Name: _____

New York State Testing Program

Mathematics Test
Session 1
Grade 8

v202

Released Questions

Session 1

TIPS FOR TAKING THE TEST

Here are some suggestions to help you do your best:

- Read each question carefully and think about the answer before making your choice.
- You have been provided with mathematics tools (a ruler, a protractor, and a calculator) and a reference sheet to use during the test. It is up to you to decide when each tool and the reference sheet will be helpful. You should use mathematics tools and the reference sheet whenever you think they will help you to answer the question.

Grade 8 Mathematics Reference Sheet

CONVERSIONS

1 inch = 2.54 centimeters
1 meter = 39.37 inches
1 mile = 5,280 feet
1 mile = 1,760 yards
1 mile = 1.609 kilometers

1 kilometer = 0.62 mile
1 pound = 16 ounces
1 pound = 0.454 kilogram
1 kilogram = 2.2 pounds
1 ton = 2,000 pounds

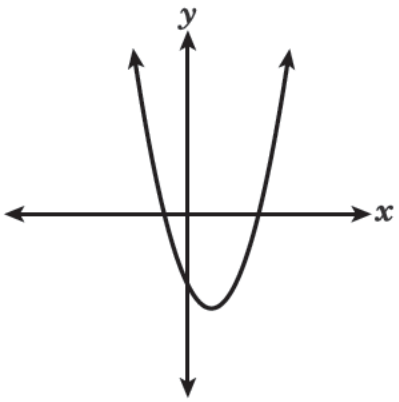
1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 gallon = 3.785 liters
1 liter = 0.264 gallon
1 liter = 1,000 cubic centimeters

FORMULAS

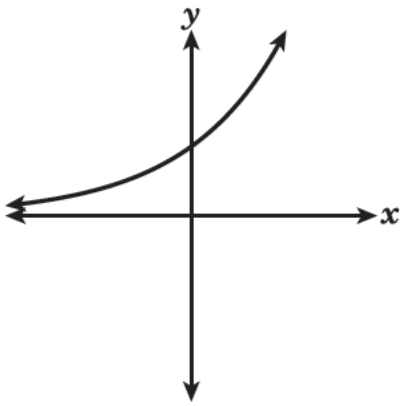
Triangle	$A = \frac{1}{2}bh$
Parallelogram	$A = bh$
Circle	$A = \pi r^2$
Circle	$C = \pi d$ or $C = 2\pi r$
General Prisms	$V = Bh$
Cylinder	$V = \pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$
Cone	$V = \frac{1}{3}\pi r^2 h$
Pythagorean Theorem	$a^2 + b^2 = c^2$

1 Which graph represents a linear function of x ?

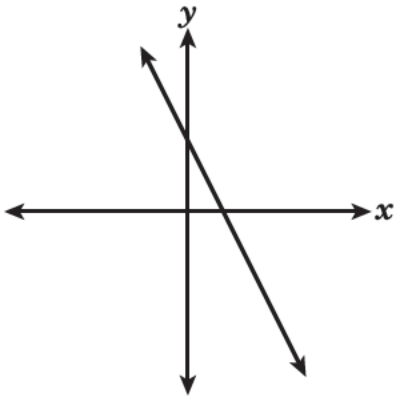
A



C



B



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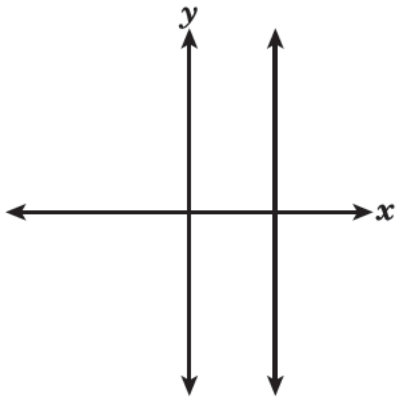


2 What is the value of the expression shown below?

$$\frac{1.6 \times 10^5}{0.2 \times 10^2}$$

A 0.8×10^3

B 8×10^3

C 0.8×10^7

D 8×10^7

GO ON

3 At a factory, the cost of making different numbers of toothbrushes is shown in the table below.

COST OF TOOTHBRUSHES

Number of Toothbrushes	3	6	9	12
Cost (dollars)	$4.50	$9.00	$13.50	$18.00

A linear function models the cost based on the number of toothbrushes made. Which statement about the rate of change of this function is true?

