New York State
EDUCATION DEPARTMENT
Knowledge › Skill › Opportunity

New York State Testing Program
Grade 8
Mathematics Test

Released Questions

2024

New York State administered the Mathematics Tests in May 2024
and is making approximately 75% of the questions
from these tests available for review and use.

New York State Testing Program
Grades 3–8 Mathematics

Released Questions from 2024 Exams

Background

As in past years, SED is releasing large portions of the 2024 NYS Grades 3–8 English Language Arts and Mathematics test materials for review, discussion, and use.

For 2024, included in these released materials are at least 75 percent of the test questions that appeared on the 2024 tests (including all constructed-response questions) that counted toward students' scores. Additionally, SED is also providing a map that details what each released question measures and the correct response to each question. These released materials will help students, families, educators, and the public better understand the tests and the New York State Education Department's expectations for students.

Understanding Math Questions

Multiple-Choice Questions

Multiple-choice questions are designed to assess the New York State P–12 Next Generation Learning Standards for Mathematics. Mathematics multiple-choice questions will be used mainly to assess standard algorithms and conceptual standards. Multiple-choice questions incorporate both the grade-level standards and the "Standards for Mathematical Practices." Many questions are framed within the context of real-world applications or require students to complete multiple steps. Likewise, many of these questions are linked to more than one standard, drawing on the simultaneous application of multiple skills and concepts.

One-Credit Constructed-Response Questions

One-credit constructed-response questions require students to complete a task and provide only their final answer. These one-credit questions will often require multiple steps, assessing procedural skills, as well as conceptual understanding and application. While students may show how they arrived at their final answer, only the final answer will be scored.

Two-Credit Constructed-Response Questions

Two-credit constructed-response questions require students to complete tasks and show their work. These two-credit response questions will often require multiple steps, the application of multiple mathematics skills, and real-world applications. Many of the short-response questions will cover conceptual and application standards.

Three-Credit Constructed-Response Questions

Three-credit constructed-response questions ask students to show their work in completing two or more tasks or a more extensive problem. These three-credit response questions allow students to show their understanding of mathematical procedures, conceptual understanding, and application. Three-credit response questions may also assess student reasoning and the ability to critique the arguments of others. The scoring rubric for all constructed-response questions can be found in the grade-level Educator Guides at https://www.nysed.gov/state-assessment/grades-3-8-ela-and-math-test-manuals.

New York State P–12 Next Generation Learning Standards Alignment

The alignment(s) to the New York State P–12 Next Generation Learning Standards for Mathematics is/are 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 procedure and conceptual understanding. For example, two-credit and three-credit constructed-response questions require students to show an understanding of mathematical procedures, concepts, and applications.

These Released Questions Do Not Comprise a "Mini Test"

To ensure it is possible to develop future tests, some content must remain secure. This document is *not* intended to be representative of the entire test, to show how operational tests look, or to provide information about how teachers should administer the test; rather, its purpose is to provide an overview of how the test reflects the demands of the New York State P–12 Next Generation Learning Standards.

The released questions do not represent the full spectrum of the standards assessed on the State tests, nor do they represent the full spectrum of how the standards should be taught and assessed in the classroom. It should not be assumed that a particular standard will be measured by an identical question in future assessments.

Name: _____

New York State Testing Program

Mathematics Test
Session 1

Grade 8

Spring 2024

RELEASED QUESTIONS

Session 1

TIPS FOR TAKING THE TEST

Here are some ideas to help you do your best:

- Read each question carefully. Take your time.
- You have a ruler, a protractor, a reference sheet, and a calculator that you can use on the test if they help you answer the question.

1 A group of friends went to a movie theater and paid $\$15.00$ for each movie ticket. The group of friends shared one container of popcorn that cost $\$8.99$. Which equation can be used to determine the total cost, c, for n tickets and the container of popcorn?

