Name: Key

New York State Testing Program

2023 Mathematics Test Session 1

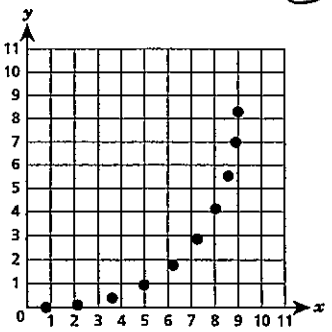
Grade 8

May 2–4, 2023

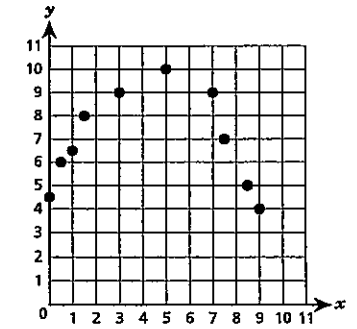
RELEASED QUESTIONS

5 Which scatter plot best represents a linear association between y and x?

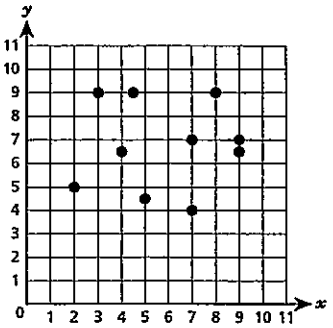
A



C



B



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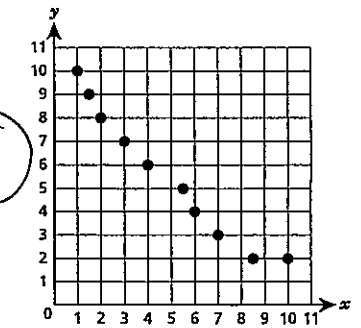


GO ON

6 Quadrilateral ABCD is graphed on a coordinate plane. Vertex A is located at the point (−2,3). The quadrilateral is dilated by a scale factor of 2, with the center of dilation at the origin, to form quadrilateral A′B′C′D′. Which ordered pair represents the location of vertex A′ ?

multiply by 2

$(-2,3) \xrightarrow{D_2} (-4,6)$

A (−4,5)

B (−4,6)

C (0,5)

D (6,−4)

Rate of Change = slope

7 The equation and the table shown below each represent a different relationship between x and y.

FUNCTION A

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

R.O.C = $\frac{5}{4}$ = 1.25

FUNCTION B

x	y
5	1.5
10	3
15	4.5

(5, 1.5) (10, 3)
$x_1\ y_1$ $x_2\ y_2$

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$m = \frac{3 - 1.5}{10 - 5}$ $m = \frac{1.5}{5}$ $m = .3$

Which statement about the functions is true?

A Function A has a greater rate of change than Function B because $1.25 > 3.\overline{3}$.

B Function B has a greater rate of change than Function A because $1.25 < 3.\overline{3}$.

C Function A has a greater rate of change than Function B because $1.25 > 0.3$.

D Function B has a greater rate of change than Function A because $1.25 < 0.3$.

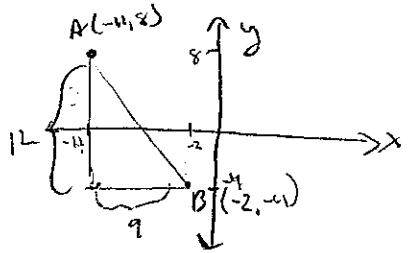
8 Two points are plotted on a coordinate plane. Point A is plotted at (−11,8) and point B is plotted at (−2,−4). What is the distance, in units, from point A to point B ?

