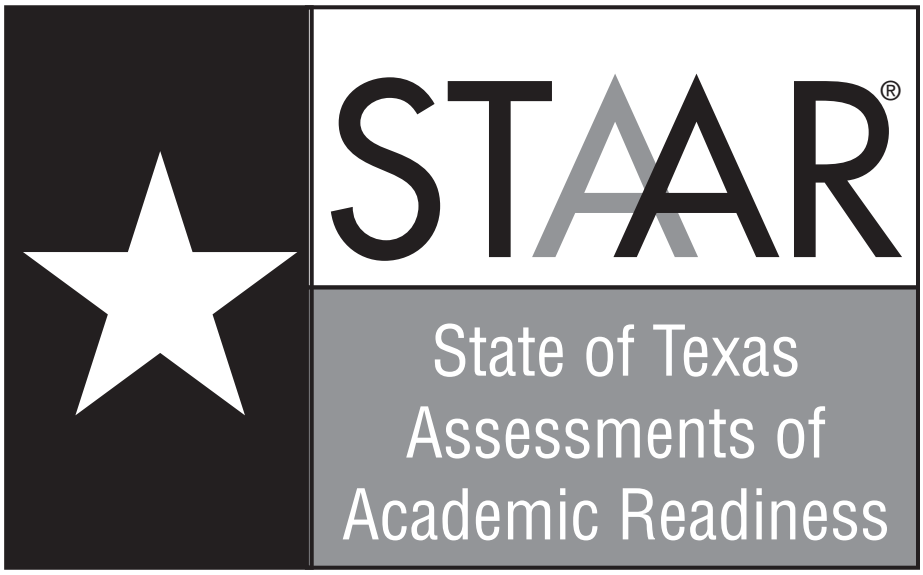


GRADE 8

Mathematics

Administered April 2019

RELEASED

Copyright © 2019, Texas Education Agency. All rights reserved. Reproduction of all or portions of this work is prohibited without express written permission from the Texas Education Agency.

STAAR GRADE 8 MATHEMATICS REFERENCE MATERIALS

STAAR® State of Texas Assessments of Academic Readiness

LINEAR EQUATIONS

Slope-intercept form	$y = mx + b$
Direct variation	$y = kx$
Slope of a line	$m = \frac{y_2 - y_1}{x_2 - x_1}$

CIRCUMFERENCE

Circle	$C = 2\pi r$	or	$C = \pi d$

AREA

Triangle	$A = \frac{1}{2}bh$
Rectangle or parallelogram	$A = bh$
Trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$
Circle	$A = \pi r^2$

SURFACE AREA

	Lateral	Total
Prism	$S = Ph$	$S = Ph + 2B$
Cylinder	$S = 2\pi rh$	$S = 2\pi rh + 2\pi r^2$

VOLUME

Prism or cylinder	$V = Bh$
Pyramid or cone	$V = \frac{1}{3}Bh$
Sphere	$V = \frac{4}{3}\pi r^3$

ADDITIONAL INFORMATION

Pythagorean theorem	$a^2 + b^2 = c^2$
Simple interest	$I = Prt$
Compound interest	$A = P(1 + r)^t$

MATHEMATICS

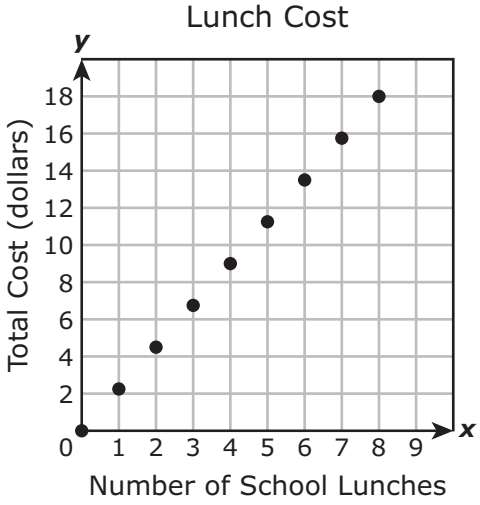
DIRECTIONS

Read each question carefully. For a multiple-choice question, determine the best answer to the question from the four answer choices provided. For a griddable question, determine the best answer to the question. Then fill in the answer on your answer document.

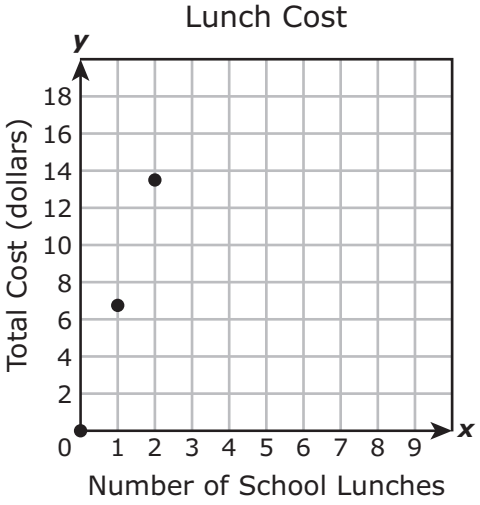
1 Oscar buys his lunch in the school cafeteria. The cost of 15 school lunches is $33.75.

Which graph has a slope that best represents the average cost of the lunches in dollars per lunch?

