THIRD SPACE LEARNING

8th Grade Pennsylvania State Test

State Test Grade 8

Grade 8

Questions

Name: ..... Class: .....

Date: ..... Score: .....

No Calculator For Questions 1 - 6

1 Which expression is equivalent to $\sqrt{64}$?

A. 2^2
B. 2 x 4
C. 4 x $\sqrt{3}$
D. 64^2

2 Complete the following statement:

4.1×10^{-4} is *about* _____ times the size as 2×10^{-3}.

A. 0.2
B. 2
C. 0.08
D. 80

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3 The points A(–2, 2) and B(3, –10) are plotted on the coordinate plane. What is the distance between the points?

A. $\sqrt{65}$
B. $\sqrt{145}$
C. $\sqrt{89}$
D. 13

---

4 Which number the best approximation of $\sqrt{18}$?

A. 4
B. 5.5
C. 4.2
D. 9

---

5 Which expression has a value of $\frac{1}{125}$?

A. $\frac{5^5}{5^2}$
B. $(5^4)^{-1}$
C. $5^{-7} + 5^4$
D. $5^{-6} \times 5^3$

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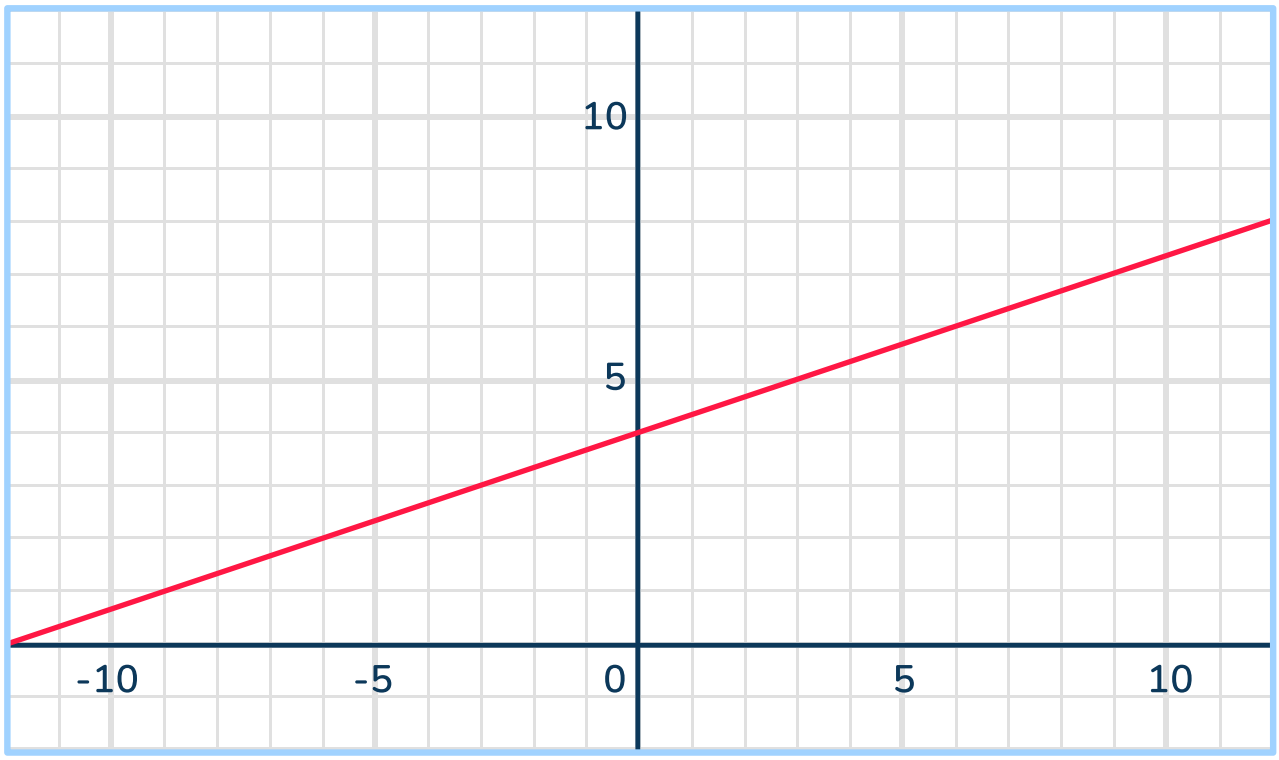
6 Which number is irrational?

A. $\frac{1}{9}$
B. $\sqrt{8^2}$
C. $\sqrt{2}$
D. $\sqrt[3]{64}$

Calculator Can Be Used For Questions 7 - 45

7 Which equation represents the line on the coordinate plane?



A. $y = 3x + 4$
B. $y = \frac{1}{3}x + 4$
C. $y = x + 4$
D. $y = -3x + 4$

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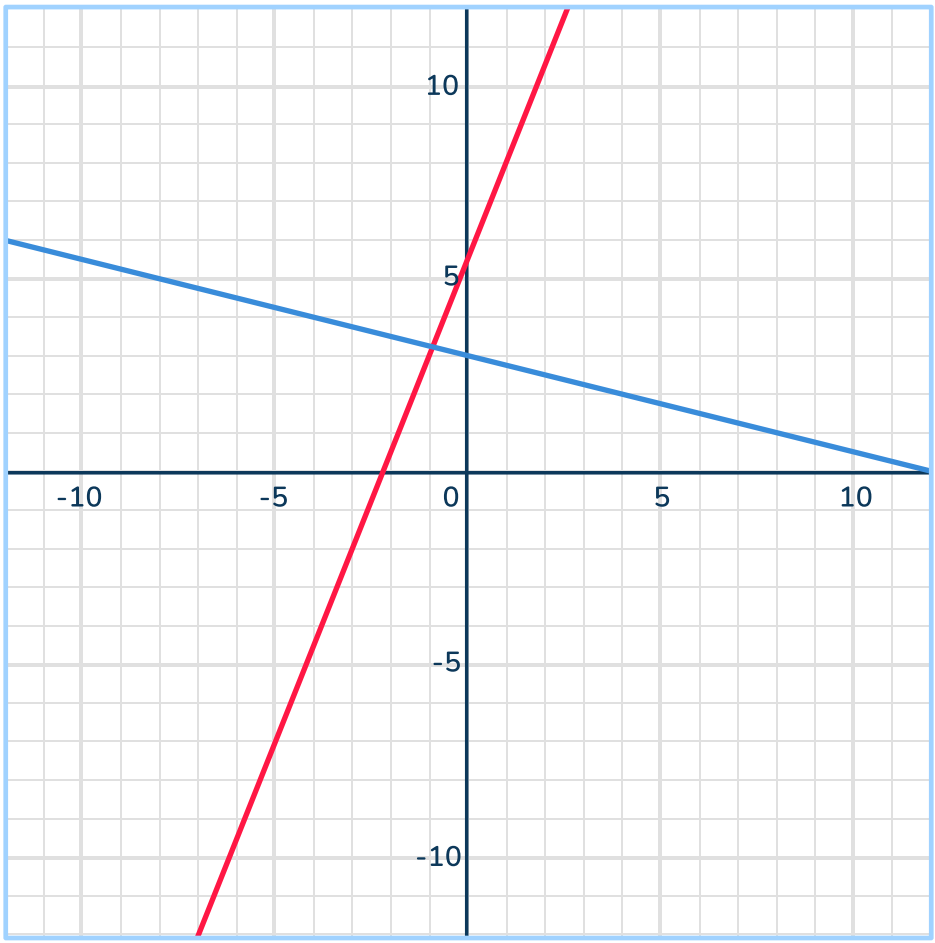
8



Which system and solution is shown by the graph?