A The cost increases by $1.50 for each additional toothbrush made.

B The cost increases by $4.50 for each additional toothbrush made.

C The cost increases by $9.00 for each additional 3 toothbrushes made.

D The cost increases by $18.00 for each additional 3 toothbrushes made.

4 A company makes two different-sized ice cream cones. The smaller cones are 3.5 inches tall and have a diameter of 3 inches. The larger cones are 5.1 inches tall and have a diameter of 4.5 inches. About how much greater, to the nearest tenth of a cubic inch, is the volume of the larger cone than the volume of the smaller cone?

A 18.8

B 56.4

C 75.2

D 225.5

5 Chris and Sam earn money shoveling snow, as described below.

- The amount of money Chris earns can be modeled by the equation $y = 8.25x$, where y is the total amount of money, in dollars, earned in x hours.
- The table below shows the relationship between the total amount of money earned, y, in dollars, and the total amount of time worked, x, in hours, for Sam.

SAM'S EARNINGS

x	4	6	8
y	30	45	60

Which statement correctly compares the rates at which Chris and Sam earn money shoveling snow?

A Sam earns $\$0.75$ more per hour than Chris.

B Chris earns $\$0.75$ more per hour than Sam.

C Sam earns $\$0.25$ more per hour than Chris.

D Chris earns $\$0.25$ more per hour than Sam.

6 Which equation represents a function of x that is **not** linear?

A $y = 4(x + 3)$

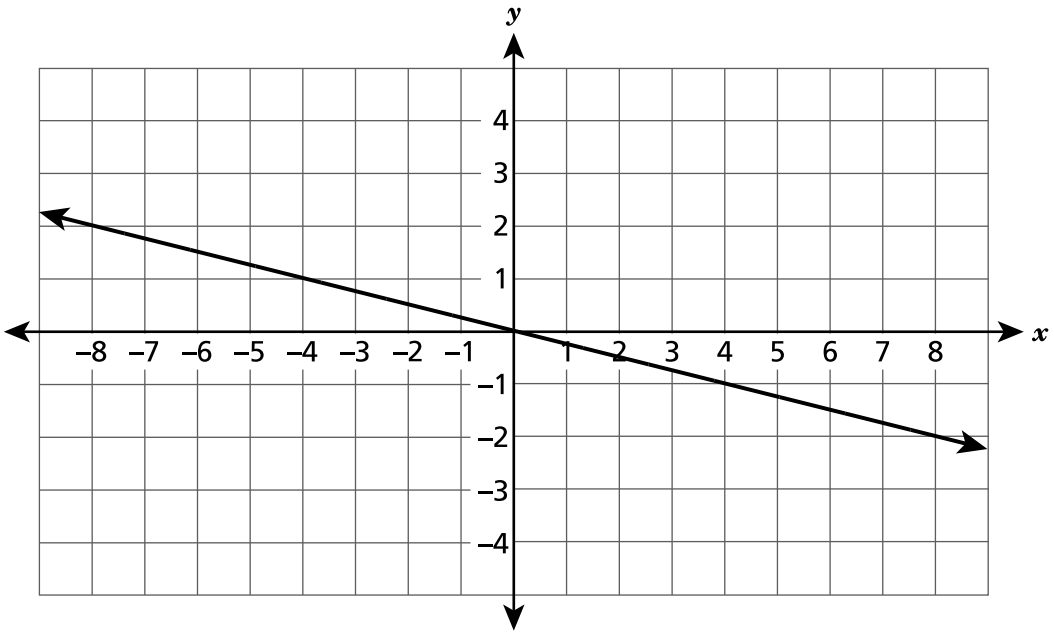
B $y = 4^2 + 3x$

C $y = 4x + 3x^2$

D $y = \frac{4 + x}{3}$

GO ON

7 Which equation represents the line shown on the coordinate plane below?



A $y = 4x$

B $y = -4x$

C $y = \frac{1}{4}x$

D $y = -\frac{1}{4}x$

8 The closest distance between Earth and Mars is approximately 3.39×10^7 miles. The fastest rocket leaving Earth travels at an average speed of approximately 3.6×10^4 miles per hour. At that rate, which expression could be used to determine the approximate number of hours it would take the rocket to travel that distance?