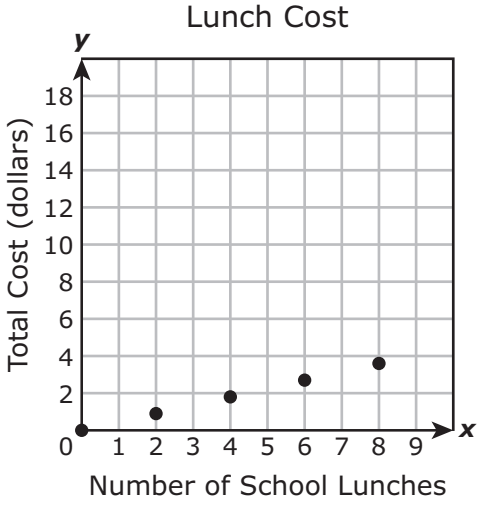
A



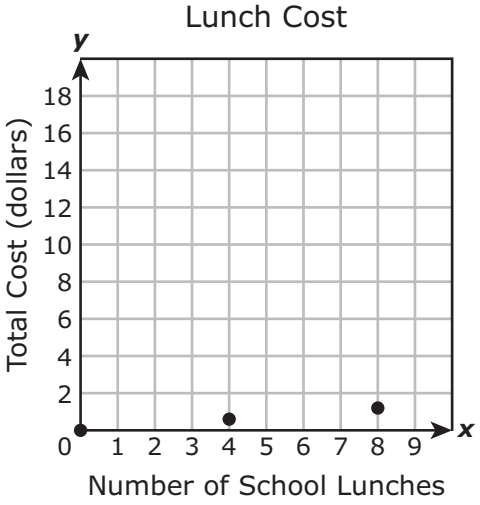
C



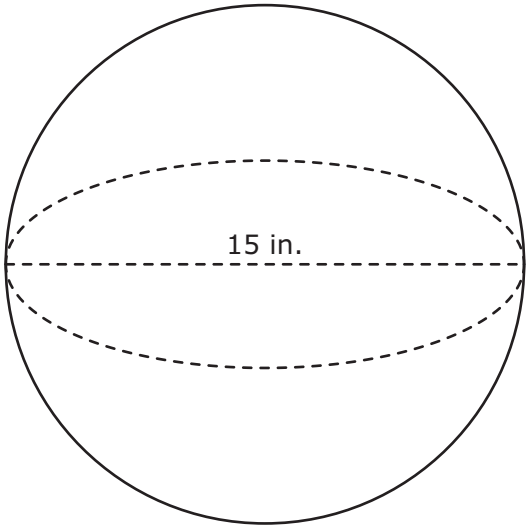
B



D



2 A sphere and its dimension are shown in the diagram.



Which measurement is closest to the volume of the sphere in cubic inches?

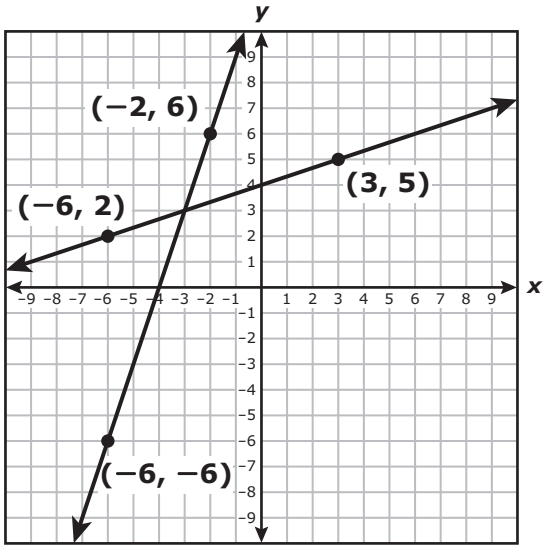
F 1,325.4 $in.^3$

G 188.5 $in.^3$

H 94.2 $in.^3$

J 1,767.1 $in.^3$

3 The two lines graphed on the coordinate grid each represent an equation.



Which ordered pair represents a solution to both equations?

A (−4, 0)

B (−3, 3)

C (3, −3)

D (0, 4)

4 Figure I and Figure II are similar figures.

Figure I

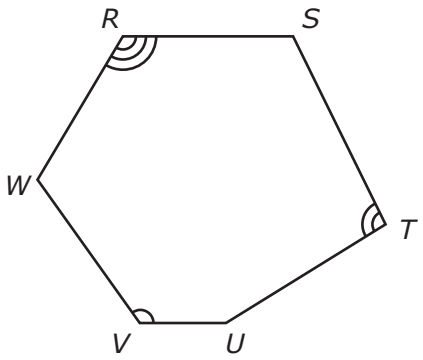
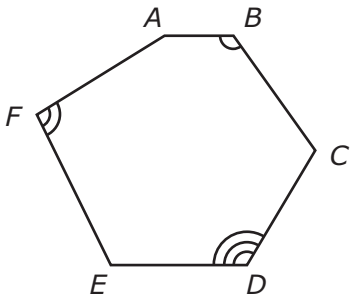


Figure II



Which proportion must be true?

F $\frac{RS}{AB} = \frac{TU}{CD}$

G $\frac{TU}{AB} = \frac{UV}{AF}$

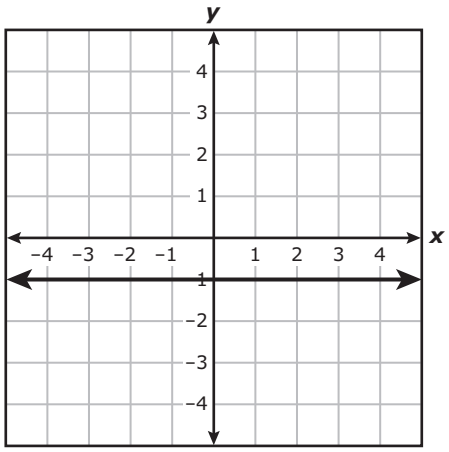
H $\frac{ST}{EF} = \frac{WR}{CD}$

J $\frac{WV}{AB} = \frac{ST}{EF}$

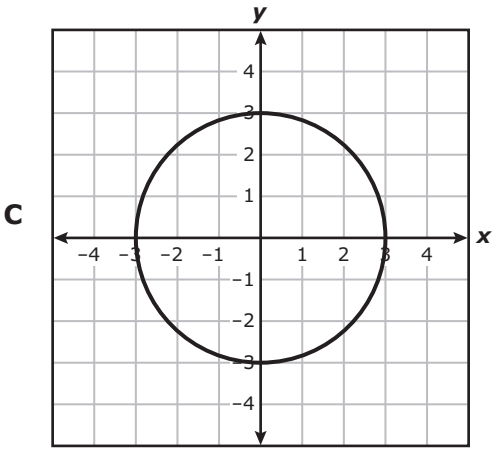
GO ON

5 Which graph represents y as a function of x?

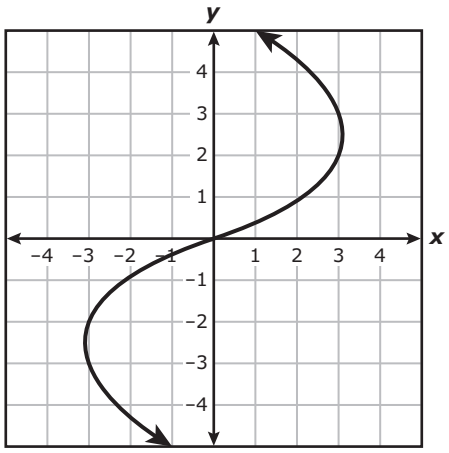
A



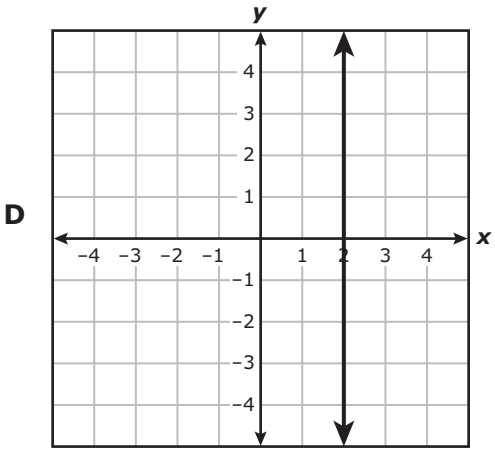
C



B



D



GO ON

6 A polygon will be dilated on a coordinate grid to create a smaller polygon. The polygon is dilated using the origin as the center of dilation.

