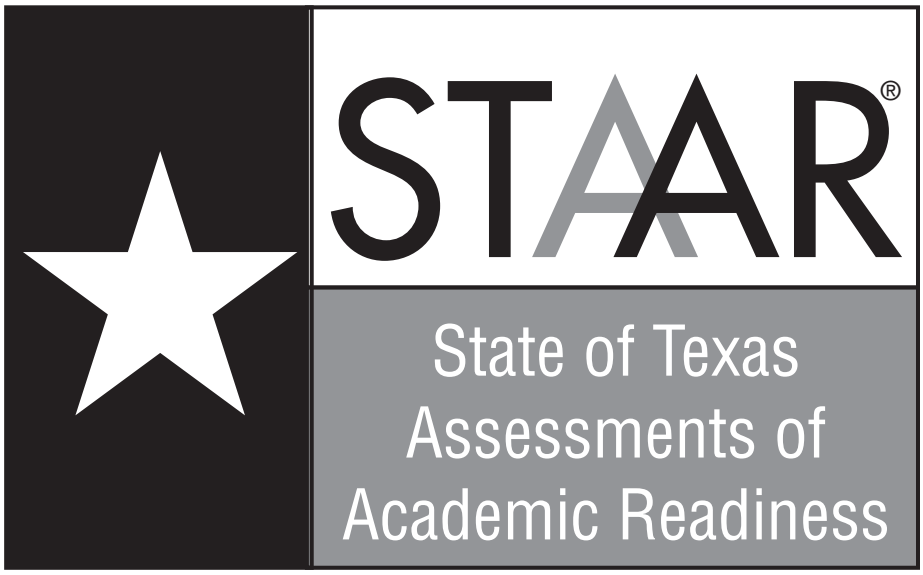

GRADE 8

Mathematics

Administered March 2017

RELEASED

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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	$A = P(1 + r)^t$

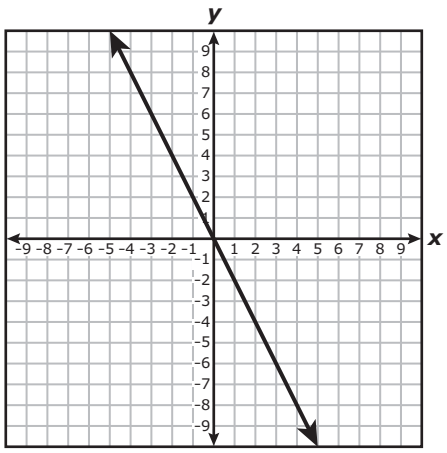
MATHEMATICS

DIRECTIONS

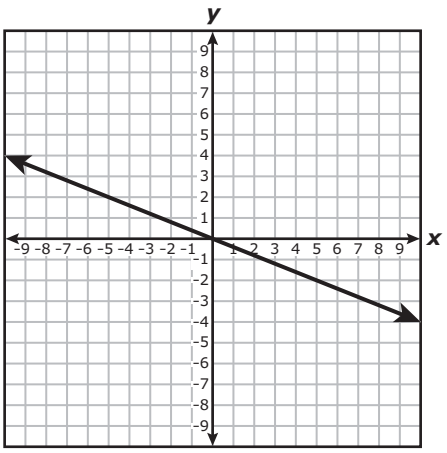
Read each question carefully. For a multiple-choice question, determine the best answer to the question from the four answer choices provided. For a griddable question, determine the best answer to the question. Then fill in the answer on your answer document.

1 Which graph shows a non-proportional linear relationship between *x* and *y*?

A



C



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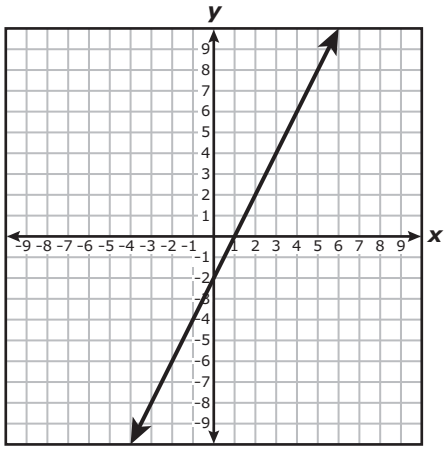

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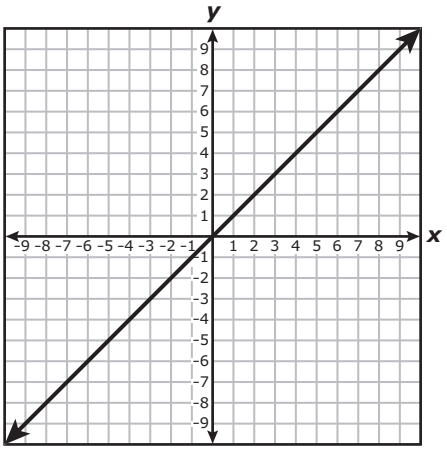
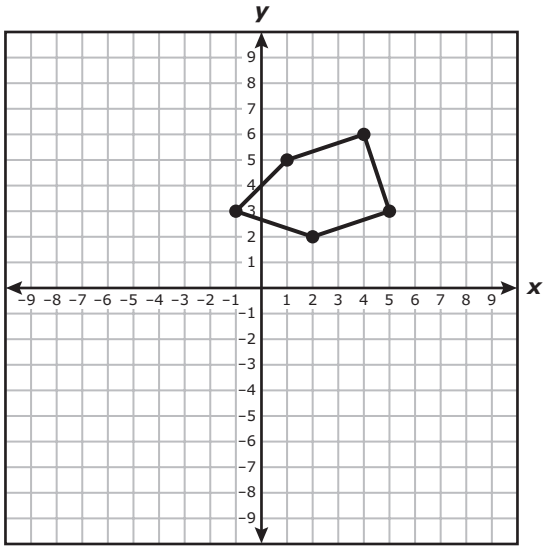


2 The coordinate grid shows a pentagon. The pentagon is translated 1 unit to the left and 10 units down to create a new pentagon.



Which rule describes this transformation?