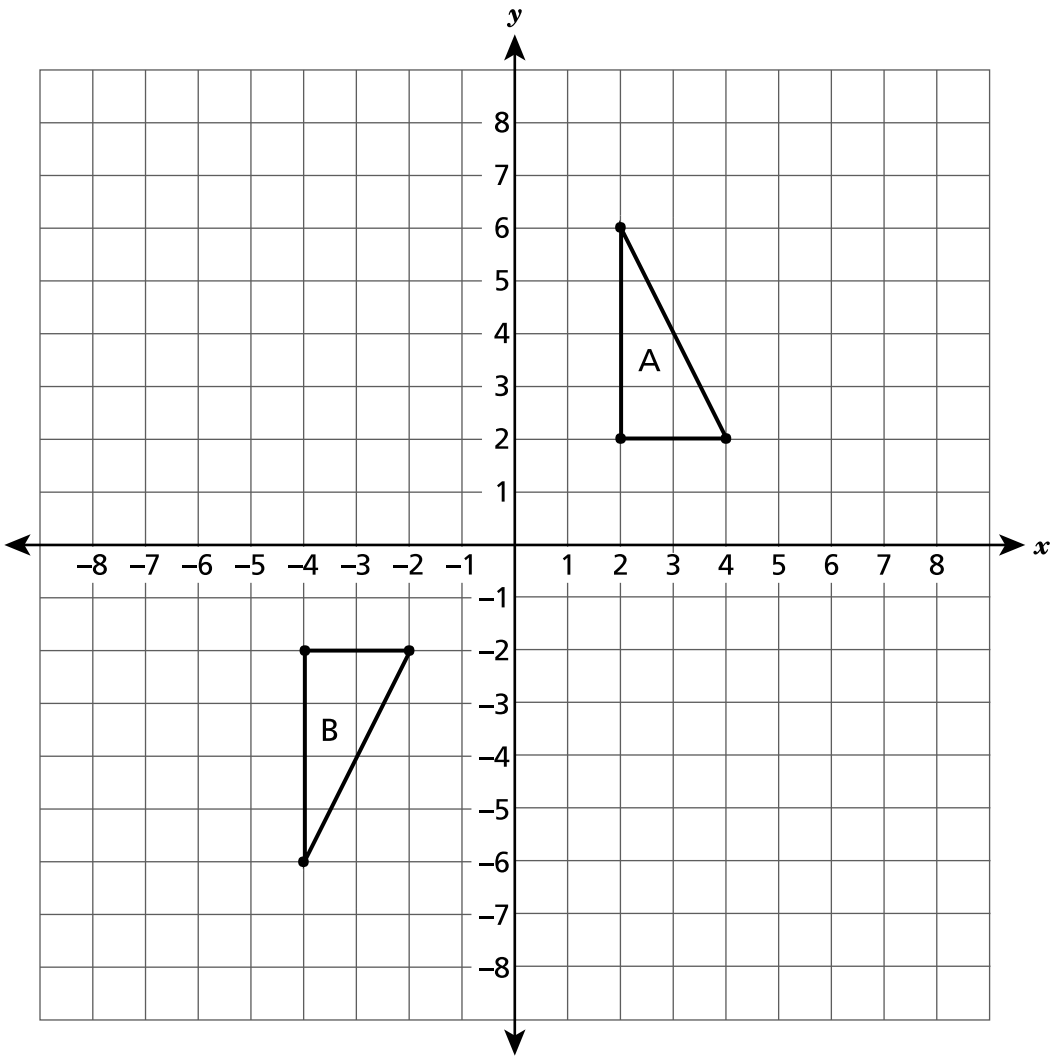
A $\left(3.39 \times 10^7\right) - \left(3.6 \times 10^4\right)$