Which rule could represent this dilation?

F $(x, y) \rightarrow (0.5 - x, 0.5 - y)$

G $(x, y) \rightarrow (x - 7, y - 7)$

H $(x, y) \rightarrow (\frac{5}{4}x, \frac{5}{4}y)$

J $(x, y) \rightarrow (0.9x, 0.9y)$

7 Aquarium I contains 4.6 gallons of water. Louise will begin filling Aquarium I at a rate of 1.2 gallons per minute.

Aquarium II contains 54.6 gallons of water. Isaac will begin draining Aquarium II at a rate of 0.8 gallon per minute.

After how many minutes will both aquariums contain the same amount of water?

A 148 min

B 125 min

C 25 min

D 50 min

---

8 The width of a rectangle is 4 feet, and the diagonal length of the rectangle is 13 feet. Which measurement is closest to the length of this rectangle in feet?

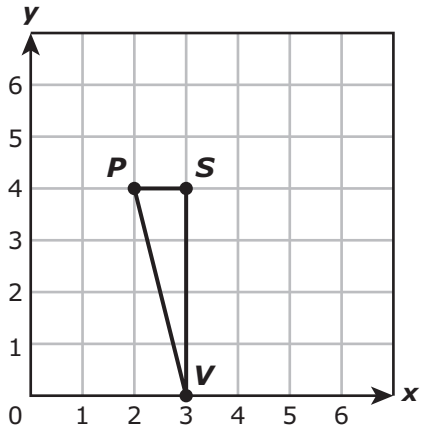
F 9 ft

G 17 ft

H 12.4 ft

J 13.6 ft

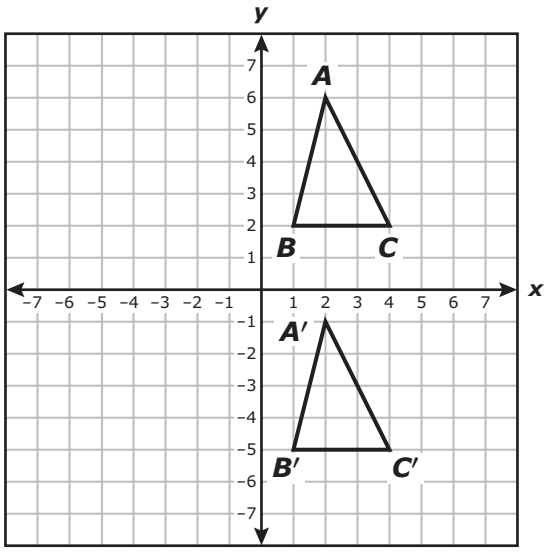
9 Triangle *PSV* is shown on the coordinate grid. The coordinates of each vertex of the triangle are integers.



What is the slope of $\overline{PV}$?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

10 Triangle *ABC* was transformed to create triangle *A′B′C′*.



Which rule best describes this transformation?

F $(x, y) \rightarrow (x, y - 7)$

G $(x, y) \rightarrow (x, -y)$

H $(x, y) \rightarrow (x - 7, y)$

J $(x, y) \rightarrow (-x, y)$

---

11 Two customers took out loans from a bank.

- Henry took out a 4-year loan for $5,000 and paid 4.2% annual simple interest.
- Ingrid took out a 6-year loan for $5,000 and paid 3.9% annual simple interest.

What is the difference between the amounts of interest Henry and Ingrid paid for their loans?

A $417

B $150

C $60

D $330

12 A coach is ordering shirts for a team.

- The coach pays a one-time fee of $24.
- The coach also pays $8 for each shirt ordered.

Which function can be used to find c, the total amount the coach pays in dollars when k shirts are ordered?