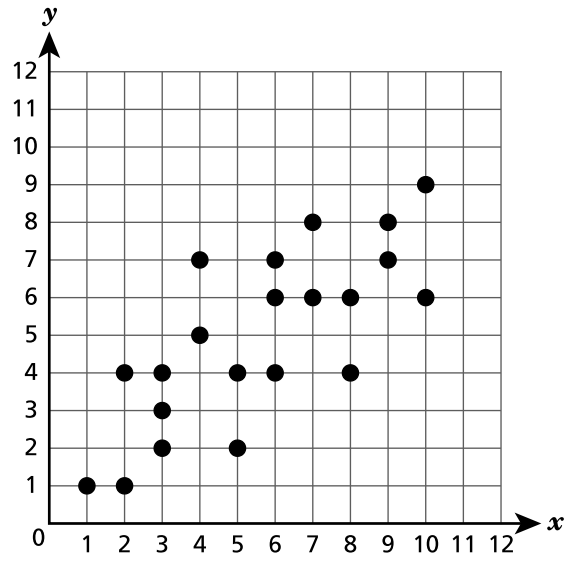
A $c = 15n + 8.99$

B $c = 8.99n + 15$

C $c = 15(n + 8.99)$

D $c = 8.99(n + 15)$

2 A scatter plot is shown below.



Which pair of points could be used to draw a line that best represents the relationship of the data?

A $(4, 7)$ and $(8, 4)$

B $(3, 3)$ and $(9, 7)$

C $(2, 4)$ and $(6, 4)$

D $(3, 2)$ and $(3, 4)$

GO ON

4 Triangle ABC is rotated 90° about the origin and then reflected over the y axis to form triangle $A'B'C'$. One of the angles in triangle ABC has a measure of 115°. One of the angles in triangle $A'B'C'$ has a measure of 40°. Which is the measure of an angle in triangle ABC?

A 25°

B 75°

C 155°

D 180°

5 What is the value of x in the equation $\frac{2}{3}x - 7 = 5 - \frac{3}{5}x$?

A $3\frac{18}{19}$

B $9\frac{9}{19}$

C $15\frac{1}{5}$

D $19\frac{1}{5}$

7 Two electricians, Electrician A and Electrician B, offer pricing plans for their work. Each electrician charges an initial fee for a service call plus an hourly rate. The charges for each electrician are represented by the equation and the table shown below.

ELECTRICIAN A

$C = 25x + 50$

ELECTRICIAN B

Time (hours)	Total Charge (dollars)
3	130
4	150
5	170

Which statement comparing the charges for each electrician is true?

A Electrician A has an initial fee and an hourly rate that are both less than those for Electrician B.

B Electrician A has an initial fee and an hourly rate that are both greater than those for Electrician B.

C Electrician A has an initial fee that is less than that for Electrician B. The hourly rate for Electrician A is greater than that for Electrician B.

D Electrician A has an initial fee that is greater than that for Electrician B. The hourly rate for Electrician A is less than that for Electrician B.

GO ON

9 What is the slope of the line on a coordinate plane that passes through the points $(2, 2)$ and $(-1, -2)$?

A $-\frac{4}{3}$

B $-\frac{3}{4}$

C $\frac{3}{4}$

D $\frac{4}{3}$

10 A sphere has a radius of 4 inches. A cone has a radius of 3 inches and a height of 8 inches. Which expression represents the difference in volume, in cubic inches, between the sphere and the cone?

A $\pi\left[\frac{4}{3}(4^3) - \frac{1}{3}(3^2)(8)\right]$

B $\pi\left[\frac{4}{3}(4^2) - \frac{1}{3}(3^2)(8)\right]$

C $\pi\left[\frac{4}{3}(4^3) - \frac{1}{3}(8)^2(3)\right]$

D $\pi\left[\frac{4}{3}(4^2) - \frac{1}{3}(8)^2(3)\right]$

12 Which value of x makes the equation $x^3 = 64$ true?

A 4

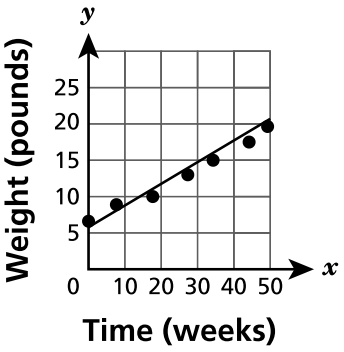
B 8

C 16

D 32

18 The scatter plot below shows the weight, in pounds, of an alligator as it grows at a zoo. The line $y = 0.3x + 5.8$ has been drawn to **best** represent the relationship between the alligator's weight and growth time.