F $(x, y) \rightarrow (x - 1, y - 10)$

G $(x, y) \rightarrow (x + 1, y - 10)$

H $(x, y) \rightarrow (x - 1, y + 10)$

J $(x, y) \rightarrow (x + 1, y + 10)$

3 Two numbers are shown on the number line.

Which value is NOT located between these two numbers on the number line?

A π

B $\sqrt{9}$

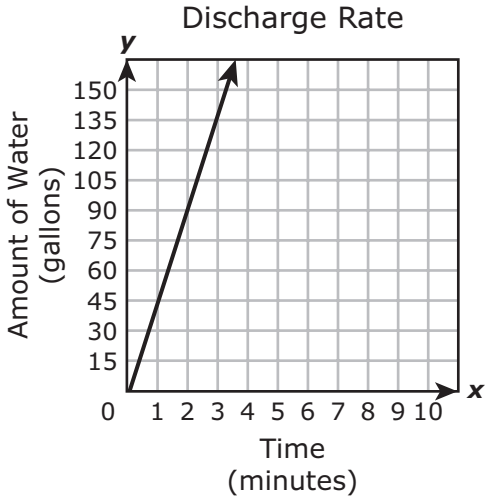
C $\frac{\pi}{9}$

D $\frac{\pi^2}{9}$

GO ON

4 A water hose discharges water at a rate of 45 gallons per minute. Which graph has a slope that best represents this rate?

F



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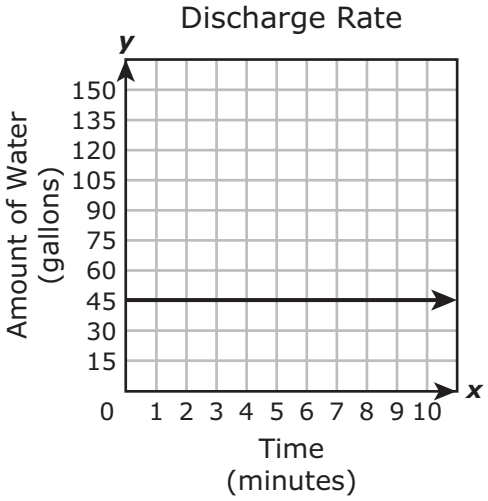
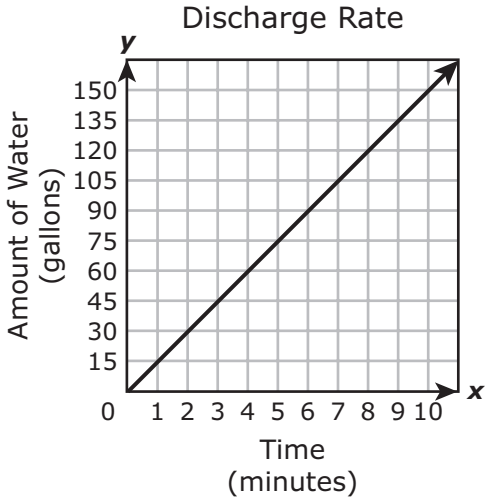
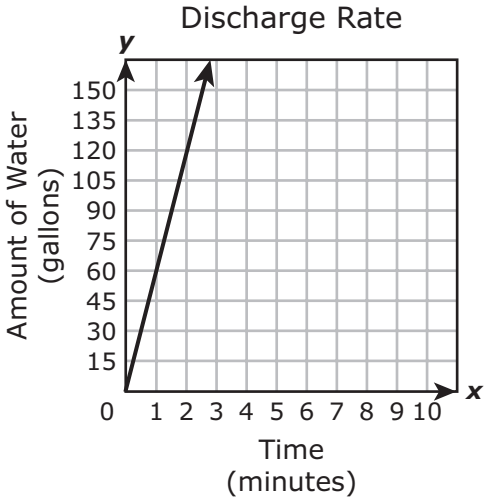


G



J



GO ON

5 Triangle *MNP* is graphed on a coordinate grid with vertices at $M\,(-3, -6)$, $N\,(0, 3)$ and $P\,(6, -3)$. Triangle *MNP* is dilated by a scale factor of u with the origin as the center of dilation to create triangle $M'N'P'$.

Which ordered pair represents the coordinates of the vertex P'?

A $(6 + u, -3 + u)$

B $(\frac{6}{u}, -\frac{3}{u})$

C $(6 + \frac{1}{u}, -3 + \frac{1}{u})$

D $(6u, -3u)$

GO ON

6 The table shows the number of gallons of gasoline in a car's gas tank after the car has been driven x miles.

Gasoline Usage

Miles Driven, x	Gallons of Gasoline in Tank, y
0	15
10	14.6
20	14.2
35	13.6
60	12.6
75	12

When these data are graphed on a coordinate grid, the points all lie on the same line. What are the slope and y-intercept of this line?

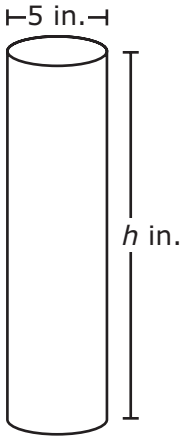
F Slope $= \frac{1}{25}$, y-intercept $= 375$

G Slope $= -\frac{1}{25}$, y-intercept $= 15$

H Slope $= 25$, y-intercept $= 375$

J Slope $= -25$, y-intercept $= 15$

7 A cylinder and its dimensions are shown in the diagram.



Which equation can be used to find V, the volume of the cylinder in cubic inches?

A $V = \pi(2.5h)^2$

B $V = \pi(5h)^2$

C $V = \pi(2.5)^2h$

D $V = \pi(5)^2h$

8 The approximate volume in milliliters, m, for a volume of f fluid ounces is equal to 29.57 times the value of f. Which table represents this relationship?

