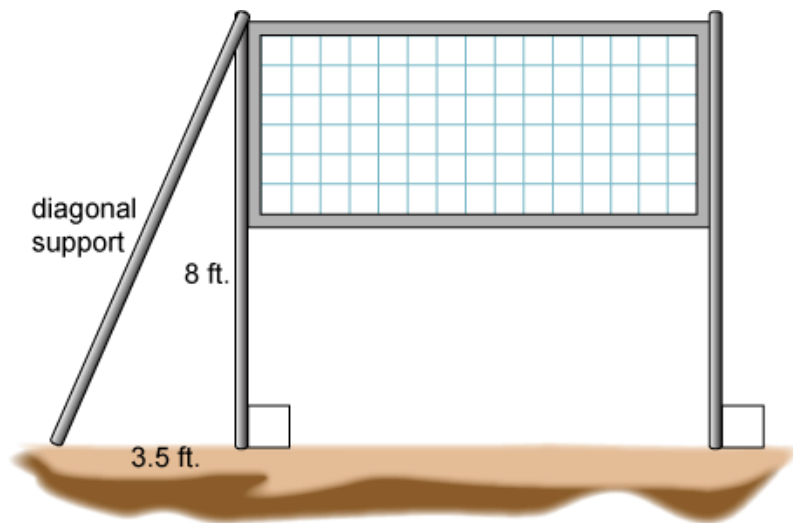


How many feet up from the top of the first stair is Jason after he climbs to the top of the stairs?

- A. 3 feet
- B. 9 feet**
- C. 12 feet
- D. 19 feet

ITEM 260

Jerry is assembling his new volleyball net in the backyard.

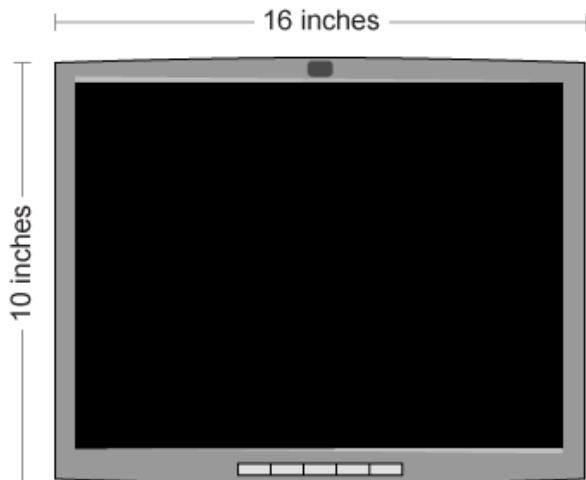


How long is the diagonal support, rounded to the nearest foot?

- A. 7 feet
- B. 9 feet**
- C. 28 feet
- D. 76 feet

ITEM 261

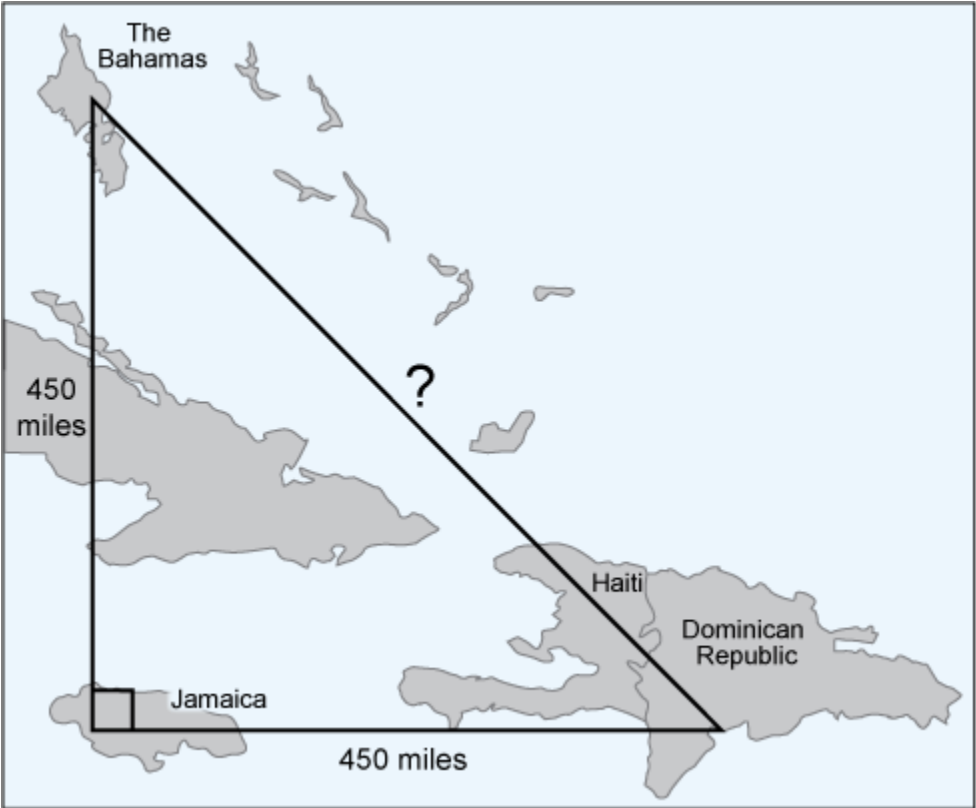
The advertised size of a rectangular computer monitor is the diagonal distance between two corners. A monitor is 16 inches wide and 10 inches high. What is the advertised size of the monitor, rounded to the nearest inch?



- A. 10 inches
- B. 12 inches
- C. 19 inches
- D. 26 inches

ITEM 262

This map shows the route Elizabeth followed on her vacation around the Caribbean Sea.

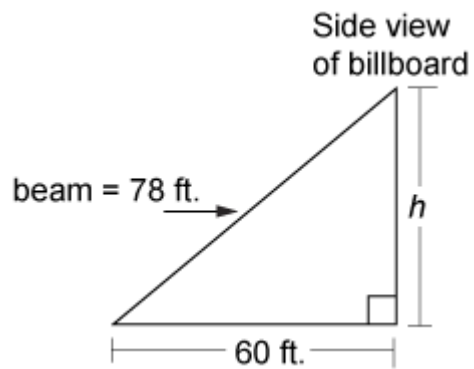


Elizabeth began her vacation in the Bahamas. Then she went to Jamaica and to the Dominican Republic. From there she returned to the Bahamas. What is the **best** estimate for the **total** distance of the route Elizabeth followed on her vacation?

- A. 650miles
- B. 900 miles
- C. 1,100 miles
- D. 1,550 miles

ITEM 263

A builder attaches a diagonal support beam to a new billboard.

