

# North Carolina EOG 2018 Grade 8 Math

Exam Materials

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Answer Key Materials

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# Released Items

Published January 2019

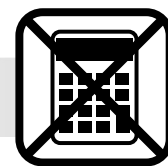
## **Grade 8 Mathematics North Carolina End-of-Grade Assessment**



**Public Schools of North Carolina**

Department of Public Instruction | State Board of Education

Division of Accountability Services/North Carolina Testing Program



## Sample Questions

S1 Kerry walks 3 miles each day. How far will she walk in 7 days?

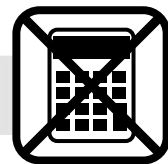
- A 10 miles
- B 14 miles
- C 21 miles
- D 24 miles

S2 What number is represented by point  $P$  on the number line below?

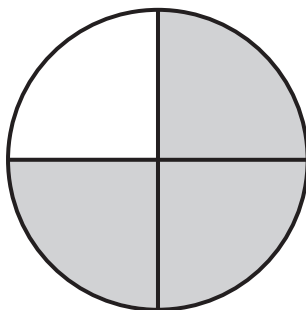


Only 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, ., -, and / are allowed in your answer.  
Answers that are mixed numbers must be entered as an improper fraction or decimal.

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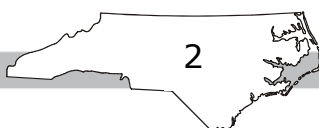
S3 What fraction of the circle is shaded?

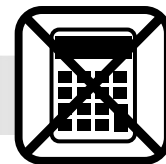


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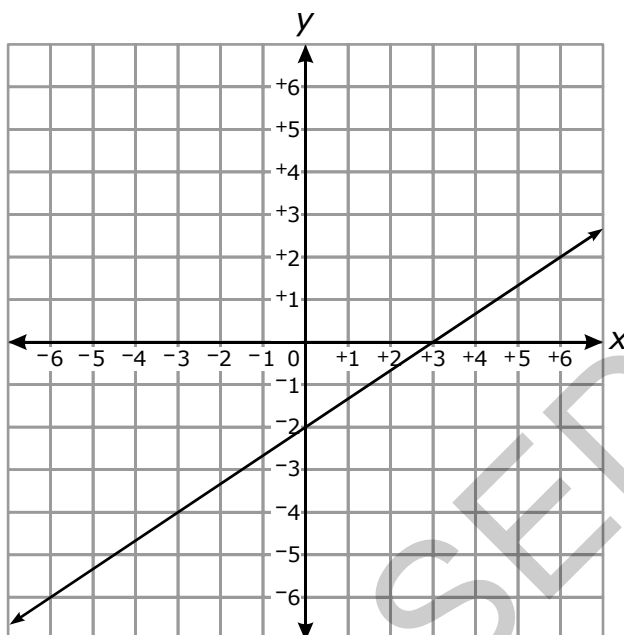
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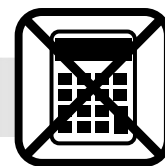




- 1 What is the equation of the line graphed below?

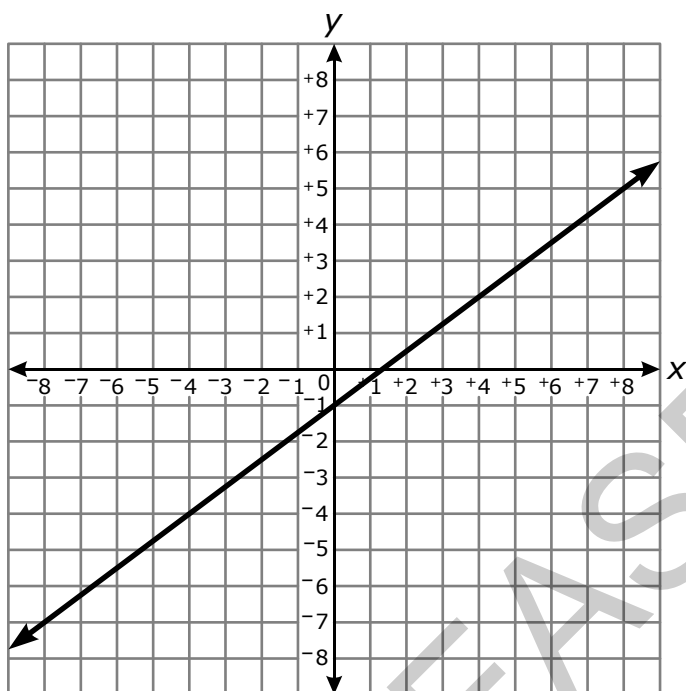


- A  $y = \frac{2}{3}x - 2$
- B  $y = \frac{2}{3}x + 3$
- C  $y = \frac{3}{2}x - 2$
- D  $y = \frac{3}{2}x + 3$

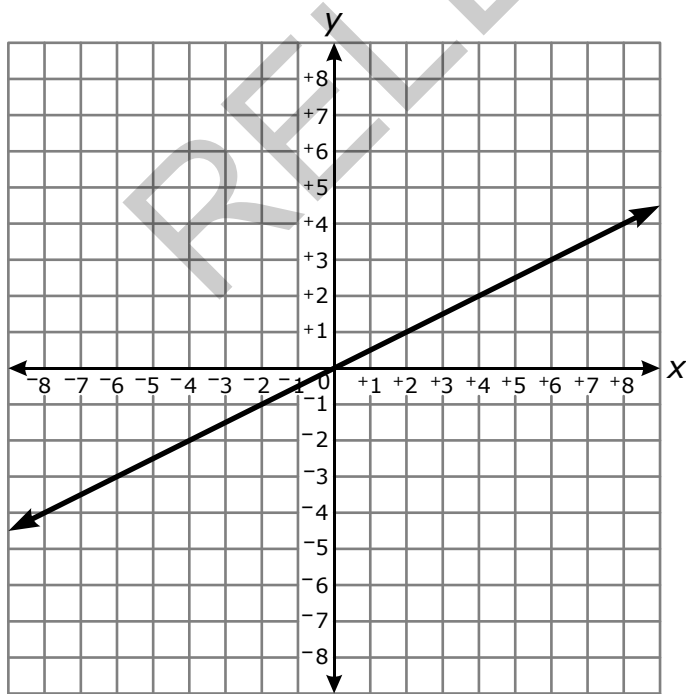


- 2 Which graph has a slope that is  $\frac{1}{4}$  unit greater than the slope of the graph of  $y = x - 2$ ?