F

Liquid Volume

Fluid Ounces, f	Milliliters, m
29.57	1
59.14	2
88.71	3
118.28	4

H

Liquid Volume

Fluid Ounces, f	Milliliters, m
0	29.57
1	59.14
2	88.71
3	118.28

G

Liquid Volume

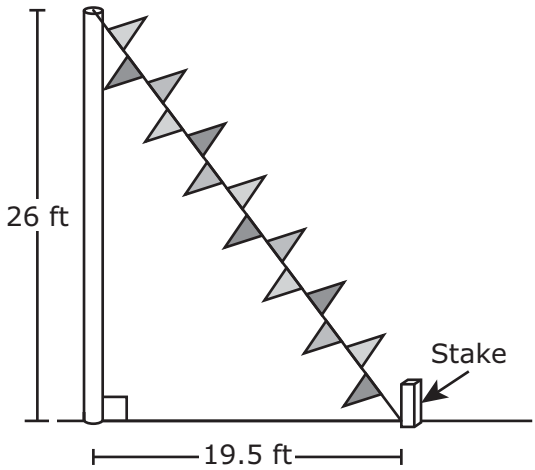
Fluid Ounces, f	Milliliters, m
29.57	0
59.14	1
88.71	2
118.28	3

J

Liquid Volume

Fluid Ounces, f	Milliliters, m
1	29.57
2	59.14
3	88.71
4	118.28

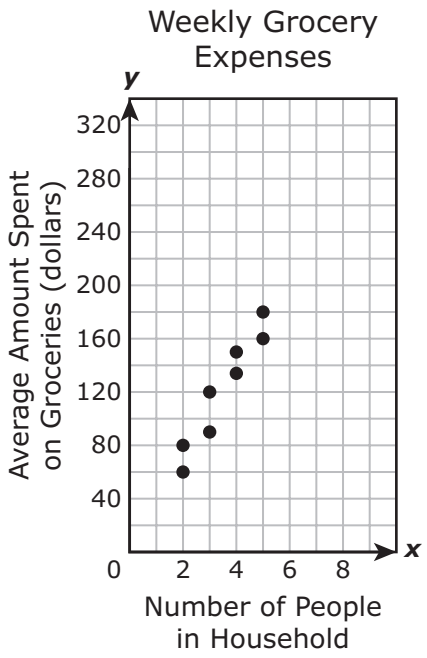
9 The manager of a car dealership wants to attach a rope with flags to the top of a pole and to a stake in the ground, as shown in the diagram.



Based on the diagram, what is the distance in feet from the top of the pole to the bottom of the stake?

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

10 The scatterplot shows the number of people in each of 8 different households and the average amount of money each household spent on groceries.



Based on the scatterplot, what is the best prediction of the average amount of money spent on groceries for a household that has 7 people?

F $240

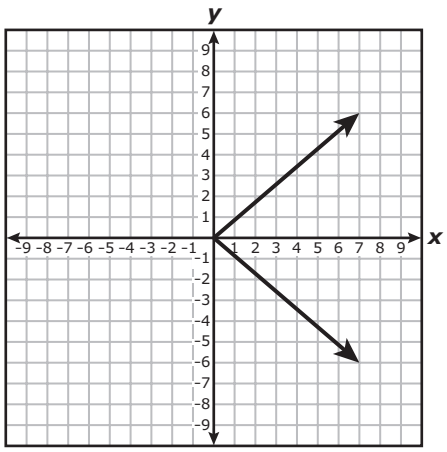
G $190

H $210

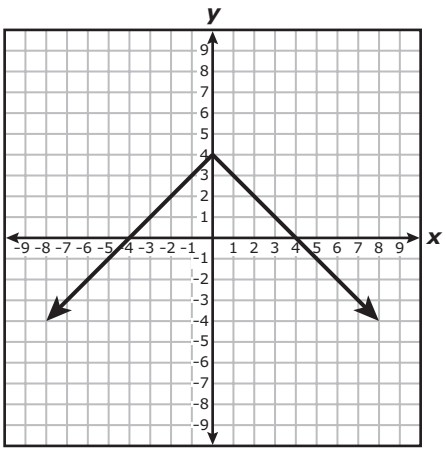
J $300

11 Which graph does NOT represent y as a function of x?

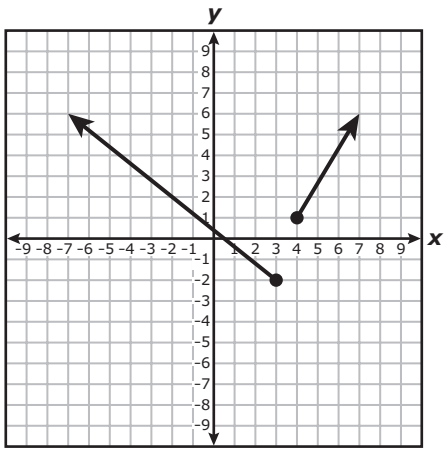
A



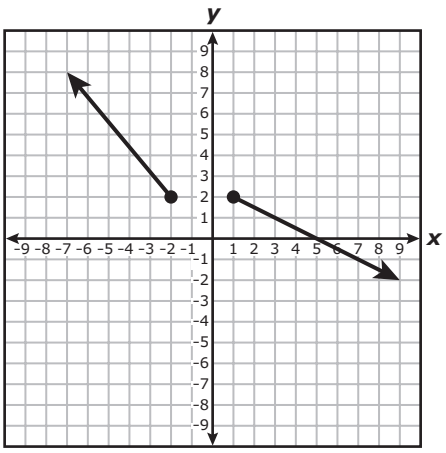
C



B



D



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12 What value of x makes this equation true?

$$\frac{x}{3} - 3 = \frac{x}{9} + 3$$

F 3

G −9

H −1

J 27

13 An eighth-grade student estimated that she needs $8,800 for tuition and fees for each year of college. She already has $5,000 in a savings account. The table shows the projected future value of the account in five years based on different monthly deposits.

Future Value of a Savings Account

Initial Balance (dollars)	$5,000	$5,000	$5,000	$5,000
Monthly Deposit (dollars)	$100	$200	$300	$400
Account Value in Five Years (dollars)	$12,273	$18,737	$25,202	$31,667

The student wants to have enough money saved in five years to pay the tuition and fees for her first two years of college. Based on the table, what is the minimum amount she should deposit in the savings account every month?