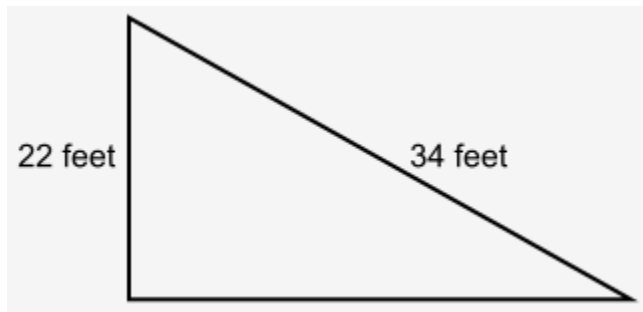


What is the height of the billboard, rounded to the nearest foot?

- A. 18 feet
- B. 50 feet**
- C. 98 feet
- D. 138 feet

ITEM 264

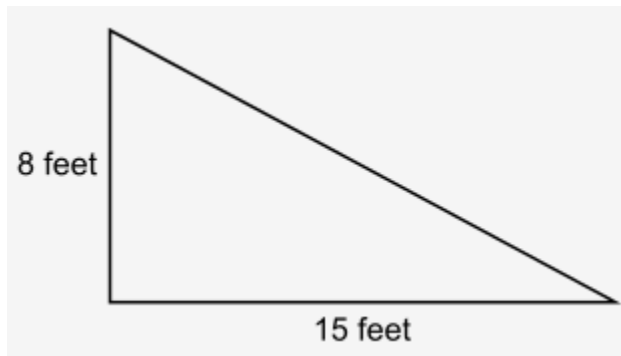
Find the missing side length of the given right triangle. Round to the nearest thousandth.



- A. 4.899 inches
- B. 10.583 inches
- C. 25.923 inches**
- D. 40.497 inches

ITEM 265

Find the length of the hypotenuse of the right triangle pictured below.



- A. 7 feet
- B. 13 feet
- C. 17 feet**
- D. 23 feet

ITEM 266

Mrs. Jones is dividing her 4' x 6' bulletin board in half by putting ribbon diagonally from 1 corner to its opposite corner. How much ribbon does she need? (Round your answer to the nearest tenth of a foot.)

- A. 24.0 feet
- B. 20.0 feet
- C. 15.8 feet
- D. 7.2 feet

ITEM 267

Martin must change the light bulb on the light on the side of his barn. The light is 8 feet high. He has a 10-foot ladder that he must lean on the barn in order to change the bulb. How far, in feet, from the bottom of the barn must he put the bottom of the ladder?

A. 10

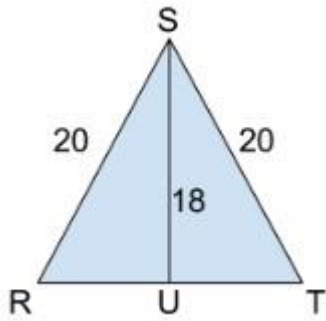
B. 8

C. 6

D. 2

ITEM 268

In triangle RST , line SU is perpendicular to line RT . The dimensions are shown in inches. What is the length, in inches, of line RT ?



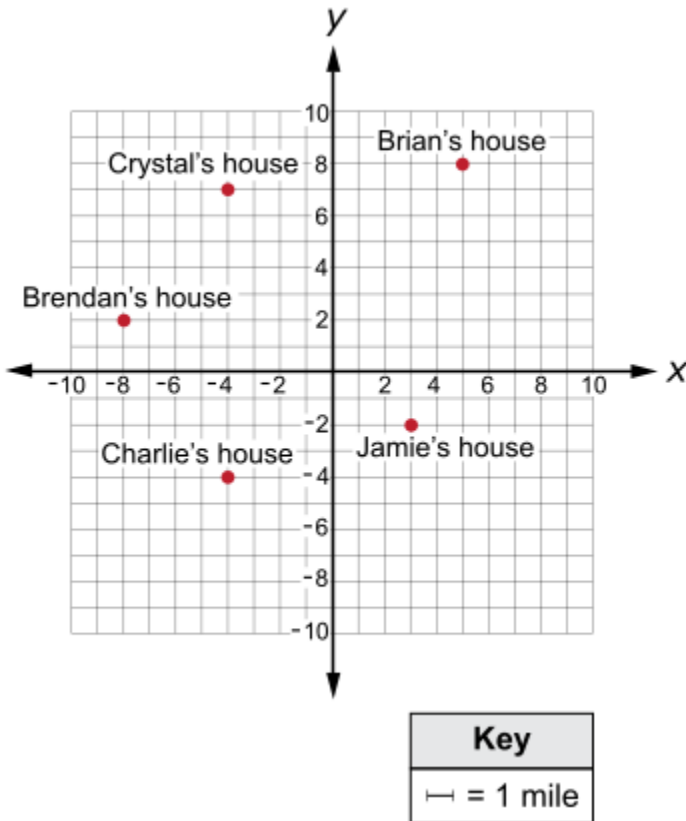
Enter your answer below. Round to the nearest hundredth.

17.44

Geometry
8.G.B.08
Items 269-279

ITEM 269

Use the graph to answer the question.

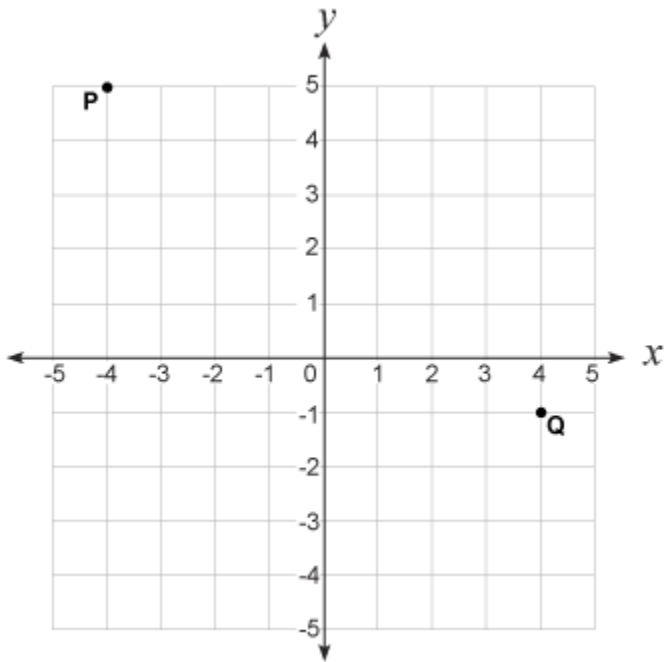


What is the distance from Crystal's house to Jamie's house? Round your answer to the nearest tenth.

- A. 5.1 miles
- B. 8.6 miles
- C. 11.4 miles
- D. 16.0 miles

ITEM 270

What is the distance between point P and point Q?