A



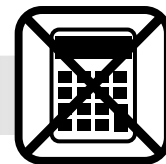
B



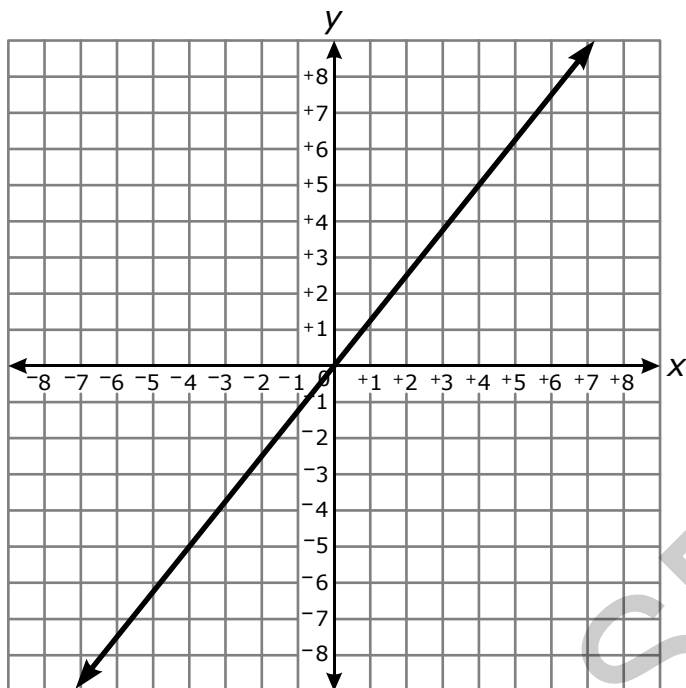
Answer choices C and D are on the following page.



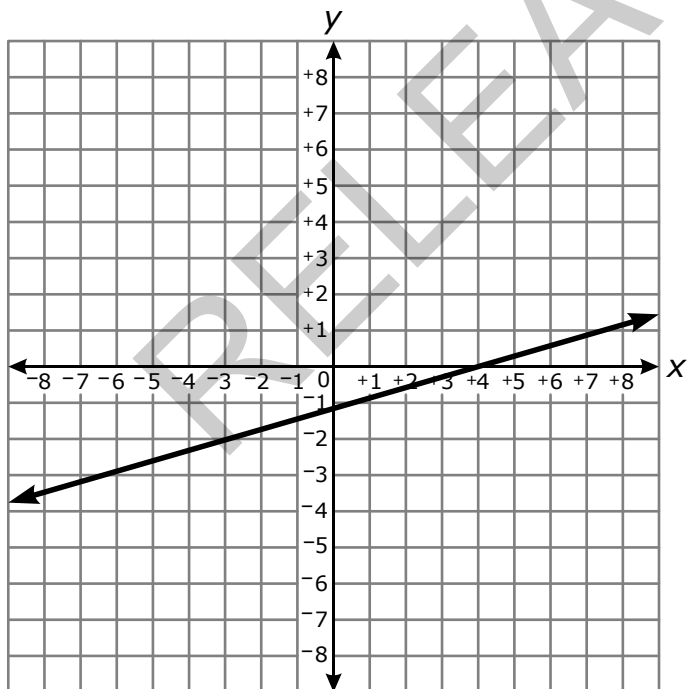
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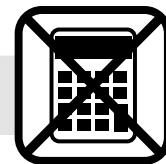


C



D





- 3 Susan recorded the time she ate dinner and the number of calories she consumed during dinner for six consecutive days. The results are shown in the table.

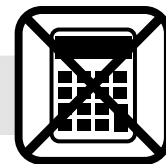
Time	Calories
4:00 p.m.	600
5:30 p.m.	750
6:30 p.m.	700
5:30 p.m.	900
7:30 p.m.	400
8:30 p.m.	800

Which **best** describes the association between the time Susan ate dinner and the number of calories she consumed?

- A positive
- B negative
- C irrational
- D almost none
- 4 Which choice is an irrational number?

- A  $\frac{4\pi}{\pi}$
- B  $\sqrt{6^2}$
- C  $\sqrt{18}$
- D 21.989





5 In which choice is  $y$  a nonlinear function of  $x$ ?

A  $y = \frac{x}{4} + 5$

B  $y = 10 + x$

C  $y = \frac{x+3}{4} - 2x$

D  $y = \frac{2}{x+3} - 5$

6 Mr. Jones determined that the equation  $y = 98 - \frac{16}{5}x$  could be used to predict his students' unit test scores, based on the number of days,  $x$ , a student was absent during the unit. What is the meaning of the  $y$ -intercept of the function?

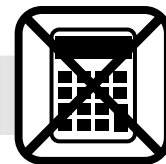
A A student who was not absent during the unit should score about 98.

B A student who was not absent during the unit should score about 94.5.

C A student's test score should increase by about 3.2 points for each day the student is absent.

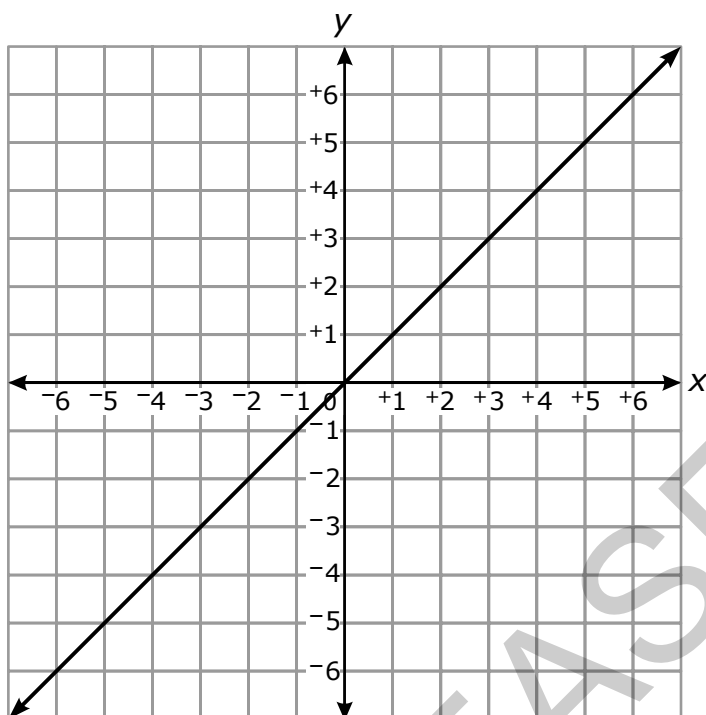
D A student's test score should decrease by about 3.2 points for each day the student is absent.