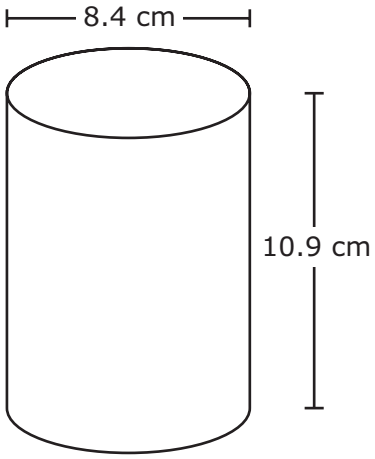
A $200

B $300

C $100

D $400

14 A cylinder and its dimensions are shown in the diagram.



Which measurement is closest to the lateral surface area of the cylinder in square centimeters?

F 575.3 cm^2

G 287.6 cm^2

H 398.5 cm^2

J 604.1 cm^2

---

15 Two eighth-grade classes are selling raffle tickets to raise money.

- One class is selling tickets for \$2.50 each and has already raised \$350.
- The other class is selling tickets for \$3.00 each and has already raised \$225.

Which equation can be used to find t, the number of tickets each class needs to sell so that the total amount raised is the same for both classes?

A $3t + 350 = 2.50t + 225$

B $350t + 2.50 = 225t + 3$

C $2.50t + 350 = 3t + 225$

D Not here

16 Mr. Wilkins deposited $2,500 in a new account at his bank.

- The bank pays 6.5% interest compounded annually on this account.
- Mr. Wilkins makes no additional deposits or withdrawals.

Which amount is closest to the balance of the account at the end of 2 years?

F $2,835.56

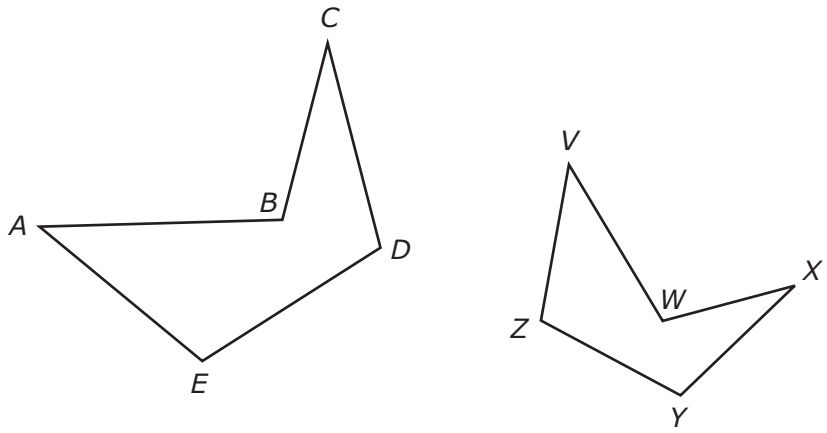
G $2,513.00

H $2,662.50

J $2,825.00

---

17 Figure *ABCDE* is similar to figure *VWXYZ*.



Which proportion must be true?

A $\frac{AE}{XY} = \frac{CD}{VZ}$

B $\frac{AB}{VW} = \frac{YZ}{DE}$

C $\frac{BC}{XY} = \frac{DE}{YZ}$

D $\frac{AB}{VW} = \frac{CD}{XY}$

18 The mass of a textbook is approximately 0.00165 metric ton. How is this number written in scientific notation?

F 165×10^{-5}

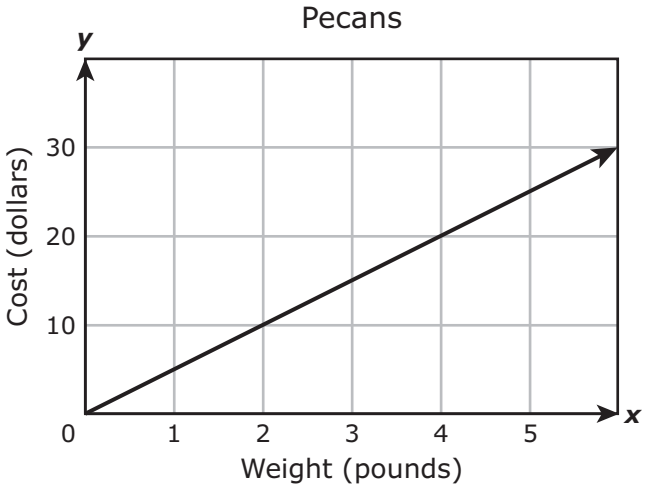
G 1.65×10^{-3}

H 16.5×10^{-4}

J 0.165×10^{-2}

---

19 The graph shows the relationship between the cost of some pecans and the weight of the pecans in pounds.



Which function best represents the relationship shown in the graph?

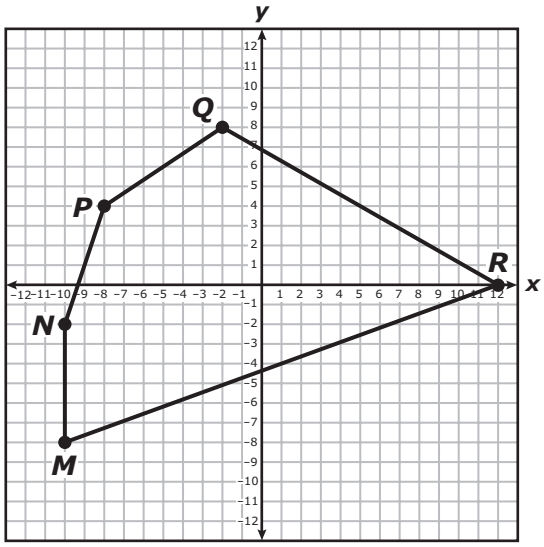
A $y = 5x$

B $y = \frac{1}{5}x$

C $y = 2x$

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

20 Pentagon *MNPQR* is shown on the coordinate grid. Pentagon *MNPQR* is dilated with the origin as the center of dilation using the rule $(x, y) \rightarrow (\frac{1}{4}x, \frac{1}{4}y)$ to create pentagon *M′N′P′Q′R′*.



Which statement is true?

F Pentagon *M′N′P′Q′R′* is larger than pentagon *MNPQR*, because the scale factor is greater than 1.

