Tennessee Comprehensive Assessment Program

TCAP

Math | Grade 8
Practice Test
Subpart 1, Subpart 2, & Subpart 3

Student Name

Teacher Name

TN Department of Education

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Test Administrator Instructions:

This practice test has Subpart 1, Subpart 2, and Subpart 3. There is also an answer document and an answer key at the end of this document. It is recommended that you print one copy of this practice test and pull the answer key before copying and distributing the practice test and answer document to your students.

This practice test is representative of the operational test but is shorter than the actual operational test. To see the details about the operational test, please see the blueprints located on the Tennessee Department of Education website.

Directions

Subpart 1 of this Practice Test booklet contains sample items for Grade 8 Math. You may use this test booklet for scratch paper or to make notes, but you must mark your answers on your answer document.

You MAY NOT use a calculator in Subpart 1 of this test booklet.

Sample 1: Selected-Response

1. Which expressions are equivalent to 4(9 + 3)?

A. 4(12)

B. 36 + 3

C. 36 + 12

D. 4 + (9 + 3)

E. (9 + 3) + (9 + 3) + (9 + 3) + (9 + 3)

Sample 2: Table

2. Mark **True** or **False** in the table on your answer document to indicate whether each comparison is true.

	True	False
$3^2 < \frac{4}{9} + \frac{2}{3}$	○	○
$2(2^3 + 14 \bullet 2) \geq 9 \bullet 8$	○	○
$16.2 \bullet 3 - 24.6 < 72 \div 3 + 2.78$	○	○

1. What value of coefficient b makes the equation true for any real number x?

$$-3(2x - 3) + 5x = bx + 9$$

A. −6

B. −1

C. −21

D. 7

2. Toby has a spherical beach ball with a diameter of 10 inches. Malcolm has a spherical beach ball with a radius of 7 inches. Which expression represents the difference in the volumes of the two beach balls?

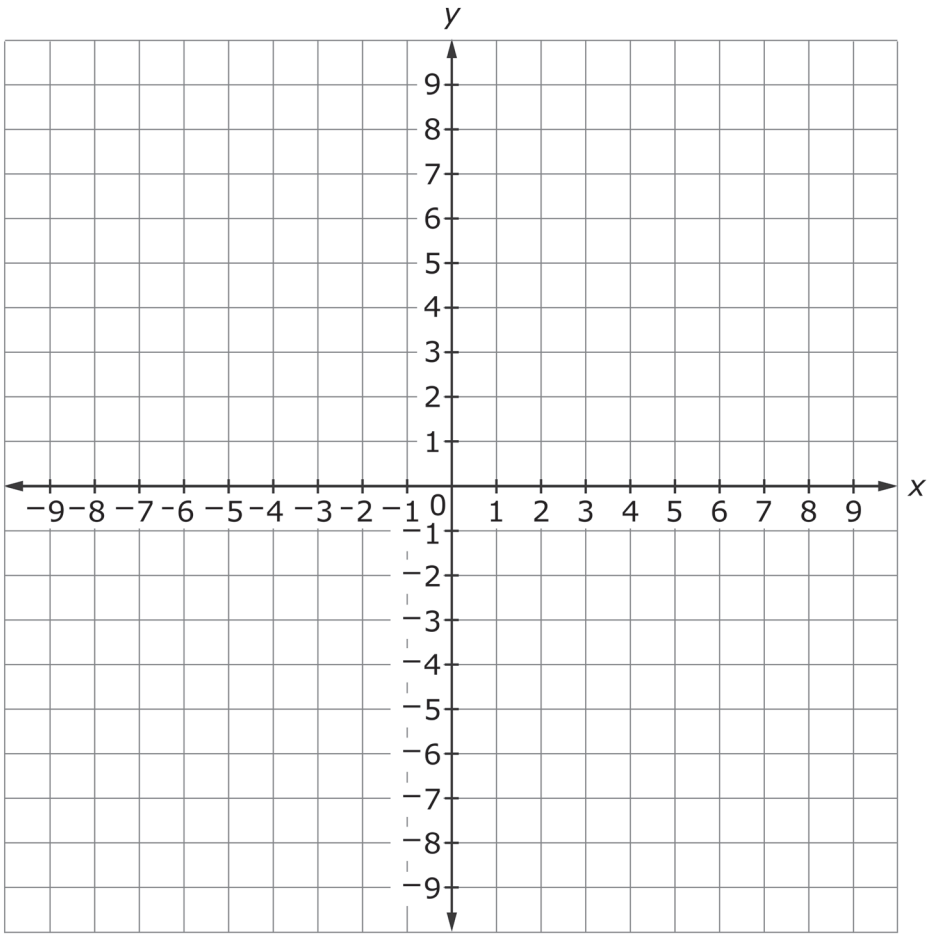
A. $\frac{4}{3}\pi(7^2) - \frac{4}{3}\pi(5^2)$

B. $\frac{4}{3}\pi(10^2) - \frac{4}{3}\pi(7^2)$

C. $\frac{4}{3}\pi(7^3) - \frac{4}{3}\pi(5^3)$

D. $\frac{4}{3}\pi(10^3) - \frac{4}{3}\pi(7^3)$

3. On the coordinate plane on your answer document, plot **five** points that represent a function.



4. Given the expression $\frac{(2^{-3})(2^5)}{(2^7)}$, select **all** equivalent numerical expressions.

A. $(2^{-3+5})(2^{-7})$

B. $\frac{2^5}{2^{3-7}}$

C. $\frac{2^5}{2^{10}}$

D. $(2^5)(2^{-4})$

E. $\frac{1}{32}$

F. 32

5. A baby weighs 7 pounds at birth. The table shows the birth weight after each month of life, up to the sixth month.

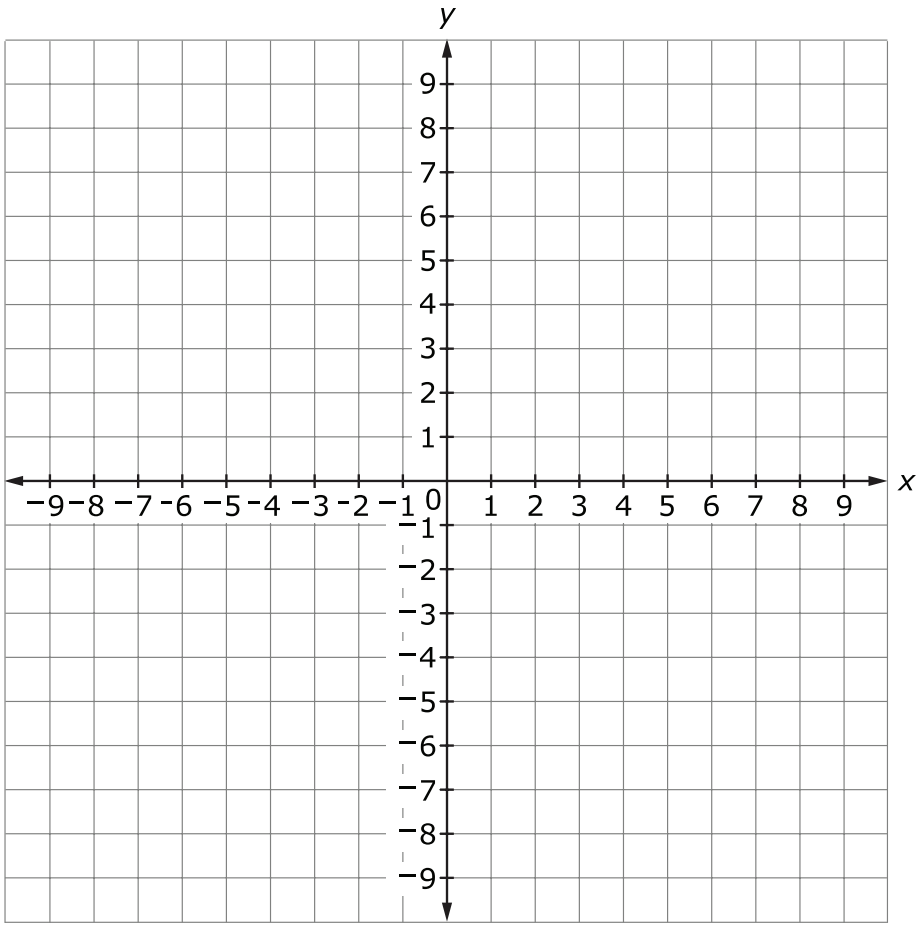
Month	Weight (pounds)
0	7
1	8
2	9
3	10
4	11
5	12
6	13

Write an equation in the form of $y = mx + b$ that can be used as a linear model of these data.

Write your answer in the space provided on your answer document.

6. A triangle has vertices $R(1, 2)$, $S(3, 3)$ and $T(-3, 4)$. The triangle will be reflected over the x-axis.

On the coordinate grid on your answer document, create triangle $R'S'T'$, the image of triangle RST. Label each vertex.