F $c = 8k + 32$

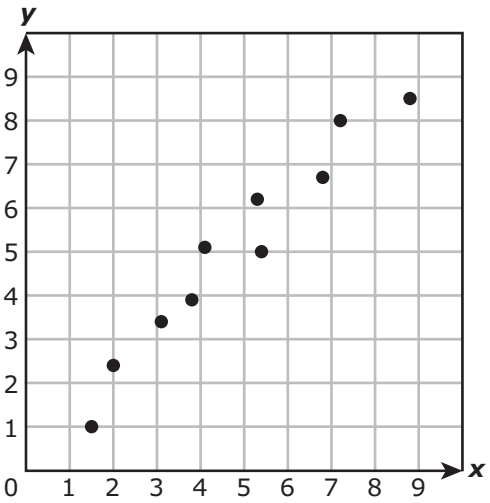
G $c = 8k + 24$

H $c = 32k + 8$

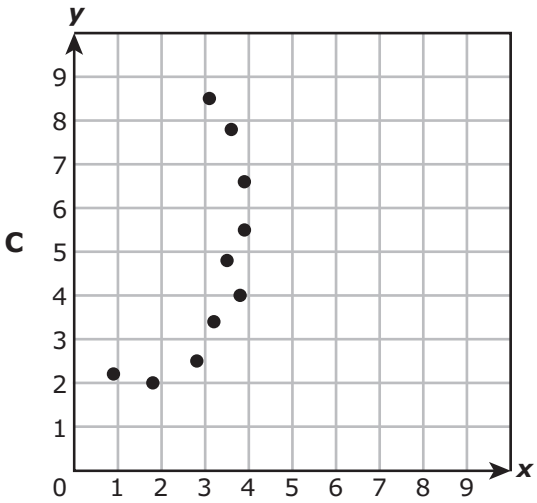
J $c = 24k + 8$

13 Which scatterplot does NOT suggest a linear relationship between x and y?

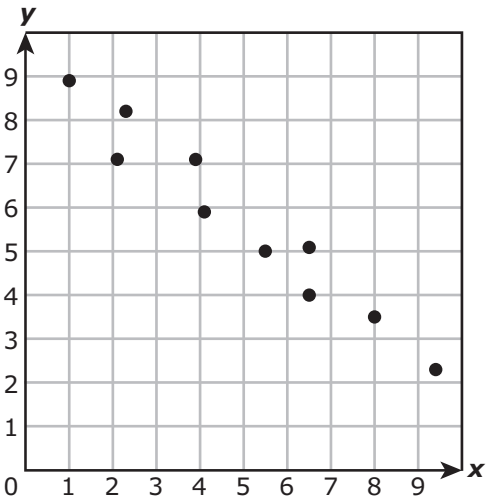
A



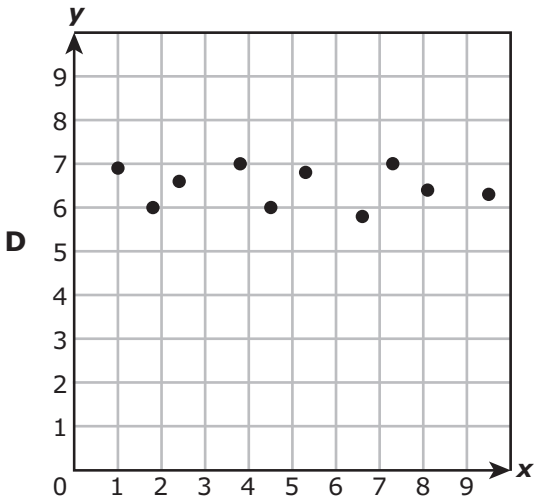
C



B



D



GO ON

14 What value of x makes this equation true?

$$12x - 15 = 6 - 3x$$

F $\frac{7}{3}$

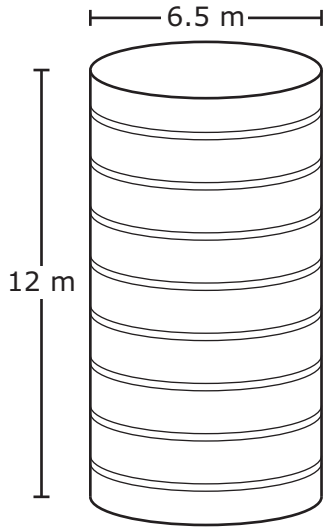
G $\frac{3}{7}$

H $\frac{5}{7}$

J $\frac{7}{5}$

---

15 A silo is a building shaped like a cylinder used to store grain. The diameter of a particular silo is 6.5 meters, and the height of the silo is 12 meters.



Which equation can be used to find V, the volume of this silo in cubic meters?

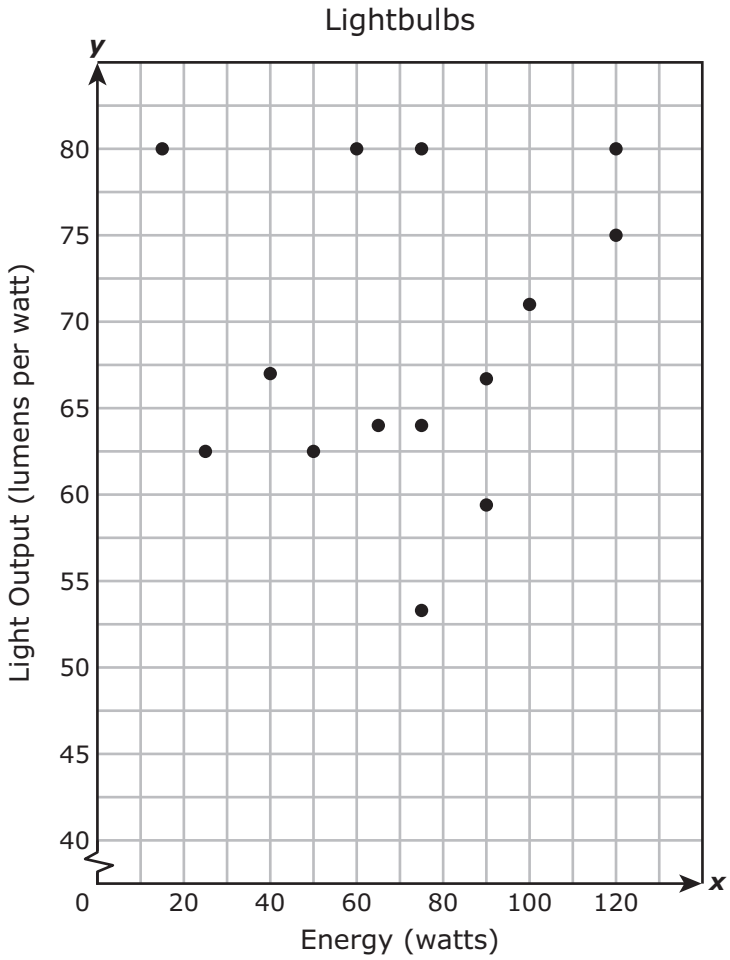
A $V = \pi(3.25)^2(12)$

B $V = \pi(6.5)^2(12)$

C $V = \pi(12)^2(3.25)$

D $V = \pi(6)^2(6.5)$

16 The scatterplot shows the energy in watts and the light output in lumens per watt of several lightbulbs.



Which statement best describes the association between the energy and light output of these lightbulbs?

F As the energy increases, the light output increases.

G As the energy increases, the light output decreases.

H As the energy increases, the light output remains the same.

J There is no apparent association between the energy and light output.

17 The table shows the completion times of four runners in a race.

Race Times

Runner	Time (seconds)
Joe	$12\frac{1}{2}$
Ellen	12.09
Steve	$12\frac{2}{5}$
Patty	12.8

Which list shows the runners in order by their completion times from fastest to slowest?

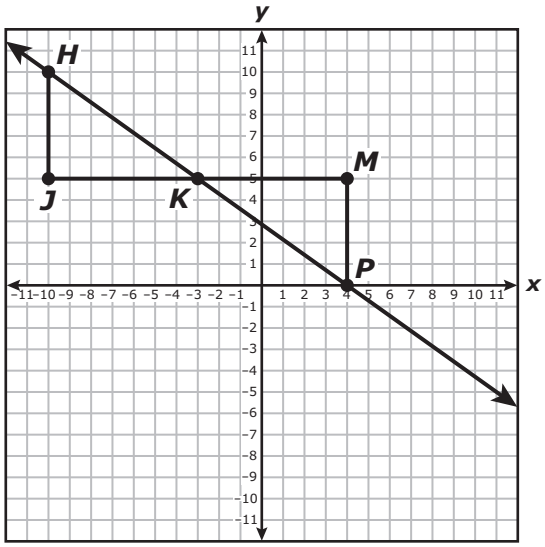
A Patty, Joe, Steve, Ellen

B Ellen, Joe, Steve, Patty

C Ellen, Steve, Joe, Patty

D Patty, Steve, Joe, Ellen

18 Triangle *HJK* and triangle *PMK* are similar right triangles. The coordinates of all the vertices are integers.



Which statement is true about the slope of $\overline{HK}$ and the slope of $\overline{PK}$?