G Pentagon *M′N′P′Q′R′* is smaller than pentagon *MNPQR*, because the scale factor is less than 1.

H Pentagon *M′N′P′Q′R′* is smaller than pentagon *MNPQR*, because the scale factor is greater than 1.

J Pentagon *M′N′P′Q′R′* is larger than pentagon *MNPQR*, because the scale factor is less than 1.

---

21 Clarissa needs a $2,500 loan in order to buy a car. Which loan option would allow her to pay the least amount of interest?

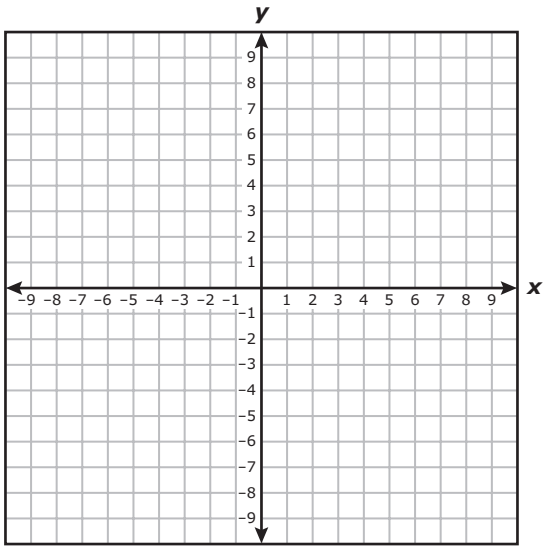
A An 18-month loan with a 4.75% annual simple interest rate

B A 30-month loan with a 4.00% annual simple interest rate

C A 24-month loan with a 4.25% annual simple interest rate

D A 36-month loan with a 4.50% annual simple interest rate

22 Point J $(-4, -6)$ and point K $(4, 4)$ are located on a coordinate grid.



Which measurement is closest to the distance between point J and point K in units?

F 18 units

G 6 units

H 13 units

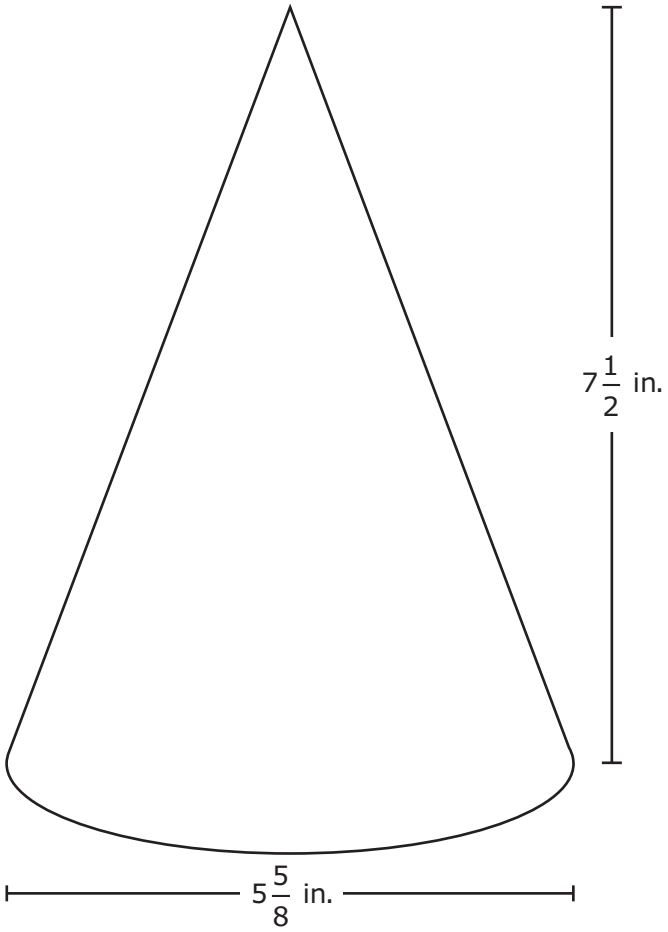
J 9 units

---

23 A rectangle's perimeter and its area have the same numerical value. The width of the rectangle is 3 units. What is the length of the rectangle in units?

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

24 A cone and its dimensions are shown in the diagram.



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

F 186.38 in.^{3}

G 248.50 in.^{3}

H 745.51 in.^{3}

J 62.13 in.^{3}

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

A $\{(2, 5), (3, 1), (2, 1), (4, 7)\}$

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

C $\{(1, 3), (3, 5), (2, 5), (1, 6)\}$

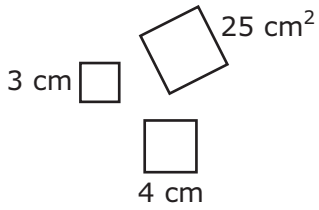
D $\{(4, 7), (4, 6), (4, 4), (4, 1)\}$

---

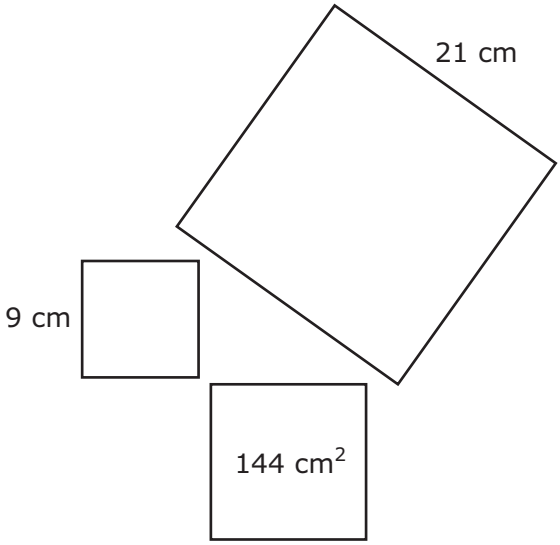
26 When three squares are joined at their vertices to form a right triangle, the combined area of the two smaller squares is the same as the area of the largest square.

Which three squares do NOT support this statement?