- A. 6 units
- B. 10 units**
- C. 8 units
- D. 14 units

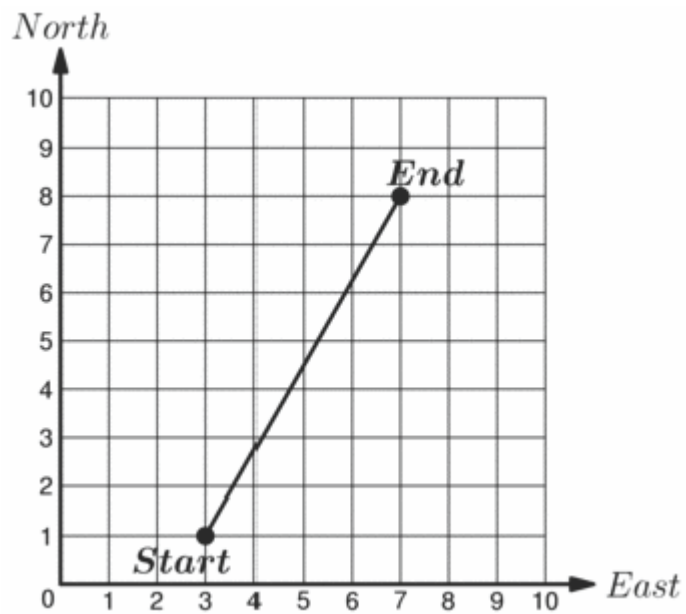
ITEM 271

What is the distance between $(-3, -5)$ and $(-3, -9)$ on the coordinate plane?

- A. -4 units
- B. 0 units
- C. 4 units
- D. 14 units

ITEM 272

This grid shows a bike trail.



Approximately, how long is the bike trail?

- A. 3.3 units
- B. 8.1 units**
- C. 11 units
- D. 32.5 units

ITEM 273

Find the distance between the two points (0,0) and (4,5).

A. $\sqrt{18}$

B. $\sqrt{41}$

C. 3

D. 4

ITEM 274

Find the distance between $(0,3)$ and $(\frac{3}{2},0)$ on a coordinate plane.

A. 11.25

B. 3

C. $\frac{3}{2}$

D. 3.35

ITEM 275

Which of the following is the distance between (2, 11) and (5, 20) on the coordinate plane?

A. 9.5

B. 3

C. 9

D. 90

ITEM 276

The two points (8, 12) and (3, 0) are plotted on a coordinate grid. What is the distance between these two points?

- A. 5 units
- B. 12 units
- C. 17 units
- D. 13 units**

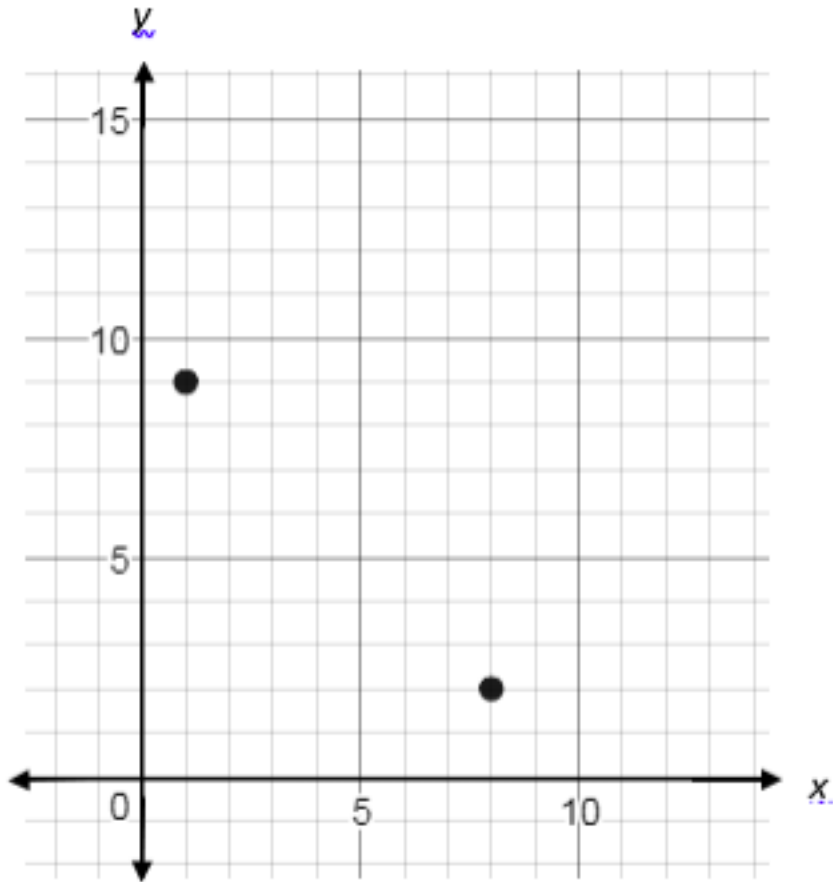
ITEM 277

What is the distance on the coordinate plane between the points: (9, 8) and (1, 2)?

- A. 8 units
- B. 10 units**
- C. 100 units
- D. 36 units

ITEM 278

Find the distance between the two plotted points to the nearest tenth of a unit.



Enter answer below.

9.9

ITEM 279

The two points $(0, 12)$ and $(5, 0)$ are plotted on a coordinate plane. What is the distance between these two points?

- A. 5 units
- B. 12 units
- C. 13 units**
- D. 17 units

Geometry

8.G.C.09

Items 280-285

ITEM 280

A basketball has a radius of 4.7 inches.

What is the volume of the basketball? Round your answer to the nearest whole number.

- A. 93 cubic inches
- B. 245 cubic inches
- C. 326 cubic inches
- D. 435 cubic inches**

ITEM 281

Melissa has a cylindrical trash can with a diameter of 2 feet and a height of 2.5 feet. What is the approximate volume of Melissa's trash can? (Use 3.14 for π)

A. 7.85 ft.³

B. 14.13 ft.³

C. 15.70 ft.³

D. 31.40 ft.³

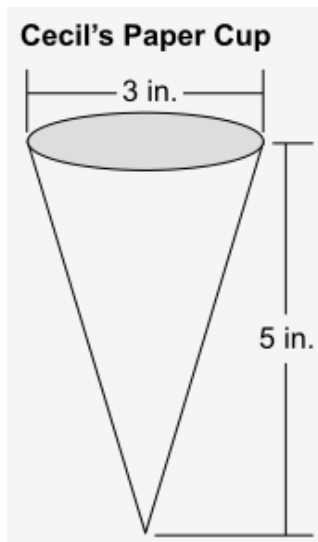
ITEM 282

A cylinder has a radius of 5 centimeters and a height of 8 centimeters. When the cylinder is compared to a cone with the same radius and height, which of the following statements is true?