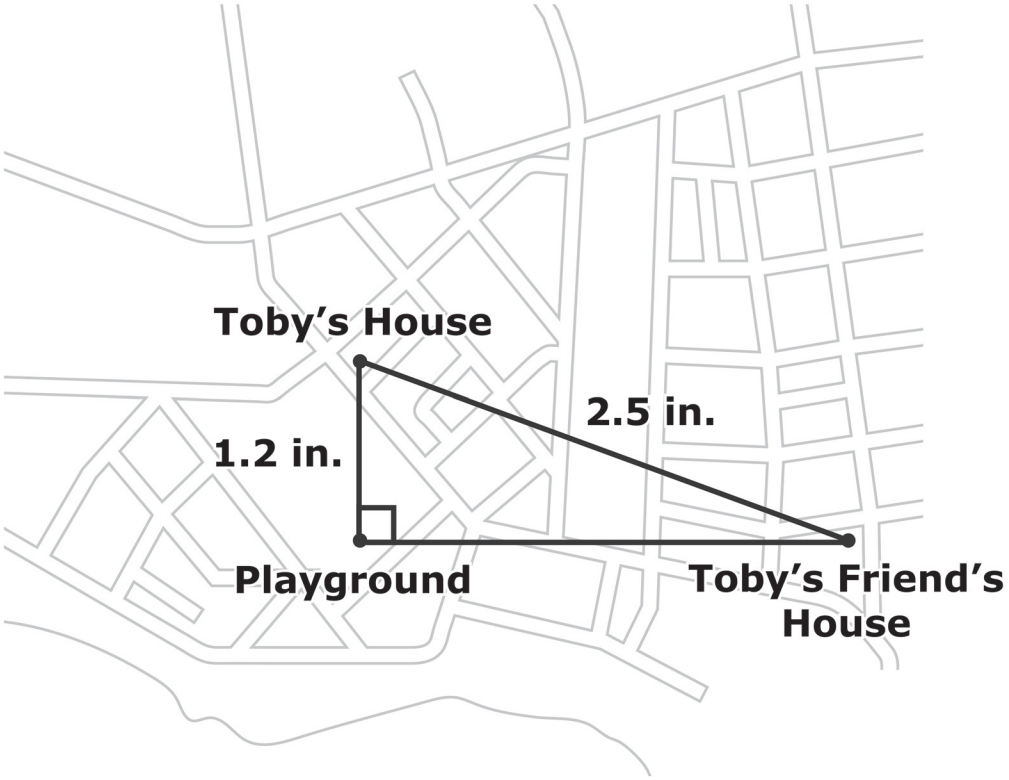
7. Look at the table below. On your answer document, mark "Irrational" if the number is an irrational number, and "Rational" if the number is a rational number.

	Irrational	Rational
1.33333...	○	○
5	○	○
$\sqrt{4}$	○	○
$\sqrt{7}$	○	○
2.5	○	○
π	○	○

8. Look at the irrational expressions below. On your answer document, match the Irrational Expression on the left to the **closest** Approximate Value on the top.

Irrational Expression	**Approximate Value**			
	6.71	3.40	5.27	5.50
$\frac{2}{3}\sqrt{26}$	○	○	○	○
$3\sqrt{5}$	○	○	○	○
1.75π	○	○	○	○
$\frac{\sqrt{111}}{2}$	○	○	○	○

9. Toby has created a map of his neighborhood. When he drew the map he noticed his house, his friend's house, and the playground formed a right triangle.



Which expression represents the distance, in inches, between Toby's friend's house and the playground?

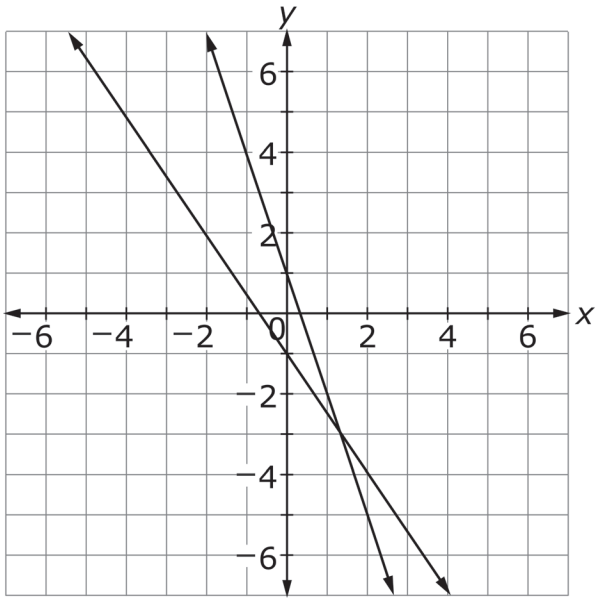
A. $\sqrt{2.5 - 1.2}$

B. $\sqrt{2.5^2 - 1.2^2}$

C. $\sqrt{2.5 + 1.2}$

D. $\sqrt{2.5^2 + 1.2^2}$

10. The system of linear equations shown is graphed on the coordinate plane.



What is the approximate solution for the system of linear equations?

A. (1, –3)

B. (–3, 1.3)

C. (1.3, –3)

D. (–3, 1)

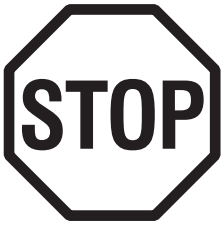
11. The value of an irrational number expression is estimated to be between 18 and 19. Which could be the expression?

A. $\left(\sqrt{2}\right)^9$

B. $\left(\sqrt{3}\right)^5$

C. $\left(\sqrt{6}\right)^3$

D. $\left(\sqrt{7}\right)^3$



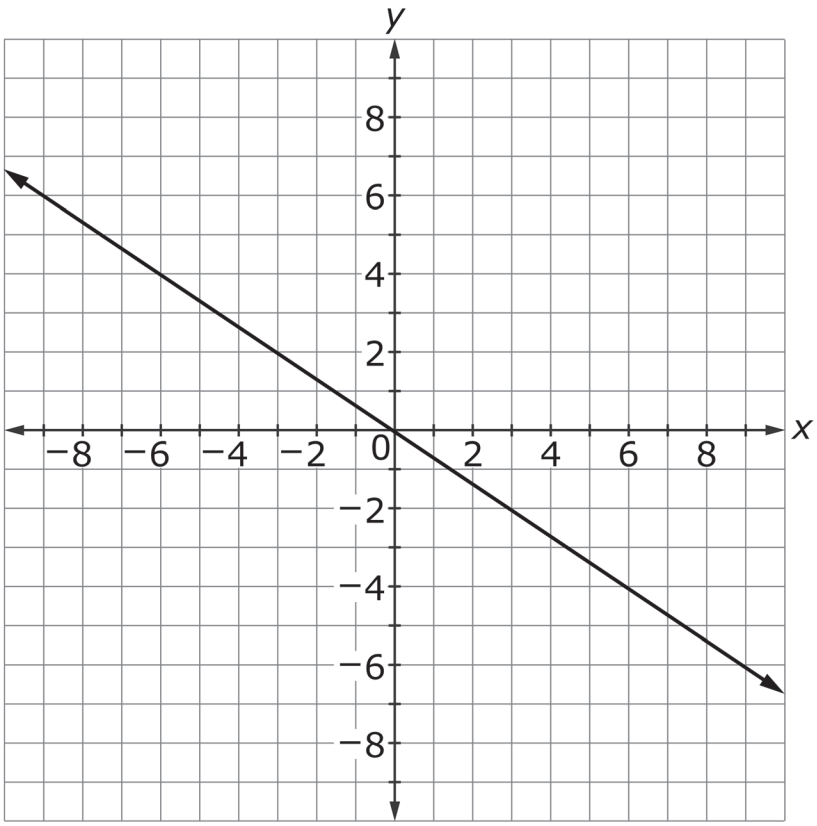
This is the end of Subpart 1 of the Grade 8 Math Practice Test.
Proceed to Subpart 2.

Directions

Subpart 2 of this Practice Test booklet contains sample items for Grade 8 Math. You may use this test booklet for scratch paper or to make notes, but you must mark your answers on your answer document.

You MAY use a calculator in Subpart 2 of this test booklet.

12. The graph displays a linear function.

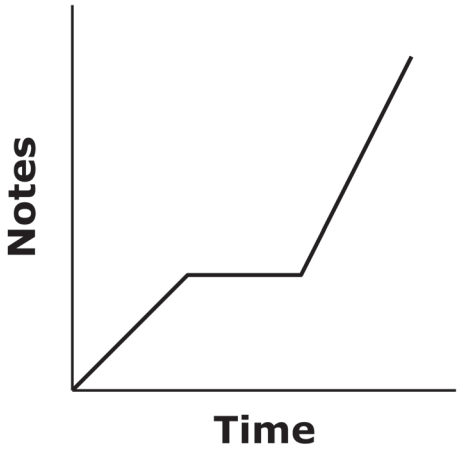


Write the equation of the linear function in the form $y = mx + b$.

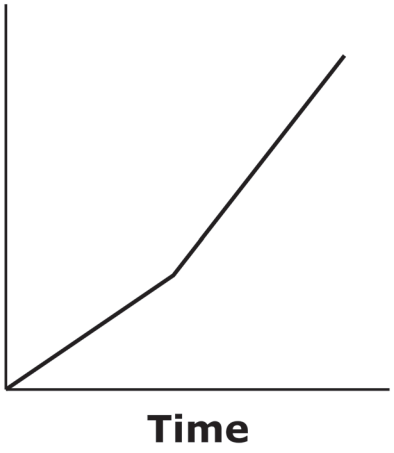
Write your answer in the space provided on your answer document.

13. Kari plays a certain number of notes in a set amount of time on the piano. She rests for an equal amount of time, then plays fewer notes in the same amount of time it took her to play the first set of notes. Which graph can be used to represent the situation?

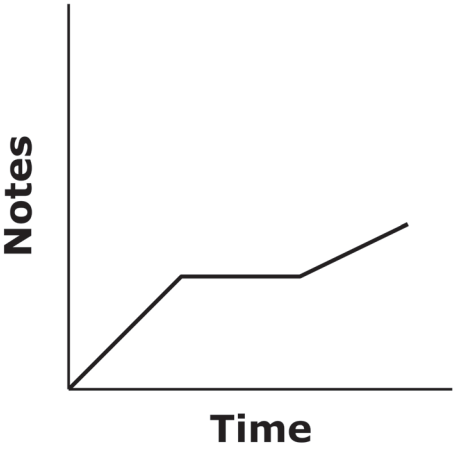
A.



