

Mathematics Student Guide

Georgia Performance Standards Version

A Guide for Students Preparing for the
Georgia High School Graduation Tests



Mathematics

Includes:

Description of the Content of the Test
Sample Mathematics Test Items and Explanations
Practice Questions

NOTE: This document is intended as a student aid.
Please photocopy as necessary for student use.



Dr. John D. Barge
State School Superintendent
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INTRODUCTION

The Georgia High School Graduation Tests

To earn a high school diploma in Georgia, all students must pass tests in English language arts, mathematics, science, social studies, and writing. The content area tests are referred to as the Georgia High School Graduation Tests (GHSGT). The writing test is referred to as the Georgia High School Writing Test (GHSWT). Students take all five tests for the first time in the 11th grade.

For a detailed explanation of the GHSGT, refer to the Department of Education's Web site: http://public.doe.k12.ga.us/ci_testing.aspx?PageReq=CI_TESTING_GHSGT.

The Georgia High School Graduation Test in Mathematics

This document is designed to help you prepare for the Georgia Performance Standards (GPS) version of the graduation test in mathematics. This test version will be administered to first-time test takers in spring 2011. The *Mathematics Student Guide—GPS* can be viewed at the Web site provided above.

If you take the mathematics test prior to spring 2011, you will continue to take the QCC (Quality Core Curriculum) version. A student guide for the QCC version of the mathematics test can also be found at the Web site provided above. Look for the GPS and QCC designations in the document title. You may also use this document.

If you are an 11th-grade student, you must take the mathematics test in the spring of the 11th grade. Students who are unsure when they should take the test should contact their school counselor.

Students who have taken the mathematics test without passing may retest at any administration. You will have up to five opportunities to take and pass the test between the spring administration of your 11th-grade year and the summer after 12th grade.

If you do not pass the mathematics test but have met all other graduation requirements, you may be eligible for a certificate of performance or a special-education diploma. If you leave school with a certificate of performance or a special-education diploma, you may retake the test as often as necessary to qualify for a high school diploma.

Students who meet certain criteria may be eligible to apply to the State Board of Education for a waiver or variance. Refer to the Georgia Department of Education's Web site for more information (www.gadoe.org).

CONTENT COVERED ON THE MATHEMATICS GHS GT

This document is designed as a supplement to the test content descriptions for mathematics. The domains and their respective weights are included here, but you should refer to the test content descriptions for further description of the tested objectives. The *Test Content Descriptions* may be found at this part of the Georgia Department of Education's Web site: http://www.doe.k12.ga.us/ci_testing.aspx?folderID=227&m=links&ft=Content%20Descriptions

Content Domains of the GPS Mathematics GHS GT

The content in the GPS-based mathematics test is grouped into the three sections called **domains** described below. The sample test items that appear on pages 9 through 14 of this student guide are representative of these domains and closely resemble items found on the actual test. The items are also aligned to the GPS. The percentages listed for each domain indicate the emphasis it is given on the test.

Domain 1: **Algebra** (36% of the test)

Students will explore and interpret the characteristics of functions, including quadratic, piecewise, and exponential functions. Students will simplify and operate with radical expressions, polynomials, and rational expressions. Students will solve equations and inequalities and explore inverses of functions. Students will represent and operate with complex numbers.

Domain 2: **Geometry** (36% of the test)

Students will explore, understand, and use the formal language of reasoning and justification. Students will investigate properties of geometric figures in the coordinate plane. Students will understand and apply properties of triangles, quadrilaterals, and other polygons. Students will explore right triangles and right-triangle trigonometry. Students will understand the properties of circles. Students will find and compare the measures of spheres.

Domain 3: **Data Analysis** (28% of the test)

Students will determine the number of outcomes related to a given event and will use the basic laws of probability. Students will compare summary statistics from one sample data distribution to another and understand that a random sample is used to improve the chance of selecting a representative sample. Students will pose questions to be answered by collecting data. Students will use the "eyeballing" method to find good linear fits to data and investigate the possible confusion between correlation and causation.

PREPARING FOR THE TEST

The GPS version of the mathematics *Test Content Descriptions* describes the content that you can expect to find on the test. To review what you have learned in your mathematics courses, you may use any high school textbook that covers algebra, geometry, and data analysis.

The sample test items that appear on pages 9 through 14 are representative of test items that assess content knowledge of each of the three domains. There is also a practice test of 33 questions on pages 15 through 24 to help you prepare to take the actual test.