ALLIGATOR'S WEIGHT



Which statement **best** describes what the number 0.3 in the equation represents in this situation?

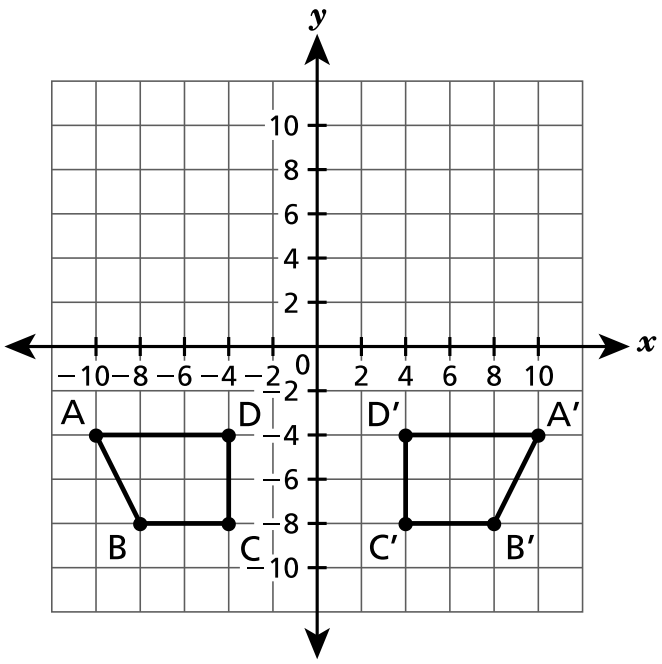
A The starting weight, in pounds, of the alligator.

B The approximate number of pounds the alligator gains each week.

C The maximum number of pounds the alligator gains each week.

D The average number of pounds of food the alligator is fed each week.

19 Trapezoid ABCD and its image A′B′C′D′ are shown on the coordinate plane below.



Which series of transformations could be applied to map trapezoid ABCD onto trapezoid A′B′C′D′ ?

A reflection over the *x* axis and then a rotation of 180° about the origin

B reflection over the *x* axis and then a rotation of 90° about the origin

C reflection over the *y* axis and then a rotation of 180° about the origin

D reflection over the *y* axis and then a rotation of 90° about the origin

20 Which equation represents a linear function?

A $y = \frac{1}{2}x - 3$

B $y = x^2 + 5$

C $y = x^2 + 2x$

D $y = \frac{1}{5}x^3$

GO ON

22 On a coordinate plane, triangle ABC is rotated 90 degrees clockwise about the origin and then dilated with a scale factor of 2 centered at the origin to form triangle $A'B'C'$. Which statement describes the relationship between triangle ABC and triangle $A'B'C'$?

A They are similar and congruent.

B They are similar but not congruent.

C They are congruent but not similar.

D They are neither congruent nor similar.

23 One of the angles in a triangle measures x degrees. Another angle in the triangle measures y degrees. Which expression represents the measurement, in degrees, of the third angle of the triangle?

A $180 - (x + y)$

B $180 - x + y$

C $x + y - 180$

D $x + y + 180$

GO ON

27 Which expression is equivalent to 3^5 ?

A $\frac{3^{10}}{3^5}$

B $\frac{3^{15}}{3^3}$

C $\frac{9^{10}}{3^5}$

D $\frac{9^3}{9^5}$

30 Which list of numbers could represent the side lengths of a right triangle?

A 5, 10, 13

B 5, 12, 17

C 10, 24, 26

D 10, 24, 68

STOP

Grade 8
Mathematics Test
Session 1
Spring 2024

Name: _____

New York State Testing Program

Mathematics Test
Session 2

Grade 8

Spring 2024

RELEASED QUESTIONS

Session 2

TIPS FOR TAKING THE TEST

Here are some ideas to help you do your best:

- Read each question carefully. Take your time.
- You have a ruler, a protractor, a reference sheet, and a calculator that you can use on the test if they help you answer the question.
- Be sure to show your work when asked.
- Be sure to explain your answer when asked.