B $\left(3.6 \times 10^4\right) - \left(3.39 \times 10^7\right)$

C $\left(3.39 \times 10^7\right) \div \left(3.6 \times 10^4\right)$

D $\left(3.6 \times 10^4\right) \div \left(3.39 \times 10^7\right)$

9 Triangle A and triangle B are graphed on the coordinate plane below.



Which sequence of transformations will map triangle A onto its congruent image, triangle B ?

A a reflection over the x-axis, then a reflection over the y-axis

B a translation 8 units down, then a reflection over the y-axis

C a reflection over the x-axis, then a translation 6 units to the left

D a rotation 90° clockwise about the origin, then a translation 6 units to the left

10 Which system of equations has no solution?

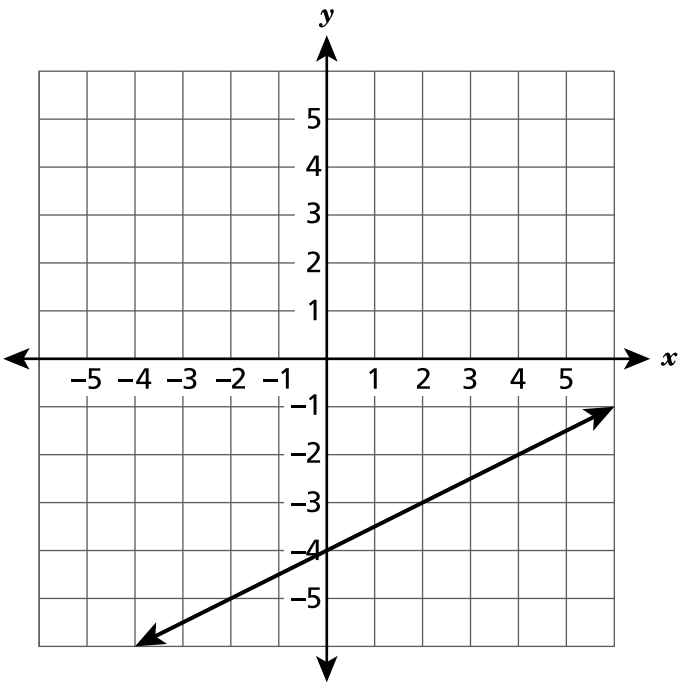
A $\begin{cases} 3x + 4y = 5 \\ 6x + 8y = 10 \end{cases}$

B $\begin{cases} 7x - 2y = 9 \\ 7x - 2y = 13 \end{cases}$

C $\begin{cases} 2x - y = -11 \\ -2x + y = 11 \end{cases}$

D $\begin{cases} 3x + 6y = 1 \\ x + y = 0 \end{cases}$

11 A line is graphed on the coordinate plane below.



Line $y = -x + 2$ will be graphed on the same coordinate plane to create a system of equations. What is the solution to that system of equations?