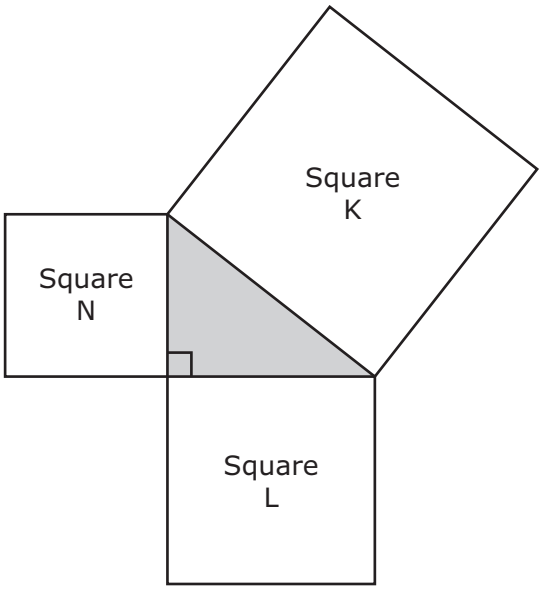
F The slope of $\overline{HK}$ is less than the slope of $\overline{PK}$, because the ratio of the change in *y*-values of the endpoints to the change in *x*-values of the endpoints is less for $\overline{HK}$ than it is for $\overline{PK}$.

G The slope of $\overline{HK}$ is equal to the slope of $\overline{PK}$, because the ratio of the change in *y*-values of the endpoints to the change in *x*-values of the endpoints is the same for $\overline{HK}$ as it is for $\overline{PK}$.

H The slope of $\overline{HK}$ is greater than the slope of $\overline{PK}$, because the ratio of the change in *y*-values of the endpoints to the change in *x*-values of the endpoints is greater for $\overline{HK}$ than it is for $\overline{PK}$.

J The relationship between the slope of $\overline{HK}$ and the slope of $\overline{PK}$ cannot be determined, because the triangles are congruent.

19 The diagram shows three squares that are joined at vertices to form a right triangle.



Which statement is true?

A The sum of the areas of Square N and Square L is equal to the area of Square K.

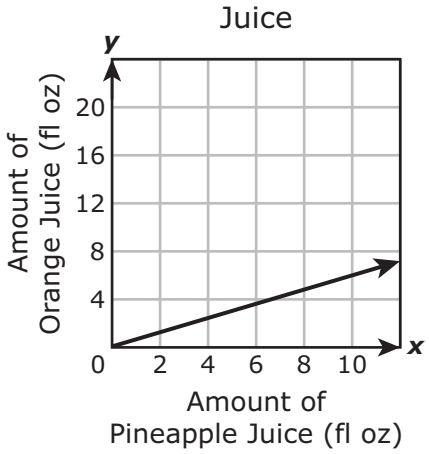
B The sum of the areas of Square N and Square L is greater than the area of Square K.

C The sum of the areas of Square N and Square K is equal to the area of Square L.

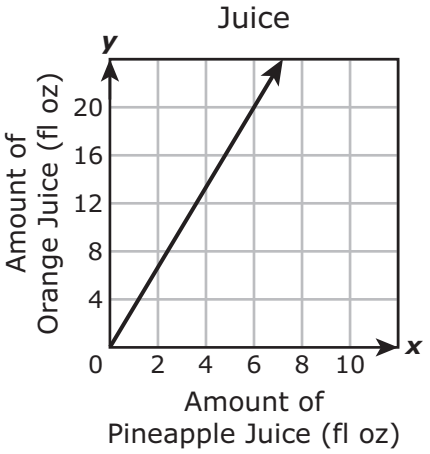
D The sum of the areas of Square N and Square K is less than the area of Square L.

20 A bottle contains 30 fluid ounces of orange juice and 18 fluid ounces of pineapple juice. Which graph has a slope that best represents the ratio of orange juice to pineapple juice in this bottle?

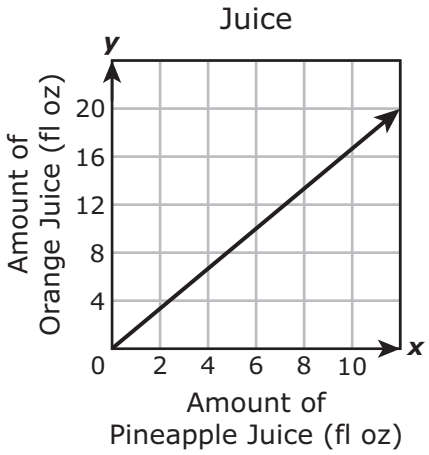
F



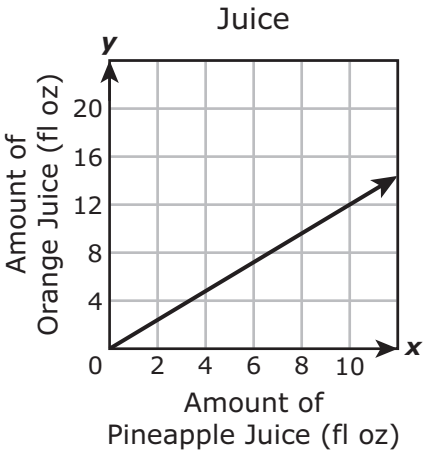
H



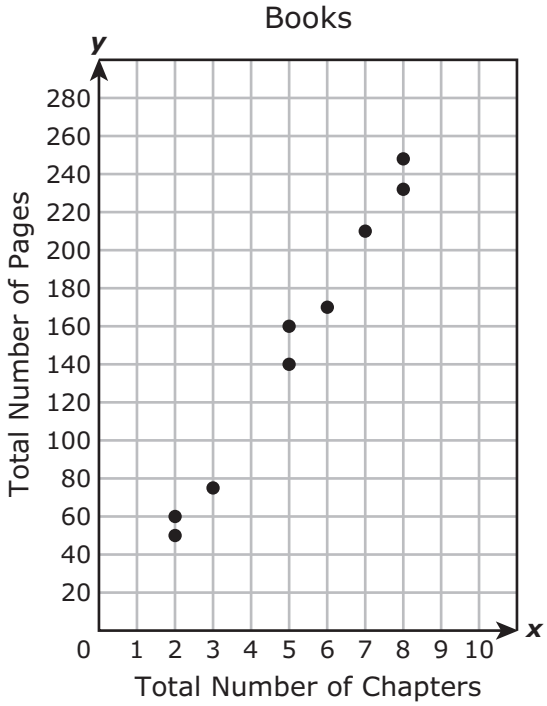
G



J



21 Students recorded the total number of pages and chapters in each of several books on the scatterplot.



Based on the scatterplot, which is the best prediction of the total number of pages in a book with 4 chapters?