- A. The volume of the cylinder is four-thirds the volume of the cone.
- B. The volumes are the same.
- C. The volume of the cylinder is three times the volume of the cone.
- D. The volume of the cone is three times the volume of the cylinder.

ITEM 283

Cecil has a paper cup, as shown below.



What is the volume, in cubic inches, of Cecil's cup?

- A. 2.12
- B. 11.78**
- C. 4.12
- D. 10.14

ITEM 284

Jade needs some potting soil for her cylindrical flower pot. The pot is twelve inches high and its base has a radius of four inches. To the nearest cubic inch, how much potting soil does Jade need to buy?

- A. 151 cubic inches
- B. 48 cubic inches
- C. 603 cubic inches**
- D. 301 cubic inches

ITEM 285

Jackie bought a container to hold a plant. It was shaped like a cone with a height of 24 inches and a diameter of 12 inches. Approximately how much soil will the container hold?

- A. 864 cubic inches
- B. 904 cubic inches**
- C. 288 cubic inches
- D. 3617 cubic inches

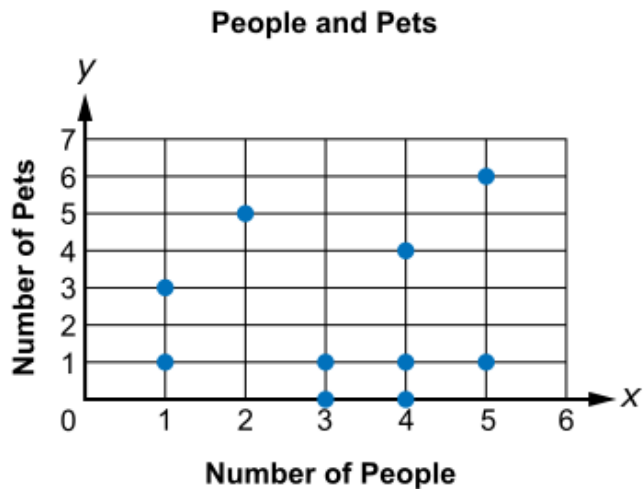
Statistics and Probability

8.SP.A.01

Items 286-298

ITEM 286

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.

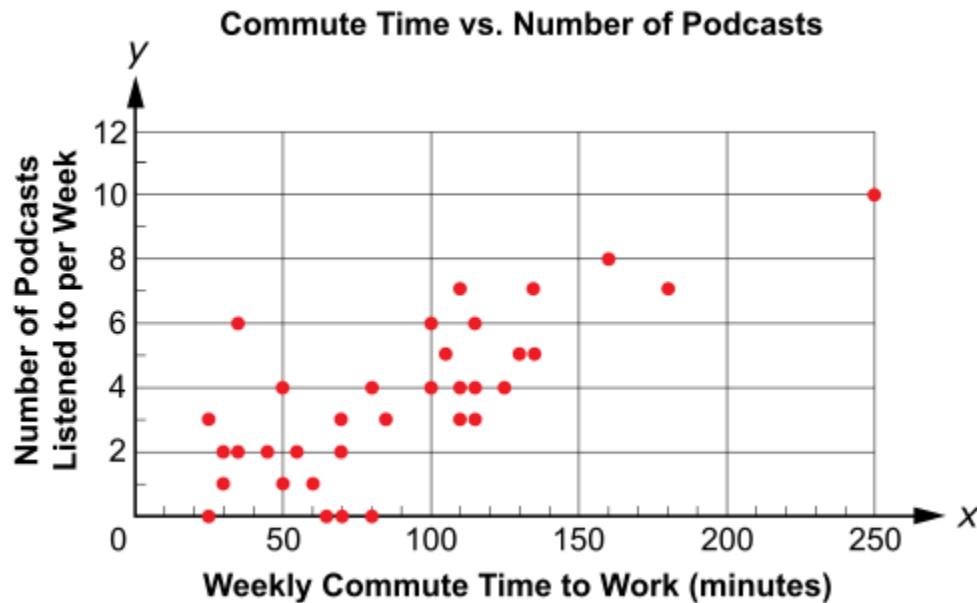


Which statement about the numbers of people and pets living in the homes of Misha's ten coworkers is true?

- 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 correlation between the numbers of people and pets living in the home.**

ITEM 287

Use the scatter plot to answer the question.



Maria wonders whether there is a relationship between the number of podcasts her coworkers listen to and the amount of time they spend commuting to work. She conducts a survey and records the results in the scatter plot.

Which statement accurately describes the relationship between the two quantities in Maria's scatter plot?

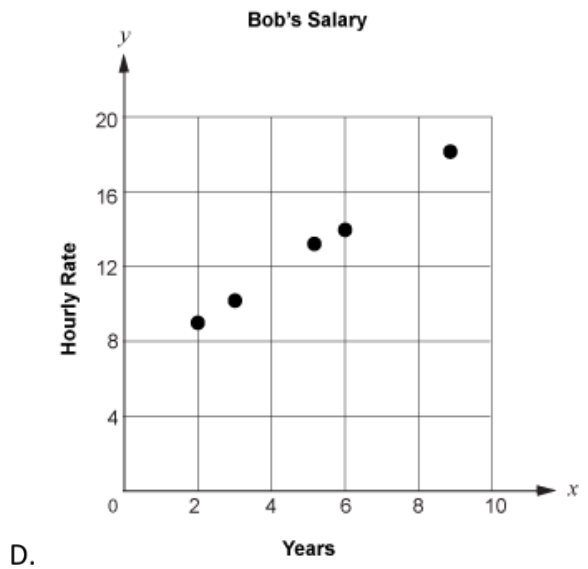
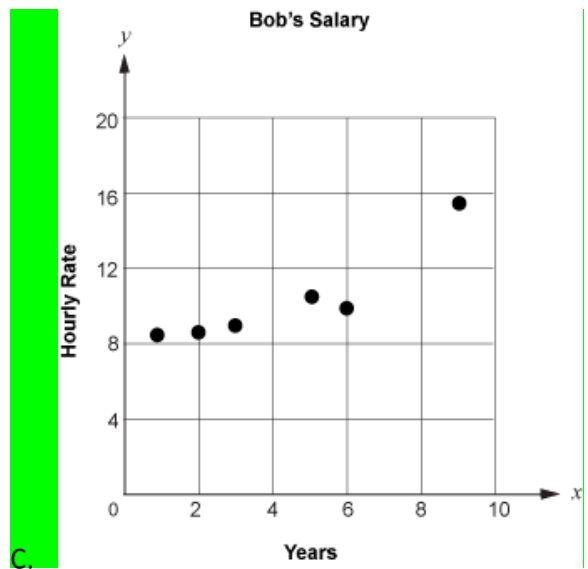
- A. The positive correlation in her scatter plot means that Maria's coworkers tend to listen to more podcasts as their commute time increases.
- B. The positive correlation in her scatter plot means that Maria's coworkers tend to listen to fewer podcasts as their commute time increases.
- C. Maria's scatter plot shows that there is no correlation between her coworkers' commute time and the number of podcasts they listen to.
- D. Some of her data shows a negative correlation and some of her data shows a positive correlation, so it is difficult for Maria to draw a conclusion.