A $(-2, 4)$

B $(0, -4)$

C $(2, -4)$

D $(4, -2)$

12 Linear function K passes through points $(-3, 7)$ and $(3, 3)$. What is the rate of change of function K?

A $-\frac{3}{2}$

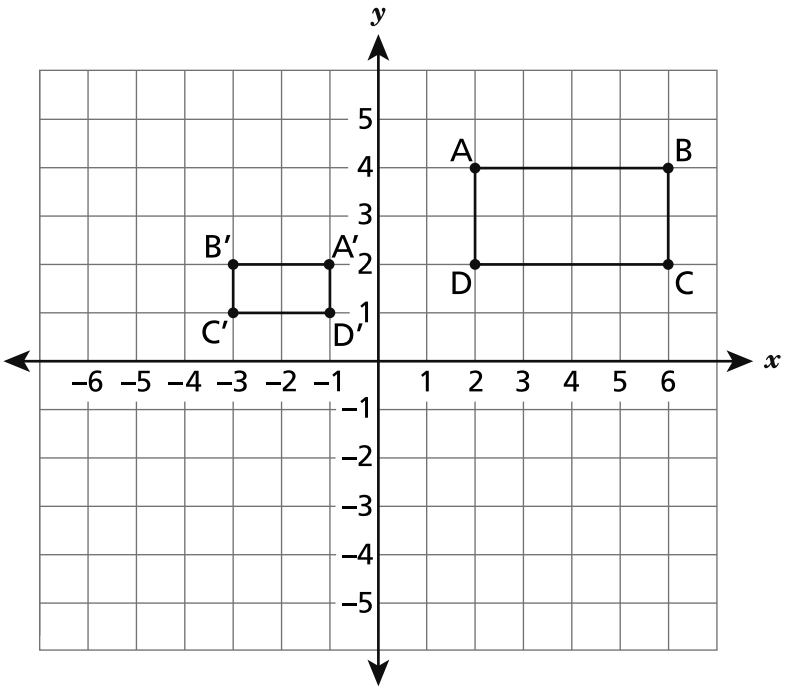
B $-\frac{2}{3}$

C $\frac{3}{2}$

D $\frac{2}{3}$

GO ON

13 Rectangle $A'B'C'D'$ is similar to rectangle $ABCD$, as shown on the coordinate plane below.



Which sequence of transformations maps rectangle $ABCD$ onto rectangle $A'B'C'D'$?

A a translation 8 units to the left, then a dilation by a scale factor of $\frac{1}{2}$ with a center of dilation at the origin

B a reflection over the y-axis, then a dilation by a scale factor of $\frac{1}{2}$ with a center of dilation at the origin

C a dilation by a scale factor of $\frac{1}{2}$ with a center of dilation at the origin, then a 90° counterclockwise rotation about the origin

D a 90° counterclockwise rotation about the origin, then a dilation by a scale factor of $\frac{1}{2}$ with a center of dilation at the origin

14 Patty has a flower box in the shape of a rectangular prism with interior dimensions that are 15 inches in length, 8 inches in width, and 6 inches in height. Patty will fill the flower box $\frac{3}{4}$ full of soil. How many cubic inches of soil will be in the flower box?

A 387

B 516

C 540

D 720

15 On a coordinate plane, the graph of a line passes through the origin and the point $(10, 14)$. What is the equation of the line?

A $y = \frac{5}{7}x$

B $y = \frac{7}{5}x$

C $y = x + \frac{5}{7}$

D $y = x + \frac{7}{5}$

16 Which statement about the solution to the equation shown below is true?

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

A There is no solution.

B There is only one solution, $x = -1$.

C There is only one solution, $x = -9$.

D There are an infinite number of solutions.

17 A study was conducted to determine the relationship between the age, x, in years, of a certain brand of motorcycle and its value, y, in dollars. The equation $y = -750x + 8{,}500$ best models the data. Based on the equation, what is the estimated value of a motorcycle that is 5 years old?

A $\$3{,}750$

B $\$4{,}750$

C $\$7{,}750$

D $\$12{,}250$

18 Which statement **best** describes the data in a scatter plot where the *y*-values are decreasing as the *x*-values are increasing?

A The data can best be modeled by a vertical line.

B The data can best be modeled by a horizontal line.

C The data can best be modeled by a line with a positive slope.

D The data can best be modeled by a line with a negative slope.

19 Which proportional relationship has the greatest rate of change?

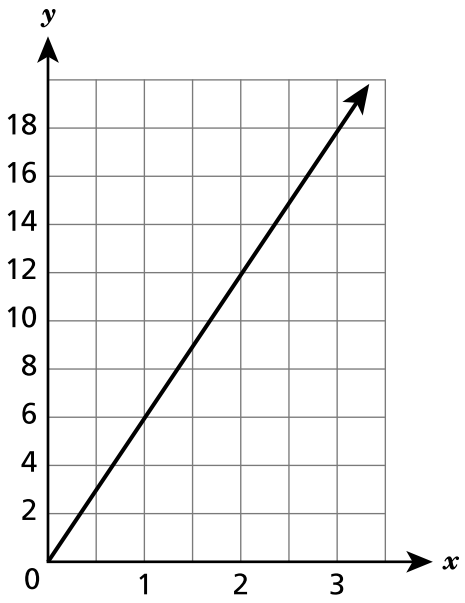
A $y = 7x$

B The value of y increases by 12 for every increase of 4 in the value of x.