A 150 pages

B 140 pages

C 90 pages

D 120 pages

22 Quadrilateral *KMPT* is dilated by a scale factor of $\frac{3}{4}$ to create quadrilateral *K′M′P′T′*. The perimeter of quadrilateral *KMPT* is *x* units.

What is the perimeter in units of quadrilateral *K′M′P′T′*?

F *x* units

G $\frac{3}{4}x$ units

H $\left(\frac{3}{4}\right)^2 x$ units

J $\frac{4}{3}x$ units

---

23 Mr. Jenkins deposited $1,250 into an account. He made no additional deposits or withdrawals. Mr. Jenkins earned 4.25% annual simple interest on the money in the account.

What was the balance in dollars and cents in Mr. Jenkins's account at the end of 4 years?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

24 A polygon is graphed on a coordinate grid with (x, y) representing the location of a certain point on the polygon. The polygon is transformed using the rule $(x, y) \rightarrow (ax, ay)$.

Which statement must be true?

F If a is greater than 1, the image of the polygon is congruent to the polygon.

G If a is between 0 and 1, the image of the polygon is congruent to the polygon.

H If a is greater than 1, the image of the polygon is smaller than the polygon.

J If a is between 0 and 1, the image of the polygon is smaller than the polygon.

---

25 At a store each notebook has a cost of x dollars. Which situation can be represented by this inequality?

$$5x < 3x + 2$$

A The cost of 5 notebooks is greater than the cost of 3 notebooks plus a $2 pen.

B The cost of 5 notebooks is less than the cost of 3 notebooks with a $2-off coupon.

C The cost of 5 notebooks is less than the cost of 3 notebooks plus a $2 pen.

D The cost of 5 notebooks is $2 greater than the price of 3 notebooks.

---

26 A can in the shape of a cylinder has a diameter of 6 centimeters and a height of 10 centimeters. Which measurement is closest to the total surface area of the can in square centimeters?

F 603.19 cm^2

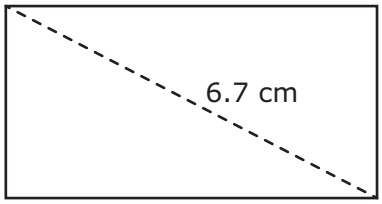
G 245.04 cm^2

H 376.99 cm^2

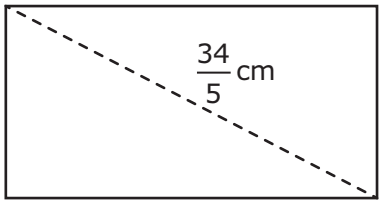
J 188.50 cm^2

27 The diagonal lengths of three rectangles are shown. The rectangles are not drawn to scale.

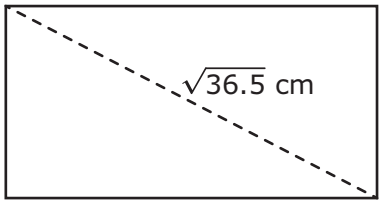
Rectangle P



Rectangle S



Rectangle T



Which list shows the rectangles in order by their diagonal lengths from shortest to longest?

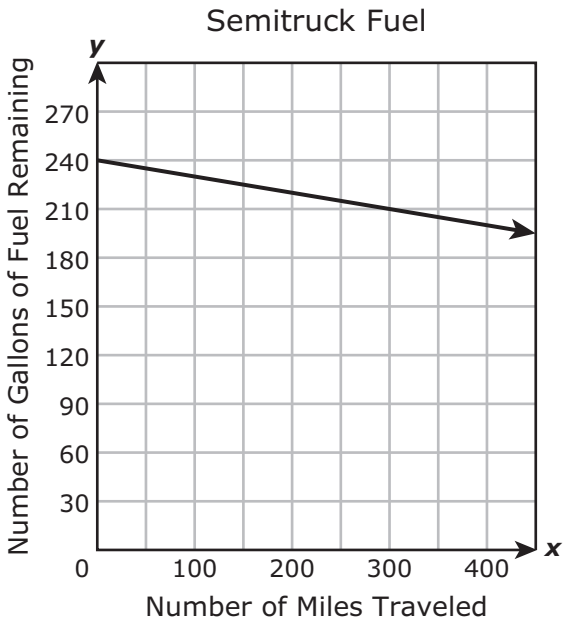
A Rectangle T, Rectangle S, Rectangle P

B Rectangle T, Rectangle P, Rectangle S

C Rectangle S, Rectangle T, Rectangle P

D Rectangle S, Rectangle P, Rectangle T

28 The graph shows the relationship between the number of gallons of fuel remaining in the tank of a semitruck and the number of miles traveled by the semitruck.



Which function can be used to find y, the number of gallons of fuel remaining in the tank of the semitruck after it has traveled x miles?

F $y = 240x - 30$

G $y = -\frac{1}{6}x + 240$

H $y = 240x - 10$

J $y = -\frac{1}{10}x + 240$

---

29 The density of oxygen is 0.001429 grams per cubic centimeter. How is this number written in scientific notation?

A 1.429×10^{3}

B 1.429×10^{2}

C 1.429×10^{-3}

D 1.429×10^{-2}

30 Helen had $330 in her savings account when Vince opened a savings account with zero dollars.

- Helen deposited $30 into her account each week for x weeks.
- Vince deposited $50 into his account each week for x weeks.
- The accounts did not earn interest.

Which inequality represents this situation when the amount of money in Helen's account was greater than the amount of money in Vince's account?

F $30x < 330 + 50x$

G $50x > 330 + 30x$

H $30x > 330 + 50x$

J $50x < 330 + 30x$

---

31 The height of a cylinder is 5 centimeters. The circumference of the base of the cylinder is 16π centimeters.

Which measurement is closest to the volume of the cylinder in cubic centimeters?