33 The table below represents a function.

x	y
2.5	7.5
3.5	10.5
4.5	13.5
5.5	16.5

Which statement describes the function?

A The function is nonlinear because the y intercept is 0.

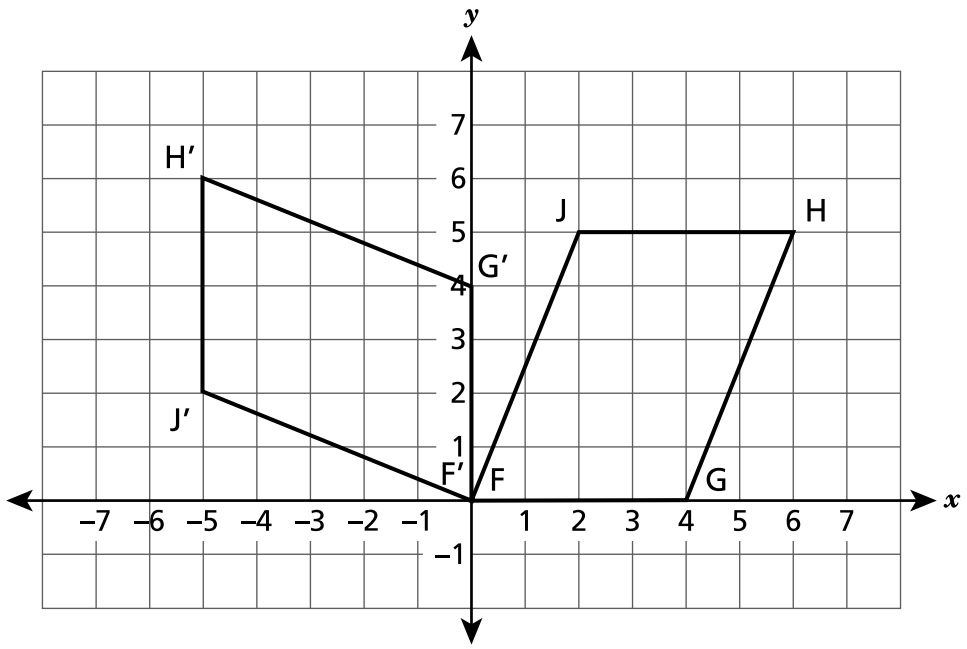
B The function is linear because the rate of change is constant.

C The function is linear because the y intercept is a constant value.

D The function is nonlinear because the rate of change is not constant.

GO ON

34 Quadrilateral $FGHJ$ is rotated about the origin to form quadrilateral $F'G'H'J'$.



Which two sides are equal in length?

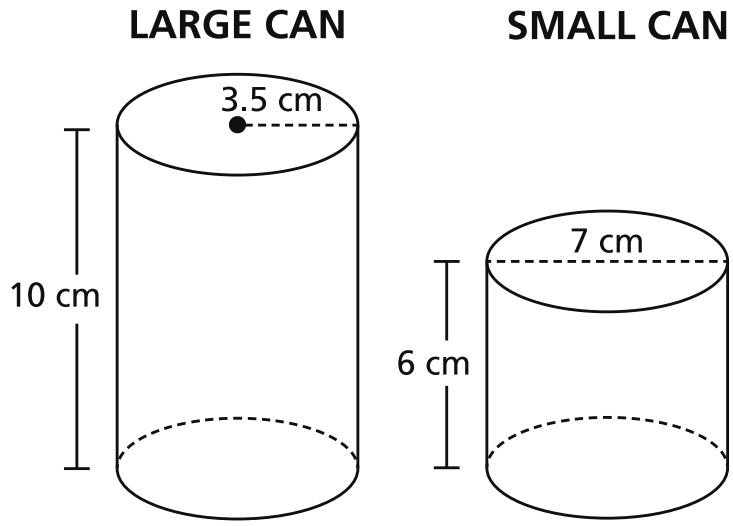
A $\overline{FG}$ and $\overline{F'J'}$

B $\overline{JF}$ and $\overline{H'J'}$

C $\overline{GH}$ and $\overline{H'G'}$

D $\overline{HG}$ and $\overline{H'J'}$

35 A manufacturer makes cylindrical cans in two sizes. The dimensions of each can are shown in the diagram below.



What is the difference between the volumes, in cubic centimeters, of the large can and the small can in terms of π?