A. $\begin{cases} 4y + x = 12 \\ 4y - 10x = 9 \end{cases}$

solution: $x = -1$

B. $\begin{cases} y = 3 - \frac{1}{4}x \\ y = 2\frac{1}{4} + 2\frac{1}{2}x \end{cases}$

solution: $x = 3\frac{1}{4}$

C. $\begin{cases} 4x + 7 = 7 \\ y + x = 2 \end{cases}$

solution: $x = -1$

D. $\begin{cases} y = \frac{1}{4}x \\ -4y + 26 = x \end{cases}$

solution: $x = 3\frac{1}{4}$

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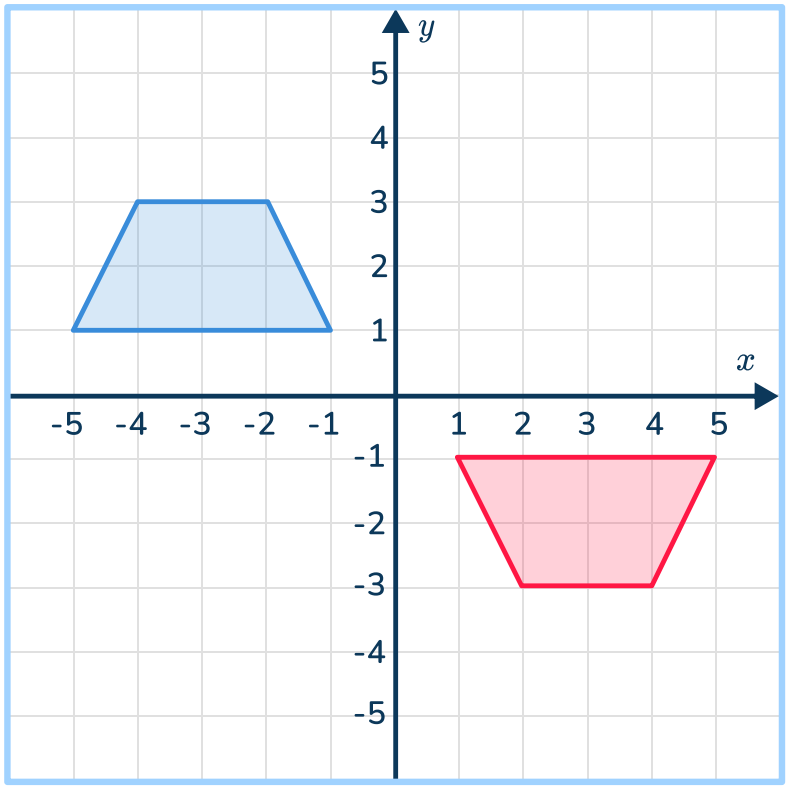
9 What is the value of the expression below?

$$\frac{0.1 \times 10^3}{0.5 \times 10^7}$$

A. 5×10^{-4}
B. 2×10^{-4}
C. 5×10^{-5}
D. 2×10^{-5}

---

10 The two trapezoids shown are congruent.



Which transformation(s) prove the congruence of the two shapes?

A. A reflection over the y-axis, then a reflection over the x-axis
B. A 270° rotation about the origin
C. A translation 6 units to the right, then 2 units down
D. A 90° rotation about the origin, then a reflection across the x-axis

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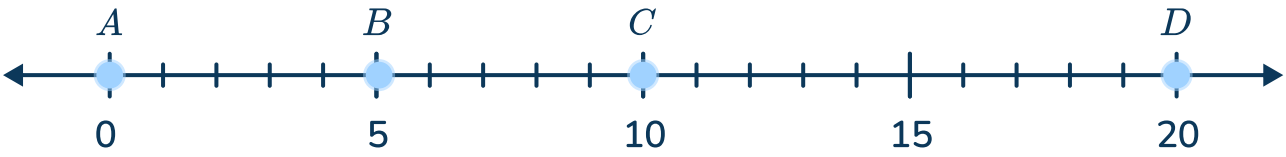
11 Which point is closest to $\sqrt{20}$?



12 Which equation represents y as a linear function of x?

A. $y = -9x^2$
B. $|7x| = y$
C. $-\frac{7x}{9} = y$
D. $\sqrt{x} = y$

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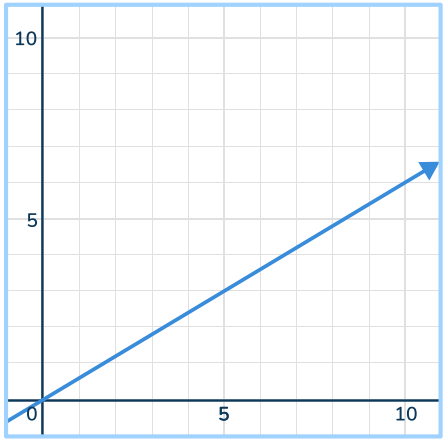
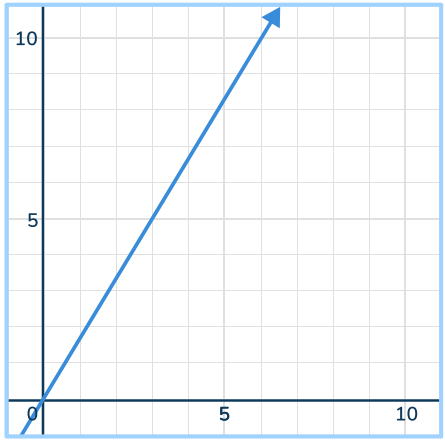
13 Jeff is making bracelets. He uses 3 green beads, x, for every 5 yellow beads, y. Which graph shows the relationship?

A.



B.



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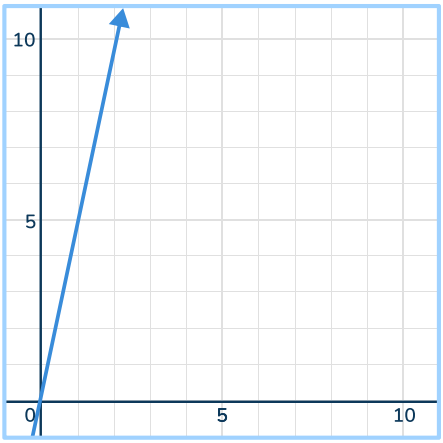
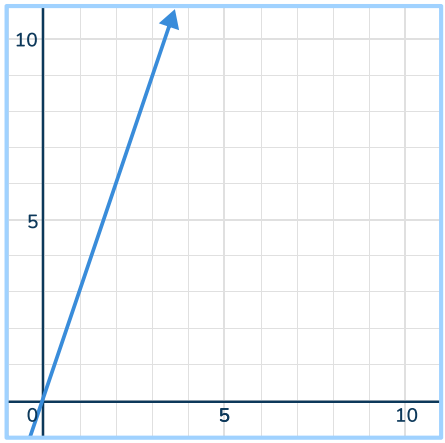


D.



14 The 7th and 8th graders and Mills Middle School are required to take a foreign language class, either Spanish or Mandarin.

	Spanish	Mandarin
7th graders	53	55
8th graders	70	x

If 42% of 7th and 8th graders take Mandarin, what is the value of x?

A. 29
B. 52
C. 34
D. 212

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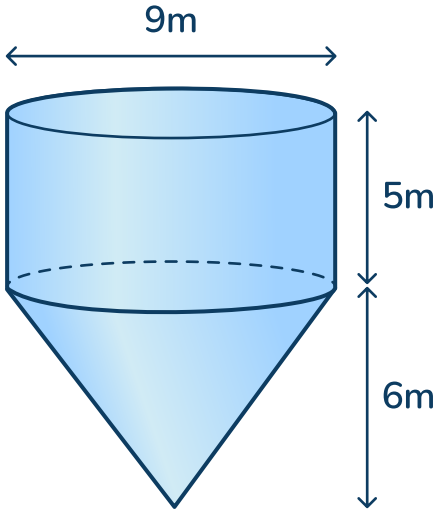
15 What is the volume of the shape? Round to the nearest tenth.