C

x	y
0	0
2	8
4	16
6	24

D



20 A flower vase is in the shape of a cylinder and has a diameter of 5 inches and a height of 7 inches. Which equation could be used to determine the volume, in cubic inches, of the vase?

A $V = \pi(5)^2(7)$

B $V = \pi(7)^2(5)$

C $V = \pi(7)^2(2.5)$

D $V = \pi(2.5)^2(7)$

GO ON

21 The planet Mercury is approximately 3.6×10^7 miles away from the sun, and the planet Jupiter is approximately 4.8×10^8 miles away. About how many times farther from the sun is planet Jupiter than planet Mercury?

A 1.3

B 7.5

C 13.3

D 17.3

22 Which expression is equivalent to $\left(5^{-2}\right)^5 \times 5^4$?

A 5^{12}

B 5^7

C $\frac{1}{5^6}$

D $\frac{1}{5^{40}}$

23 Linear functions M and P are shown below.

FUNCTION M

x	y
–2	–9
0	1
2	11
4	21

FUNCTION P

$y = 7x + 9$

In comparing the rates of change, which statement about Function M and Function P is true?

A Their rates of change differ by 2.

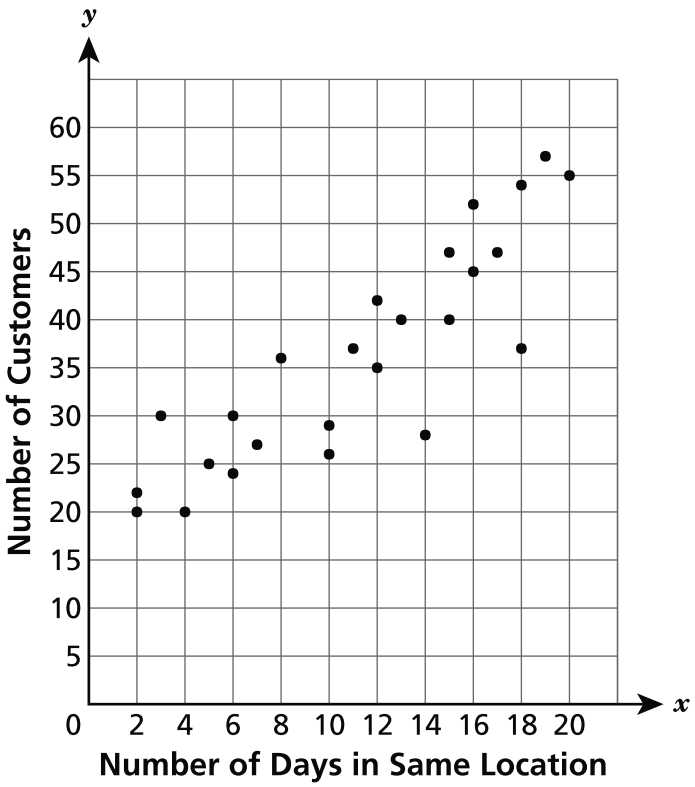
B Their rates of change differ by 4.

C Function M has a greater rate of change than Function P.

D Function M and Function P have the same rate of change.

24 The scatter plot below shows the average number of customers who visit a food truck per day, depending on the number of days the food truck stays in the same location.

FOOD TRUCK CUSTOMERS



Which statement **best** describes the association between the number of days the food truck is in the same location and the number of customers who visit the food truck per day?