ITEM 288

Which scatter plot **best** represents the data in the table below?

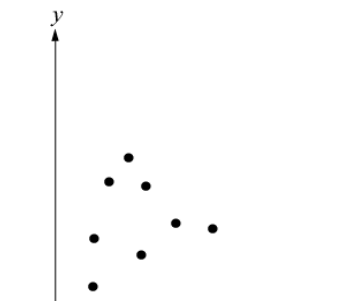
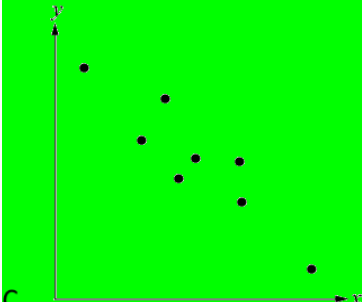
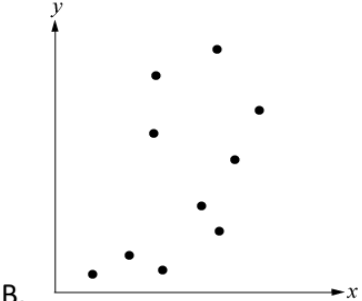
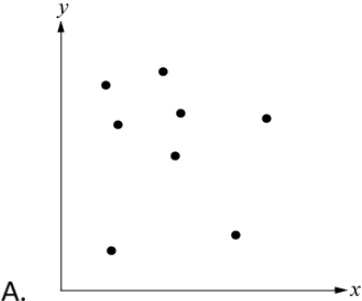
Employee Hourly Rates

Years of Employment	Hourly Pay Rate (\$)
6	9.85
2	8.50
1	8.25
9	15.65
5	10.50
3	9.00



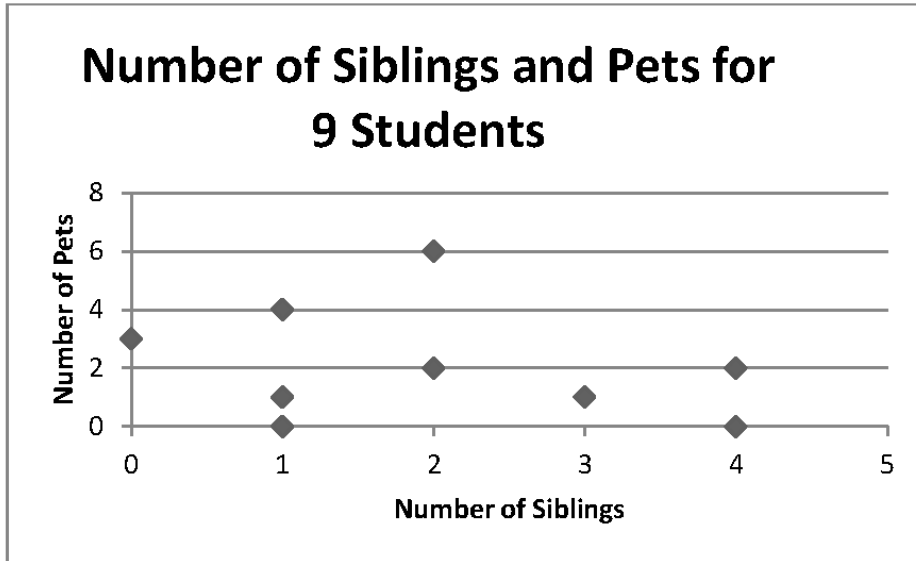
ITEM 289

Which scatter plot shows the most linear relationship?



ITEM 290

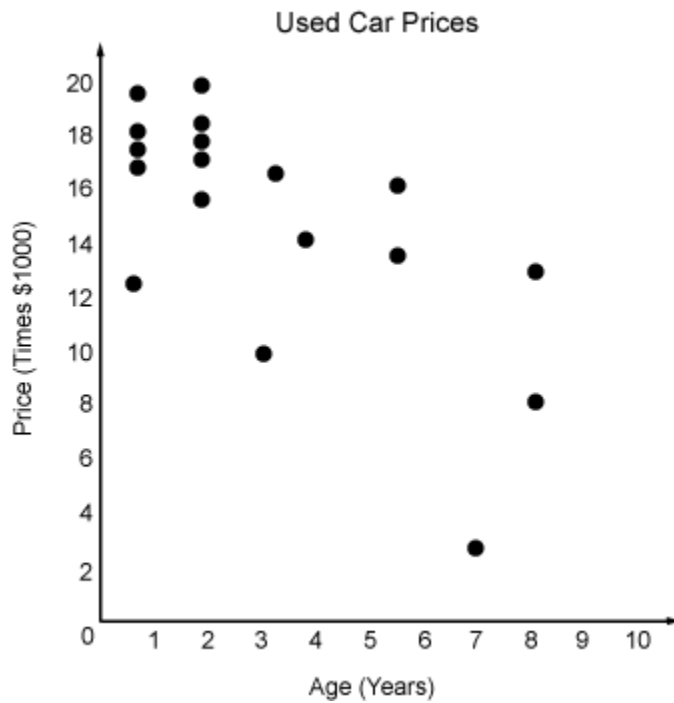
Tony made a scatter plot of the data showing the number of siblings and the number of pets for nine students. Based on the scatter plot, which statement is true?



- A. There is a positive, linear relationship between the number of siblings and the number of pets.
- B. There is a negative, linear relationship between the number of siblings and the number of pets.
- C. There is no relationship between the number of siblings and the number of pets.
- D. There is not enough information to determine whether a relationship exists.

ITEM 291

Use the scatter plot below to answer this question.

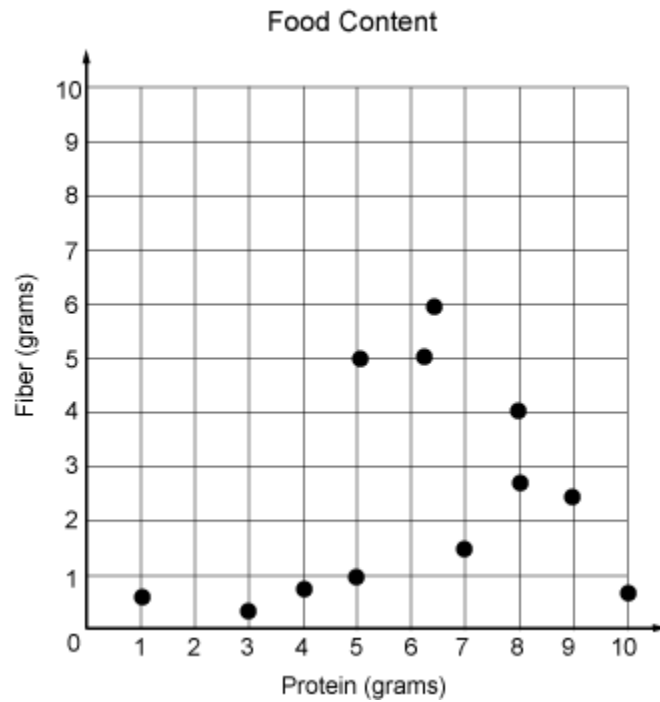


The scatter plot above shows the ages of used cars and their prices. Which statement is **best** supported by this data?