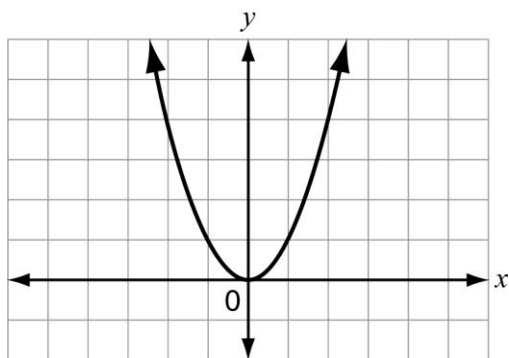
Finally, you may use questions from the Georgia Online Assessment System for further practice. You may locate a link to the Georgia online system on the Georgia Department of Education home page, www.gadoe.org.

What you will find on the test

The mathematics test consists of 65 multiple-choice questions. Each question has four possible answers; only **one** of the four choices is the correct answer.

The parts of a test question are identified in the following sample item.

This graph represents the function $f(x) = x^2$.



Stimulus

How is the graph of the function $g(x) = 4x^2$ different from the graph of the function $f(x) = x^2$?

Stem

- A. It is wider. ← Distractor
- B. It is narrower. ← Correct Response (Key)
- C. It is shifted 4 units up. ← Distractor
- D. It is shifted 4 units to the right. ← Distractor

Options

Stimulus: information you must use to answer the question

Stem: the question or statement to be answered (pay particular attention to **bold** words)

Options: answer choices you might select—one of the four choices is the correct response (the “key”), and the others are called “distractors”

You should be able to complete the test in 60 minutes. However, you have up to 3 hours, if needed.

The questions on the test require a range of thinking skills. Some questions may involve interpreting a graph or table. Others may involve applying a formula. The term **DEPTH OF KNOWLEDGE** (DOK) describes the degree of mental processing that is necessary to answer an item correctly.

Level 1

Level 1 includes recalling information such as a fact, definition, term, or simple procedure, as well as performing a simple algorithm or applying a formula. In mathematics, a one-step, well-defined, and straight algorithmic procedure is at this lowest level. Other key words that signify a Level 1 assessment item include “identify,” “recall,” “recognize,” “use,” and “measure.” Verbs such as “describe” and “explain” can be classified in items at different levels, not just in Level 1, depending on what is to be described and explained.

Level 2

Level 2 includes engaging some mental processing beyond a habitual response. A Level 2 assessment item requires you to make some decisions about how to approach the problem or activity, whereas Level 1 requires you to provide a rote response, perform a well-known algorithm, follow a set procedure (such as recipe), or follow a clearly defined series of steps. Key words that generally distinguish a Level 2 item include “classify,” “organize,” “estimate,” “make observations,” “collect and display data,” and “compare data.” These actions imply more than one step. For example, to compare data requires first identifying characteristics of the objects or phenomena and then grouping or ordering them. Some action verbs, such as “explain,” “describe,” or “interpret” can be classified at different levels, depending on the objective of the action. For example, if an item required you to explain how light affects mass by indicating there is a relationship between light and heat, it would be considered a Level 2 item. Interpreting information from a simple graph or requiring reading information from the graph also is found at Level 2, but interpreting information from a complex graph that requires you to make some decisions about what features of the graph need to be considered and how information from the graph can be aggregated is found at Level 3. Caution is warranted in interpreting Level 2 as only testing skills because some reviewers interpret skills very narrowly, as primarily visualization and probability skills, which may actually be more complex simply because they are less common. Other Level 2 activities include explaining the purpose and use of experimental procedures; carrying out experimental procedures; making observations and collecting data; classifying, organizing, and comparing data; and organizing and displaying data skills in tables, graphs, and charts.

Level 3

Level 3 requires reasoning, planning, and using evidence at a higher level of thinking than the previous two levels. In most instances, assessment items that require you to explain your thinking are Level 3 items. Activities that require you to make conjectures are also at this level. The cognitive demands at Level 3 are complex and abstract. The complexity does not result from the fact that there are multiple answers, a possibility at both Levels 1 and 2, but because the task requires more demanding reasoning. An activity, however, that has more than one possible answer and requires you to justify your response is most likely a Level 3 activity. Other Level 3 activities include drawing conclusions from observations, citing evidence and developing a logical argument for concepts, explaining phenomena in terms of concepts, and using concepts to solve problems.

Examples of questions that represent these three levels can be found in the “Sample Items and Explanations” section on pages 9 through 14.

TAKING THE TEST

Many of the GHSGT mathematics questions involve tables and graphs. All the test questions require you to carefully read the directions, each question, **and** its four answer choices (options). Use these strategies to help you succeed on the test.