A 13

B 15

C $\sqrt{145}$

D $\sqrt{185}$



$a^2 + b^2 = c^2$

$12^2 + 9^2 = c^2$

$144 + 81 = c^2$

$\sqrt{225} = \sqrt{c^2}$

$15 = c$

15 Which expression has a value of $\frac{1}{16}$?

A $(2^{-4})^{-1}$ $= 2^4$

B $(2^4)^{-1}$ $= 2^{-4} = \frac{1}{2^4} = \frac{1}{16}$

C $(2^8)^{-2}$

D $(2^{-8})^{-2}$

power to power rule $(x^a)^b = x^{a \cdot b}$ multiply the exponents

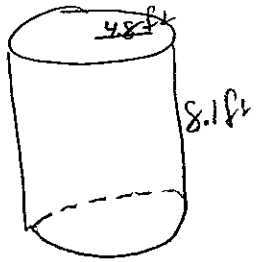
16 A cylinder has a radius of 4.8 feet and a height of 8.1 feet. What is the volume, to the nearest tenth of a cubic foot, of the cylinder?

A 989.4

B 586.3

C 244.3

D 186.6



* use the π button when they don't say what to use for π

$V = \pi r^2 L$

$V = \pi \cdot (4.8)^2 \cdot (8.1)$

$V = \pi \cdot 23.04 \cdot 8.1$

$V = 586.2965873835$

17 The rule for a function of x is:

multiply the input value by 2, then subtract 6

The data set for the input values of the function, x, is $\{-1,1,3,5\}$. Which value is one of the output values, y?

$2x - 6$

A −2

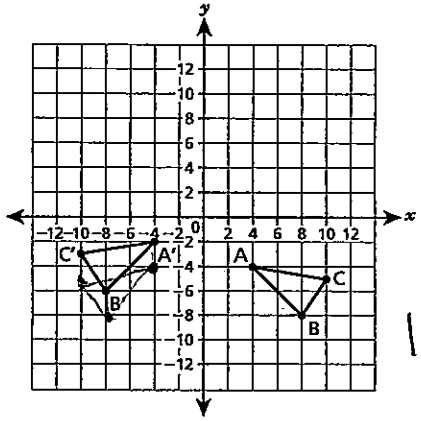
B −1

C 2

D 4

x	y	
−1	−8	$2(-1)-6$
1	−4	$2(1)-6$
3	0	$2(3)-6$
5	4	$2(5)-6$

19 Triangle ABC and its congruent image, triangle A′B′C′, are graphed on the coordinate plane shown below.



Which sequence of transformations maps triangle ABC onto triangle A′B′C′?

A a reflection over the y-axis and then a translation 2 units up

B a reflection over the y-axis and then a translation 2 units down

C a reflection over the x-axis and then a translation 8 units left

D a reflection over the x-axis and then a translation 8 units right

20 Which equation represents the graph of a line on a coordinate plane that passes through the x-intercept at (9,0) and the y-intercept at (0,−5)?

A $y=-\frac{9}{5}x-5$

B $y=\frac{9}{5}x-5$

C $y=-\frac{5}{9}x-5$

D $y=\frac{5}{9}x-5$

21 Trent draws a triangle with one interior angle measuring 34°. Which angle measures could be the measures of the other two interior angles in Trent's triangle?

A 46° and 90°

B 53° and 127°

C 66° and 80°

D 68° and 68°

24 Nathan observes the growth of sunflower plants for a science project. He collects data on the relationship between the height, in centimeters, of each sunflower plant during a thirty-day period and the amount of fertilizer, in grams, used on each plant. The equation for the line of best fit for these data is $y = 0.35x + 2$, where y is the height of the plant in centimeters and x is the number of grams of fertilizer used. Based on the model, what does the slope of the line represent?

m = 0.35

A the height of the plant height = y

B the amount of fertilizer used amount used = x

C the average growth of the plant per gram of fertilizer used .35x

D the average amount of fertilizer used per centimeter the plant grew

25 Line segment CD is graphed on a coordinate plane. The line segment is reflected over the x-axis and then rotated 90° clockwise about the origin to create line segment EF. Which statement is always true about line segment EF?

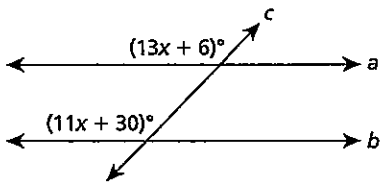
A Line segment EF is congruent to line segment CD. Same size

B Line segment EF is perpendicular to line segment CD.