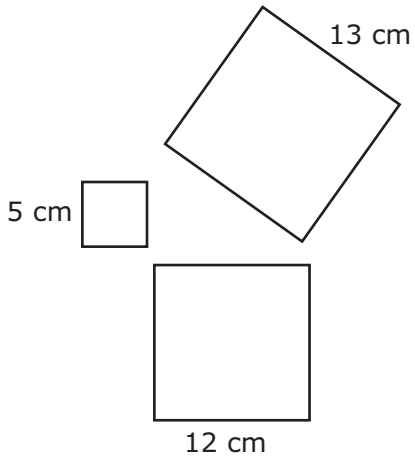
F



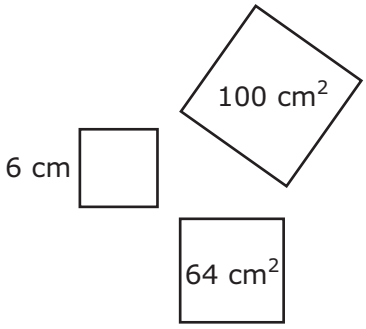
H



G



J



27 A circle is graphed on a coordinate grid and then reflected across the y-axis. If the center of the original circle was located at (x, y), which ordered pair represents the center of the new circle after the transformation?

A (x, y)

B $(x, -y)$

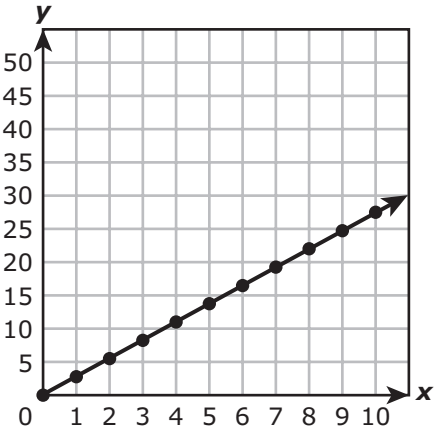
C $(-x, y)$

D $(-x, -y)$

---

28 Leanor pays a total of \$16.50 for every 6 shirts she has dry-cleaned. Which graph models a relationship with the same unit rate?

F



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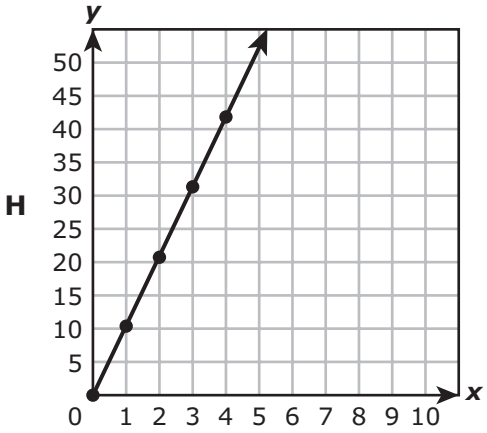
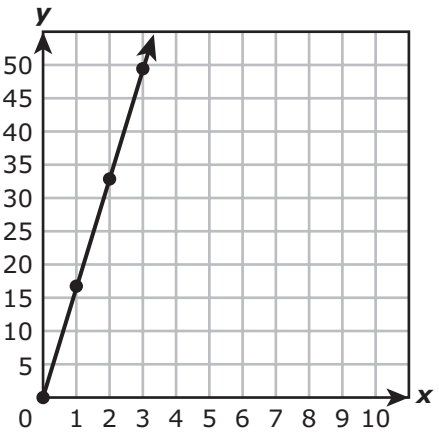
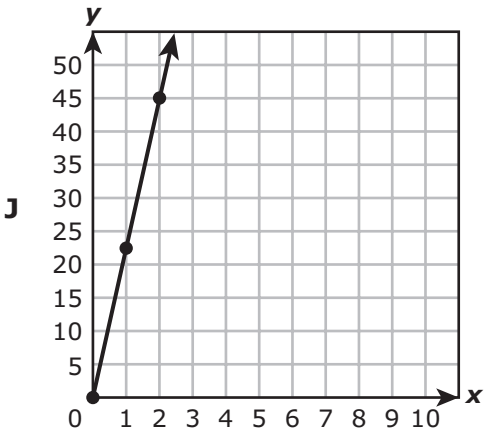


G



J



29 An inequality is shown.

$$\frac{1}{8} < x < 18\%$$

Which value of x makes the inequality true?

A $\frac{1}{5}$

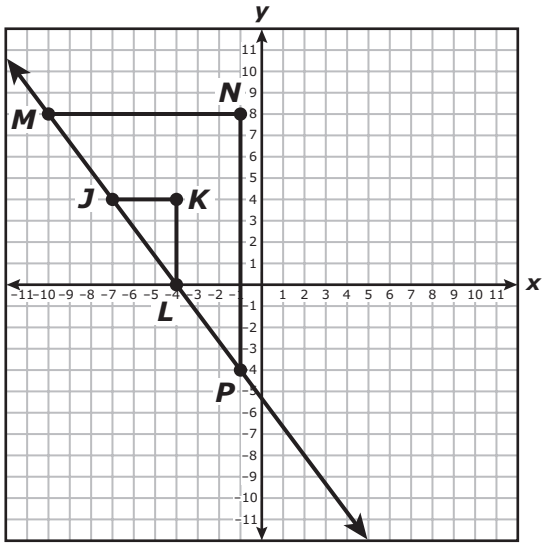
B 1.6

C 0.09

D $\sqrt{0.02}$

GO ON

30 Triangle *MNP* and triangle *JKL* are similar right triangles.



Which proportion can be used to show that the slope of $\overline{JL}$ is equal to the slope of $\overline{MP}$?

F $\dfrac{0-(-7)}{4-(-4)} = \dfrac{-4-(-10)}{8-(-1)}$

G $\dfrac{0-4}{-4-(-7)} = \dfrac{-4-8}{-1-(-10)}$

H $\dfrac{0-(-4)}{4-(-7)} = \dfrac{-4-(-1)}{8-(-10)}$

J $\dfrac{-4-(-7)}{0-4} = \dfrac{-1-(-10)}{-4-8}$

---

31 Paula completely covered a square wall using $87.5\ ft^2$ of wallpaper without any overlap. Which measurement is closest to the side length of this wall in feet?