- A. Most used cars cost less than \$14,000.
- B. The oldest used car has the lowest price.
- C. Most used cars are less than 3 years old.
- D. The price of a used car steadily decreases with age.

ITEM 292

Use the scatter plot below to answer this question.

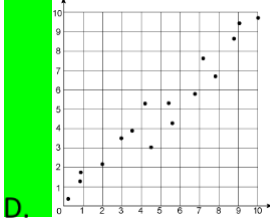
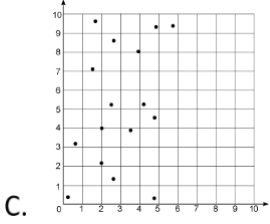
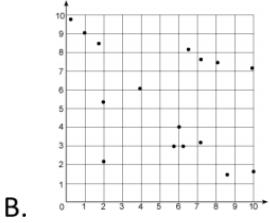
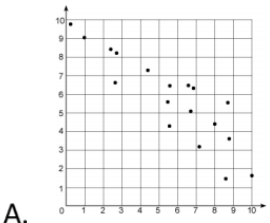


The scatter plot above shows the relationship between protein and fiber in certain foods. Which statement is true of the protein and fiber content in these foods?

- A. Most have close to 1 gram of protein.
- B. Most have more than 4 grams of fiber.
- C. Most have more grams of protein than fiber.
- D. Most have more grams of fiber than protein.

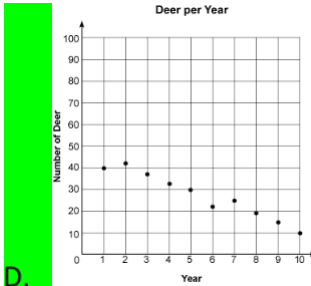
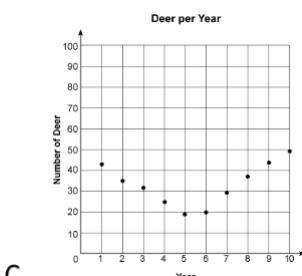
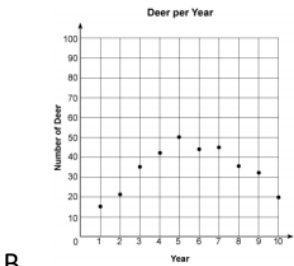
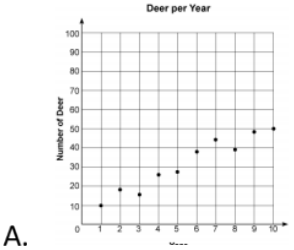
ITEM 293

Which scatterplot shows a positive trend?



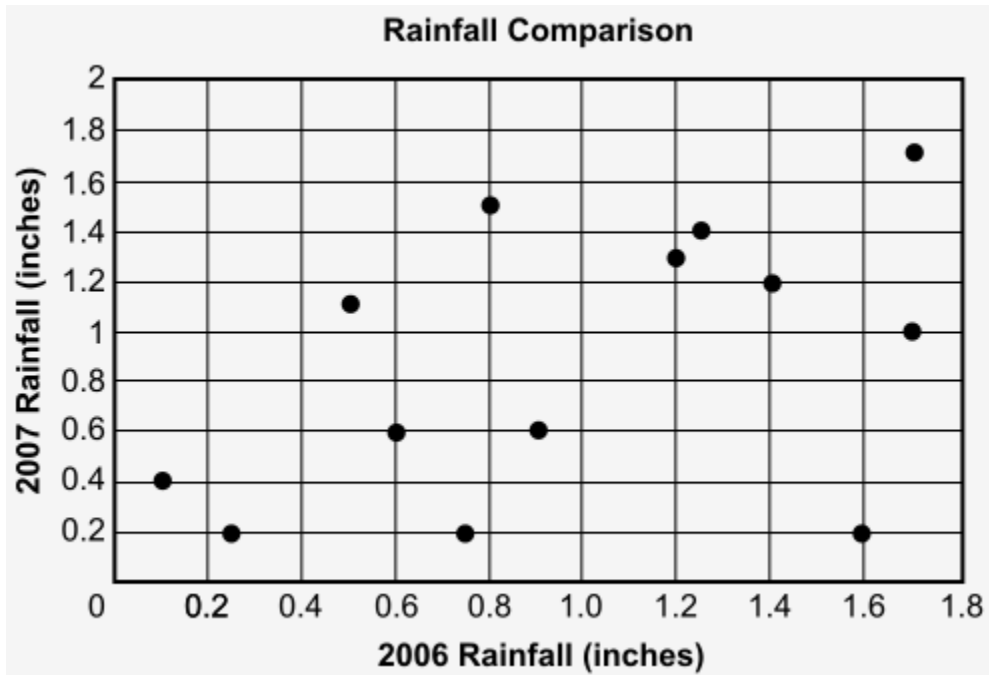
ITEM 294

Samantha records the number of deer she sees near her house each year. She notices a decreasing trend in the number of deer. Which scatterplot shows her data?



ITEM 295

George compared the amount of rainfall on ten different dates in 2006 to the amount of rainfall for the same dates in 2007.



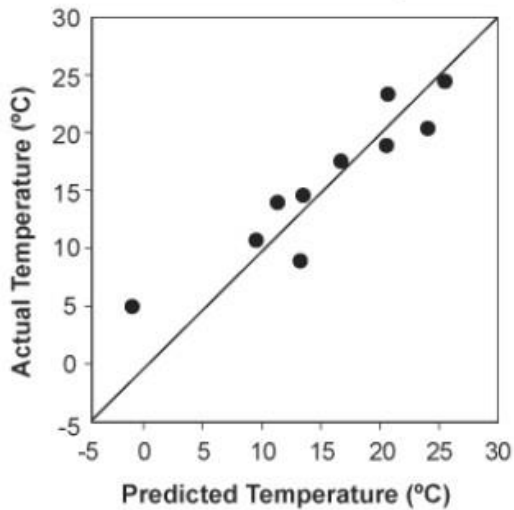
Which interpretation **best** describes the data shown on the scatterplot?