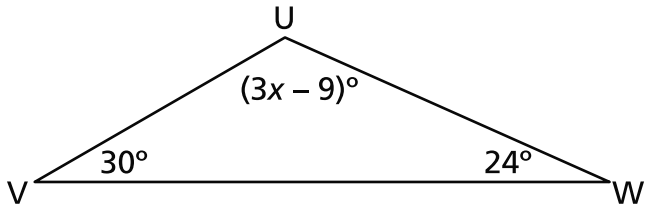
A There is no association.

B There is a nonlinear association.

C There is a positive linear association.

D There is a negative linear association.

25 The measures of the angles in triangle UVW are shown in the diagram below.



What is the value of x?

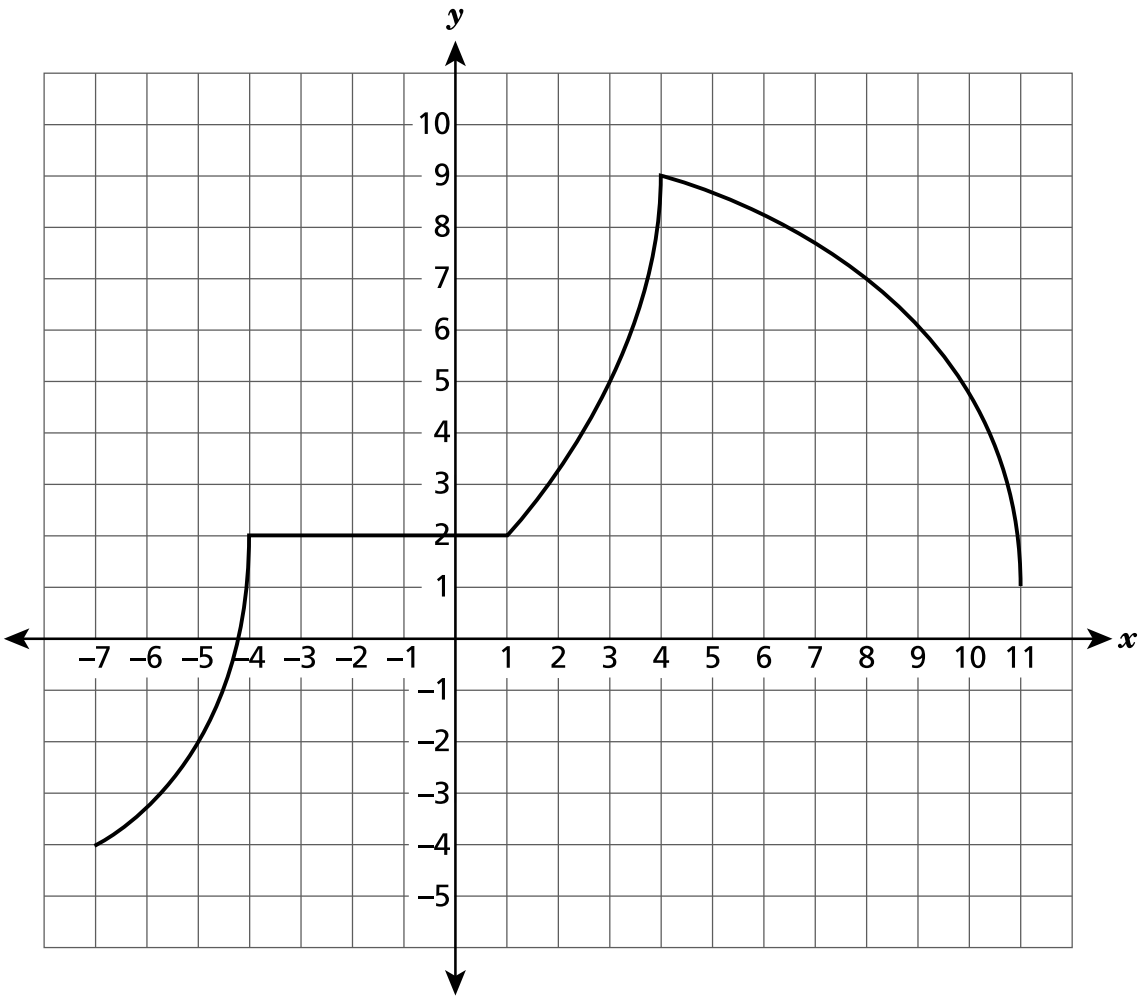
A 21

B 39

C 45

D 126

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



Which statement correctly describes the function on a given interval?