A. 445.3 m^3
B. 1,781.3 m^3
C. 395.8 m^3
D. 197.9 m^3

---

16 The table and the equation both show a different relationship between y and x.

Function A

x	y
2	-24
3	-22
5	-10

Function B

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

Which statement about the functions is true?

A. The rate of change of Function A is less than Function B.
B. The rate of change of Function A is greater than Function B.
C. The y-intercept for Function A and Function B is the same.
D. Function A is non-linear; Function B is linear.

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17 A container is in the shape of a cylinder that has a diameter of 9 inches and a height of 1.5 feet. Find the volume of the container in cubic inches. Round to the nearest tenth.

A. 381.7 inches^2
B. 4,580.4 inches^2
C. 1,145.1 inches^2
D. 95.4 inches^2

18 Which calculation always results in a rational number?

A. The difference between two rational numbers.
B. The product of an irrational number and rational number.
C. The sum of two irrational numbers.
D. The quotient of an irrational number and rational number.

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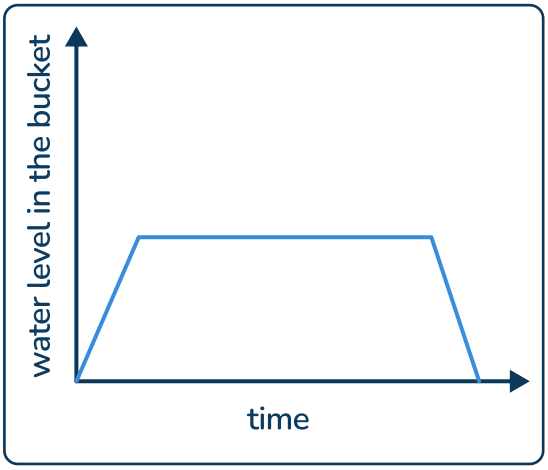
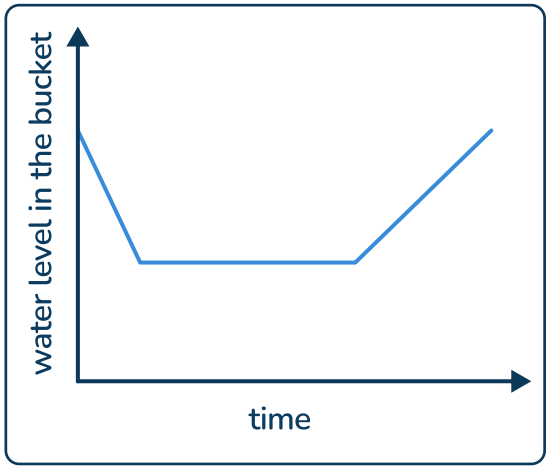
19 A bucket sitting outside was full of water. Jace used some of it to water plants. Later in the day, it rained and filled the bucket with water.

Which is a graph of the function described above?

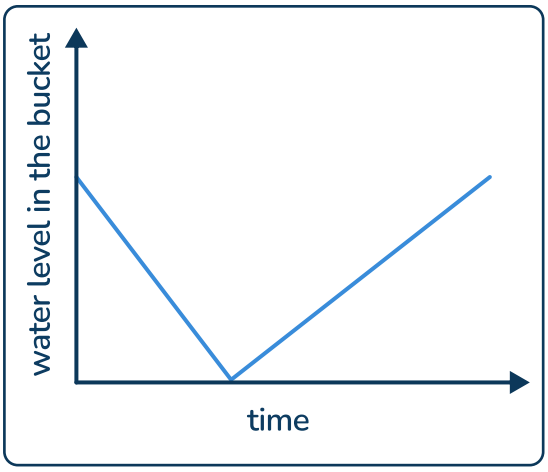
A.



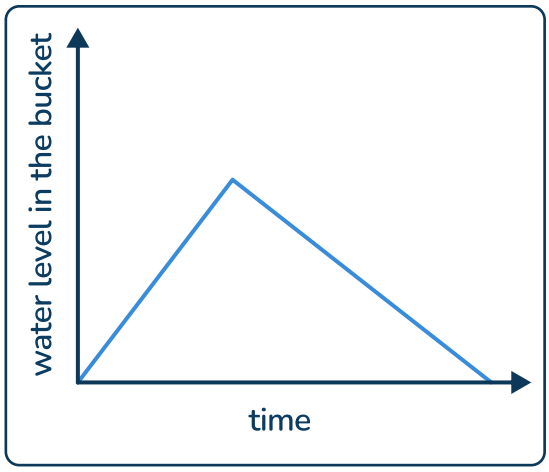
B.



C.



D.



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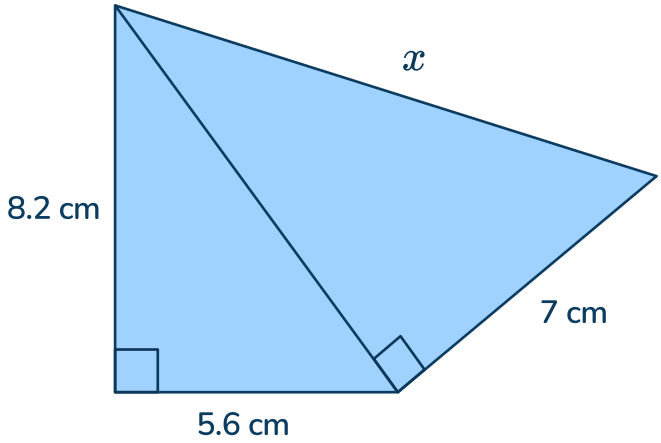
20 Solve for x. Round to the nearest tenth.



A. 10.3 cm
B. 6.9 cm
C. 12.1 cm
D. 9.9 cm

---

21 $2x^3 = 332.75$

Which value for x makes the equation true? Round to the nearest hundredth.

A. 5.5
B. 18.2
C. 55.5
D. 166.4

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22 Which set of coordinates does NOT represent a function?

A. {(8, 0), (0, 8), (11, 7)}
B. {(3, 1), (–3, –1), (3, 11)}
C. {(0, 0), ($\frac{1}{2}$, 1), (–8, 1)}
D. {(2, 9), (3, 9), (4, 9)}

---

23 What will the coordinates be of T' if T(3, 9) is translated down 4 and left 12?

A. (9, –5)
B. (21, -1)
C. (–1, 21)
D. (–9, 5)

---

24 Tabitha runs her family's plumbing business. The table below shows what the service charges for the amount of hours worked. Which linear equation represents the information in the table?