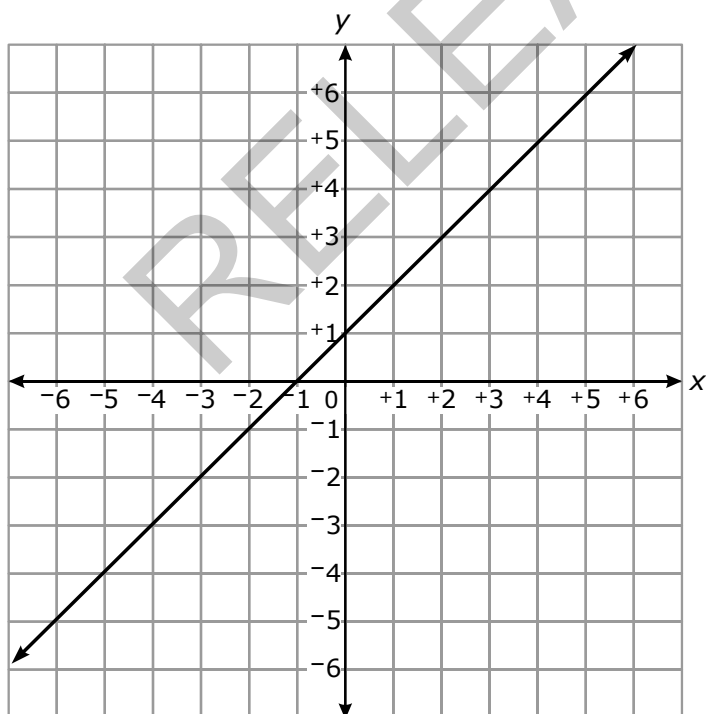


7 Which is the graph of the linear equation  $y = -x$ ?

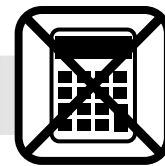
A



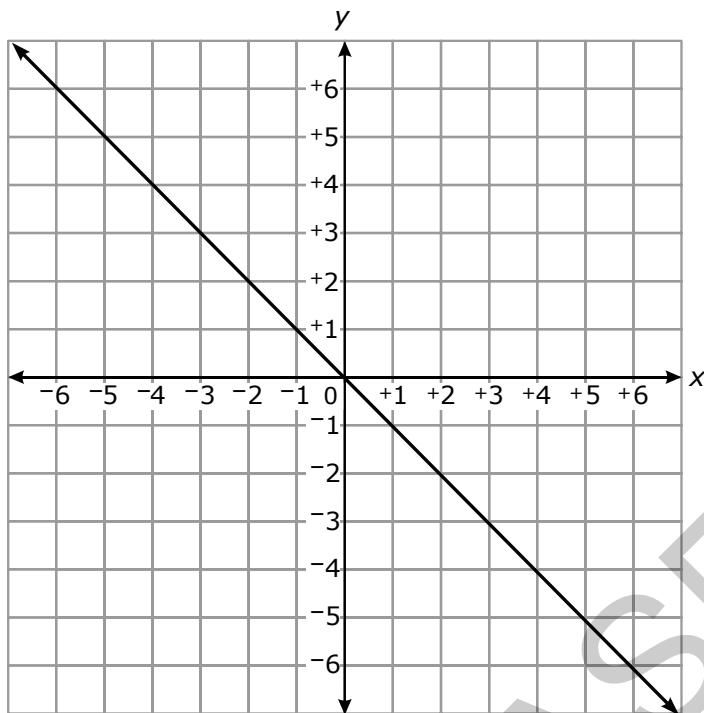
B



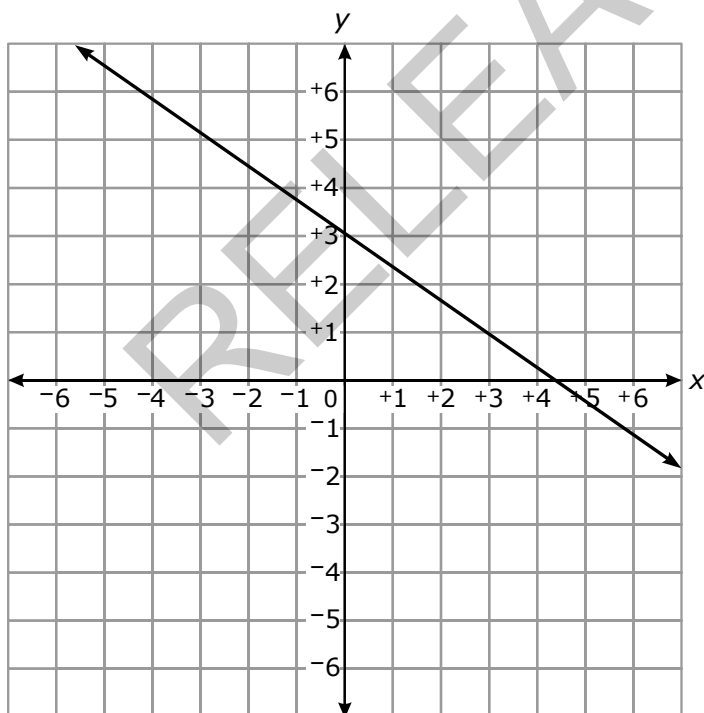
Answer choices C and D are on the following page.

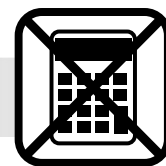


C



D





8 In which choice is  $y$  a nonlinear function of  $x$ ?

A

$x$	0	2	4	6	8
$y$	24	18	12	6	0

B

$x$	0	2	4	6	8
$y$	24	18	13	9	6

C

$x$	0	2	4	6	8
$y$	24	21	18	15	12

D

$x$	0	2	4	6	8
$y$	24	22	20	18	16

9 Which choice is both the square of an integer and the cube of an integer?

A 121

B 100

C 64

D 16

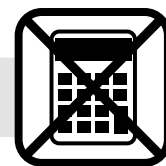
10 In which choice do all three points lie on the same straight line?

A  $(0, 1), (-1, 3), (1, 3)$

B  $(4, 2), (2, 1), (4, -2)$

C  $(0, 0), (8, 0), (0, 8)$

D  $(1, 2), (2, 4), (4, 8)$



Questions 11 through 15 require you to write your answers in the boxes provided on your answer sheet. A sample grid is shown below each question, but your answer must be properly entered on the answer sheet to be scored. Write only one number or symbol in each box and fill in the circle in each column that matches what you have printed. Fill in only one circle in each column.

- 11 The area of a square is  $49 \text{ cm}^2$ . What is the perimeter, in cm, of the square?

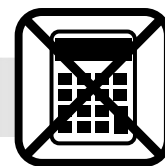
Only 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, ., -, and / are allowed in your answer. Answers that are mixed numbers must be entered as an improper fraction or decimal.

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- 12 What is the slope of the line that passes through the points (2, 3) and (8, 6)?

Only 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, ., -, and / are allowed in your answer. Answers that are mixed numbers must be entered as an improper fraction or decimal.

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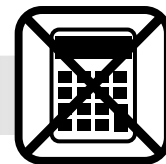
- 13 The table shows four quantities. Each quantity is assigned a numeric label.

Quantity	Numeric Label
$\frac{\pi^2}{4}$	1
$\frac{\pi^2}{8}$	2
$\sqrt{2}$	3
$\sqrt{3}$	4

- Order the quantities from least to greatest.
- Next, write the sequence of numeric labels in the same order as their corresponding quantities.
- This sequence of numeric labels is your answer.
- Enter your answer into the grid. (For example, if the order of the numeric labels were "1, 2, 3, 4," enter the answer as "1234".)

Only 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, ., -, and / are allowed in your answer. Answers that are mixed numbers must be entered as an improper fraction or decimal.

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- 14 What is the value of  $x$  in the equation shown below?

$$x^3 + 1 = 9$$

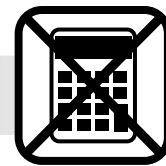
Only 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, ., -, and / are allowed in your answer. Answers that are mixed numbers must be entered as an improper fraction or decimal.