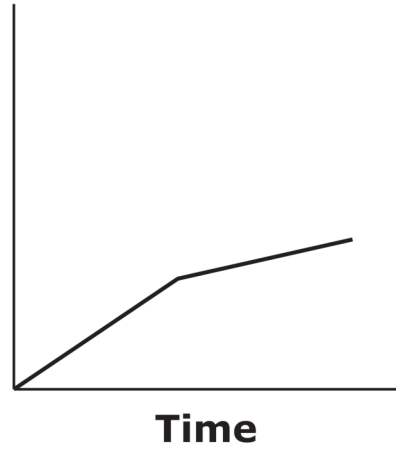
C.



B.



D.



14. Three towns, *A*, *B*, and *C*, can be considered as the vertices of a triangle.

- The distance from town *A* to town *B* is 224 miles.
- The distance from town *B* to town *C* is 260 miles.
- The distance from town *A* to town *C* is 132 miles.

Mark **one** choice from the box in **each** sentence to correctly complete the sentence on your answer document.

If the three towns are the vertices of a right triangle, then the length of the hypotenuse is

○ 132
○ 224
○ 260

miles.

If the three towns are the vertices of a right triangle,

then

○ $132^2 + 224^2 = 260^2$
○ $224^2 - 132^2 = 260^2$
○ $132^2 + 260^2 = 224^2$

.

Therefore, the three towns

○ are
○ are not

the vertices of a right triangle.

15. A car dealership polled customers on their preferred type of vehicle, car or truck, and recorded the results based on the gender of the customer.

		Type of Preferred Vehicle		
		Car	Truck	Total
Gender	Male	45	40	85
	Female	35	30	65

Is there an association between type of preferred vehicle and gender?

A. No; 53% of all customers preferred cars and 47% preferred trucks, so the percentages are roughly the same.

B. No; 53% of men preferred cars and 47% preferred trucks. The percentages for women are roughly the same.

C. Yes; 30% of all customers were men who preferred cars, while 23% were women who preferred cars.

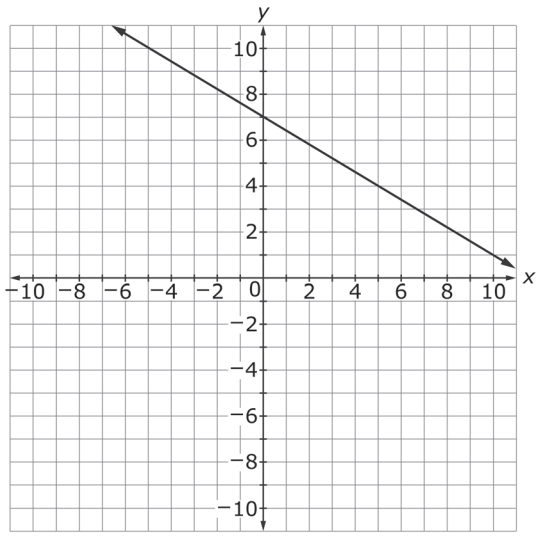
D. Yes; 57% of the customers were men, which is a higher percentage than the 43% of the customers who were women.

16. Presley fills a cup in the shape of a cone with water. The cup has a diameter of 3.6 inches and a height of 6 inches. What is the volume, in cubic inches, of water Presley will use to completely fill the cup?

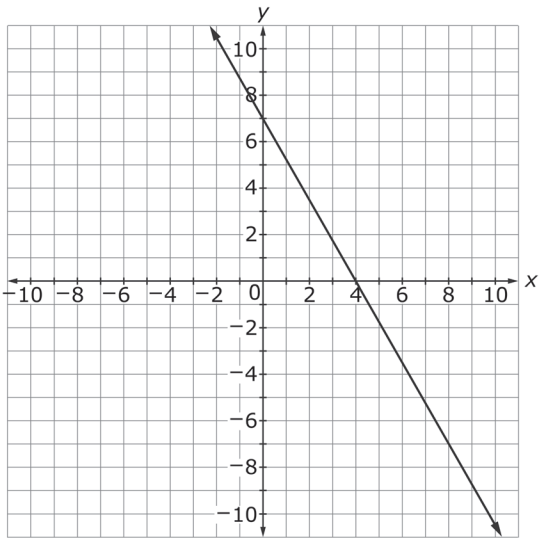
Write your answer in the space provided on your answer document.

17. What is the graph of the linear function $y = -\frac{3}{5}x + 7$?

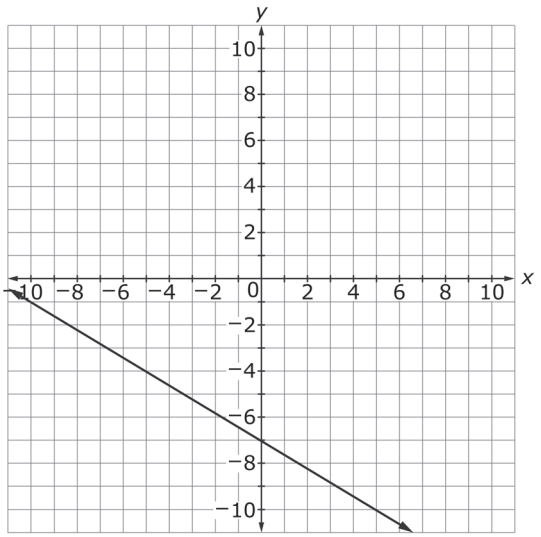
A.



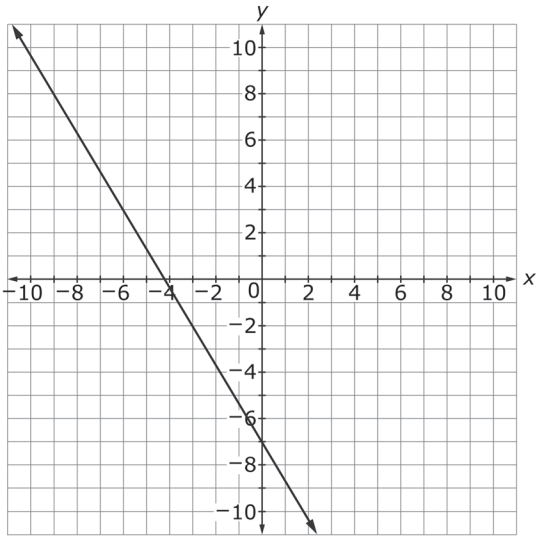
C.



B.



D.



18. Determine if each of the following equations has one rational solution or two rational solutions.

Solve each equation below. On your answer document, mark "One" if the equation has one rational solution, and "Two" if the equation has two rational solutions.

	One	Two
$x^2 = 1$	○	○
$x^3 = 8$	○	○
$x^2 = 0$	○	○
$x^2 = 16$	○	○
$x^3 = \frac{1}{27}$	○	○

19. What is the volume of a sphere with an 18-inch diameter?

Write your answer in the space provided on your answer document.

20. For $1200, a business can post an advertisement for 30 days. For $1500, the advertisement will be posted for 60 days. The relationship comparing cost to days is linear. Which function can be used to model the relationship between cost, y, and the number of days, x, that an advertisement will be posted?

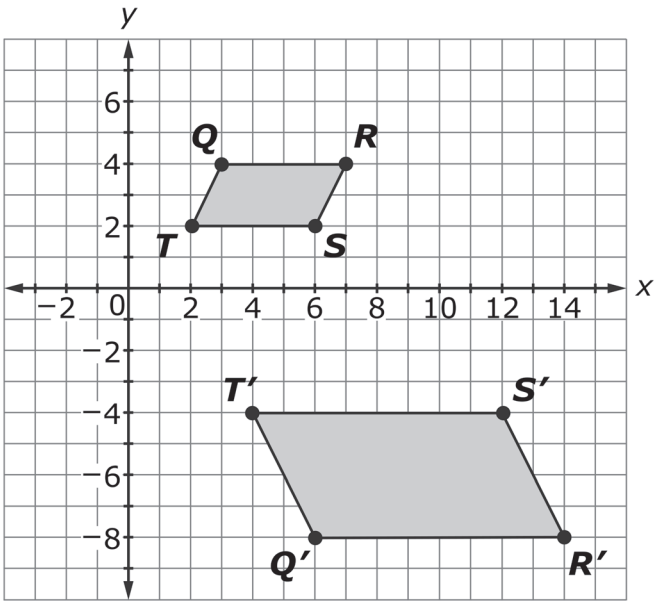
A. $y = 300x + 1200$

B. $y = 1200x + 300$

C. $y = 10x + 900$

D. $y = 900x + 10$

21. Quadrilateral *QRST* and its image, *Q′R′S′T′*, are shown.



What is the sequence of transformations that results in quadrilateral *QRST* being mapped onto quadrilateral *Q′R′S′T′*?