A 4π

B 49π

C 73.5π

D 155.5π

36 An equation is shown below.

$$2(3x + 1) = x + 1 + 5x$$

Which statement about the equation is true?

A It has no solutions.

B It has exactly one solution.

C It has exactly two solutions.

D It has an infinite number of solutions.

GO ON

37 Which statement **best** describes the value of $\sqrt{2}$?

A between 0.5 and 1.0

B between 1.5 and 2.0

C between 1.0 and 1.5 but closer to 1.0

D between 1.0 and 1.5 but closer to 1.5

38 A set of ordered pairs is shown below.

$$\{(-3,3),\ (1,1),\ (4,2),\ (-1,-1),\ (-2,-1),\ (3,1),\ (-2,3)\}$$

Which ordered pair should be removed to make the set a function?

A $(-3,3)$

B $(4,2)$

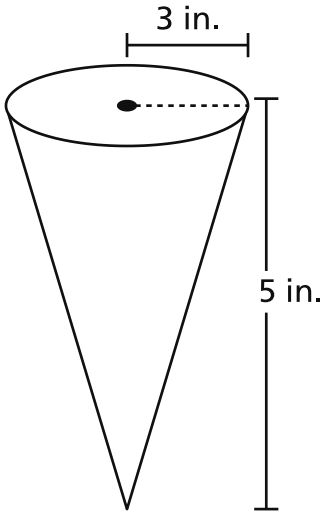
C $(-2,-1)$

D $(3,1)$

39 **This question is worth 1 credit.**

A movie theater sells popcorn in cone shaped containers as shown below.

POPCORN CONTAINER



What is the volume, in cubic inches, of the popcorn container? Round your answer to the nearest tenth.