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- 15 What positive integer is closest to the value of  $\sqrt{230}$ ?

Only 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, ., -, and / are allowed in your answer. Answers that are mixed numbers must be entered as an improper fraction or decimal.

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**This is the end of the calculator inactive test questions.**

**Directions:**

- 1. Look back over your answers for the calculator inactive questions. You will not be able to go back and work on these questions once you are given a calculator.**
- 2. Raise your hand to let your teacher know you are ready to begin the calculator active test questions.**
- 3. Do not begin work on the calculator active test questions until your teacher has given you a calculator.**

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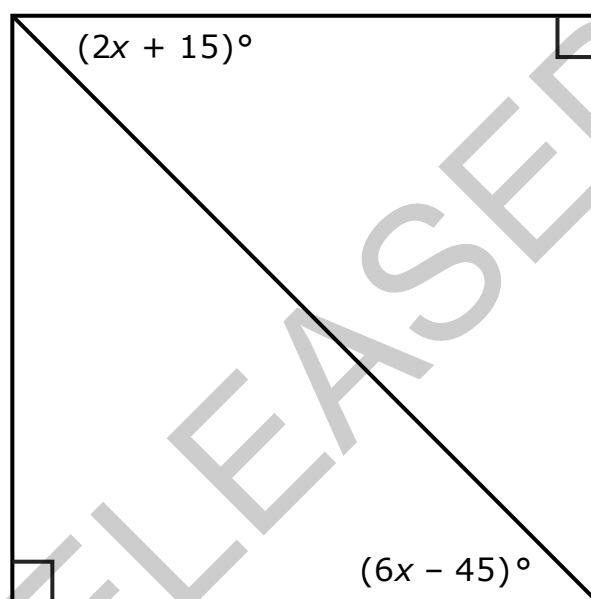






Questions 16 through 20 require you to write your answers in the boxes provided on your answer sheet. A sample grid is shown below each question, but your answer must be properly entered on the answer sheet to be scored. Write only one number or symbol in each box and fill in the circle in each column that matches what you have printed. Fill in only one circle in each column.

- 16 A square is drawn below.



What is the value of  $x$ ?

Only 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, ., -, and / are allowed in your answer. Answers that are mixed numbers must be entered as an improper fraction or decimal.

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- 17 What is the value of  $x$  in the equation shown below?

$$0.25x + 7 = 4(x - 2)$$

Only 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, ., -, and / are allowed in your answer. Answers that are mixed numbers must be entered as an improper fraction or decimal.

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- 18 What is the rate of change of the linear function that has a graph that passes through the points (2, 9) and (-1, 3)?

Only 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, ., -, and / are allowed in your answer. Answers that are mixed numbers must be entered as an improper fraction or decimal.

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- 19 What value of  $x$  satisfies the equation below?

$$12(x - 2) + 3x = \frac{1}{2}(x + 6) + 2$$

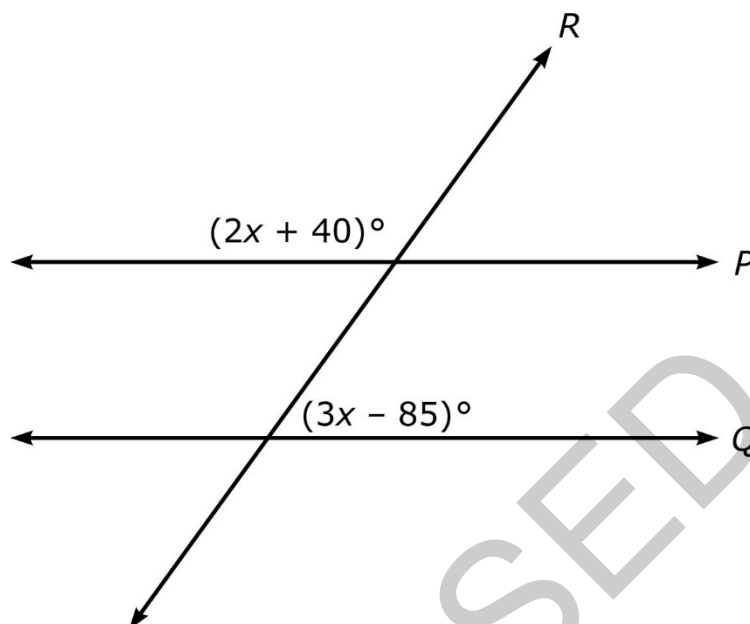
Only 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, ., -, and / are allowed in your answer.  
Answers that are mixed numbers must be entered as an improper fraction or decimal.

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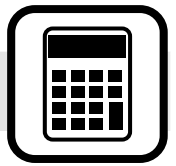
- 20 In the diagram, parallel lines  $P$  and  $Q$  are cut by transversal  $R$ .



What is the value of  $x$ ?

Only 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, ., -, and / are allowed in your answer.  
Answers that are mixed numbers must be entered as an improper fraction or decimal.

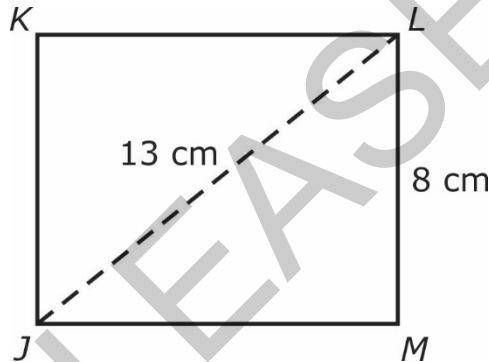
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- 21 A light year is defined as the distance light travels in one year. One light year is  $9.46 \times 10^{12}$  kilometers. A galaxy is about 150,000 light years wide. **About** how many kilometers wide is the galaxy?

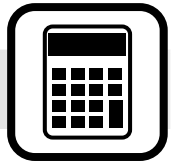
A  $1.419 \times 10^{16}$   
 B  $1.419 \times 10^{17}$   
 C  $1.419 \times 10^{18}$   
 D  $1.419 \times 10^{19}$

- 22 Rectangle  $JKLM$  is shown.

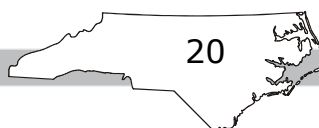


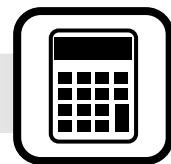
To the nearest tenth of a centimeter, what is the distance from  $J$  to  $M$ ?