Hours worked, x	Total amount of money charged, y
0	$64
2	$214
4	$364
6	$514

A. $y = 150x + 64$
B. $y = 150x$
C. $y = 75x + 64$
D. $y = 75x$

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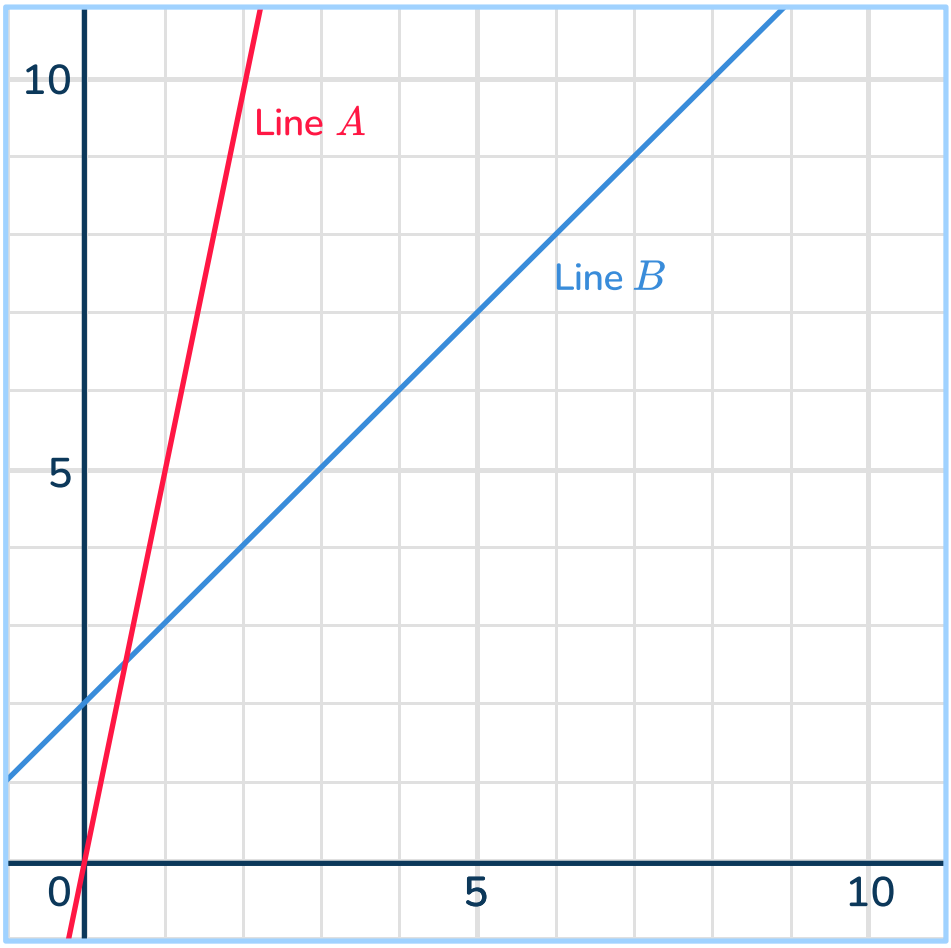
25



Which statement about the two lines shown in the graph is true?

A. Line A and Line B represent proportional relationships.
B. In Line B, for each +1 change is x, there is a +12 change in y.
C. The slope of Line B is greater than the slope of Line A.
D. The slope of Line A is 5, which is the same as its unit rate.

---

26 What is the solution to the equation? Round to the nearest tenth.

$$-5(6x - 4) = 5.5x + 3$$

A. $x = 8.2$
B. $x = 0.9$
C. $x = 0.5$
D. $x = 5.6$

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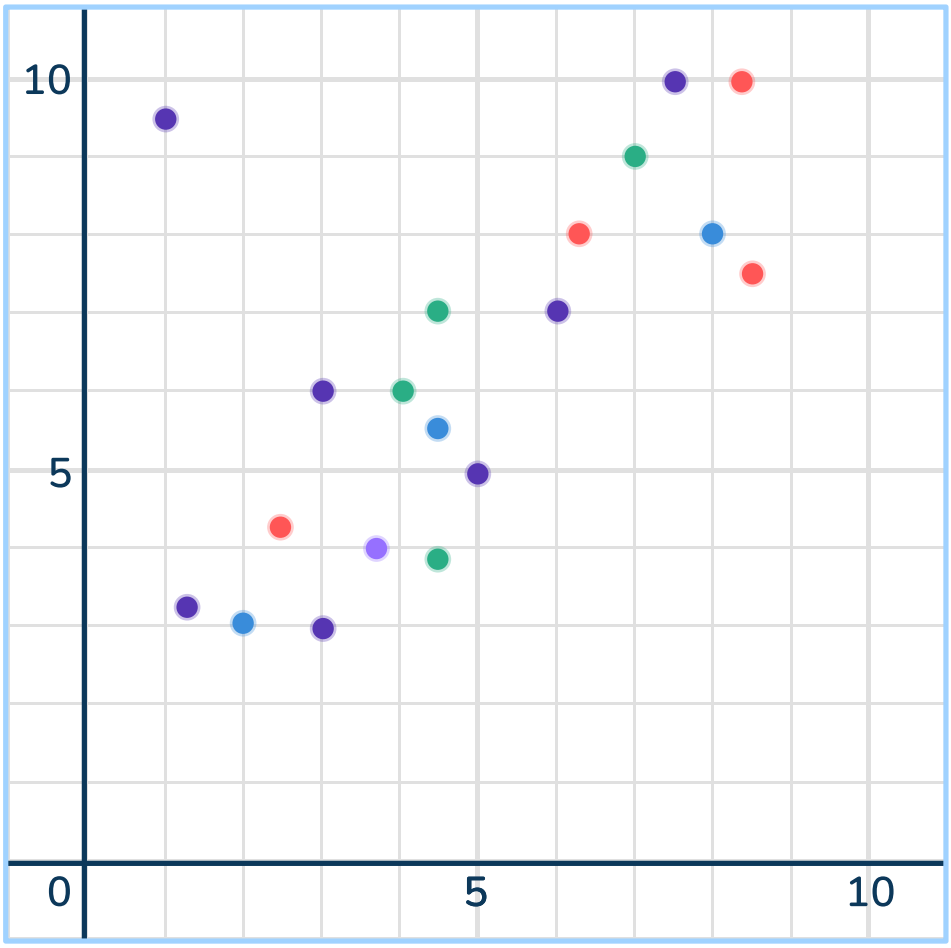
27



Which statement about the scatter plot is NOT true?

A. There appears to be 1 outlier.
B. In general, x and y have a positive association
C. The relationship between x and y looks linear.
D. The line of best fit will have a negative slope.

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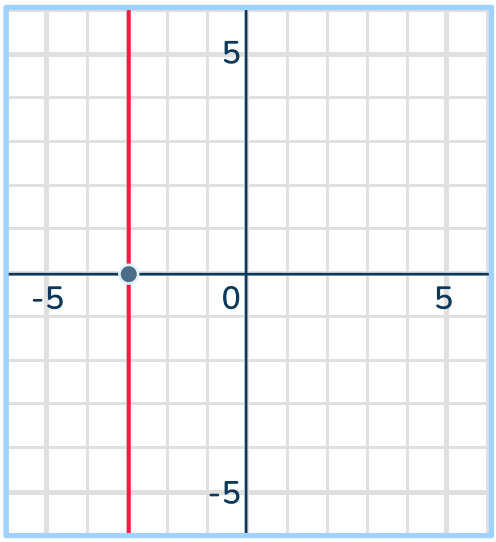
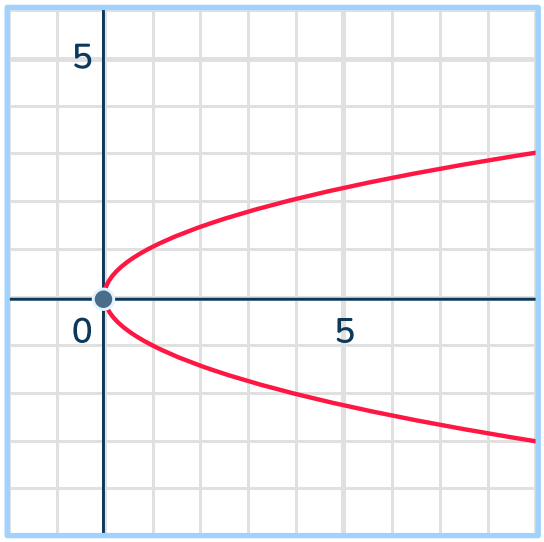
28 Which graph shows y to be a function of x?