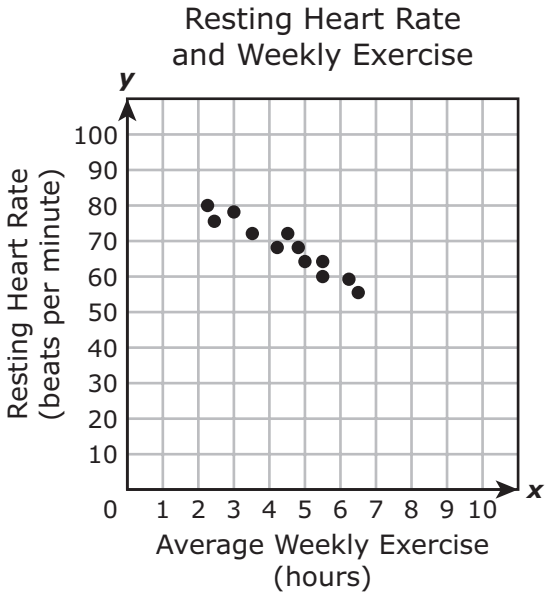
A 22 ft

B 44 ft

C 9 ft

D 7 ft

32 Ben collected data from a group of 12 people. He measured each person's resting heart rate and recorded the average number of hours each person exercised per week. He created a scatterplot to show the data he collected.



Based on the scatterplot, what is the best prediction of the resting heart rate, in beats per minute, of a person who exercises an average of 8 hours each week?

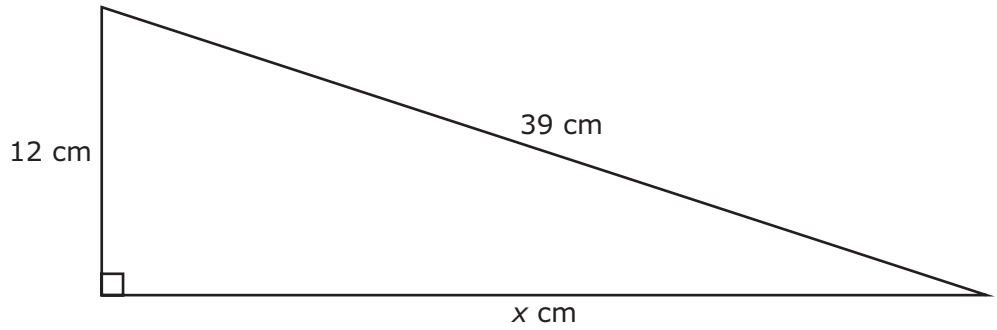
F 30 beats per minute

G 50 beats per minute

H 55 beats per minute

J 60 beats per minute

33 A right triangle and two of its side lengths are shown in the diagram.



Which measurement is closest to the value of x in centimeters?

A 37.1 cm

B 40.8 cm

C 27 cm

D 51 cm

---

34 The number of gift baskets Nikki can make varies directly with the amount of time she spends making the baskets. She can make 4 baskets in $\frac{1}{2}$ hour.

How many baskets can Nikki make in 5 hours?

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

35 Mr. Flores opened an account with a deposit of $5,000.

- The account earned annual simple interest.
- He did not make any additional deposits or withdrawals.
- At the end of 4 years, the balance of the account was $6,500.

What is the annual interest rate on this account?

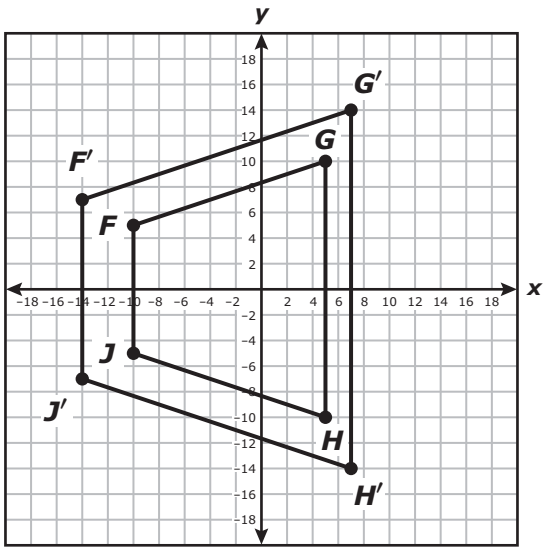
A 5.8%

B 7.5%

C 3.3%

D 1.9%

36 Quadrilateral *FGHJ* was dilated with the origin as the center of dilation to create quadrilateral *F′G′H′J′*.



Which rule best represents the dilation that was applied to quadrilateral *FGHJ* to create quadrilateral *F′G′H′J′*?

F $(x, y) \rightarrow (\frac{5}{7}x, \frac{5}{7}y)$

G $(x, y) \rightarrow (x + 1, y + 2)$

H $(x, y) \rightarrow (1.4x, 1.4y)$

J $(x, y) \rightarrow (x - 2, y + 1)$

37 Melissa is saving $25 that she earned for washing her mom's car. She earns $10 every week for doing chores, which she also saves.

Which function can be used to find t, the amount of money Melissa will have saved at the end of n weeks of doing chores?

A $t = 10n + 25$

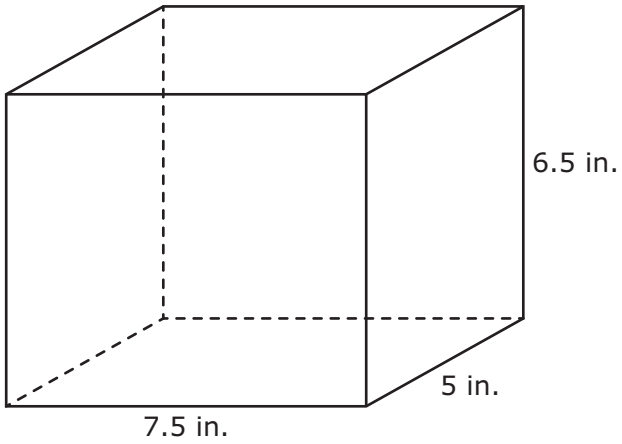
B $t = 25n + 10$

C $t = 35n$

D $t = 15n$

---

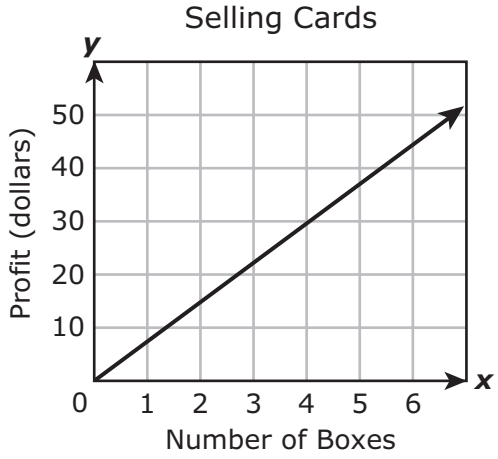
38 A rectangular prism and its dimensions are shown in the diagram.