A The function is decreasing and nonlinear between $x = -7$ and $x = -4$.

B The function is increasing and linear between $x = -4$ and $x = 1$.

C The function is increasing and linear between $x = 1$ and $x = 4$.

D The function is decreasing and nonlinear between $x = 4$ and $x = 11$.

STOP

THE STATE EDUCATION DEPARTMENT

THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, NY 12234

2021 Mathematics Tests Map to the Standards

Grade 8 Released Questions

Question	Type	Key	Points	Standard	Cluster	Subscore	Secondary Standard(s)
Session 1							
1	Multiple Choice	B	1	CCSS.Math.Content.8.F.A.3	Functions	Functions	
2	Multiple Choice	B	1	CCSS.Math.Content.8.EE.A.4	Expressions and Equations	Expressions and Equations	
3	Multiple Choice	A	1	CCSS.Math.Content.8.F.B.4	Functions	Functions	
4	Multiple Choice	A	1	CCSS.Math.Content.8.G.C.9	Geometry	Geometry	
5	Multiple Choice	B	1	CCSS.Math.Content.8.EE.B.5	Expressions and Equations	Expressions and Equations	
6	Multiple Choice	C	1	CCSS.Math.Content.8.F.A.3	Functions	Functions	
7	Multiple Choice	D	1	CCSS.Math.Content.8.EE.B.6	Expressions and Equations	Expressions and Equations	
8	Multiple Choice	C	1	CCSS.Math.Content.8.EE.A.4	Expressions and Equations	Expressions and Equations	
9	Multiple Choice	C	1	CCSS.Math.Content.8.G.A.2	Geometry	Geometry	
10	Multiple Choice	B	1	CCSS.Math.Content.8.EE.C.8b	Expressions and Equations	Expressions and Equations	
11	Multiple Choice	D	1	CCSS.Math.Content.8.EE.C.8b	Expressions and Equations	Expressions and Equations	
12	Multiple Choice	B	1	CCSS.Math.Content.8.F.B.4	Functions	Functions	
13	Multiple Choice	B	1	CCSS.Math.Content.8.G.A.4	Geometry	Geometry	
14	Multiple Choice	C	1	CCSS.Math.Content.7.G.B.6	Geometry	Geometry	
15	Multiple Choice	B	1	CCSS.Math.Content.8.EE.B.6	Expressions and Equations	Expressions and Equations	
16	Multiple Choice	C	1	CCSS.Math.Content.8.EE.C.7a	Expressions and Equations	Expressions and Equations	
17	Multiple Choice	B	1	CCSS.Math.Content.8.SP.A.3	Statistics and Probability		
18	Multiple Choice	D	1	CCSS.Math.Content.8.SP.A.2	Statistics and Probability		
19	Multiple Choice	A	1	CCSS.Math.Content.8.EE.B.5	Expressions and Equations	Expressions and Equations	
20	Multiple Choice	D	1	CCSS.Math.Content.8.G.C.9	Geometry	Geometry	
21	Multiple Choice	C	1	CCSS.Math.Content.8.EE.A.3	Expressions and Equations	Expressions and Equations	
22	Multiple Choice	C	1	CCSS.Math.Content.8.EE.A.1	Expressions and Equations	Expressions and Equations	
23	Multiple Choice	A	1	CCSS.Math.Content.8.F.A.2	Functions	Functions	
24	Multiple Choice	C	1	CCSS.Math.Content.8.SP.A.1	Statistics and Probability		
25	Multiple Choice	C	1	CCSS.Math.Content.8.G.A.5	Geometry	Geometry	
26	Multiple Choice	D	1	CCSS.Math.Content.8.F.B.5	Functions	Functions	

This item map is intended to identify the primary analytic skills necessary to successfully answer each question. However, some questions measure proficiencies described in multiple standards, including a balanced combination of procedural and conceptual understanding.