A 5.0 cm  
 B 10.2 cm  
 C 15.3 cm  
 D 21.0 cm

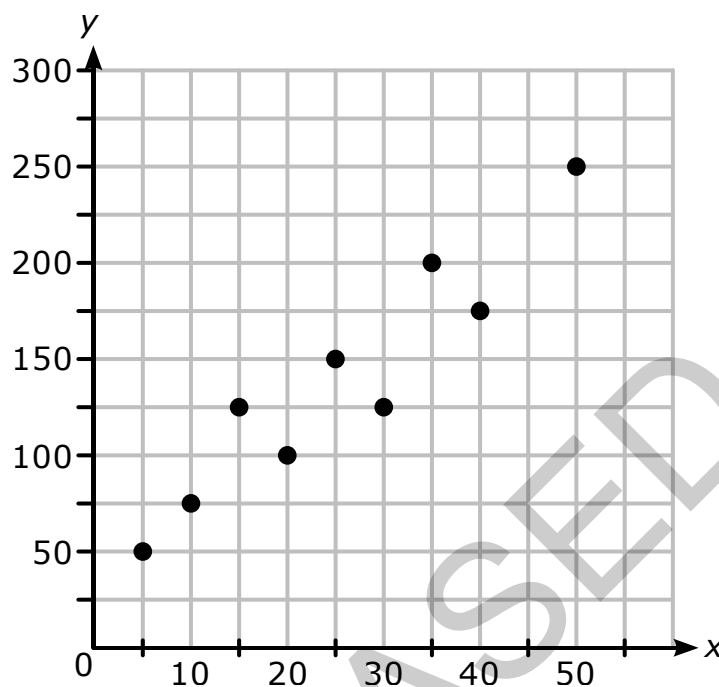


- 23 The value in dollars,  $y$ , of a car  $x$  years after it was purchased can be modeled by the function  $y = 14,000 - 875x$ . What is the meaning of the  $y$ -intercept of the linear model?
- A The initial value of the car is \$14,000.
  - B The average value of the car is \$14,000.
  - C The car's value decreases by \$875 each year after it was purchased.
  - D The car's value decreases by \$16 each year after it was purchased.
- 24 Alexis has a cylindrical trash can with a diameter of 24 cm and a height of 42 cm. What is the **approximate** volume of the can?
- A 1,008 cm<sup>3</sup>
  - B 3,167 cm<sup>3</sup>
  - C 19,000 cm<sup>3</sup>
  - D 76,000 cm<sup>3</sup>





- 25 Which equation **best** models the data shown in the scatterplot below?



- A  $y = 3x + 10$
- B  $y = 3x + 60$
- C  $y = 4x + 5$
- D  $y = 4x + 35$
- 26 In which choice is  $y$  a function of  $x$ ?
- A  $(1, 3), (3, 4), (4, 5), (5, 6)$
- B  $(2, 0), (2, 3), (4, 5), (6, 7)$
- C  $(2, 5), (4, 8), (6, 10), (2, 12)$
- D  $(6, 2), (4, 1), (6, 8), (8, 10)$

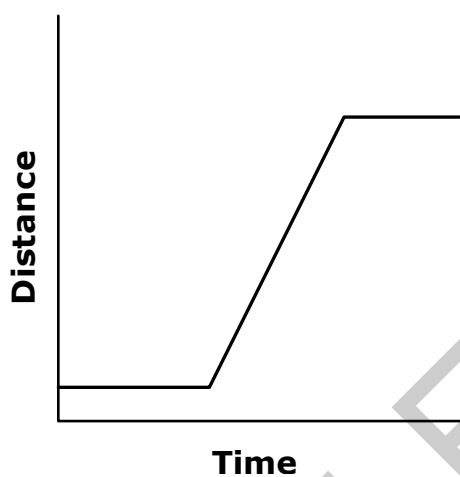


27 Carly went for a walk and jog.

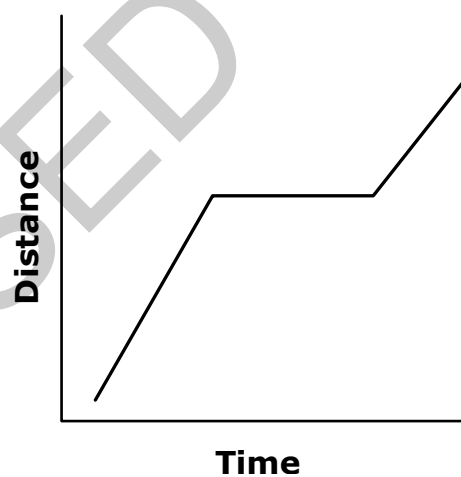
- She started walking.
- After a few minutes, Carly began jogging at a faster speed than she was walking.
- Carly then got tired and slowed down to a slower speed than she was jogging.

Which graph **best** represents the distance Carly went?

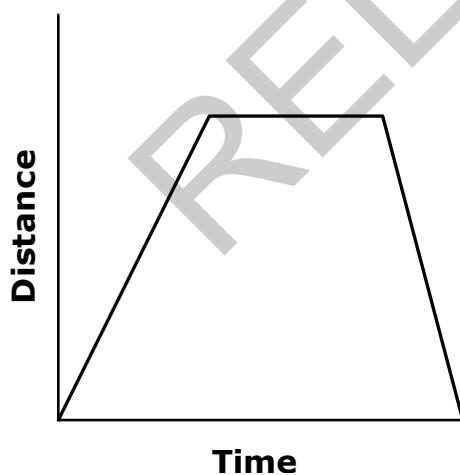
A



B



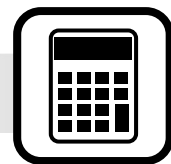
C



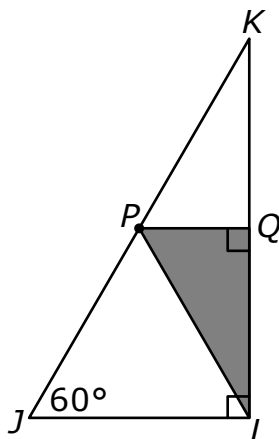
D







- 28 In the figure,  $JLK$  is a right triangle, point  $P$  is the midpoint of side  $JK$ , and segment  $PQ$  is parallel to segment  $JL$ .



The length of segment  $PK$  is 4 units and the length of segment  $PQ$  is 2 units. What is the **approximate** perimeter of shaded triangle  $PQL$ ?

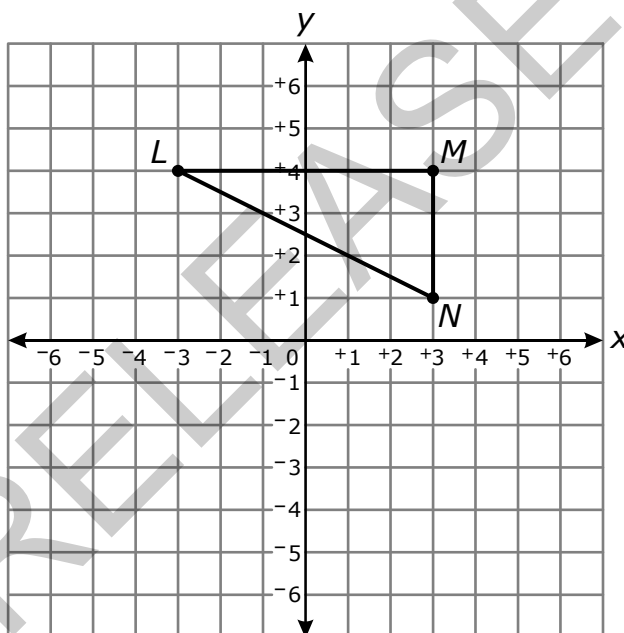
- A 10.0 units  
 B 9.5 units  
 C 9.0 units  
 D 8.5 units
- 29 A car rental company charges \$34 per day for a rented car and \$0.50 for every mile driven. A second car rental company charges \$20 per day and \$0.75 for every mile driven. What is the number of miles at which both companies charge the same amount for a one-day rental?
- A 56 miles  
 B 54 miles  
 C 36 miles  
 D 24 miles



- 30 A cylindrical barrel has a height of 8 feet and a diameter of 6 feet. What is the **approximate** volume of the barrel?