Answer _____ cubic inches

GO ON

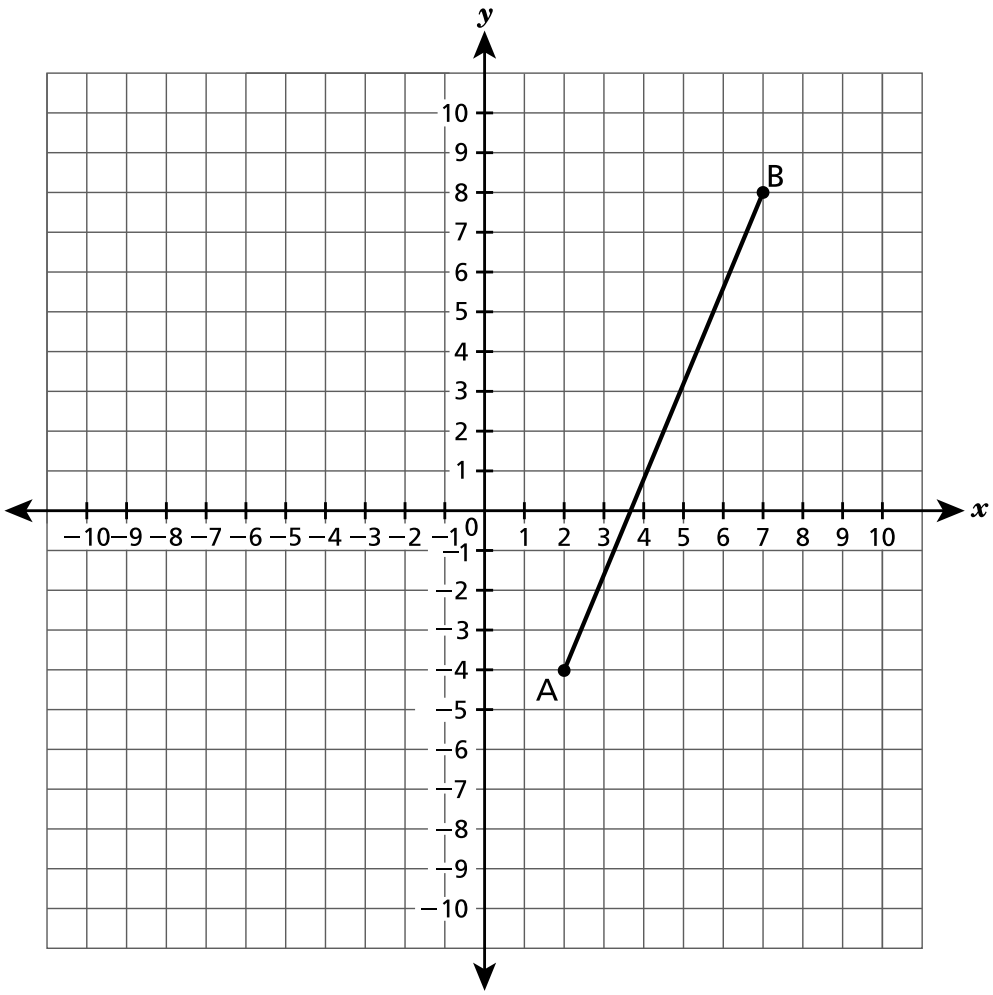
40 **This question is worth 1 credit.**

The area of a square shaped garden is 324 square feet. What is the length, in feet, of each side of the garden?

Answer _____ feet

41 **This question is worth 1 credit.**

Line segment AB is graphed on the coordinate plane shown below.



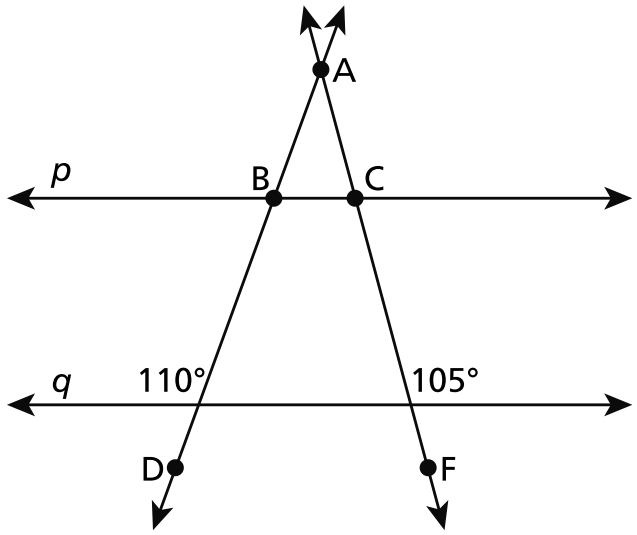
What is the length, in units, of line segment AB ?

Answer _____ units

GO ON

42 **This question is worth 2 credits.**

In the figure below, line p is parallel to line q and lines $\overline{AD}$ and $\overline{AF}$ are transversals.



What is the measure, in degrees, of $\angle BAC$?

Show your work.

Answer _____ degrees

43 **This question is worth 2 credits.**

The equation $y = 1.5x + 29$ is used to model the yearly salary, y, of an employee, in thousands of dollars, where x is the number of years the employee has worked for the company. What does the slope of the line represent in this situation?

Explain your answer.