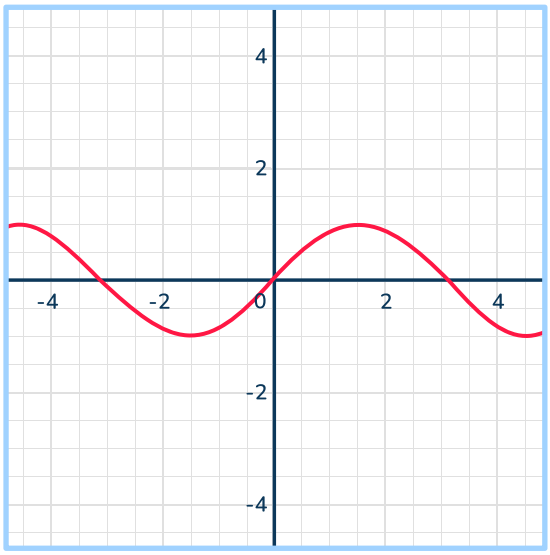
A.



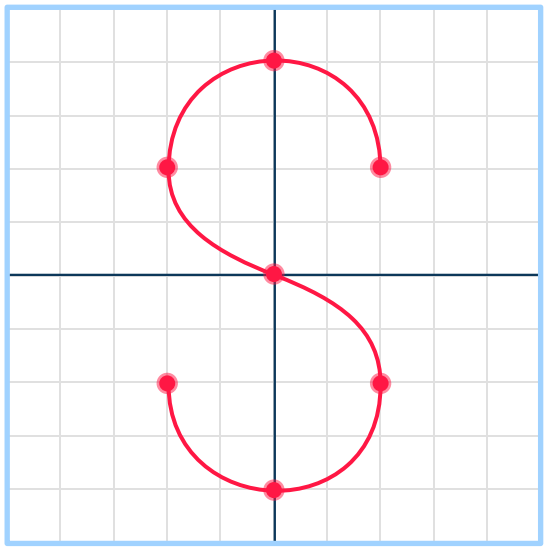
B.



C.



D.



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29 The equation $75.6 - 9.3x = y$ models the volume of a bathtub in grams after drains for x minutes.
What is the meaning of the y-intercept?.

A. The gallons of water the tub loses per minute.
B. The minutes it takes for the bathtub to drain completely.
C. The starting volume of the bathtub, in gallons.
D. The minutes the bathtub has been draining

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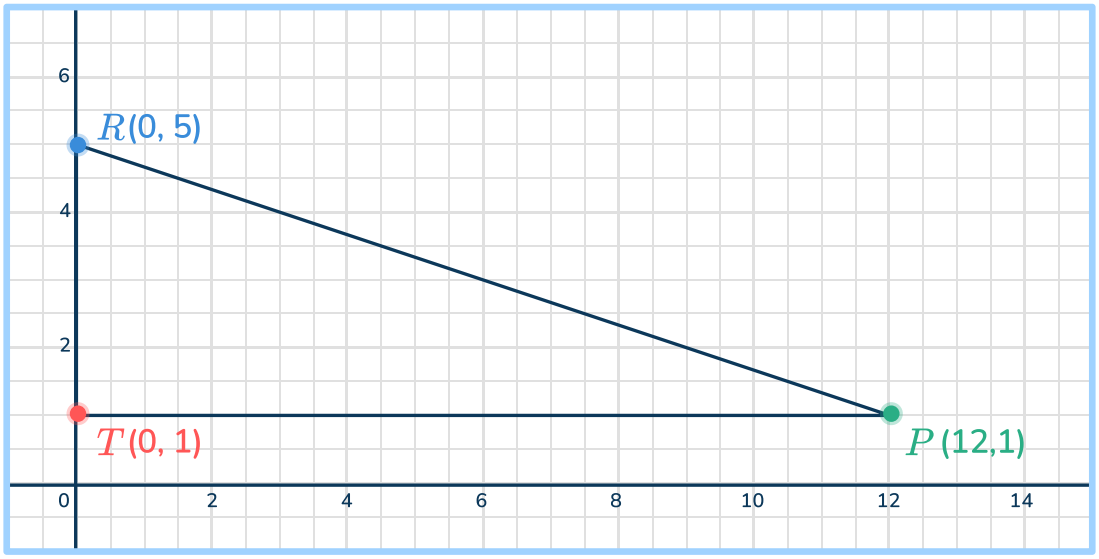
30



If the triangle is dilated by $\frac{1}{2}$, what is the distance from R' to P'?

Which strategy leads to the correct answer?

A. Multiply each coordinate by $\frac{1}{2}$ and then subtract the coordinates of P'R'T' from PRT.

B. Calculate the square root of $4^2 + 12^2$ and multiply the positive root by $\frac{1}{2}$.

C. Shift each vertex of the triangle down $\frac{1}{2}$ units, then count the units from R' to P'.

D. Calculate the positive root of $\sqrt{(1-3)^2 + (0-6)^2}$.

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31 How many solutions does the system of linear equations have?

A. 0
B. 1
C. 2
D. infinite

---

32 **Function A:** (–20, –22); (–15, –20); (–10, –18); (–5, –16)
Function B:

x	0	2	4	6
y	20	18	16	14

Which comparison statement is correct?

A. Both functions are decreasing.
B. Both functions have a slope of –2.
C. Both functions have a y-intercept of 20.
D. Both functions are linear.

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33 $\sqrt[3]{p} = 27$

Solve for p.

A. 3
B. 19,683
C. 729
D. $\sqrt{27}$

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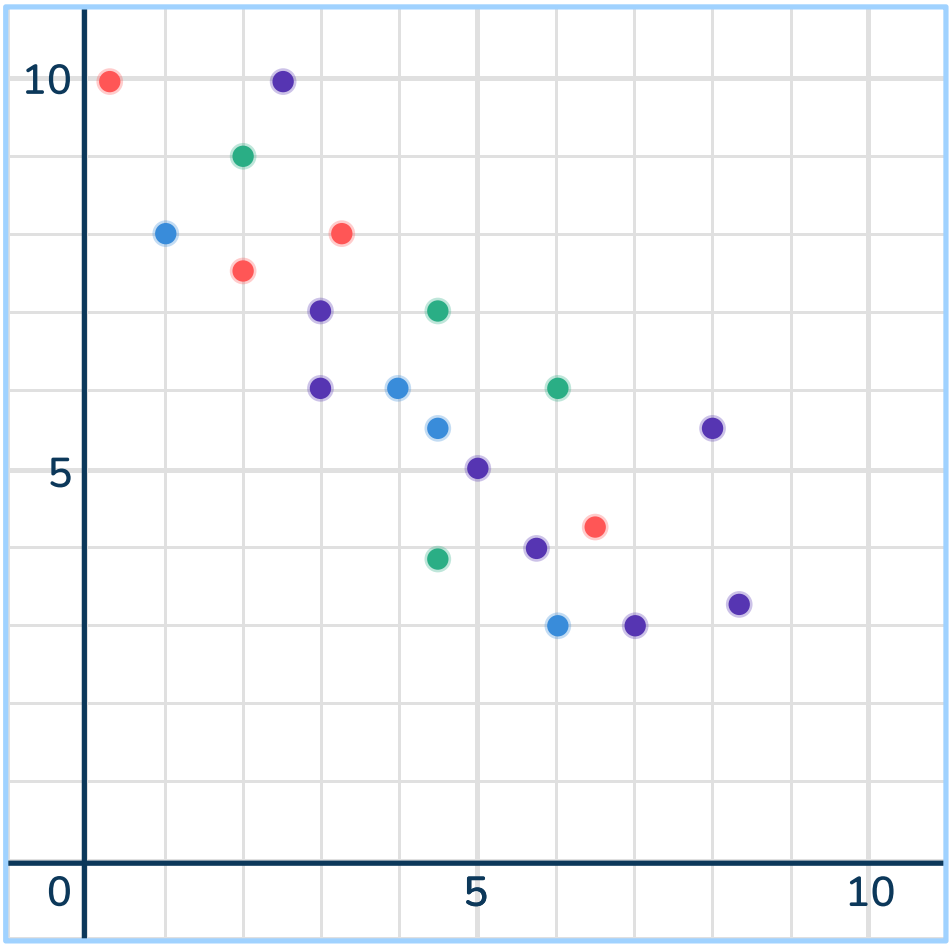
34 Which equation shows a line of best fit for the data?