A 251.3 cm^3

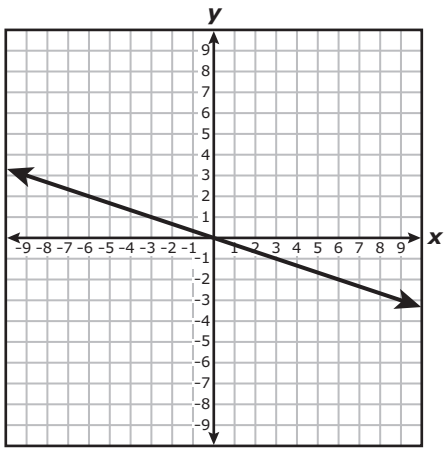
B 4,021.2 cm^3

C 1,005.3 cm^3

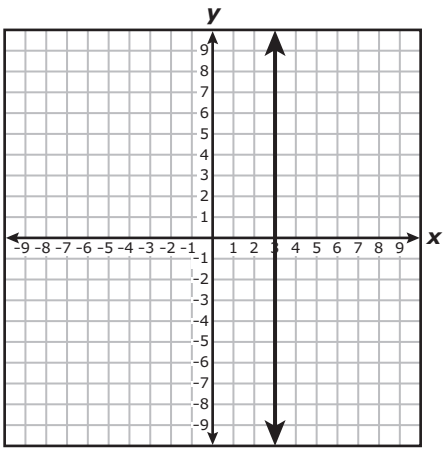
D 628.3 cm^3

32 Which graph appears to show a proportional relationship between x and y?

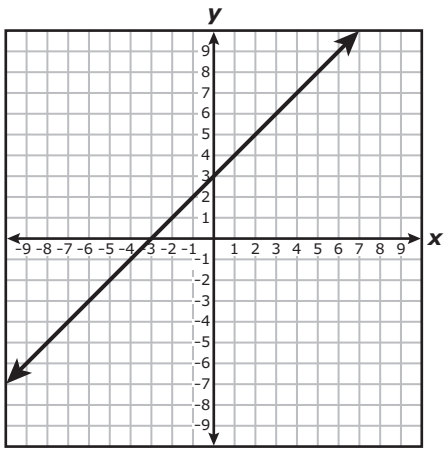
F



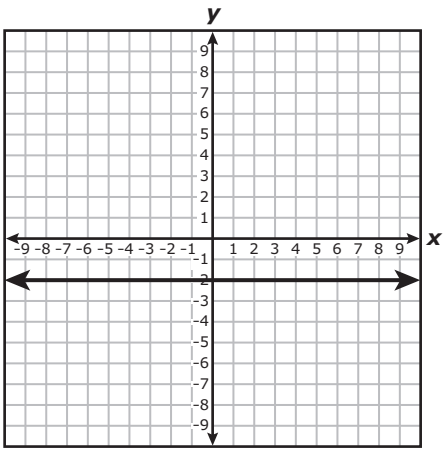
H



G

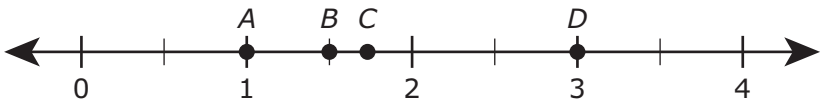


J



---

33 The points on the number line represent the values of four different numbers.



Which point best represents the value of $\sqrt{3}$?

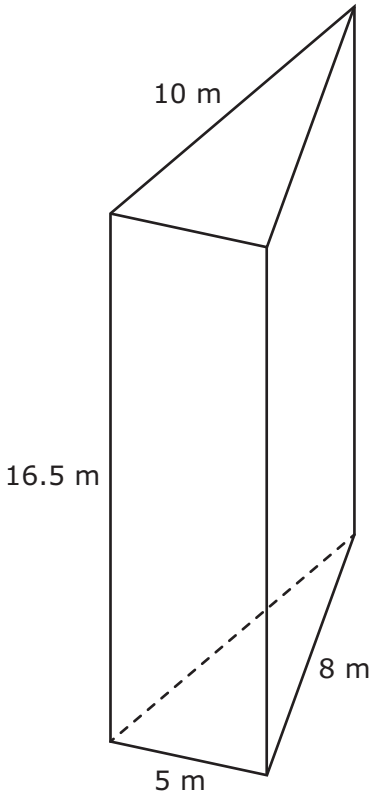
A Point A

B Point B

C Point C

D Point D

34 The side lengths of the base of a triangular prism are 5 meters, 8 meters, and 10 meters. The height of the prism is 16.5 meters.



What is the lateral surface area of the prism in square meters?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

35 The table shows the linear relationship between the number of hours Francis worked, x, and the amount of money Francis earned, y.

Francis's Earnings

Number of Hours Worked	1.25	3.75	5.5
Amount Earned	$17.50	$52.50	$77.00

Based on the table, how much did Francis earn per hour?

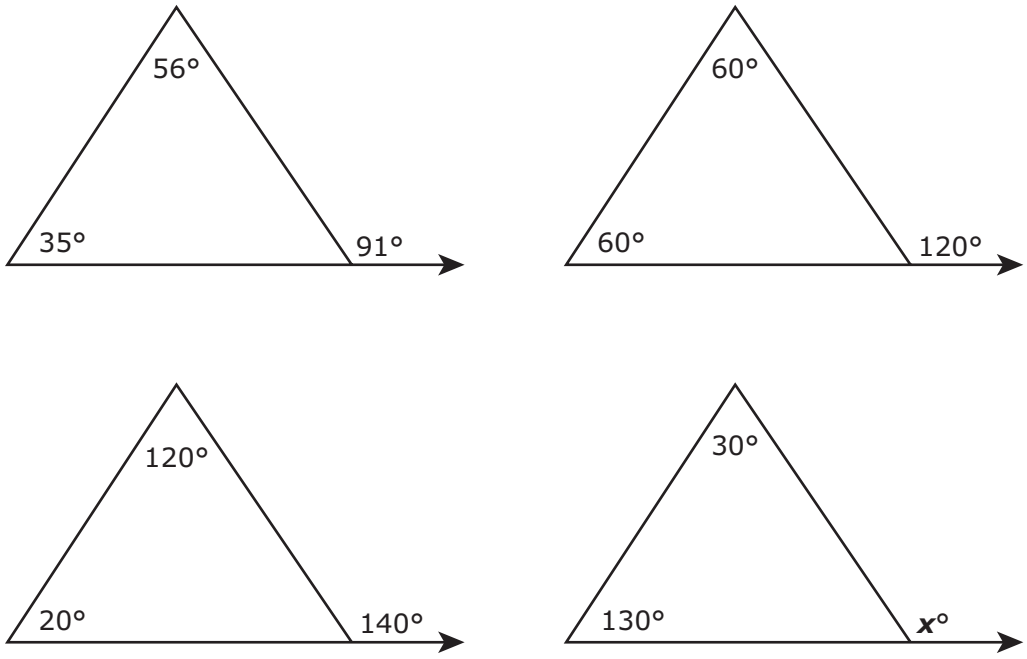
A $17.50 per hour

B $14.00 per hour

C $35.00 per hour

D $24.50 per hour

36 Four triangles are shown. One side of each triangle lies on a ray, and the triangles are not drawn to scale.



Based on these triangles, which statement about x is true?