A 151 cubic feet  
 B 226 cubic feet  
 C 603 cubic feet  
 D 905 cubic feet

- 31  $\triangle LMN$  will be dilated with respect to the origin by a scale factor of  $\frac{1}{2}$ .

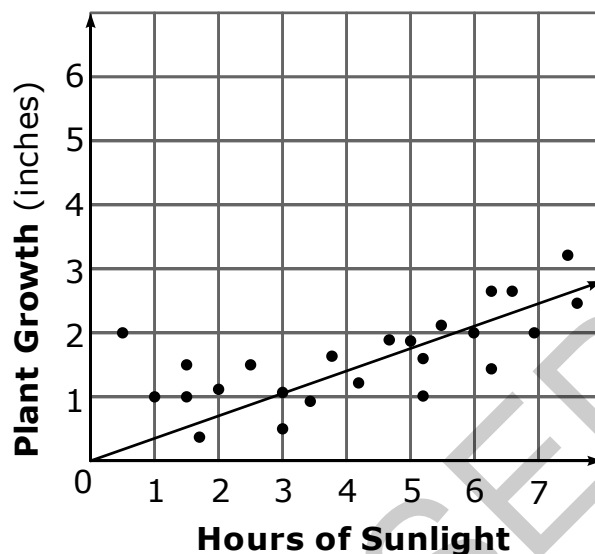


What will be the coordinates of  $\triangle L'M'N'$ ?

A  $L'(-6, -8), M'(6, 8), N'(6, 1)$   
 B  $L'(-3, 2), M'(3, 2), N'(3, 0.5)$   
 C  $L'(-1.5, 2), M'(1.5, 2), N'(1.5, 0.5)$   
 D  $L'(-1, 2), M'(1, 2), N'(1, 1)$



- 32 The scatterplot shows the amount of sunlight some tomato plants received and the amount each plant grew.



What is the meaning of the slope of the trend line shown on the scatterplot?

- A A plant grows about 3 inches for every 2 hours of sunlight it receives.
- B A plant grows about 2 inches for every 3 hours of sunlight it receives.
- C A plant grows about 3 inches for every 1 hour of sunlight it receives.
- D A plant grows about 1 inch for every 3 hours of sunlight it receives.



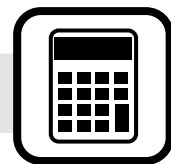
- 33 The table shows the number of hours Jake studied for his math tests and his corresponding grade.

Hours Jake Studied ( $x$ )	Test Grade ( $y$ )
1	84
2	91
3	98

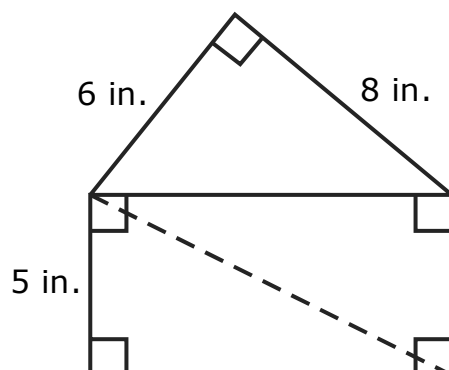
Another student, Howie, increased his test scores 6 points for each hour he studied.

Which statement correctly describes the rate of change between hours studied and corresponding test scores of the two students?

- A Jake's test scores increased by 1 point more than Howie's test scores for each hour studied.
- B Jake's test scores increased by 3 points more than Howie's test scores for each hour studied.
- C Howie's test scores increased by 1 point more than Jake's test scores for each hour studied.
- D Howie's test scores increased by 3 points more than Jake's test scores for each hour studied.



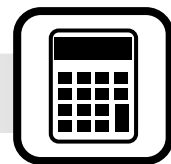
34 A figure is shown.



What is the length of the dotted line, to the nearest inch?

- A 10 inches
- B 11 inches
- C 12 inches
- D 13 inches

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- 35 A group of students were asked if they are in the Math Club and if they are in the Literature Club. Partial results are shown in the table.

	In the Math Club	Not in the Math Club
In the Literature Club	$x$	4
Not in the Literature Club	16	$y$

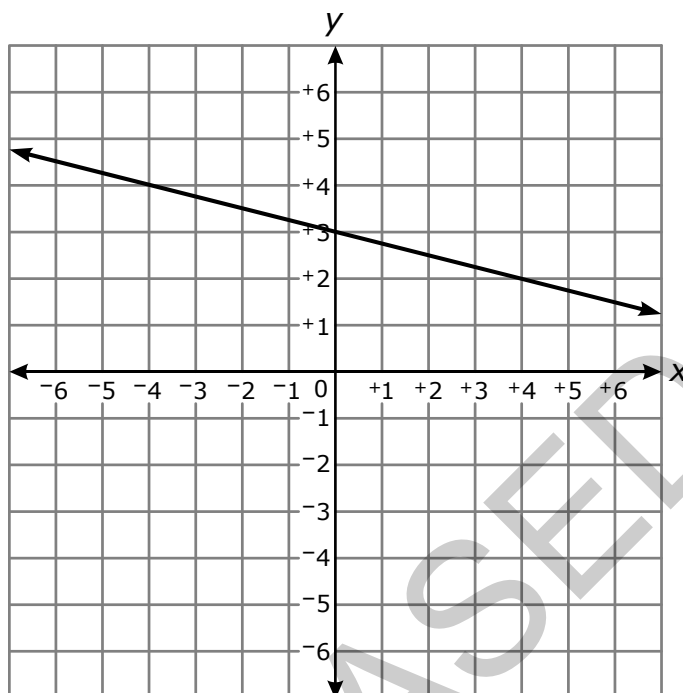
- Of the students in the Math Club, 67% (rounded) are not in the Literature Club.
- Of the students not in the Math Club, 78% (rounded) are not in the Literature Club.

What is the value of  $x + y$ ?

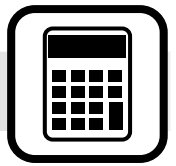
- A 22
- B 24
- C 42
- D 66
- 36  $\triangle XYZ$  with vertices  $X(1, 1)$ ,  $Y(3, 5)$ , and  $Z(5, 1)$  will be rotated  $180^\circ$  about the origin. What will be the coordinates of  $Y'$ ?
- A  $(-5, 3)$
- B  $(-3, -5)$
- C  $(5, -3)$
- D  $(5, 3)$



- 37 Which function has the same slope as the linear function graphed below?