- A. The amount of rainfall in 2006 and the amount of rainfall in 2007 were the same.
- B. The amount of rainfall in 2006 had no relationship with the amount of rainfall in 2007.**
- C. As the amount of rainfall in 2006 increased, the amount of rainfall in 2007 decreased.
- D. As the amount of rainfall in 2006 changed, the amount of rainfall in 2007 remained the same.

ITEM 296

Tomás compared the temperatures predicted by a weather reporter with the actual temperatures for 10 days. Tomás recorded his data on this scatterplot.

Predicted Versus Actual Temperatures

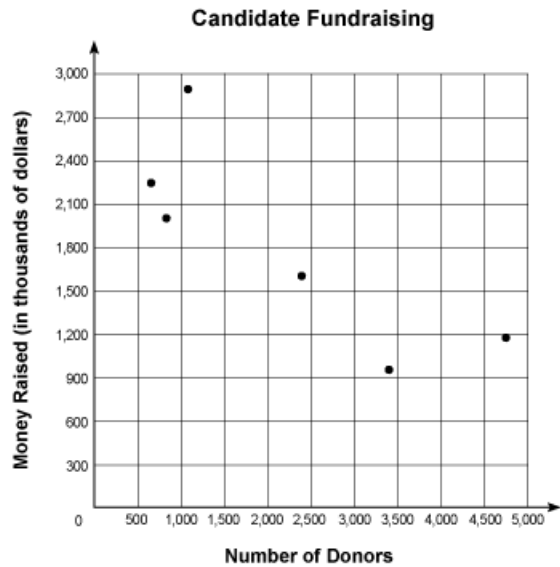


Which interpretation of the data best describes the relationship on the scatterplot?

- A. The predicted temperature increases when the actual temperature decreases.
- B. The predicted temperature is always greater than the actual temperature.
- C. The predicted temperature cannot be compared with the actual temperature.
- D. The predicted temperature is a reasonably accurate predictor of the actual temperature.**

ITEM 297

A public interest group tracked the amount of money raised by six presidential candidates. This scatterplot shows the data.



Based on the data, which conclusion is correct?

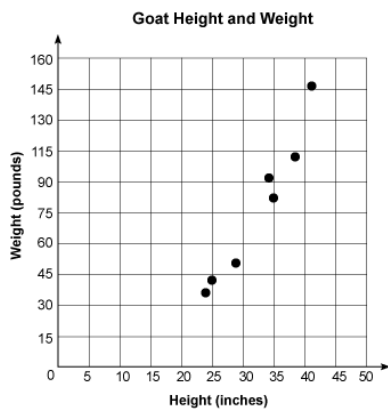
- A. Candidates with more donors tend to raise more money.
- B. Candidates with fewer donors tend to raise more money.**
- C. All candidates had about the same number of donors.
- D. All candidates raised about the same amount of money.

ITEM 298

Ms. Goldstein used this table to record the heights and weights of the goats on her farm.

Goat	Height (in inches)	Weight (in pounds)
Daisy	28	49
Herbert	24	35
Bouncer	42	137
Spotty	35	84
Mildred	38	110
Molly	25	42
Peg	41	146
Harry	34	93

Ms. Goldstein used the table to make this graph that compares the heights and weights of each goat.



Which sentence correctly explains the reason the graph does or does not accurately represent the data in the table?

- A. The graph is incorrect because the point for Bouncer is missing.
- B. The graph is incorrect because the point for Herbert is missing.
- C. The graph is incorrect because the point for Peg is missing.
- D. The graph is correct as it is.

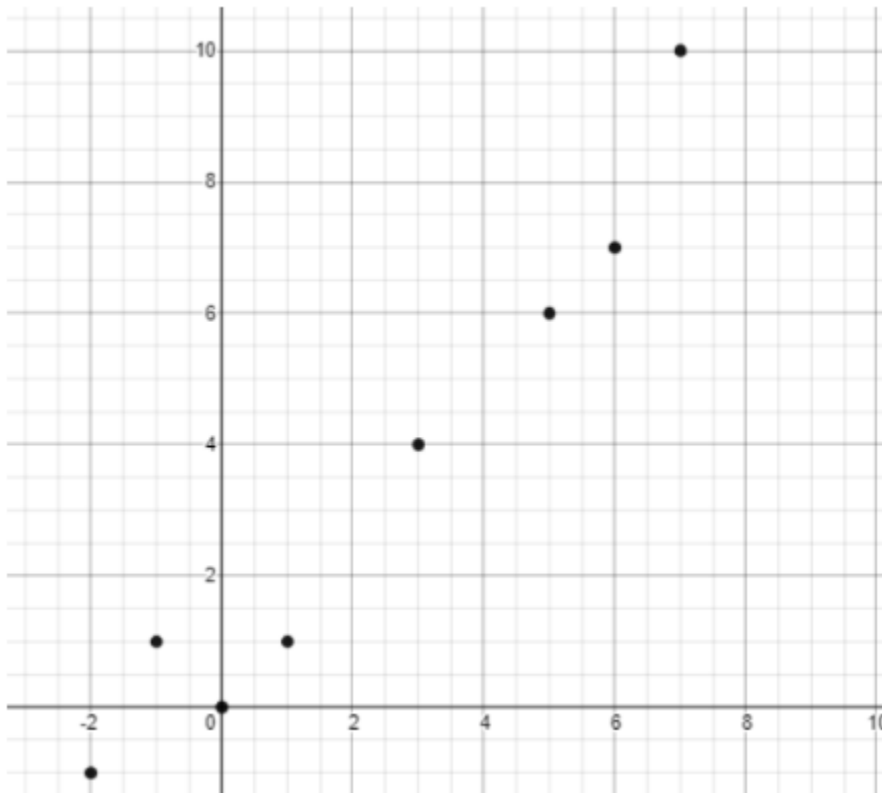
Statistics and Probability

8.SP.A.02

Items 299-301

ITEM 299

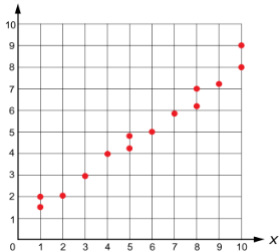
What type of line would be the best fit for this scatter plot?



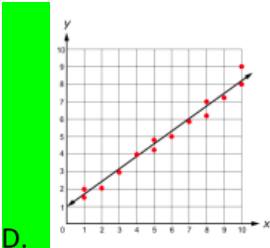
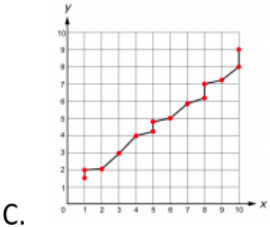
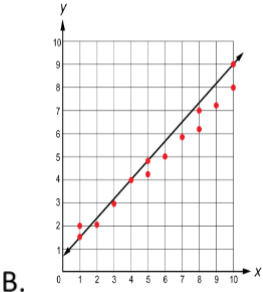
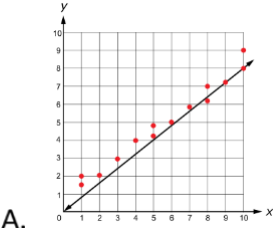
- A. A horizontal line
- B. A vertical line
- C. A positively sloping line
- D. A negatively sloping line

ITEM 300

Use the scatter plot to answer the question.