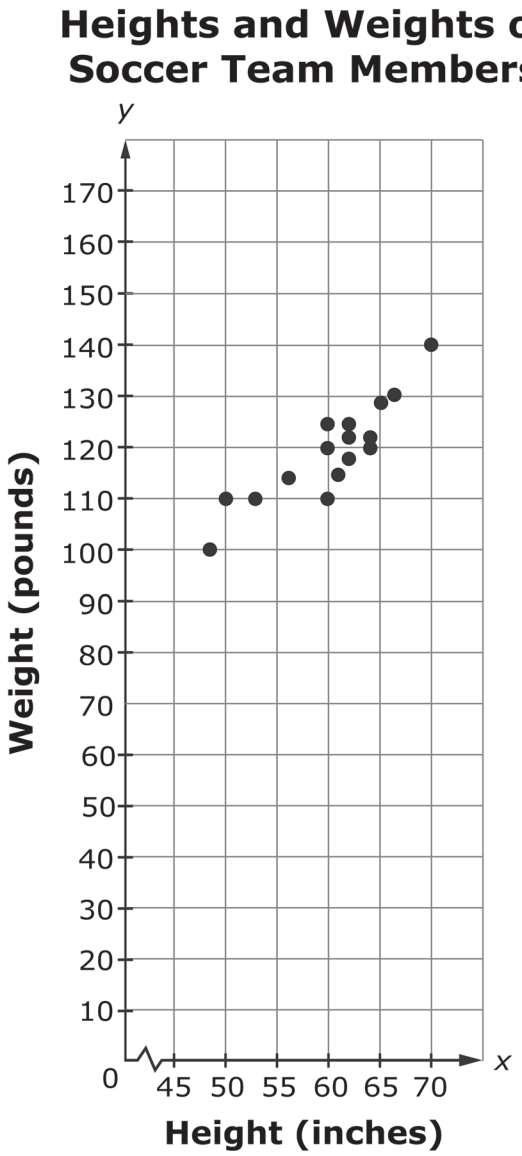
A. reflection over the *x*-axis, followed by a dilation about the origin by a scale factor of 2

B. 90° clockwise rotation about the origin, followed by a dilation about the origin by a scale factor of 2

C. dilation about the origin by a scale factor of 2, followed by a translation 2 units right and then 2 units down

D. 270° counterclockwise rotation about the origin, followed by a dilation about the origin by a scale factor of 2

22. Raul recorded the height, in inches, and weight, in pounds, of each of his soccer team members. Then he graphed the data in the scatter plot shown.



Select **all** true statements about the scatter plot of the data.

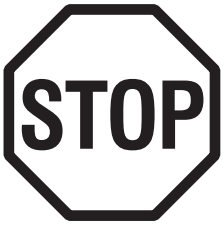
A. The data have a linear association.

B. The data have a negative association.

C. There are no obvious outliers.

D. The data are clustered about the height of 55 inches.

E. As height increases, so does weight.



This is the end of Subpart 2 of the Grade 8 Math Practice Test.
Proceed to Subpart 3.

Directions

Subpart 3 of this Practice Test booklet contains sample items for Grade 8 Math. You may use this test booklet for scratch paper or to make notes, but you must mark your answers on your answer document.

You MAY use a calculator in Subpart 3 of this test booklet.

23. Which equation represents a linear function?

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

B. $y = \frac{1}{2}(x - 3) - 2x$

C. $y = \frac{1}{2}x^2 + 3x - 1$

D. $y = \frac{1}{2}x(2x - 1) + 3$

24. Molly earns $6 for each hour she babysits plus $10 to cover any personal expenses. Suzie earns $4 for each hour she babysits plus $24 to cover personal expenses. At a certain point, Molly and Suzie will work the same number of hours and earn the same amount of money. At this point, how much money will each girl earn?

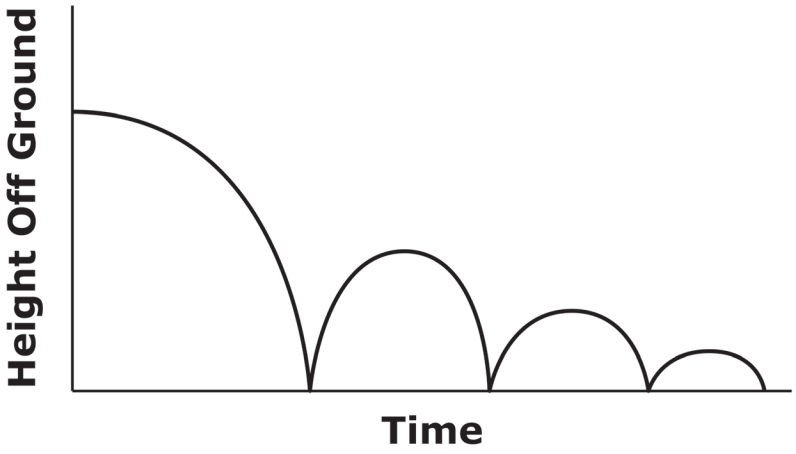
A. $34

B. $44

C. $52

D. $62

25. A graph is shown.



Which scenario could be modeled by the graph?

A. A ball is dropped and bounces on the ground before stopping.

B. A ball is thrown upward, comes back down, and bounces on the ground before stopping.

C. Four balls are dropped on the ground.

D. Four balls are thrown upward and come back down.

26. The table represents Sarah's recorded earnings for her small custom paintings.

Number of Paintings	Earnings (dollars)
3	$18
7	$42
12	$72

If Sarah wants to increase her earnings by 50% for each painting, what equation would represent her earnings?

A. $y = 3x$

B. $y = 6x$

C. $y = 9x$

D. $y = 12x$

27. Select **all** equations that have infinitely many solutions.

A. $2x + 5 = 4 + 2x + 1$

B. $5x - 5 = 11x + 2 - 1$

C. $3x + 2 - 2x = x + 2$

D. $4x + 5 = -4x + 5$

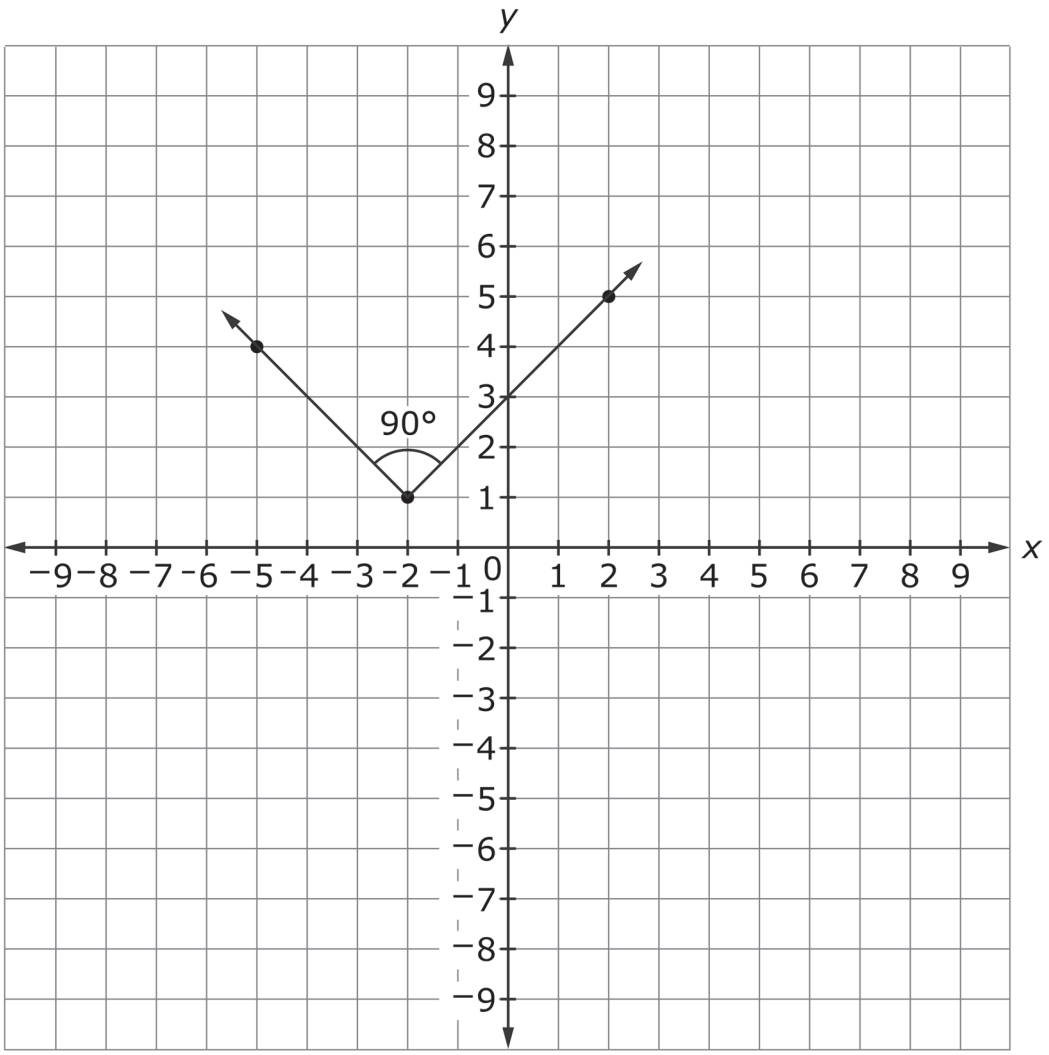
E. $3x + 4 = 3 + 3x + 1$

28. A cell phone company charges $20 for a customer to open a new account and $35 for each month of phone service.

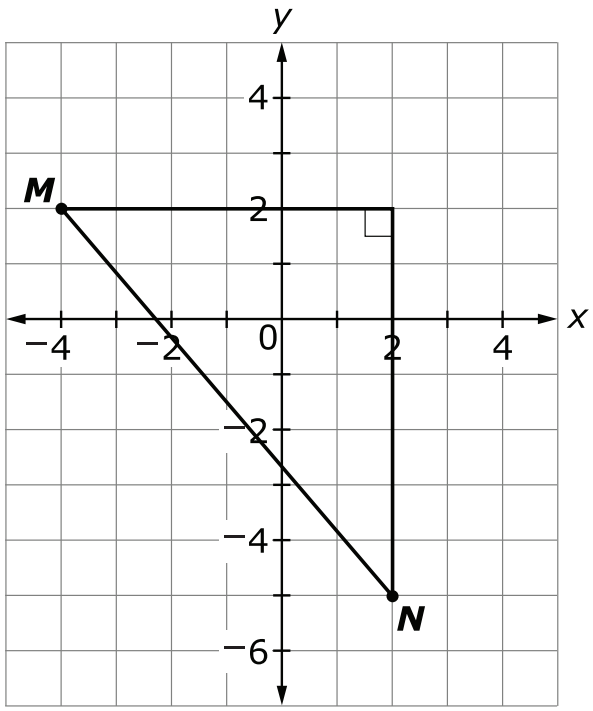
Write a linear function to represent the total cost, y, a new customer would pay for x months of service.