C Line segment EF is twice the length of line segment CD.

D Line segment EF is one-half the length of line segment CD.

23 In the figure shown below, lines a and b are parallel, and line c is a transversal.



What is the value of x?

A 6

B 9

C 12

D 18

$13x + 6 = 11x + 30$

$-11x \quad -11x$

$2x + 6 = 30$

$-6 \quad -6$

$\frac{2x}{2} = \frac{24}{2}$

$x = 12$

26 Two functions are described below.

B

m = 2
B = 3

- Function A: A taxi driver charges customers a base amount of $3.00 and also an amount of $2.00 per mile, x, for a total charge, y, to a customer.

m = 3
B = 2

- Function B: The equation $y = 3x + 2$ represents the relationship between the number of miles, x, a taxi travels and the total charge, y, to a customer.

Which statement correctly compares the relationship between Function A and Function B?

A Function A has both a greater rate of change and a greater initial value. X

B Function B has both a greater rate of change and a greater initial value. X

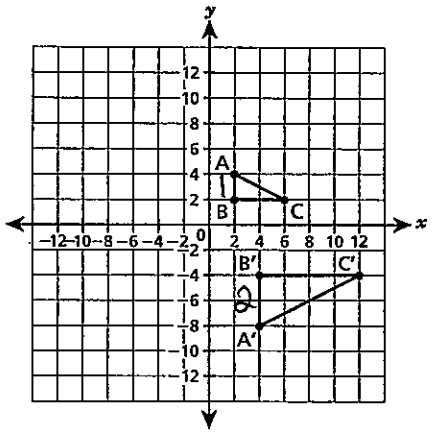
C Function A has a greater rate of change than Function B, but the initial value for Function A is less than the initial value for Function B.

D Function B has a greater rate of change than Function A, but the initial value for Function B is less than the initial value for Function A.

Average rate of change = slope

Initial value = y-intercept

On a coordinate plane, $\triangle ABC$ undergoes a sequence of transformations to create $\triangle A'B'C'$.



Bigger = scale factor more AC bigger than 1

Which sequence of transformations could have been used to take $\triangle ABC$ to $\triangle A'B'C'$?

A a dilation by a scale factor of 2 centered at the origin and then a reflection over the x-axis

B a dilation by a scale factor of 2 centered at the origin and then a reflection over the y-axis

C a dilation by a scale factor of $\frac{1}{2}$ centered at the origin and then a reflection over the x-axis

D a dilation by a scale factor of $\frac{1}{2}$ centered at the origin and then a reflection over the y-axis

GO ON

Name: Key

New York State Testing Program

2023 Mathematics Test Session 2

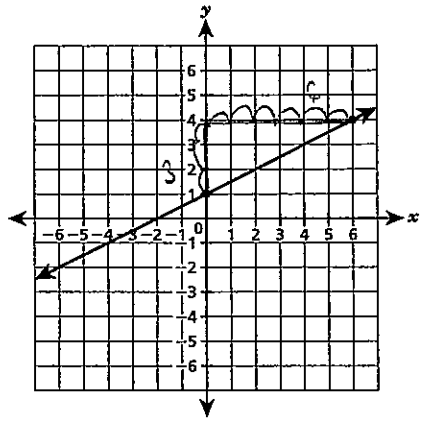
Grade 8

May 2–4, 2023

RELEASED QUESTIONS

GRADE 8 MATH SESSION 2

The graph of a line is shown on the coordinate plane below.



m = rise / run

m = 3/2

m = 1/2

b = 1

Which equation represents the graph of the line?

A $y = \frac{1}{2}x + 1$

B $y = \frac{1}{2}x - 2$

C $y = 2x + 1$

D $y = 2x - 2$

Rate of change = slope

Function A and Function B are represented by the table and graph shown below.