A. $1.1x + 9.8 = y$
B. $x + 11.2 = y$
C. $10.3 - 0.9x = y$
D. $-x - 10 = y$

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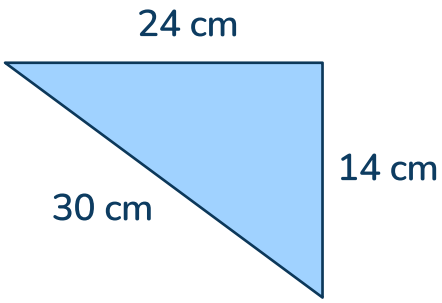
35 Decide whether the triangle is acute, right or obtuse.



A. acute
B. right
C. obtuse
D. More information is needed

---

36 Simplify $\frac{3a^4(a^2)}{\frac{1}{2}a^3}$.

A. $1.5a$
B. $6a^3$
C. $1.5a^5$
D. $6a^2$

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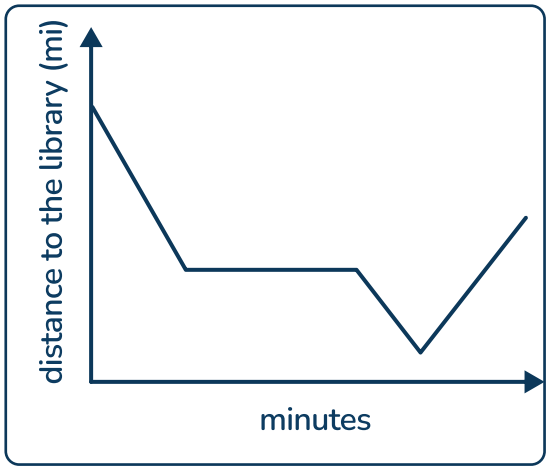
37 The graph shows the distance Lelani is from the library on her bike.



Which statement about the function is true?

A. Leilani started off at the library and then biked away.
B. During the middle of the bike ride, Leilani was moving away from the library.
C. Leilani got close to the library, but never arrived.
D. As the minutes increased, Leilani's distance from the library decreased.

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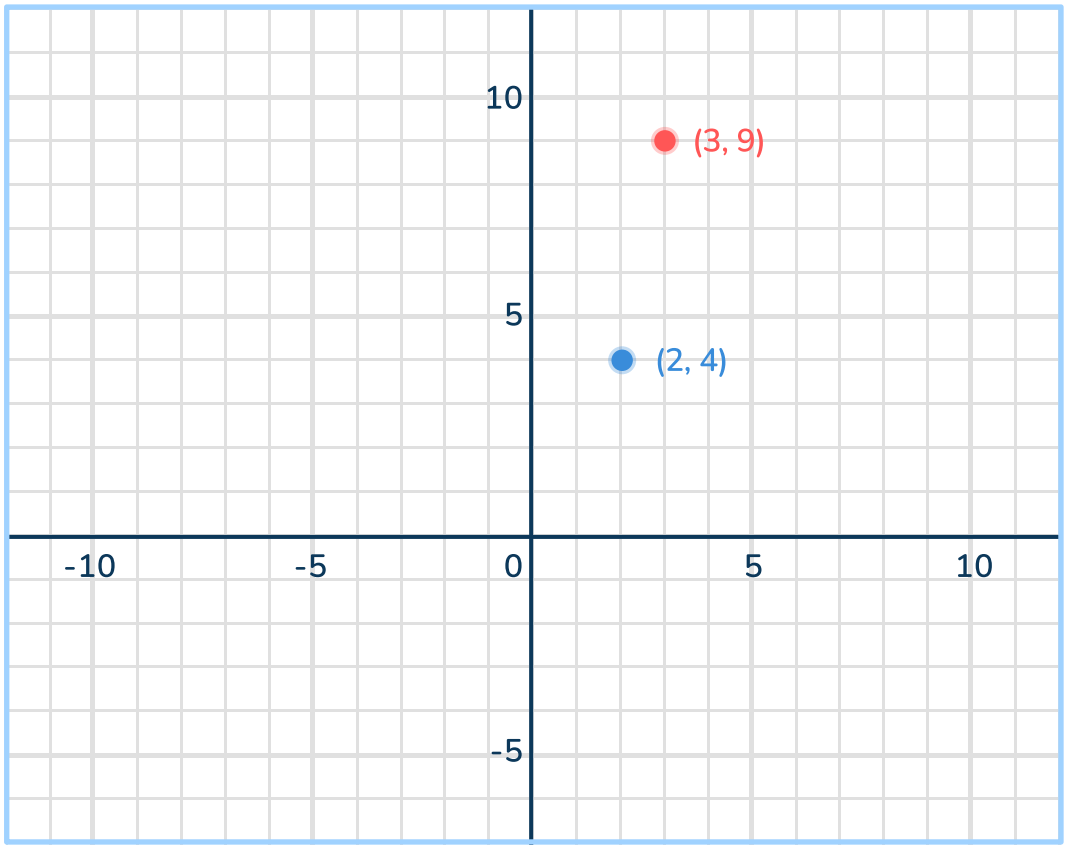
38



Jakob is looking at the graph above. He says the coordinates represent a nonlinear function.
Which coordinate, added to the graph, would make Jakob's statement true?

A. (2, 3)
B. (1, –1)
C. (1, 1)
D. (2.5, 6.5)

---

39 The equation $m = 3{,}291.23 - 600w$ shows how much money (m) Sal still owes after (w) weeks. What does the number 3,291.23 represent in this situation?

A. The amount Sal has paid.
B. The original amount that Sal owed.
C. The amount Sal pays each week.
D. The number of weeks Sal has been paying.

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40 What value for k will make the equation have no solution?

$$6x - 13 + 1 = k(\frac{1}{3}x - 4.5)$$

A. $-\frac{1}{2}$
B. 18
C. 6
D. 0

---

41 Which number is equal to $0.\overline{4}$?

A. 0.4

B. $\frac{44}{100}$

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

D. 0.2

---

42 Which equation represents the graph of a line on the coordinate plane that has an x-intercept of (4, 0) and a y-intercept of (0, 8)?