Write your answer in the space provided on your answer document.

29. A right angle has a vertex at (−2, 1). Construct a new right angle that is the image of the right angle shown after a reflection over the *x*-axis.



30. The points $M(-4, 2)$ and $N(2, -5)$ are plotted on the coordinate plane.



Select **all** expressions that represent the distance between points M and N.

A. $7^2 - 6^2$

B. $\sqrt{85}$

C. $\sqrt{36 + 49}$

D. $\sqrt{7 + 6}$

E. $\sqrt{13}$

31. The diameter of the Sun is approximately 1,400,000 kilometers, while the diameter of Saturn is approximately 1.2×10^5 kilometers. How many kilometers larger is the diameter of the Sun than the diameter of Saturn?

A. 1.28×10^6

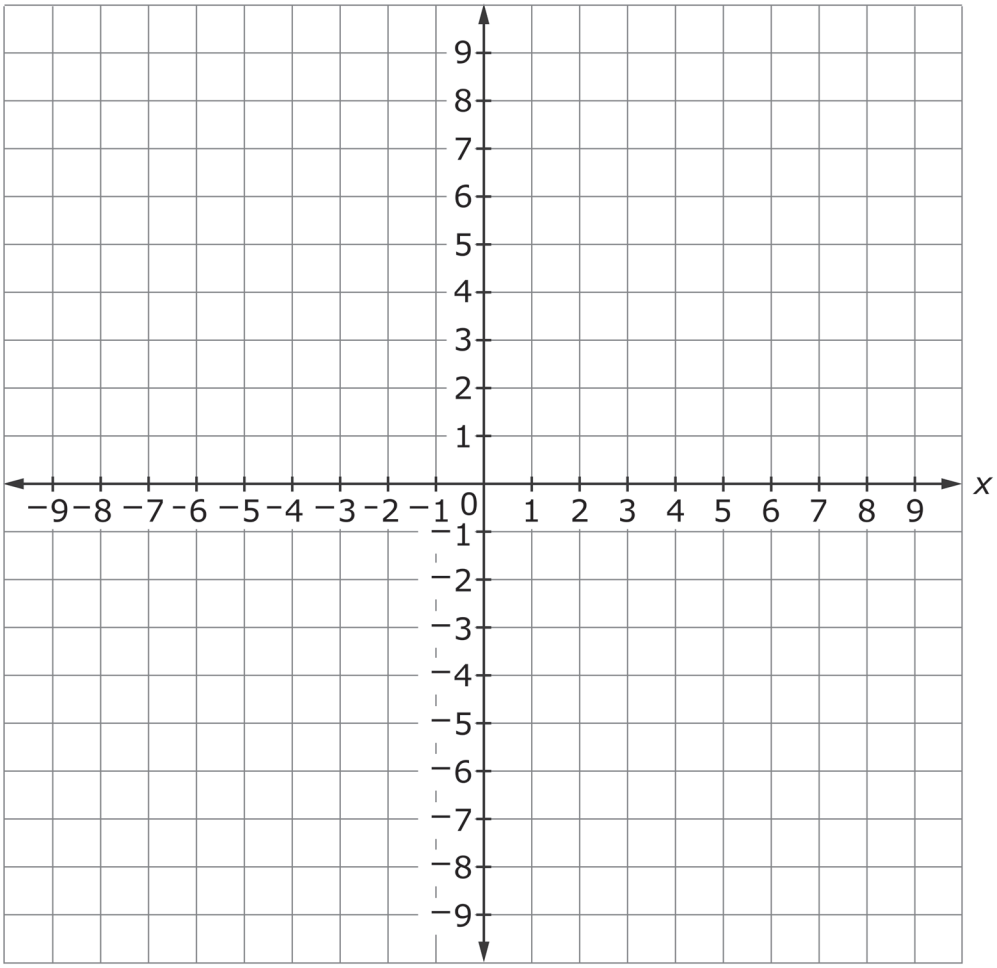
B. 1.52×10^6

C. 1.28×10^7

D. 1.58×10^7

32. Rectangle *ABCD* has the vertices (–2, 1), (2, 1), (2, –2), and (–2, –2).

Rectangle *ABCD* is dilated by a scale factor of 2. Create the image of *A′B′C′D′*.



33. Select **all** the functions that are **not** linear.

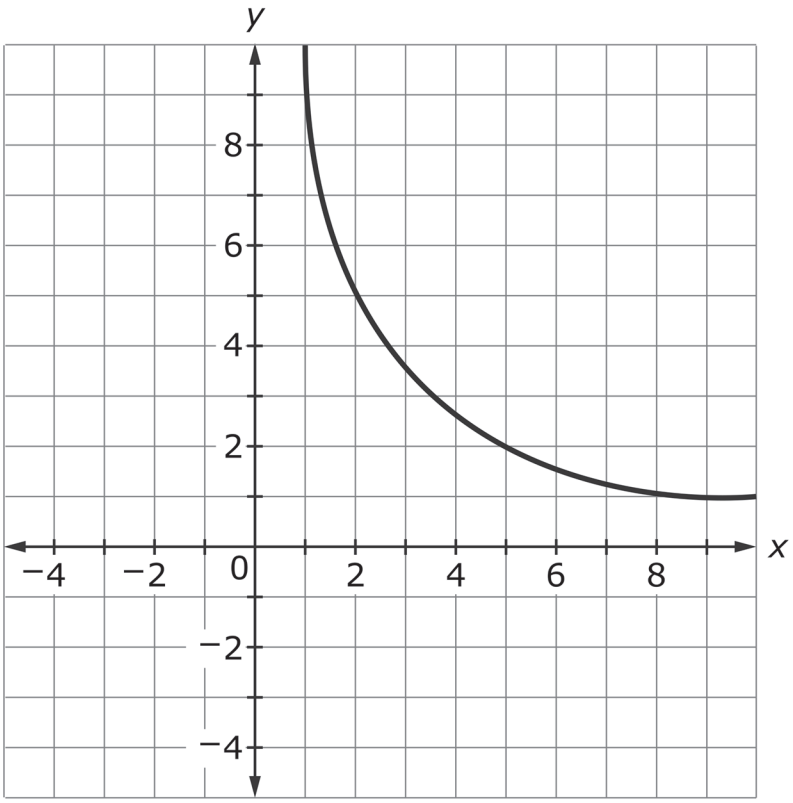
A.

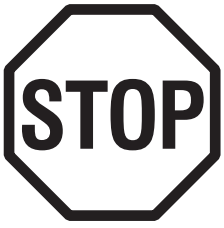
x	−3	−2	0	1	3	4
y	5	4	3	2	1	0

B. $y = \frac{1}{2}(x - 1) + 3x$

C. $y = 3x(x - 2) + 5$

D.





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TNReady Math Reference Sheet—Grade 8

1 inch = 2.54 centimeters	1 cup = 8 fluid ounces
1 meter = 39.37 inches	1 pint = 2 cups
1 mile = 5,280 feet	1 quart = 2 pints
1 mile = 1,760 yards	1 gallon = 4 quarts
1 mile = 1.609 kilometers	1 gallon = 3.785 liters
1 kilometer = 0.62 mile	1 liter = 0.264 gallons
	1 liter = 1000 cubic centimeters
1 pound = 16 ounces	
1 pound = 0.454 kilograms	Pythagorean Theorem: $a^2 + b^2 = c^2$
1 kilogram = 2.2 pounds	
1 ton = 2000 pounds	

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Name: _____

Subpart 1 Sample Questions

1. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

2.