Guess intelligently.

There is no penalty for guessing on any GHSGT item. If you are not sure of the correct answer, you are encouraged to guess. Guessing is easier if you can eliminate one or more options as clearly incorrect (distractors). Be warned, however, that many of the distractors are very attractive because they are based on common mistakes students make.

Remember that there are no trick questions.

While it is important to read each question carefully, the GHSGT does **not** include any trick questions. You should not spend time trying to figure out what is *really* meant. If you read the entire question, including all accompanying material, the meaning should be clear. Requiring a careful reading of the **entire** question is not considered a trick.

Consider every choice.

You must choose from the four options the choice that **best** answers the question. Some of the distractors will be attractive because they include an irrelevant detail, a common misconception, or the correct information applied in an incorrect way.

Spend test time wisely.

Some tests are arranged so that the easiest items are first and the hardest are last. The GHSGT in mathematics is not arranged that way. Therefore, it is possible to find several difficult questions followed by a set of easier questions. If you run into a few hard questions, do not get discouraged. Move on, answer as many questions as possible, and then go back and reattempt the harder questions.

You may have up to three hours to take the mathematics GHSGT. However, it is still important to use your time wisely. If you finish early, use the time to check your answers.

Read everything carefully.

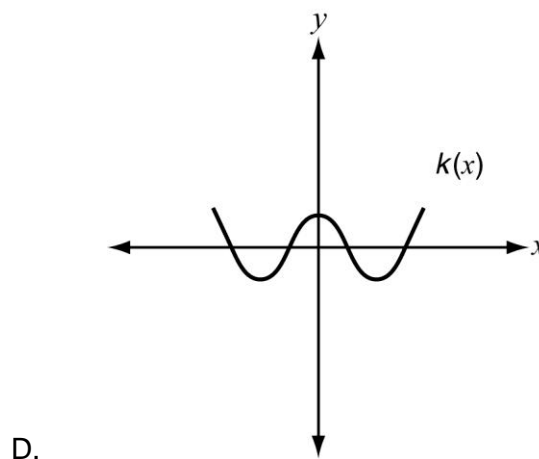
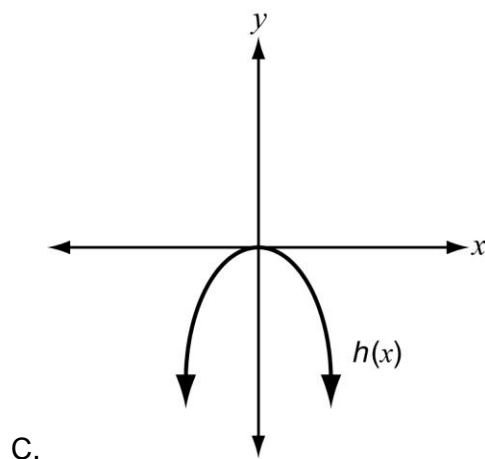
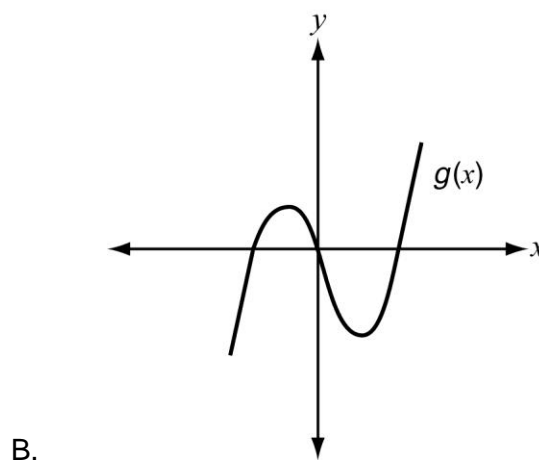
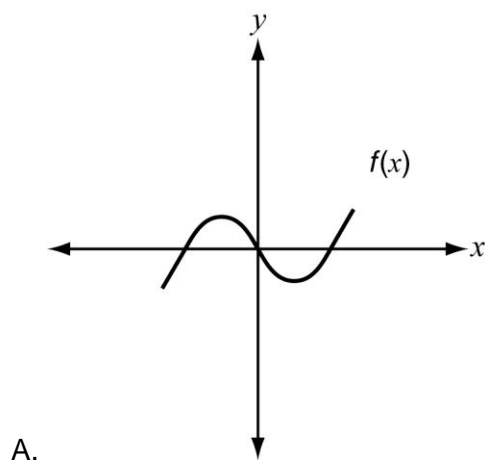
There are several places where carelessness can cause you to answer incorrectly. The first is in the initial reading of the question. Read everything carefully. The second is in choosing the answer. You should evaluate each answer option critically to make sure it actually answers the question. The third possibility for making a mistake is in the transfer of the correct answer to your answer document. You should ask yourself two questions: "Am I on the correct question number in the correct section of the test?" and "Is this the answer I mean to mark?"