A. $y = -2x + 8$

B. $y = -12x + 8$

C. $y = 12x - 8$

D. $y = 2x - 8$

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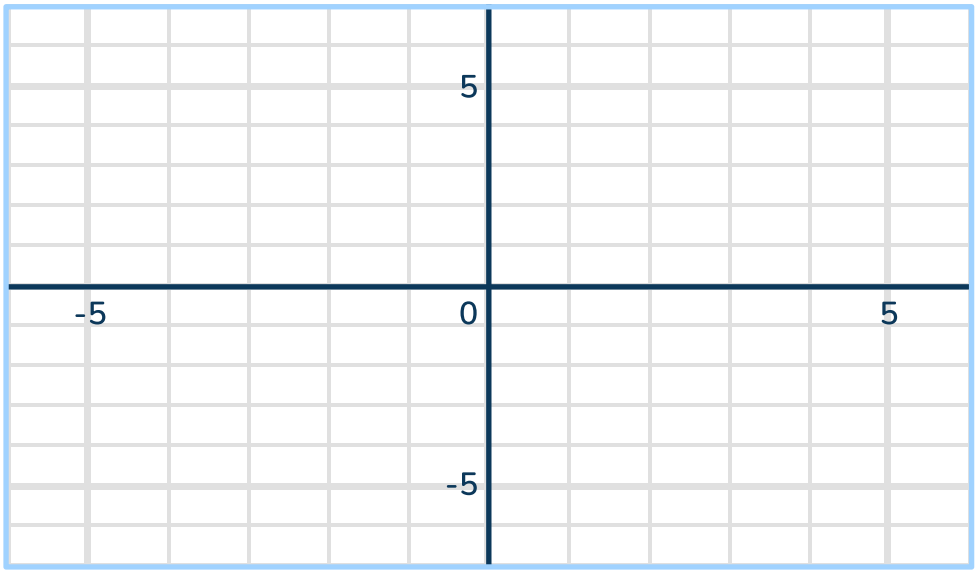
43 △TGS with vertices T(0, –1), G(2, –3), and S(4, –1) will be rotated 180° about the origin. What will be the coordinates of S'?



A. (–4, 1)
B. (4, 1)
C. (4, –1)
D. (–4, –1)

---

44 The height of a rectangle is 8 feet more than its base. The perimeter is 45 feet. Which system of equations could be used to find the dimensions of the rectangle?

A. $\begin{cases} h + 8 = b \\ 2(h + b) = 45 \end{cases}$

B. $\begin{cases} b + 8 = h \\ 2h + 2b = 45 \end{cases}$

C. $\begin{cases} b + h = 8 \\ 4h + 4b = 45 \end{cases}$

D. $\begin{cases} h + 8 = b \\ 4(h + b) = 45 \end{cases}$

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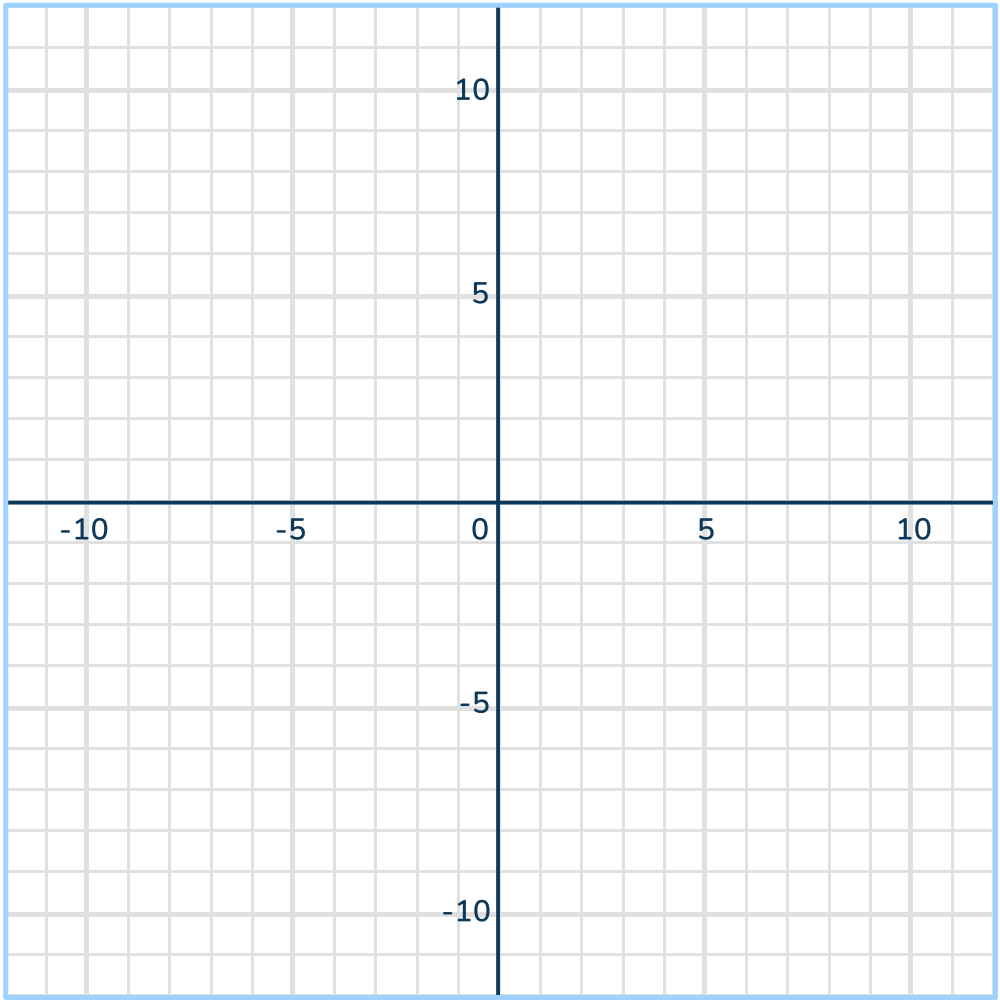
Open Ended Question

45 Quadrilateral ABCD has points A(–3, 2), B(–4, –2), C(3, 3), and D(3, –2). The quadrilateral is dilated by a scale factor of 2 about the origin and then reflected over the line $y = x$.

a. Draw the new quadrilateral.



b. Compared to the original, explain whether the new shape is congruent, similar or neither. Include the effects of the dilation and reflection in your explanation.

_____

_____

_____

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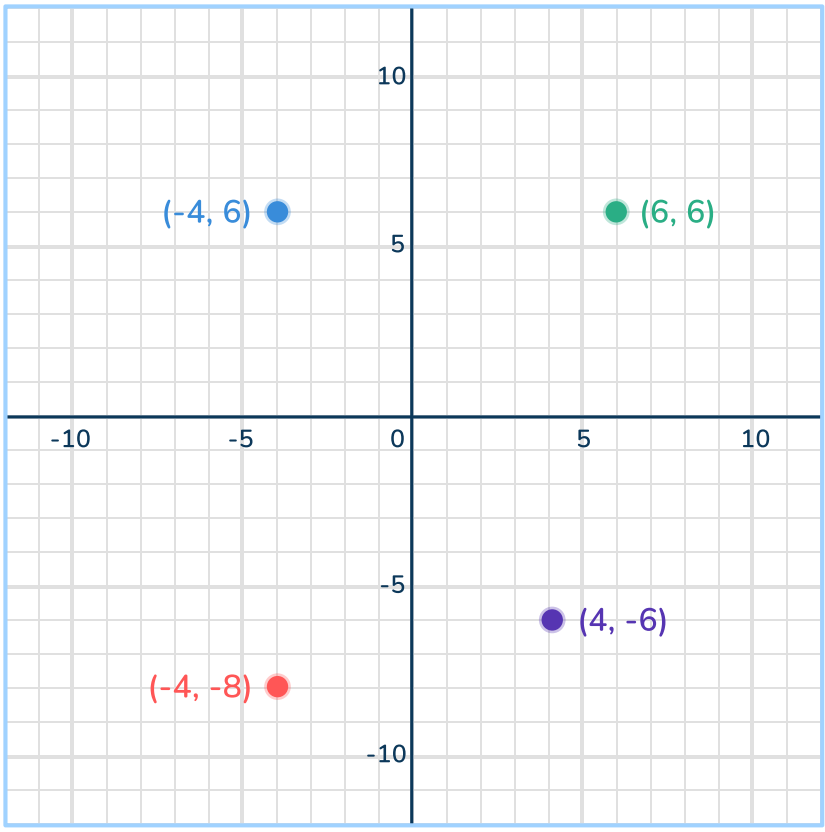
Item	KEY	Rationale
45	4 points	Student correctly identifies the 4 new coordinates.  Student clearly explains that the new shape will be similar, since it was dilated, all the corresponding sides in the original and new shape have the same ratio and the reflection only changes the orientation.
	3 points	Student correctly identifies the 4 new coordinates. The student explains that the new shape will be similar, but some parts of the explanation are incomplete or unclear.
	2 points	Student correctly identifies the 3 out of the 4 new coordinates. Student clearly explains that the new shape will be similar, since it was dilated, all the corresponding sides in the original and new shape have the same ratio and the reflection only changes the orientation.