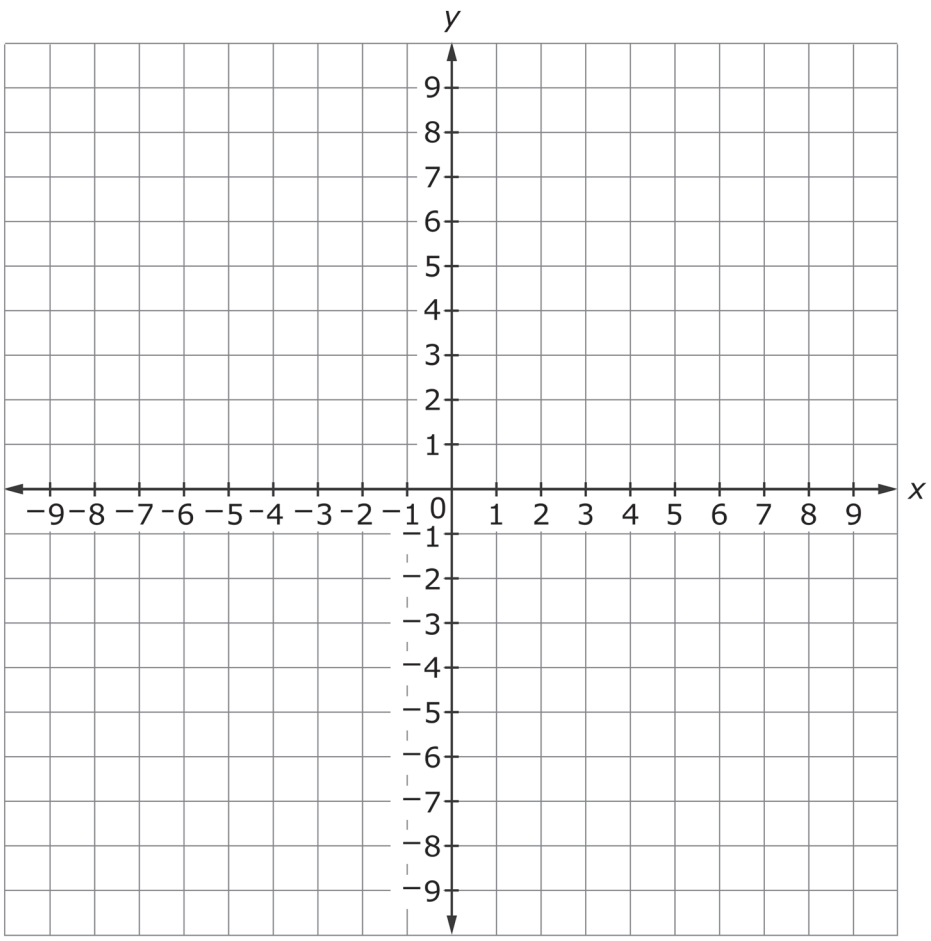
	True	False
$3^2 < \frac{4}{9} + \frac{2}{3}$	○	○
$2(2^3 + 14 \bullet 2) \geq 9 \bullet 8$	○	○
$16.2 \bullet 3 - 24.6 < 72 \div 3 + 2.78$	○	○

Subpart 1 Practice Test Questions

1. Ⓐ Ⓑ Ⓒ Ⓓ

2. Ⓐ Ⓑ Ⓒ Ⓓ

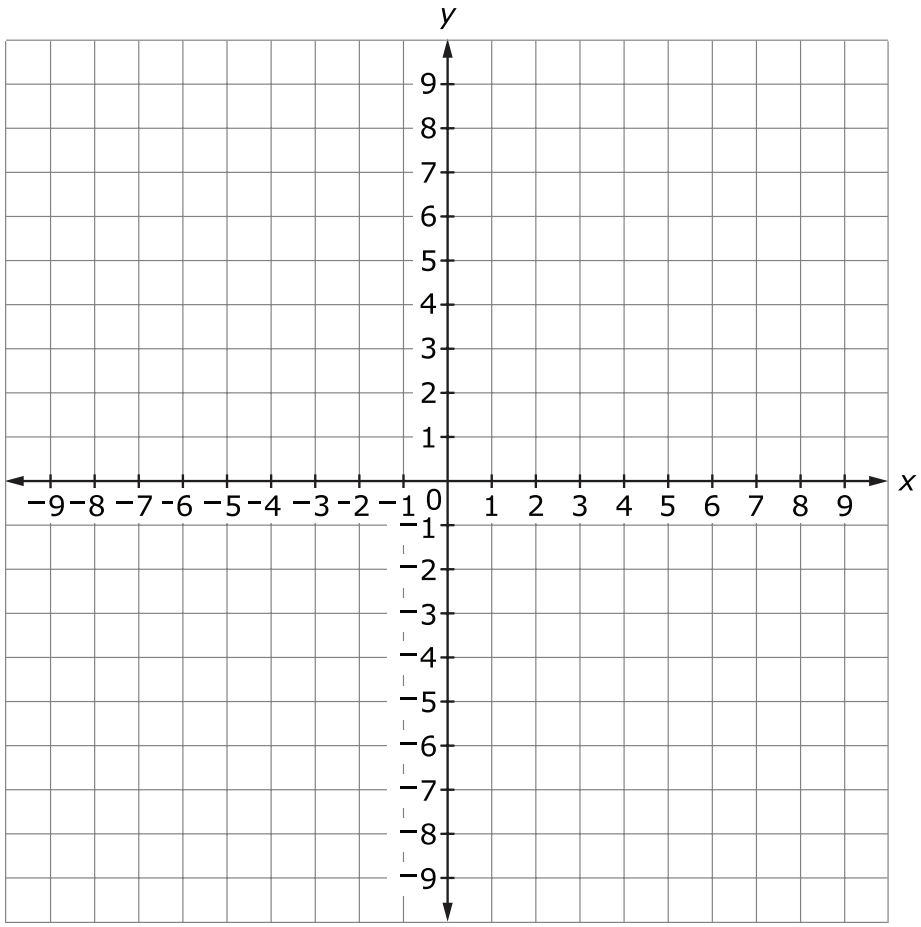
3.



4. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓕ

5.

6.



7.

	Irrational	Rational
1.33333...	○	○
5	○	○
$\sqrt{4}$	○	○
$\sqrt{7}$	○	○
2.5	○	○
π	○	○

8.

Irrational Expression	Approximate Value			
	6.71	3.40	5.27	5.50
$\frac{2}{3}\sqrt{26}$	○	○	○	○
$3\sqrt{5}$	○	○	○	○
1.75π	○	○	○	○
$\frac{\sqrt{111}}{2}$	○	○	○	○

9. Ⓐ Ⓑ Ⓒ Ⓓ

10. Ⓐ Ⓑ Ⓒ Ⓓ

11. Ⓐ Ⓑ Ⓒ Ⓓ

Subpart 2 Practice Test Questions

12.

13. Ⓐ Ⓑ Ⓒ Ⓓ

14.

- ○ 132
- ○ 224
- ○ 260

- ○ $132^2 + 224^2 = 260^2$
- ○ $224^2 - 132^2 = 260^2$
- ○ $132^2 + 260^2 = 224^2$

- ○ are
- ○ are not

15. Ⓐ Ⓑ Ⓒ Ⓓ

16.

17. Ⓐ Ⓑ Ⓒ Ⓓ

18.

	One	Two
$x^2 = 1$	○	○
$x^3 = 8$	○	○
$x^2 = 0$	○	○
$x^2 = 16$	○	○
$x^3 = \frac{1}{27}$	○	○

19.

20. Ⓐ Ⓑ Ⓒ Ⓓ

21. Ⓐ Ⓑ Ⓒ Ⓓ

22. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

Subpart 3 Practice Test Questions

23. Ⓐ Ⓑ Ⓒ Ⓓ

24. Ⓐ Ⓑ Ⓒ Ⓓ

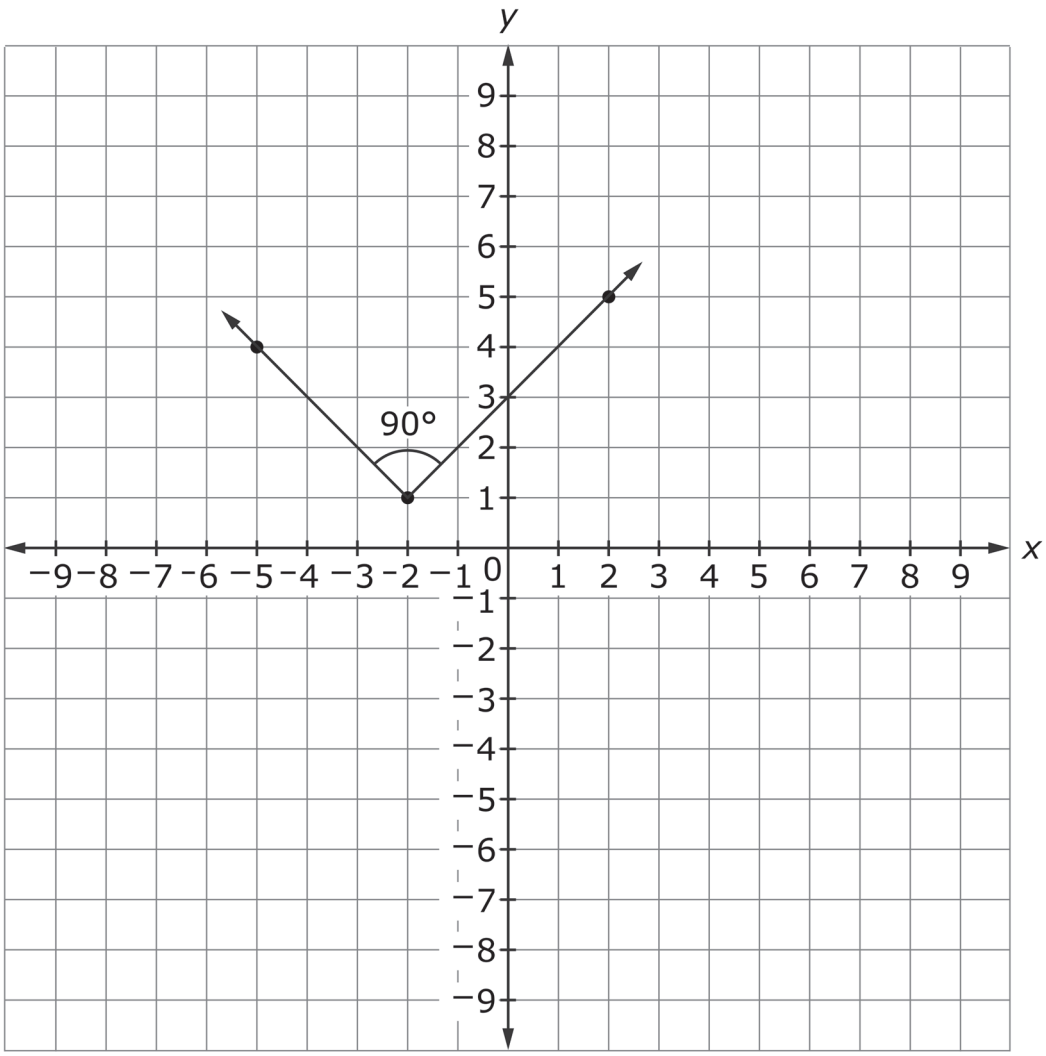
25. Ⓐ Ⓑ Ⓒ Ⓓ

26. Ⓐ Ⓑ Ⓒ Ⓓ

27. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

28.