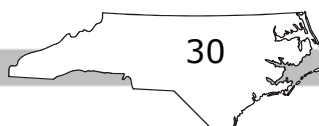
- A  $y = 4x + 3$
- B  $y = \frac{1}{4}x + 3$
- C  $y = 2 - 4x$
- D  $y = 2 - \frac{1}{4}x$
- 38 A line passes through the points (1, 4) and (5, 8). A second line passes through the points (2, 10) and (6, 4). At what point do the two lines intersect?
- A (2, 10)
- B (3, 6)
- C (4, 7)
- D (5, 8)



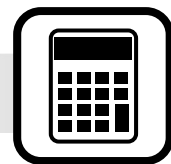
- 39 In which set of points is  $y$  a function of  $x$ ?
- A  $\{(2, 4), (4, 16), (5, 25), (6, 36)\}$
  - B  $\{(4, 2), (4, -2), (16, 4), (16, -4)\}$
  - C  $\{(2, 1), (2, 0), (1, -1), (3, 1)\}$
  - D  $\{(2, 3), (1, 3), (0, 3), (0, 2)\}$
- 40 The points  $P(3, -2)$ ,  $Q(10, -2)$ , and  $R(3, -8)$  are the vertices of a triangle. What is the **approximate** length of side  $RQ$ ?
- A 7 units
  - B 9 units
  - C 11 units
  - D 13 units
- 41 In the expressions,  $x$  and  $y$  represent positive integers.
- expression one:  $2 \cdot 10^x$
- expression two:  $4 \cdot 10^{x+y}$

The value of expression two is 20,000 times greater than the value of expression one. What is the value of  $y$ ?

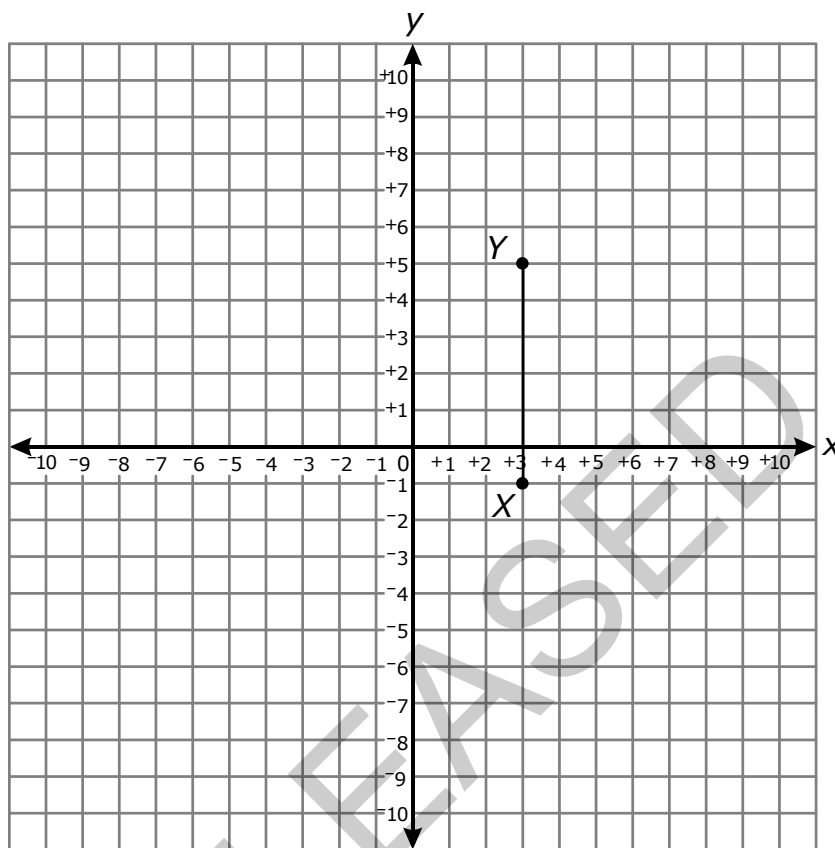
- A 3
- B 4
- C 5
- D 6





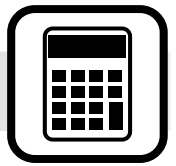


- 42 Segment  $XY$  is graphed in the coordinate plane.



Which could be the coordinates of the third vertex,  $Z$ , of triangle  $XYZ$  so that it would have a hypotenuse with a length of  $\sqrt{45}$  units?

- A (-1, 5)
- B (-1, -1)
- C (6, -1)
- D (8, 5)

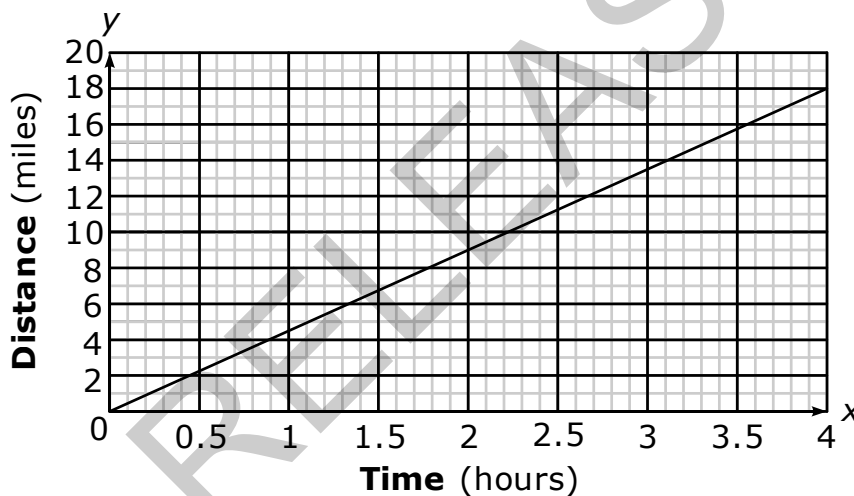


- 43 Paula and Julia went walking. The equation  $y = 3x$  models the distance Paula walked in  $x$  hours. Julia walked at a pace one mile per hour faster than Paula. Which graph correctly models Julia's walking distance as a function of time?

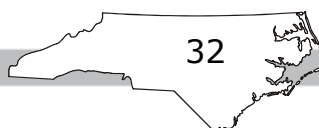
A



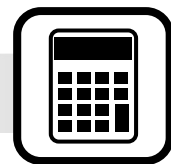
B



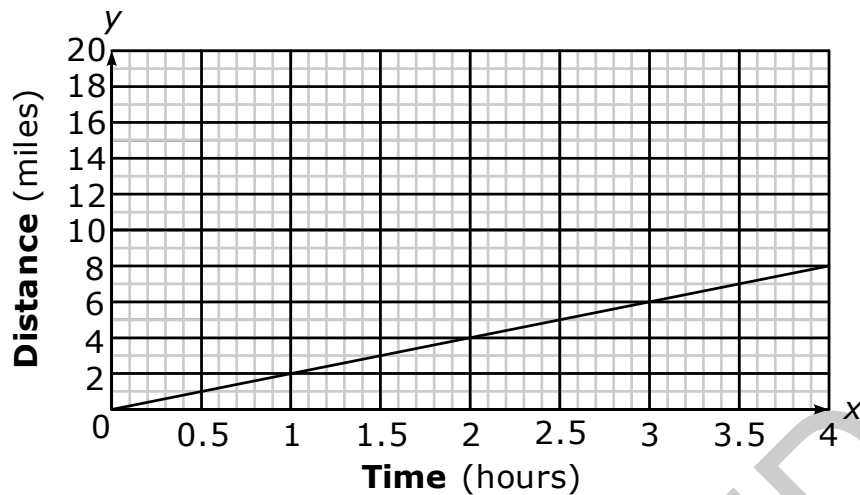
Answer choices C and D are on the following page.