What is the total surface area of this prism in square inches?

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

39 Emily sells greeting cards. The graph models the linear relationship between the number of boxes of cards she sells and her profit.



Which of these best describes the profit Emily makes from selling these cards?

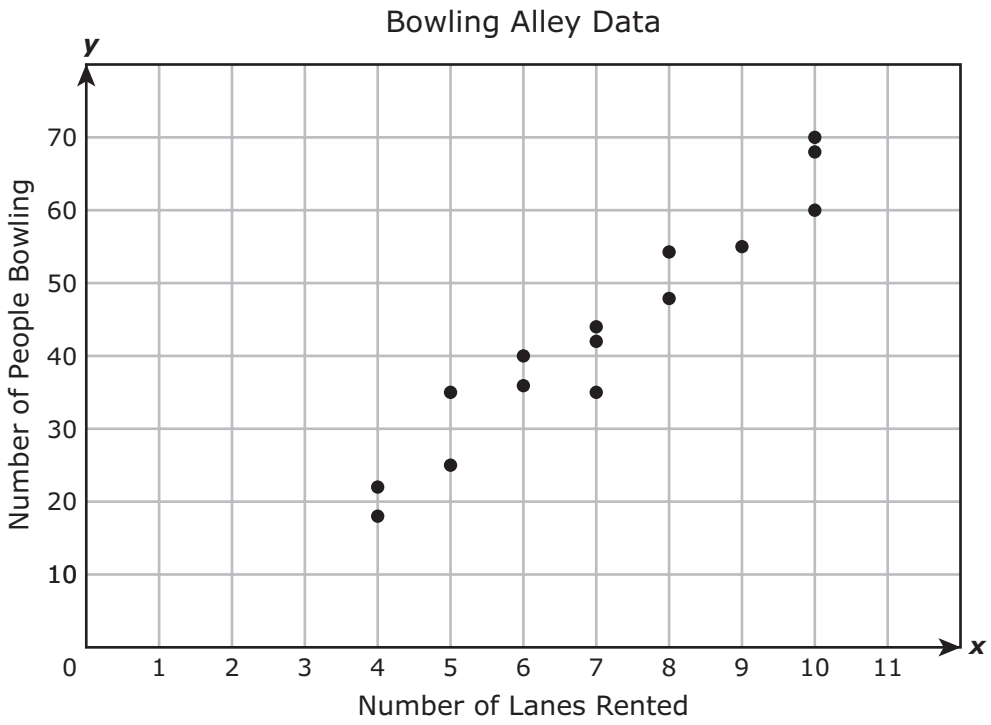
A $7.50 per box

B $10.00 per box

C $4.00 per 30 boxes

D $3.00 per 4 boxes

40 The daily attendance at a bowling alley was recorded for 15 days. The scatterplot shows the number of lanes rented each day and the number of people who bowled that day.



Which statement is best supported by the scatterplot?

F There is a non-linear association between the number of lanes rented and the number of people who bowl.

G There is a negative linear association between the number of lanes rented and the number of people who bowl.

H There is no apparent association between the number of lanes rented and the number of people who bowl.

J There is a positive linear association between the number of lanes rented and the number of people who bowl.

41 A container that holds sugar is shaped like a cylinder. The radius of the container is 3 inches, and the height of the container is 10.5 inches.

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

A 254.47 in.^{3}

B 296.88 in.^{3}

C 395.84 in.^{3}

D 197.92 in.^{3}

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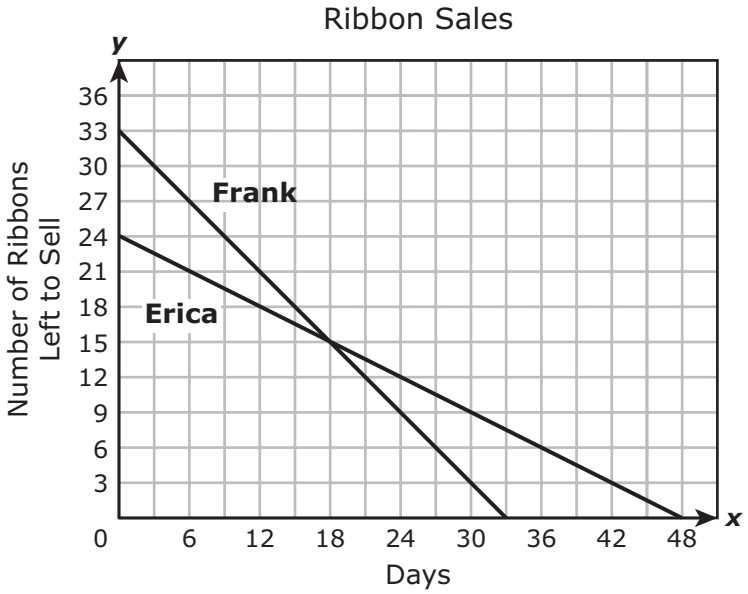
42 Frank and Erica are selling ribbons to raise money for the football team. The graph shows the linear relationship between the number of ribbons each of them has left to sell and the number of days that they have been selling ribbons.



On which day does it appear that Frank and Erica will have the same number of ribbons left to sell?

F Day 15

G Day 48

H Day 33

J Day 18

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

STOP

STAAR
GRADE 8
Mathematics
March 2017