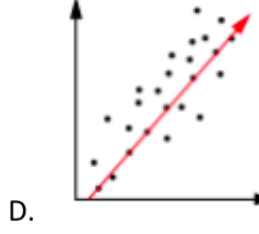
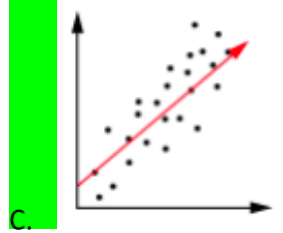
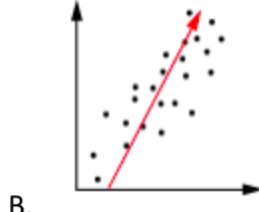
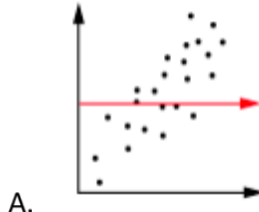
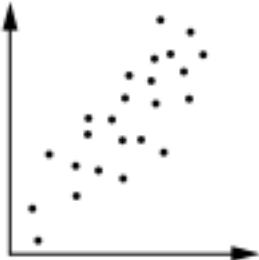


Which scatter plot shows the most accurate line of best fit?



ITEM 301

Which of these most closely approximates a line of best fit for the data in this scatter plot?



Statistics and Probability

8.SP.A.03

Items 302-304

ITEM 302

Tony records the number of miles on his odometer on his new car at the end of each week. He notices that the number of miles he drives (m) can be modeled by this equation, where w is the number of weeks he has been recording his mileage:

$$m = 48w + 53$$

Which statement accurately interprets this linear model?

- A. Tony drives approximately 48 miles per week.
- B. Tony drives approximately 53 miles per week.
- C. Tony has been recording his mileage for 48 weeks.
- D. Tony has been recording his mileage for 53 weeks.

ITEM 303

The equation $y = 50x + 150$ represents money Casey is saving from her paycheck and depositing in a savings account. What are the slope and the y -intercept, and what do they represent in this situation?

- A. The slope is 150 and it represents money in her account. The y -intercept is 50 and it represents money she is depositing from each paycheck.
- B. The slope is 50 and it represents money deposited into her account from each paycheck. The y -intercept is 150 and it represents money initially deposited into the savings account.
- C. The slope is undefined. The y -intercept is 150 and it represents money she is depositing into her account from each paycheck.
- D. The slope is 0 and it represents how much money she started with. The y -intercept is 150 and it represents how much she is depositing into her account from each paycheck.

ITEM 304

The movement of a snail on a sidewalk is represented by the equation $y = 0.5x + 2$, where y is the distance in inches, and x is the number of minutes. What are the slope and the y -intercept, and what do they represent in this situation?

A. The slope is 2 and it shows the snail moved 2 inches. The y -intercept is 0.5 and it shows the snail started at $\frac{1}{2}$ inch from the beginning of the sidewalk.

B. The slope is 0.5 and it shows the snail moving $\frac{1}{2}$ inch per minute. The y -intercept is 2 and it shows the snail started 2 inches from the beginning of the sidewalk.

C. The slope is 2 and it represents how fast the snail is moving. The y -intercept is 0 and it shows the snail started at the beginning of the sidewalk.

D. The slope is undefined. The y -intercept is $\frac{1}{2}$ and it shows how fast the snail is moving.

Statistics and Probability

8.SP.A.04

Items 305-309

ITEM 305

The table below shows how many times a cricket chirps per minute at various temperatures.

Temperature (F)	59	65	71	77
Number of chirps per minute	76	100	124	148

Choose the **three** true statements about the association between the two variables.

- A. The crickets chirp at faster rates as the temperature increases.
- B. For every 1 degree increase in temperature, the cricket chirps 4 more times per minute.
- C. There is no association between temperature and the number of chirps per minute.
- D. The association between temperature and chirps per minute is linear.
- E. The crickets do not stop chirping until the temperature drops to 0 degrees.

ITEM 306

One hundred eighth graders at Lincoln Middle School were surveyed and asked whether they read each night and whether they are on honor roll. Looking at the data in the table, select the **three** statements that are true.

	Read each night	Do Not Read at Night	Total
Honor roll	72	4	76
Not on Honor roll	12	12	24
Total	84	16	100

A. There does not appear to be any relationship between reading each night and making honor roll.

B. The relative frequency of student who read and make honor roll is 85.7%.

C. The relative frequency of students who read each night is 72%.

D. There is a positive association between students who read each night and students who make honor roll.

E. The relative frequency of students who do not read and are not honor roll students is 75%.

ITEM 307

Sally saved enough money from her job to buy a new bike. She immediately told 2 friends, who, ten minutes later, each repeated the news to 2 other friends. Ten more minutes later, these friends each told 2 others. The news continued to spread in this fashion.

Time in minutes	0	10	20	30	40	50	60
People told each time	2	4	8	16	32	64	128
Total	2	6	14	30	62	126	254

What is the relative frequency for the number of people told in 40 minutes?

- A. 32%
- B. 20%
- C. 52%
- D. 62%

ITEM 308

One hundred eighth grade students were polled about whether they have a curfew and whether they have at least a 2.5 grade point average. In looking at the data in the table below, tell which **three** statements are true.

	Curfew	No Curfew	Total
At least 2.5 average	65	5	70
Below 2.5 average	5	25	30
Total	70	30	100

- A. The relative frequency of students who have a curfew and at least a 2.5 GPA is about 93%.
- B. The relative frequency of students with no curfew who have at least a 2.5 GPA is $16\frac{2}{3}\%$.
- C. The total number of students who have a curfew is 65.
- D. The relative frequencies show that having a curfew makes it more likely that a student will have at least a 2.5 GPA.
- E. Five percent of the student have a GPA below 2.5.

ITEM 309

One hundred students were asked whether they have siblings and whether they have pets. Looking at the data in the table, select **two** statements that are true.

	Has Siblings	No Siblings	Total
Has Pets	55	20	75
No Pets	5	20	25
Total	60	40	100

- A. The relative frequency of students who have pets is 60%.
- B. The relative frequency of student with no siblings and no pets is 50%.**
- C. The relative frequency of students who have no pets is 25%.**
- D. There is no association between having siblings and having pets.
- E. The relative frequency of students who have siblings is 75%.