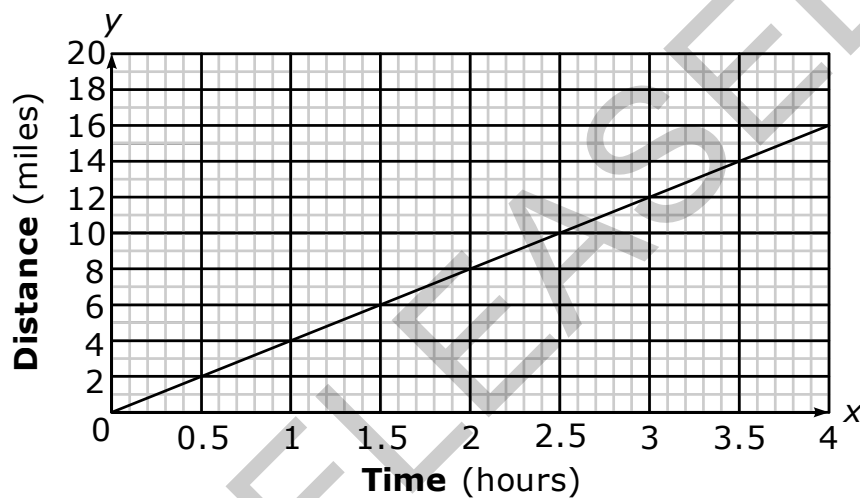
Go to the next page.



C



D



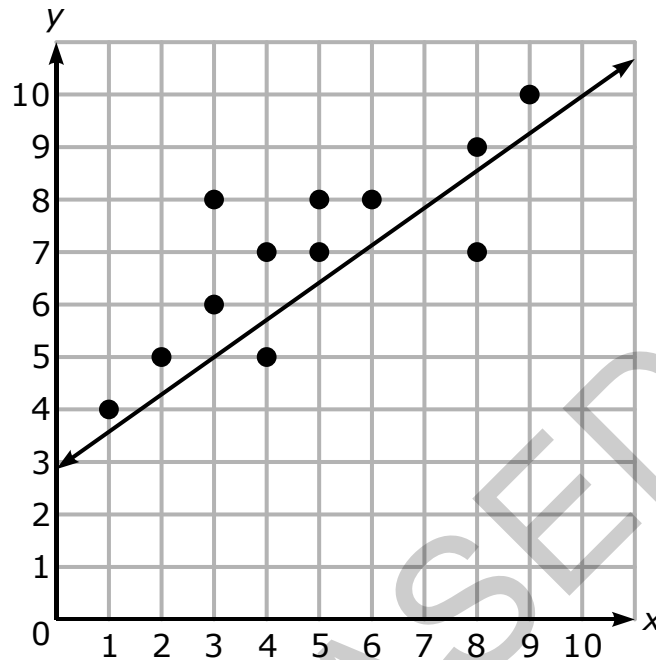
- 44 The diameter of a sphere is 6 cm. What is the volume of the sphere?

(Note:  $v = \frac{4}{3}\pi r^3$ )

- A  $8\pi \text{ cm}^3$
- B  $36\pi \text{ cm}^3$
- C  $144\pi \text{ cm}^3$
- D  $288\pi \text{ cm}^3$



- 45 Henry made the scatterplot shown.



The scatterplot shows the data points, and it also shows the linear model that Henry drew. Which statement **best** describes the linear model?

- A The linear model describes the data well because points are scattered above and below the line.
- B The linear model describes the data well because all the points are close to the line.
- C The linear model does not describe the data well because the line does not go through any of the points.
- D The linear model does not describe the data well because most of the points are located above the line.

**Directions:**

**This is the end of the mathematics test.**

- 1. Put all of your papers inside your test book and close your test book.**
- 2. Place your calculator on top of the test book.**
- 3. Stay quietly in your seat until your teacher tells you that testing is finished.**

RELEASED



**Grade 8 Mathematics  
RELEASED Form  
2018–2019  
Answer Key**

Item Number	Type	Key	DOK*	Domain
S1	MC	C		
S2	GR	-7		
S3	GR	3/4		

**Calculator Inactive**



Item Number	Type	Key	DOK	Domain
1	MC	A	2	NC.8.F.4
2	MC	C	2	NC.8.F.2
3	MC	D	1	NC.8.SP.1
4	MC	C	1	NC.8.NS.1
5	MC	D	2	NC.8.F.3
6	MC	A	2	NC.8.SP.3
7	MC	C	1	NC.8.F.4
8	MC	B	1	NC.8.F.3
9	MC	C	2	NC.8.EE.2
10	MC	D	1	NC.8.F.3
11	GR	28	2	NC.8.EE.2
12	GR	1/2	1	NC.8.F.4
13	GR	2341	3	NC.8.NS.2
14	GR	2	1	NC.8.EE.2
15	GR	15	1	NC.8.NS.2

**Calculator Active**



Item Number	Type	Key	DOK	Domain
16	GR	15	2	NC.8.G.5
17	GR	4	1	NC.8.EE.7
18	GR	2	1	NC.8.F.4
19	GR	2	1	NC.8.EE.7
20	GR	45	2	NC.8.G.5
21	MC	C	2	NC.8.EE.4
22	MC	B	2	NC.8.G.7
23	MC	A	2	NC.8.SP.3
24	MC	C	1	NC.8.G.9
25	MC	D	2	NC.8.SP.2
26	MC	A	2	NC.8.F.1
27	MC	D	2	NC.8.F.5
28	MC	B	3	NC.8.G.7
29	MC	A	2	NC.8.EE.8
30	MC	B	1	NC.8.G.9
31	MC	C	2	NC.8.G.3
32	MC	D	2	NC.8.SP.3
33	MC	A	2	NC.8.F.2
34	MC	B	2	NC.8.G.7
35	MC	A	3	NC.8.SP.4
36	MC	B	2	NC.8.G.3
37	MC	D	2	NC.8.F.2
38	MC	C	2	NC.8.EE.8
39	MC	A	2	NC.8.F.1
40	MC	B	1	NC.8.G.8

## GRADE 8 MATHEMATICS — RELEASED FORM

Item Number	Type	Key	DOK	Domain
41	MC	B	3	NC.8.EE.3
42	MC	C	2	NC.8.G.8
43	MC	D	2	NC.8.F.2
44	MC	B	1	NC.8.G.9
45	MC	D	2	NC.8.SP.2

**\*DOK:**

**1 = Recall**

**2 = Skill/Concept**

**3 = Strategic Thinking**

RELEASED