FUNCTION A

x	y
−6	−12
−2	−4
0	0
2	4

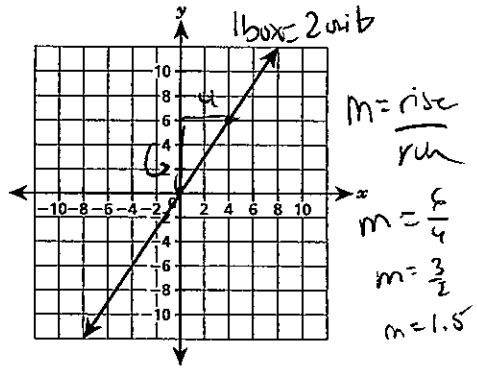
(−6, −12) (−2, −4)

x_1, y_1 x_2, y_2

$m = \frac{y_2 - y_1}{x_2 - x_1}$ $m = \frac{-4 - (-12)}{-2 - (-6)}$

$m = \frac{8}{4}$ $m = 2$

FUNCTION B



1 box = 2 units

m = rise / run

m = 6/4

m = 3/2

m = 1.5

Which statement about Function A and Function B is true?

A The rate of change for Function A is less than the rate of change for Function B.

B The rate of change for Function A is greater than the rate of change for Function B.

C The rate of change for Function A is equal to the rate of change for Function B because the graph of the line for each function is linear.

D The rate of change for Function A is equal to the rate of change for Function B because the graph of the line for each function passes through the origin.

Which statement about the value of $\sqrt{50}$ is true?

$\sqrt{50} = 7.071067811 9...$

A It is irrational because the decimal equivalent eventually repeats.

B It is rational because the decimal equivalent eventually terminates.

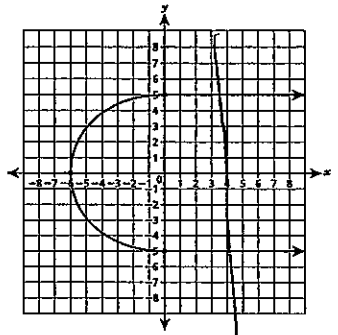
C It is rational because the value as a decimal is equivalent to a fraction.

D It is irrational because the decimal equivalent is non-repeating and does not terminate.

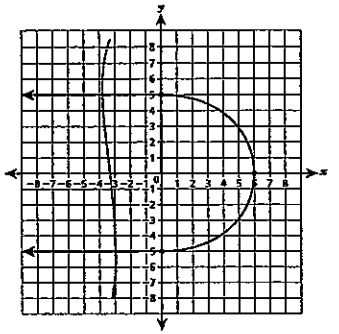
35 Which graph represents y as a function of x?

must pass the vertical line test: vertical line only goes through the function 1 time

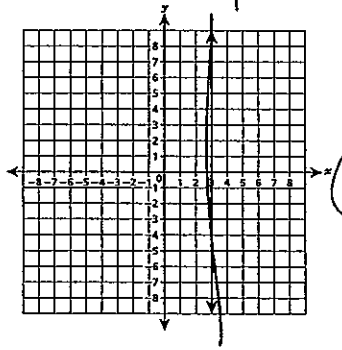
A



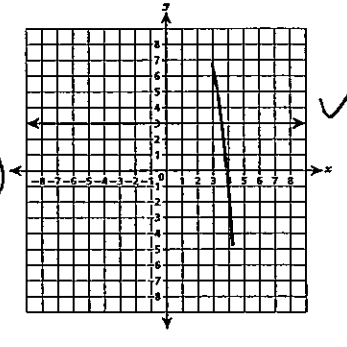
C



B



D ✓



36 A cylindrical container has a height of 56 centimeters and a diameter of 22 centimeters. What is the volume, in cubic centimeters, of the container in terms of π? → symbol

A $1,232\pi$

B $3,388\pi$

C $6,776\pi$

D $27,104\pi$

$r = \frac{d}{2}$

$r = \frac{22}{2}$

$r = 11$

$V = \pi r^2 h$

$V = \pi \cdot (11)^2 \cdot 56$

$V = \pi \cdot 121 \cdot 56$

$V = 6776\pi$

37 Quadrilateral ABCD is graphed on a coordinate plane, with point C plotted at $(-4,3)$. Quadrilateral ABCD is then reflected over the y-axis to create its image A′B′C′D′. After the reflection, what are the coordinates of point C′?