SAMPLE ITEMS AND EXPLANATIONS

The items provided in this section are samples. They should be considered **examples** of items and types of items that may be found on the mathematics test.

Domain 1: Algebra

1. Which graph does **not** have any symmetry?



Correct Answer: B Explanation: Graphs C and D both have symmetry with respect to the y -axis. Graph A has symmetry with respect to the origin. Graph B is the only graph that does not have any symmetry.

Depth of Knowledge: This is a Level 1 item. It requires a basic recognition of a property of the graphs of functions.

Domain 1: Algebra

2. Which equation's solution is $x = 11i$?

- A. $x^2 - 11 = 0$
- B. $x^2 + 11 = 0$
- C. $x^2 - 121 = 0$
- D. $x^2 + 121 = 0$

Correct Answer: D Explanation: In this problem, you square each side of the equation $x = 11i$ to obtain $x^2 = -121$. By adding 121 to each side of this equation, you will obtain $x^2 + 121 = 0$.

Depth of Knowledge: This is a Level 1 item because you solve it by performing a straightforward algorithm.

Domain 2: Geometry

3. Triangle RST is isosceles.

- $\angle S = (4x + 2)^\circ$
- $\angle R = (6x + 8)^\circ$

Which of the following could be the measure of $\angle T$?

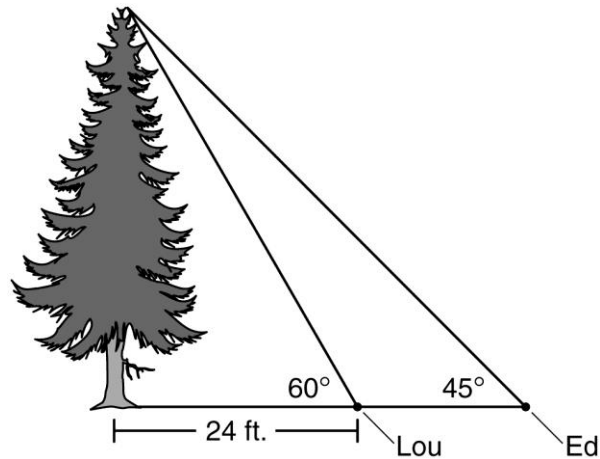
- A. 42°
- B. 50°
- C. 68°
- D. 80°

Correct Answer: B Explanation: You need to recognize that $\angle T$ is congruent to either $\angle R$ or $\angle S$. If $\angle T$ is congruent to $\angle R$, then $4x + 2 + 6x + 8 + 6x + 8 = 180$. Next, find $x = 10.125$ so that the measure of $\angle T$ is 68.75° . If $\angle T$ is congruent to $\angle S$, then $4x + 2 + 4x + 2 + 6x + 8 = 180$. Find $x = 12$, and the measure of $\angle T$ is 50° .

Depth of Knowledge: This is a Level 3 item because it requires a higher level of thinking to determine how to solve this problem.

Domain 2: Geometry

4. Lou and Ed are lying on the ground and looking up at the top of a tree. This diagram shows their positions and the distance Lou is from the tree.



- Lou is looking up at a 60° angle.
- Lou is 24 feet from the base of the tree.
- Ed is looking up at a 45° angle.

What is the approximate distance between Lou and Ed?

- A. 42 ft.
- B. 24 ft.
- C. 18 ft.
- D. 10 ft.

Correct Answer: C Explanation: You can use the properties of 45-45-90 triangles to recognize that the distance from Ed to the base of the tree is equal to the height of the tree. Using the properties of 30-60-90 triangles, determine the height of the tree is $24\sqrt{3}$ feet. The distance from Ed to Lou is therefore $24\sqrt{3} - 24 \cong 18$ feet.

Depth of Knowledge: This is a Level 2 item. It requires you to make some decisions about how to approach the problem.

Domain 2: Geometry

5. A student plotted points R and S on a coordinate grid.

- Point R is located at $(7, 2)$.
- Point S is located at $(4, -2)$.

What is the distance between points R and S ?