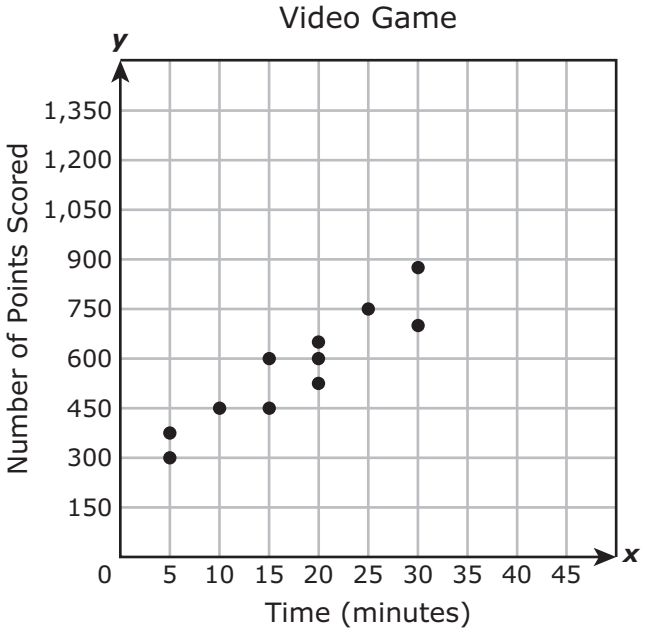
F $x = 160$, because $180 - (130 + 30) = 20$ and $180 - 20 = 160$

G $x = 20$, because $130 + 30 = 160$ and $180 - 160 = 20$

H $x = 80$, because $180 - 130 = 50$ and $50 + 30 = 80$

J $x = 340$, because $130 + 30 = 160$ and $160 + 180 = 340$

37 The scatterplot shows the time spent playing a video game and the number of points scored by several students.



Based on the scatterplot, which is the best prediction of the number of points scored by a student who spends 45 minutes playing the video game?

A 1,200

B 920

C 1,060

D 1,300

38 The length of a rectangular frame is 15 inches, and the width of the frame is 8 inches. What is the length of a diagonal of this frame in inches?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

GO ON

39 Which set of ordered pairs represents y as a function of x?

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

B $\{(0, 0), (1, 1), (2, 4), (3, 9), (3, 16)\}$

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

D $\{(0, 0), (-1, -0.5), (-2, -1), (-3, -1.5), (-4, -2)\}$

---

40 Gabriel deposits $2,500 into each of two savings accounts.

- Account I earns 4% annual simple interest.
- Account II earns 4% interest compounded annually.

Gabriel does not make any additional deposits or withdrawals. What is the sum of the balances of Account I and Account II at the end of 3 years?

F $5,600.00

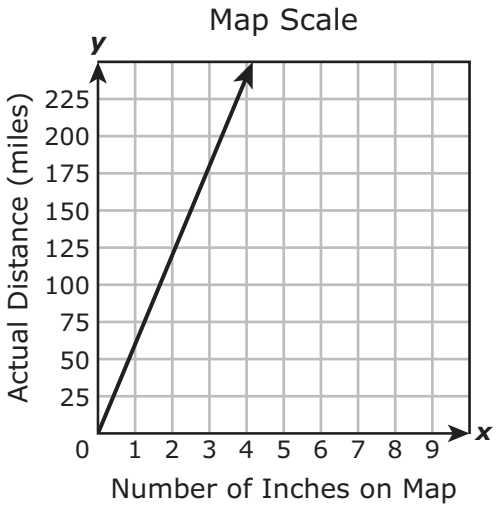
G $5,612.16

H $5,624.32

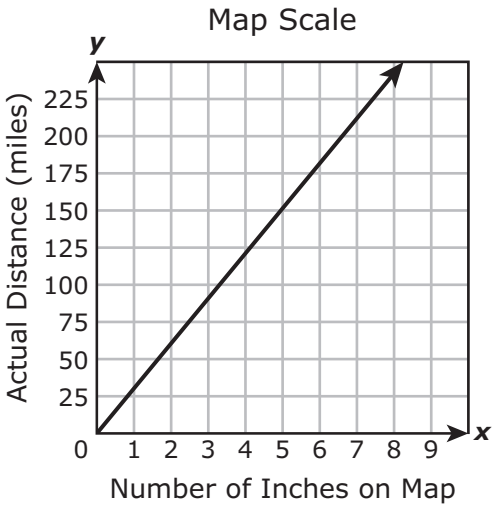
J $5,200.00

41 On a map scale, 2 inches represents 60 miles. Which graph best shows the relationship between x, the number of inches on the map, and y, the actual distance in miles?

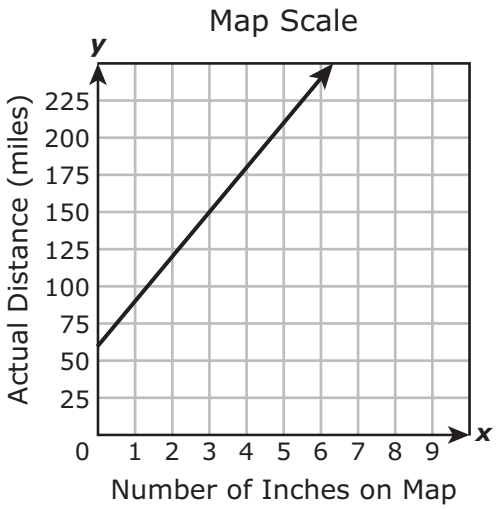
A



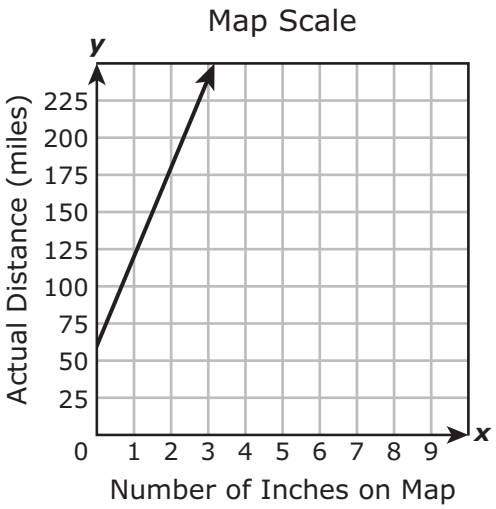
C



B



D



42 Quadrilateral *PQRS* was translated 5 units to the right and 3 units up to create quadrilateral *P′Q′R′S′*. Which rule describes this transformation?

F $(x, y) \rightarrow (x - 5, y - 3)$

G $(x, y) \rightarrow (x + 5, y + 3)$

H $(x, y) \rightarrow (x - 3, y - 5)$

J $(x, y) \rightarrow (x + 3, y + 5)$

BE SURE YOU HAVE RECORDED ALL OF YOUR ANSWERS ON THE ANSWER DOCUMENT.

STOP

STAAR
GRADE 8
Mathematics
April 2019