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Item	KEY	Rationale
	1 point	Student identifies less than 3 of the new coordinates. The student attempts to explain how each coordinate supports the corresponding student's claim, but the explanation is incomplete or unclear.
	0 points	Response is blank or does not include any correct calculations or explanations.

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Answer Key - Multiple Choice

Item number	Correct answer	Standard(s)	DOK
1	B	**M08.B-E.1.1.2**	DOK 1
2	A	**M08.B-E.1.1.3**	DOK 2
3	D	**M08.C-G.2.1.3**	DOK 1
4	C	**M08.A-N.1.1.3**	DOK 2
5	D	**M08.B-E.1.1.1**	DOK 2
6	C	**M08.A-N.1.1.1**	DOK 1
7	B	**M08.B-E.2.1.3**	DOK 1
8	A	**M08.B-E.3.1.4**	DOK 2
9	D	**M08.B-E.1.1.4**	DOK 1
10	A	**M08.C-G.1.1.2**	DOK 1
11	B	**M08.A-N.1.1.5**	DOK 2
12	C	**M08.B-F.1.1.3**	DOK 1
13	A	**M08.B-E.2.1.1**	DOK 2
14	C	**M08.D-S.1.2.1**	DOK 2
15	A	**M08.C-G.3.1.1**	DOK 2
16	B	**M08.B-F.1.1.2**	DOK 2
17	C	**M08.C-G.3.1.1**	DOK 2

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Item number	Correct answer	Standard(s)	DOK
18	A	**M08.A-N.1.1.1**	DOK 2
19	B	**M08.B-F.2.1.2**	DOK 2
20	C	**M08.C-G.2.1.2**	DOK 2
21	A	**M08.B-E.1.1.2**	DOK 1
22	B	**M08.B-F.1.1.1**	DOK 1
23	D	**M08.C-G.1.1.3**	DOK 2
24	C	**M08.B-F.1.1.3**	DOK 2
25	D	**M08.B-E.2.1.1, M08.B-E.2.1.3**	DOK 2
26	C	**M08.B-E.3.1.2**	DOK 1
27	D	**M08.D-S.1.1.1**	DOK 2
28	C	**M08.B-F.1.1.1**	DOK 1
29	C	**M08.D-S.1.1.3**	DOK 2
30	B	**M08.C-G.1.1.1, M08.C-G.2.1.3**	DOK 2
31	A	**M08.B-E.3.1.3**	DOK 1
32	D	**M08.B-F.1.1.2**	DOK 2
33	B	**M08.B-E.1.1.2**	DOK 1
34	C	**M08.D-S.1.1.2**	DOK 1
35	A	**M08.C-G.2.1.1**	DOK 1

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Item number	Correct answer	Standard(s)	DOK
36	B	**M08.B-E.1.1.1**	DOK 2
37	C	**M08.B-F.2.1.2**	DOK 2
38	C	**M08.B-F.1.1.1, M08.B-F.2.1.1**	DOK 2
39	B	**M08.B-E.2.1.3**	DOK 2
40	B	**M08.B-E.3.1.1**	DOK 2
41	C	**M08.A-N.1.1.2**	DOK 1
42	A	**M08.B-E.2.1.3**	DOK 2
43	A	**M08.C-G.1.1.1**	DOK 2
44	B	**M08.B-E.3.1.5**	DOK 1

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ANSWERS SORTED BY STANDARD

CC.2.1.8.E.1, CC.2.1.8.E.4			
Item number	Correct answer	Standard(s)	DOK
4	C	**M08.A-N.1.1.3**	DOK 2
6	C	**M08.A-N.1.1.1**	DOK 1
11	B	**M08.A-N.1.1.5**	DOK 2
18	A	**M08.A-N.1.1.1**	DOK 2
41	C	**M08.A-N.1.1.2**	DOK 1

CC.2.2.8.B.1			
Item number	Correct answer	Standard(s)	DOK
1	B	**M08.B-E.1.1.2**	DOK 1
2	A	**M08.B-E.1.1.3**	DOK 2
5	D	**M08.B-E.1.1.1**	DOK 2
9	D	**M08.B-E.1.1.4**	DOK 1
21	A	**M08.B-E.1.1.2**	DOK 1
33	B	**M08.B-E.1.1.2**	DOK 1
36	B	**M08.B-E.1.1.1**	DOK 2

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CC.2.2.8.B.2			
Item number	Correct answer	Standard(s)	DOK
7	B	**M08.B-E.2.1.3**	DOK 1
13	A	**M08.B-E.2.1.1**	DOK 2
25	D	**M08.B-E.2.1.1, M08.B-E.2.1.3**	DOK 2
39	B	**M08.B-E.2.1.3**	DOK 2
42	A	**M08.B-E.2.1.3**	DOK 2

CC.2.2.8.B.3			
Item number	Correct answer	Standard(s)	DOK
8	A	**M08.B-E.3.1.4**	DOK 2
26	C	**M08.B-E.3.1.2**	DOK 1
31	A	**M08.B-E.3.1.3**	DOK 1
40	B	**M08.B-E.3.1.1**	DOK 2
44	B	**M08.B-E.3.1.5**	DOK 1

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CC.2.2.8.C.1, CC.2.2.8.C.2			
Item number	Correct answer	Standard(s)	DOK
12	C	**M08.B-F.1.1.3**	DOK 1
16	B	**M08.B-F.1.1.2**	DOK 2
19	B	**M08.B-F.2.1.2**	DOK 2
22	B	**M08.B-F.1.1.1**	DOK 1
24	C	**M08.B-F.1.1.3**	DOK 2
28	C	**M08.B-F.1.1.1**	DOK 1
32	D	**M08.B-F.1.1.2**	DOK 2
37	C	**M08.B-F.2.1.2**	DOK 2
38	C	**M08.B-F.1.1.1, M08.B-F.2.1.1**	DOK 2

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CC.2.3.8.A.1, CC.2.3.8.A.2			
Item number	Correct answer	Standard(s)	DOK
10	A	**M08.C-G.1.1.2**	DOK 1
15	A	**M08.C-G.3.1.1**	DOK 2
17	C	**M08.C-G.3.1.1**	DOK 2
23	D	**M08.C-G.1.1.3**	DOK 2
30	B	**M08.C-G.1.1.1, M08.C-G.2.1.3**	DOK 2
43	A	**M08.C-G.1.1.1**	DOK 2
45	Answer shown after open-ended response question	**M08.C-G.1.1.1, M08.C-G.1.1.3**	DOK 2

CC.2.3.8.A.3			
Item number	Correct answer	Standard(s)	DOK
3	D	**M08.C-G.2.1.3**	DOK 1
20	C	**M08.C-G.2.1.2**	DOK 2
35	A	**M08.C-G.2.1.1**	DOK 1

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CC.2.4.8.B.1, CC.2.4.8.B.2			
Item number	Correct answer	Standard(s)	DOK
14	C	**M08.D-S.1.2.1**	DOK 2
27	D	**M08.D-S.1.1.1**	DOK 2
29	C	**M08.D-S.1.1.3**	DOK 2
34	C	**M08.D-S.1.1.2**	DOK 1

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