A $(4,3)$ ✓

B $(4,-3)$

C $(-4,3)$

D $(-4,-3)$

change the sign of the x-coordinate

$(-4,3) \rightarrow (4,3)$

This question is worth 1 credit.

What is the solution for x in the equation $x^3 = 125$?

$\sqrt[3]{x^3} = \sqrt[3]{125}$

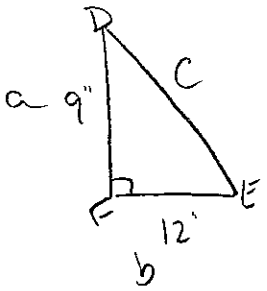
$x = 5$

Calc: 3 2nd ^

Answer _____

This question is worth 1 credit.

Triangle DEF is a right triangle with a right angle at vertex F. Side $\overline{DF}$ has a length of 9 inches and side $\overline{FE}$ has a length of 12 inches. What is the length, in inches, of side $\overline{DE}$?



$a^2 + b^2 = c^2$

$9^2 + 12^2 = c^2$

$81 + 144 = c^2$

$\sqrt{225} = \sqrt{c^2}$

$c = 15$

Answer _____ inches

This question is worth 1 credit.

An equation is shown below.

$$-8 - 5x = 20$$

What is the value of x?

$-8 - 5x = 20$

$+8 \quad +8$

$\frac{-5x}{-5} = \frac{28}{-5}$

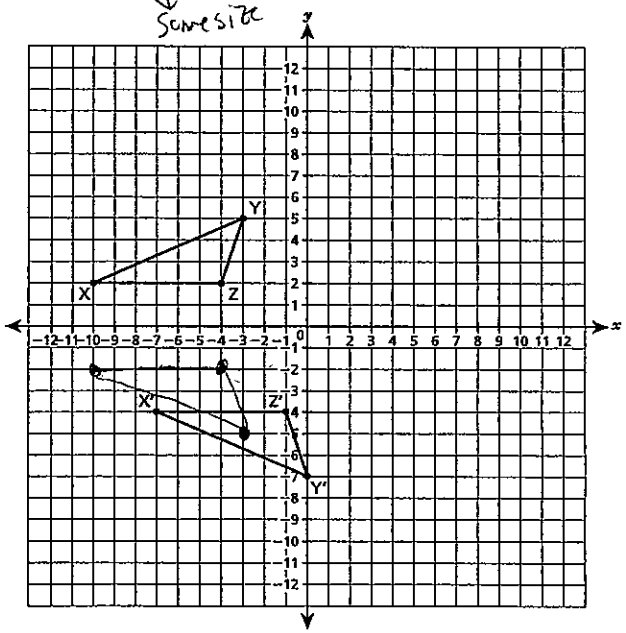
$x = -5.6$

Answer _____

This question is worth 2 credits.

Triangle XYZ and its congruent image triangle X'Y'Z' are shown on the coordinate plane below.

Same size



Describe a sequence of transformations that maps triangle XYZ onto triangle X'Y'Z'.

Explain your answer.

Reflection over the x-axis and then a translation 3 units right and 2 units down

It was flipped over the x-axis and slid 3 units right + 2 units down

This question is worth 2 credits.

What value of x makes the equation shown below true?

$24x + 33 = 3(5x + 21) - 9$

Show your work.

D
C
M
S

$24x + 33 = 3(5x + 21) - 9$

$24x + 33 = 15x + 63 - 9$

$24x + 33 = 15x + 54$

$-15x \quad -15x$

$9x + 33 = 54$

$-33 \quad -33$

$\frac{9x}{9} = \frac{21}{9}$

$x = 2\frac{1}{3}$

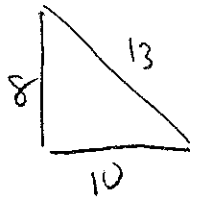
Answer $x =$ $2\frac{1}{3}$

This question is worth 2 credits.