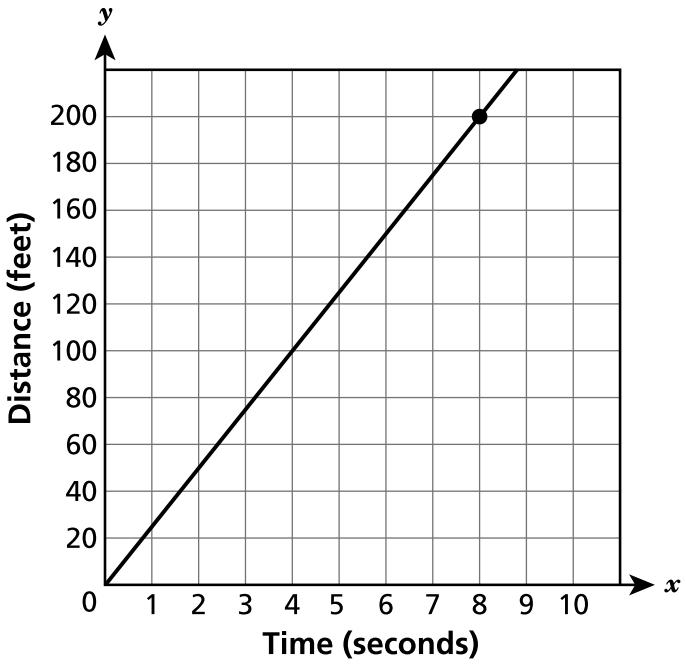
44 **This question is worth 2 credits.**

A dog owner collected data to see which of his two dogs runs at the greater speed. The graph and the table below show the relationship between the time, in seconds, and the distance, in feet, each dog ran.

DOG A

Time, *x* (seconds)	Distance, *y* (feet)
2	56
4	112
6	168
8	224

DOG B



What is the difference, in feet per second, between the speeds of the two dogs?

Show your work.

Answer _____ feet per second

45 **This question is worth 2 credits.**

Two ordered pairs of a linear function are shown below.

$$\left(2, 4\frac{1}{2}\right), \left(3, 5\frac{1}{4}\right)$$

What is the rate of change for the function?

Show your work.

Answer _____

GO ON

46 **This question is worth 2 credits.**

What value of x makes the equation shown below true?

$$\frac{1}{4}(3x - 8) + 4 = 2(x - 4)$$

Show your work.

Answer $x =$ _____

47 **This question is worth 2 credits.**

A list of numbers is shown below.

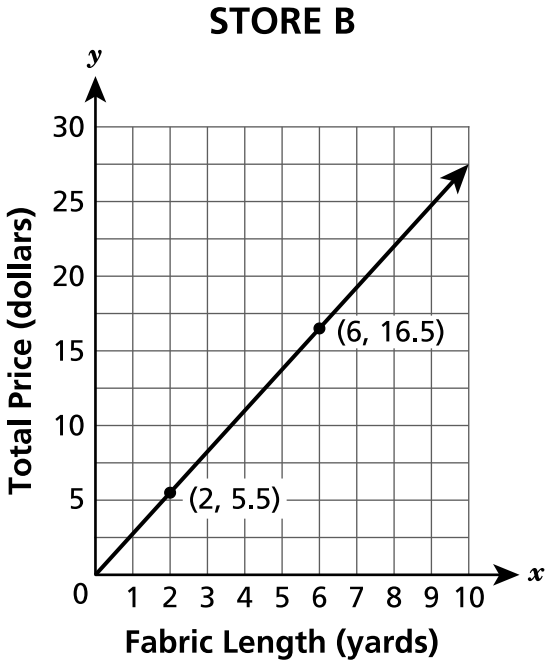
- $\sqrt{49}$
- $1.\overline{3}$
- $\sqrt{32}$
- $\frac{7}{2}$
- 1.234

Classify each number as either rational or irrational. Be sure to include how you know a number is rational.

Explain your answer.

48 **This question is worth 3 credits.**

Store A and Store B sell fabric for different prices. The equation $y = 3.5x$ represents the price, y, in dollars, for x yards of fabric at Store A. The graph below represents the price for the same type of fabric at Store B.



What is the unit rate for the price of fabric, per yard, at each store?

Store A $ _____ per yard of fabric

Store B $ _____ per yard of fabric

How much more would the price of 9 yards of fabric be at Store A than at Store B ?

Show your work.