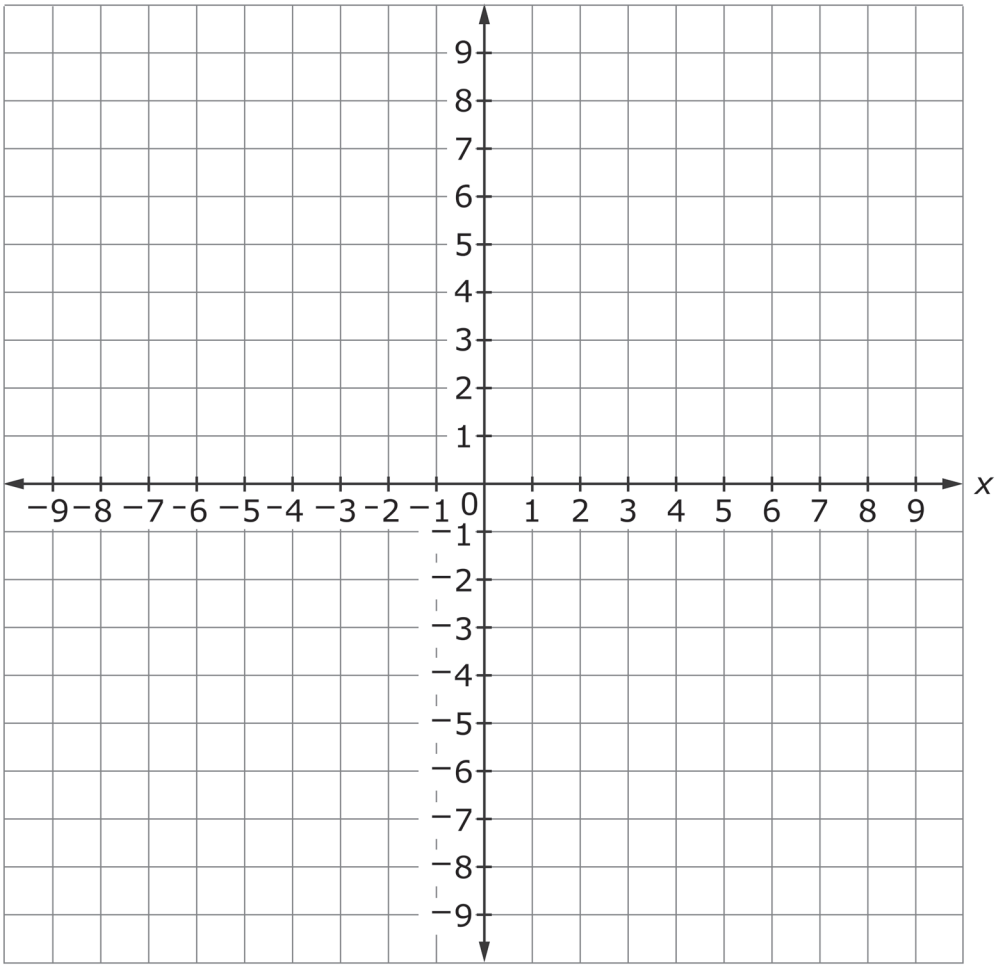
29.



30. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

31. Ⓐ Ⓑ Ⓒ Ⓓ

32.



33. Ⓐ Ⓑ Ⓒ Ⓓ

Subpart 1 Sample Questions

1. ● Ⓑ ● Ⓓ ●

2.

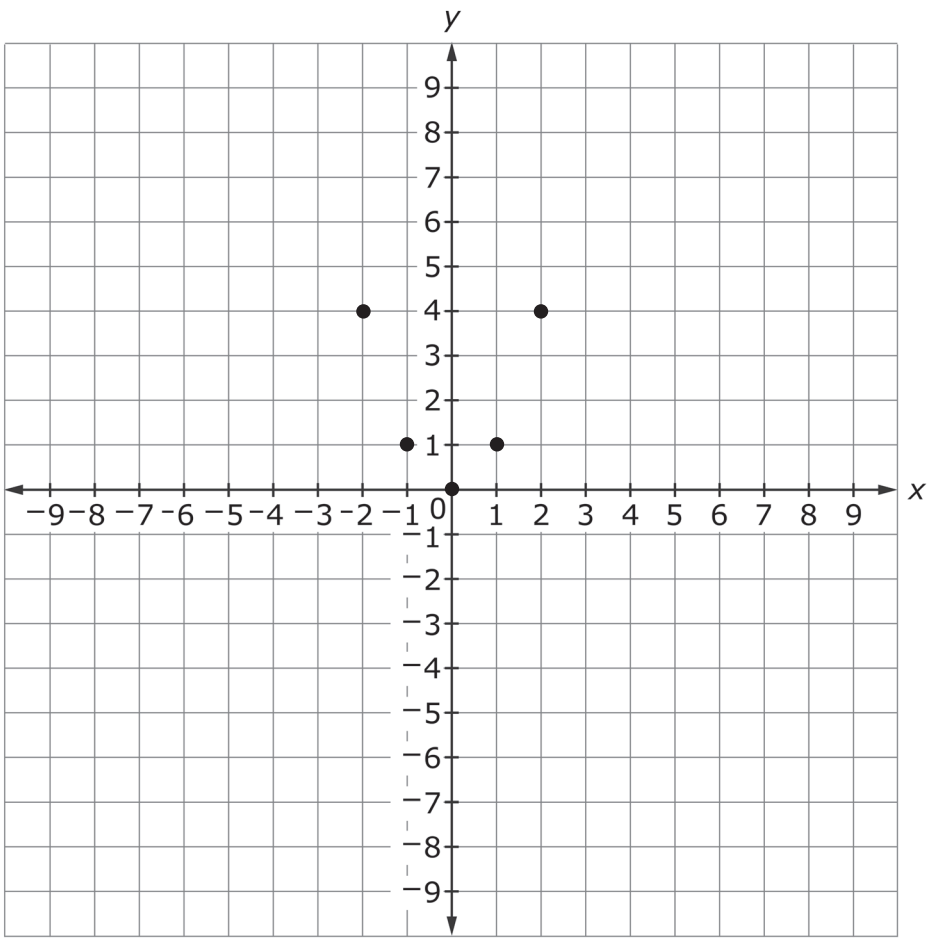
	True	False
$3^2 < \frac{4}{9} + \frac{2}{3}$	○	●
$2(2^3 + 14 \bullet 2) \geq 9 \bullet 8$	●	○
$16.2 \bullet 3 - 24.6 < 72 \div 3 + 2.78$	●	○

Subpart 1 Practice Test Questions

1. Ⓐ ● Ⓒ Ⓓ

2. Ⓐ Ⓑ ● Ⓓ

3.

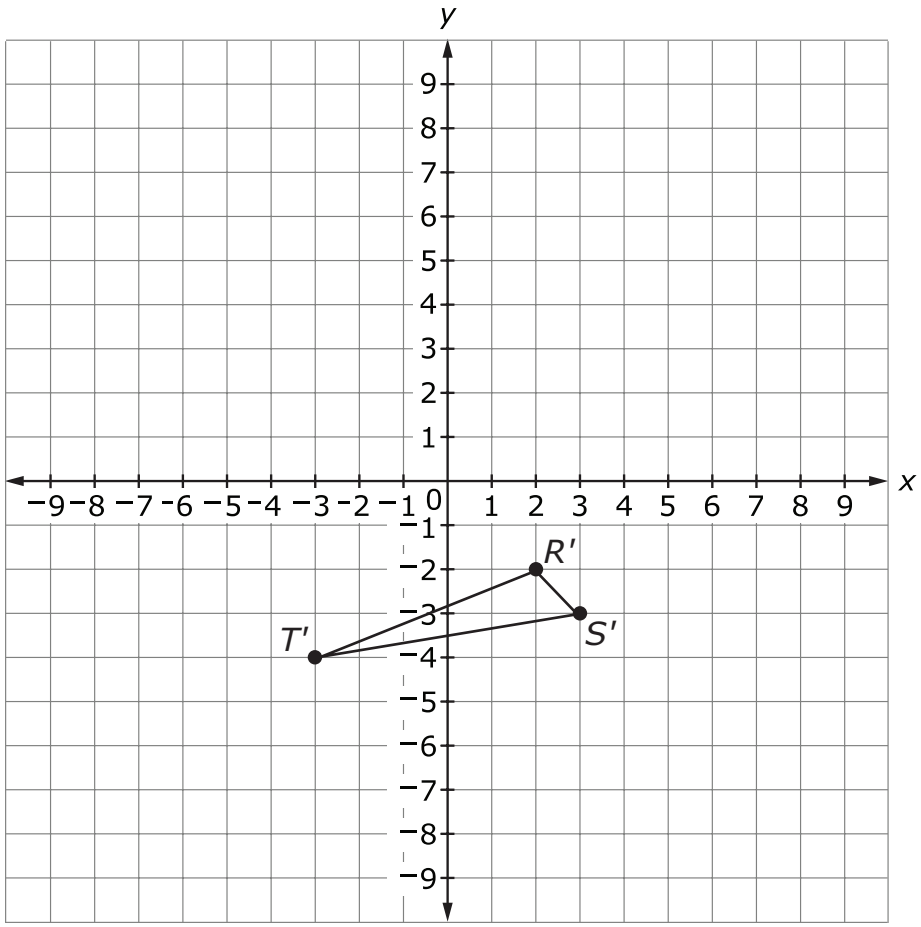


Any five points will be accepted as long as only one *x*-value maps to only one *y*-value. The points must pass the vertical line test.