Triangle RST has side lengths of 8 centimeters, 10 centimeters, and 13 centimeters. Is triangle RST a right triangle? Be sure to include what you know about the Pythagorean theorem in your answer.

Explain how you determined your answer.

$\triangle RST$ is not a right triangle b/c the lengths of the sides of the triangle do not satisfy the pythagorean theorem



$a^2 + b^2 = c^2$

$8^2 + 10^2 = 13^2$

$64 + 100 = 169$

$164 \neq 169$

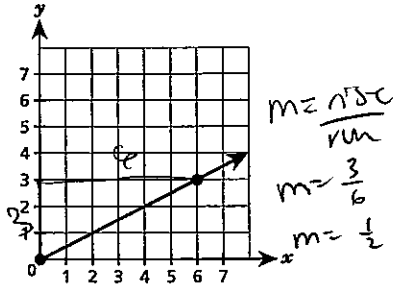
This question is worth 2 credits.

Function A and Function B are shown below.

FUNCTION A

x	y
−5	−30
−3	−18
2	12
4	24

FUNCTION B



Which function has a greater rate of change? Be sure to include the rate of change for each function in your answer.

Explain how you determined your answer.

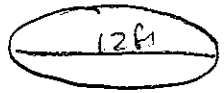
Function A which has a rate of change of 6 has a greater rate of change that function B which has a rate of change of $\frac{1}{2}$

This question is worth 2 credits.

The top surface of a trampoline is in the shape of a circle with a diameter of 12 feet. What is the area, in square feet, of the top circular surface of the trampoline?

Round your answer to the nearest whole number.

Show your work.



$A = \pi r^2$

$A = \pi \cdot 6^2$

$A = \pi \cdot 36$

$A = 113.097\ 3355292$

Use the π button when it doesn't say what to use for π

$r = \frac{d}{2}$

$r = \frac{12}{2}$

$r = 6$

Answer 113 square feet

This question is worth 2 credits.

A student claims the expressions $\frac{5^7}{5^3}$ and $5^6 \times 5^{-2}$ are equivalent. Is the student correct?

Be sure to include what you know about properties of exponents and the value of each expression in simplest form in your answer.

Explain how you determined your answer.

Yes, The student is correct. When you divide like bases you subtract the exponents so $5^7 \div 5^3 = 5^4$ When you multiply like bases you add the exponents so $5^6 \cdot 5^{-2} = 5^4$

$\frac{5^7}{5^3} = 5^{7-3} = 5^4$

$5^6 \cdot 5^{-2} = 5^{6+(-2)} = 5^4$

This question is worth 3 credits.

Three different functions are represented by the equation, table, and graph shown below.

FUNCTION A

$y = 2x + 3$

linear

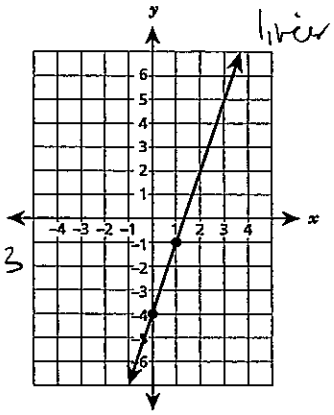
FUNCTION B

x	y
−1	1
0	0
1	1
2	4

+1 −1, +1 +1, +1 +3

$\frac{-1}{1} = -1 \quad \frac{1}{1} = 1 \quad \frac{3}{1} = 3$

FUNCTION C



Determine whether each function is linear or nonlinear. Be sure to include what you know about the properties of all three functions in your answer.

Explain your answer.

Function A is linear B/c the highest exponent of the variable is 1. Function B is non-linear B/c it has a variable rate of change. Function C is linear B/c it is a straight line.