Answer $ _____

STOP

Grade 8
Mathematics Test
Session 2
Spring 2024

THE STATE EDUCATION DEPARTMENT

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

2024 Mathematics Tests Map to the Standards

Grade 8

Question	Type	Key	Points	Standard	Domain	Secondary Standard(s)	Multiple Choice Questions	Constructed Response Questions	
							Percentage of Students Who Answered Correctly (P-Value)	Average Points Earned	P-Value (Average Points Earned ÷ Total Possible Points)
Session 1									
1	Multiple Choice	A	1	NGLS.Math.Content.NY-8.F.4	Functions		0.75		
2	Multiple Choice	B	1	NGLS.Math.Content.NY-8.SP.2	Statistics and Probability		0.68		
4	Multiple Choice	A	1	NGLS.Math.Content.NY-8.G.1b	Geometry	NGLS.Math.Content.NY-8.G.5	0.47		
5	Multiple Choice	B	1	NGLS.Math.Content.NY-8.EE.7b	Expressions and Equations		0.50		
7	Multiple Choice	C	1	NGLS.Math.Content.NY-8.F.2	Functions		0.47		
9	Multiple Choice	D	1	NGLS.Math.Content.NY-NY-8.EE.6	Expressions and Equations		0.31		
10	Multiple Choice	A	1	NGLS.Math.Content.NY-8.G.9	Geometry		0.51		
12	Multiple Choice	A	1	NGLS.Math.Content.NY-8.EE.2	Expressions and Equations		0.79		
18	Multiple Choice	B	1	NGLS.Math.Content.NY-8.SP.3	Statistics and Probability		0.59		
19	Multiple Choice	A	1	NGLS.Math.Content.NY-8.G.2	Geometry		0.39		
20	Multiple Choice	A	1	NGLS.Math.Content.NY-8.F.3	Functions		0.63		
22	Multiple Choice	B	1	NGLS.Math.Content.NY-8.G.4	Geometry		0.57		
23	Multiple Choice	A	1	NGLS.Math.Content.NY-8.G.5	Geometry		0.47		
27	Multiple Choice	A	1	NGLS.Math.Content.NY-8.EE.1	Expressions and Equations		0.65		
30	Multiple Choice	C	1	NGLS.Math.Content.NY-8.G.6	Geometry		0.46		
Session 2									
33	Multiple Choice	B	1	NGLS.Math.Content.NY-8.F.3	Functions		0.71		
34	Multiple Choice	C	1	NGLS.Math.Content.NY-8.G.1a	Geometry		0.68		
35	Multiple Choice	B	1	NGLS.Math.Content.NY-8.G.9	Geometry		0.51		
36	Multiple Choice	A	1	NGLS.Math.Content.NY-8.EE.7a	Expressions and Equations		0.50		
37	Multiple Choice	D	1	NGLS.Math.Content.NY-8.NS.2	The Number System		0.65		
38	Multiple Choice	C	1	NGLS.Math.Content.NY-8.F.1	Functions		0.55		
39	Constructed Response	n/a	1	NGLS.Math.Content.NY-8.G.9	Geometry			0.36	0.36
40	Constructed Response	n/a	1	NGLS.Math.Content.NY-8.EE.2	Expressions and Equations			0.22	0.22
41	Constructed Response	n/a	1	NGLS.Math.Content.NY-8.G.8	Geometry			0.19	0.19
42	Constructed Response	n/a	2	NGLS.Math.Content.NY-8.G.5	Geometry			0.44	0.22
43	Constructed Response	n/a	2	NGLS.Math.Content.NY-8.SP.3	Statistics and Probability			0.22	0.11
44	Constructed Response	n/a	2	NGLS.Math.Content.NY-8.EE.5	Expressions and Equations			0.78	0.39
45	Constructed Response	n/a	2	NGLS.Math.Content.NY-8.F.4	Functions			0.55	0.27
46	Constructed Response	n/a	2	NGLS.Math.Content.NY-8.EE.7b	Expressions and Equations			0.69	0.34
47	Constructed Response	n/a	2	NGLS.Math.Content.NY-8.NS.1	The Number System			0.46	0.23
48	Constructed Response	n/a	3	NGLS.Math.Content.NY-8.EE.5	Expressions and Equations			1.37	0.46

*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.