4. ● Ⓑ ● Ⓓ ● Ⓕ

5. $y = x + 7$ or any equivalent equation

6.



7.

	Irrational	Rational
1.33333...	○	●
5	○	●
$\sqrt{4}$	○	●
$\sqrt{7}$	●	○
2.5	○	●
π	●	○

8.

Irrational Expression	Approximate Value			
	6.71	3.40	5.27	5.50
$\frac{2}{3}\sqrt{26}$	○	●	○	○
$3\sqrt{5}$	●	○	○	○
1.75π	○	○	○	●
$\frac{\sqrt{111}}{2}$	○	○	●	○

9. Ⓐ ● Ⓒ Ⓓ

10. Ⓐ Ⓑ ● Ⓓ

11. Ⓐ Ⓑ Ⓒ ●

Subpart 2 Practice Test Questions

12. $y = -\frac{2}{3}x$

13. Ⓐ ● Ⓒ Ⓓ

14.

○	132
○	224
●	260

●	$132^2 + 224^2 = 260^2$
○	$224^2 - 132^2 = 260^2$
○	$132^2 + 260^2 = 224^2$

●	are
○	are not

15. Ⓐ ● Ⓒ Ⓓ

16. Accept answers in the range 20.34 – 20.4

17. ● Ⓑ Ⓒ Ⓓ

18.

	One	Two
$x^2 = 1$	○	●
$x^3 = 8$	●	○
$x^2 = 0$	●	○
$x^2 = 16$	○	●
$x^3 = \frac{1}{27}$	●	○

19. Accept answers in the range 3052 – 3055

20. Ⓐ Ⓑ ● Ⓓ

21. ● Ⓑ Ⓒ Ⓓ

22. ● Ⓑ ● Ⓓ ●

Subpart 3 Practice Test Questions

23. Ⓐ ● Ⓒ Ⓓ

24. Ⓐ Ⓑ ● Ⓓ

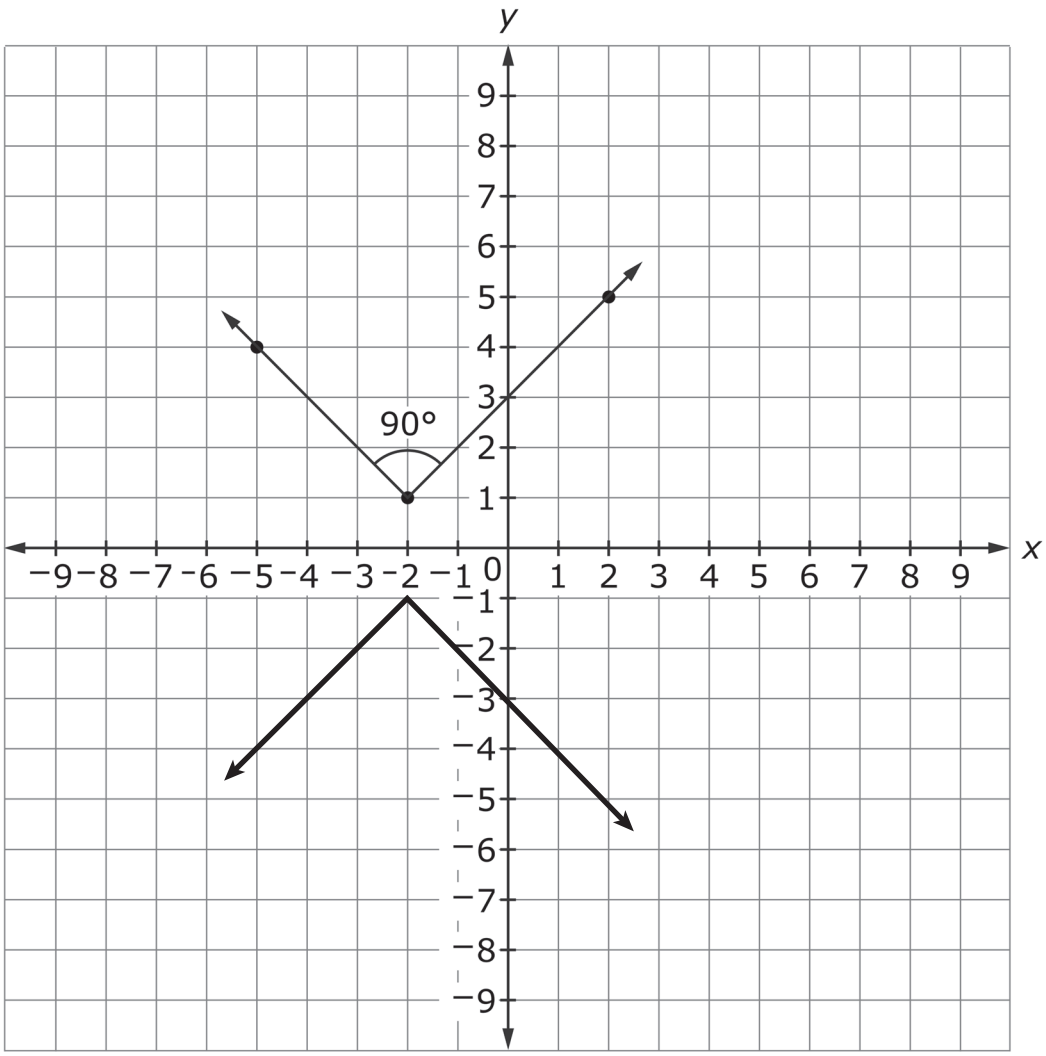
25. ● Ⓑ Ⓒ Ⓓ

26. Ⓐ Ⓑ ● Ⓓ

27. ● Ⓑ ● Ⓓ ●

28. $y = 35x + 20$ and any equivalent equation

29.

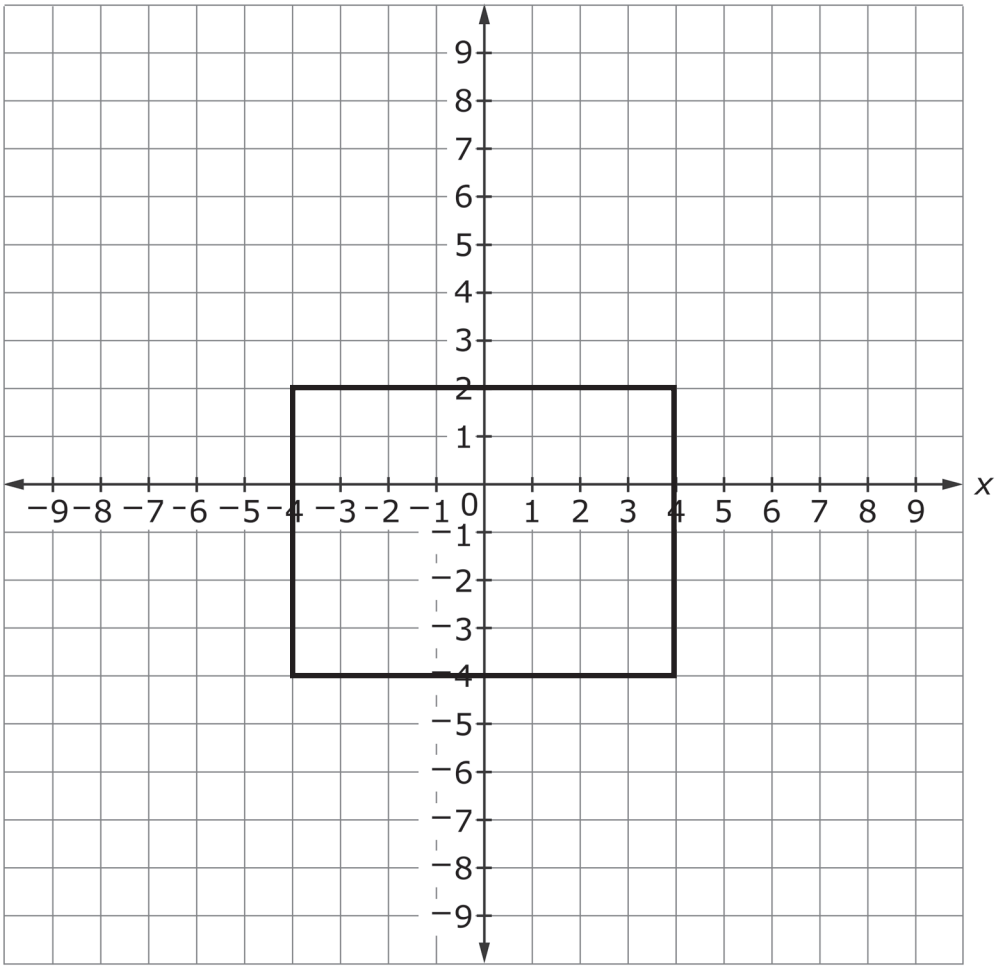


A right angle drawn with vertex at (–2, –1)

30. Ⓐ ● ● Ⓓ Ⓔ

31. ● Ⓑ Ⓒ Ⓓ

32.



33. ● Ⓑ ● ●