- A. 3 units
- B. 5 units
- C. 10.2 units
- D. 11.7 units

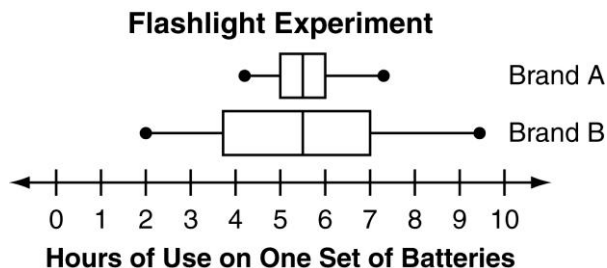
Correct Answer: B Explanation: Use the distance formula to find

$$d = \sqrt{(7 - 4)^2 + (2 - (-2))^2} = \sqrt{25} = 5.$$

Depth of Knowledge: This is a Level 1 item. It requires you to apply a simple algorithm.

Domain 3: Data Analysis

6. A study was conducted to compare the number of hours the same set of flashlights would run on two different battery brands. The results are represented in this double box-and-whisker plot.



Which statement is correct?

- A. Brand A is more likely than Brand B to last more than $5\frac{1}{2}$ hours.
- B. Brand A is less likely than Brand B to last more than $5\frac{1}{2}$ hours.
- C. Brand A is more likely than Brand B to last less than 4 hours.
- D. Brand A is less likely than Brand B to last less than 4 hours.

Correct Answer: D Explanation: Choice D is correct since none of the flashlights using Brand A lasted less than 4 hours, but at least 25% of the flashlights using Brand B lasted less than 4 hours.

Depth of Knowledge: This is a Level 2 item. It requires you to interpret data represented by a graph.

Domain 3: Data Analysis

7. Hayden is working on a 50-piece puzzle. The puzzle has 22 edge pieces. The rest are inside pieces.

Hayden will pick two puzzle pieces at random. What is the probability that both of the puzzle pieces she picks will be inside pieces?

- A. $\frac{14}{25}$
B. $\frac{54}{175}$
C. $\frac{189}{625}$
D. $\frac{196}{625}$

Correct Answer: B **Explanation:** The probability that the first piece she picks is an inside piece is $\frac{28}{50}$. The probability that the second piece she picks is an inside piece is $\frac{27}{49}$.

$$\frac{28}{50} \times \frac{27}{49} = \frac{756}{2450} = \frac{54}{175}$$

Depth of Knowledge: This is a Level 2 item. It requires you to make some decisions about how to approach the problem and is more abstract than a typical Level 1 problem.

PRACTICE QUESTIONS

Following are practice questions that you may use to help prepare for the Georgia High School Graduation Test in mathematics, which is based on the Georgia Performance Standards (GPS). These questions will **not** appear on the mathematics test, but represent some of the types of questions you should expect on the test. While working on these questions, it is a good idea to use the same calculator that you will use when taking the GHSGT. You may not use a graphing calculator or one that stores text. The answers are on page 25.

Domain 1: Algebra

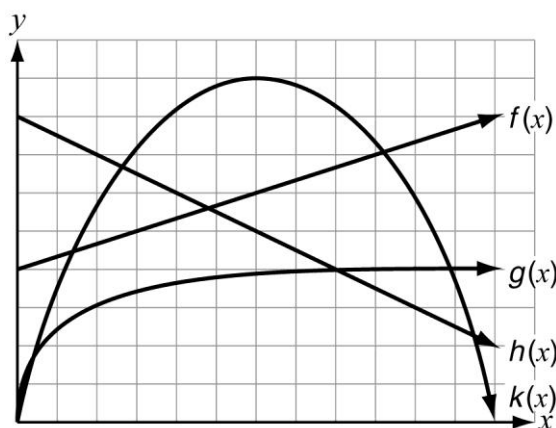
1. This inequality can be used to find the range of possible weights in ounces, w , for a box of cereal.

$$|w - 13.5| \leq 0.05$$

What is the range of weights, in ounces, for the box of cereal?

- A. $w \leq 13.55$
- B. $w \leq -13.55$
- C. $13.45 \leq w \leq 13.55$
- D. $-13.45 \leq w \leq -13.55$

2. Four functions are plotted on this coordinate plane.



Which function has a rate of change that approaches 0 as x increases over all values?

- A. $f(x)$
- B. $g(x)$
- C. $h(x)$
- D. $k(x)$

3. Which expression is equivalent to

$$\frac{y-3}{y+2} \div \frac{6-2y}{3y+6}?$$

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

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

C. $\frac{-2(y-3)^2}{3(y+2)^2}$

D. $\frac{3(y-3)^2}{2(y+2)^2}$

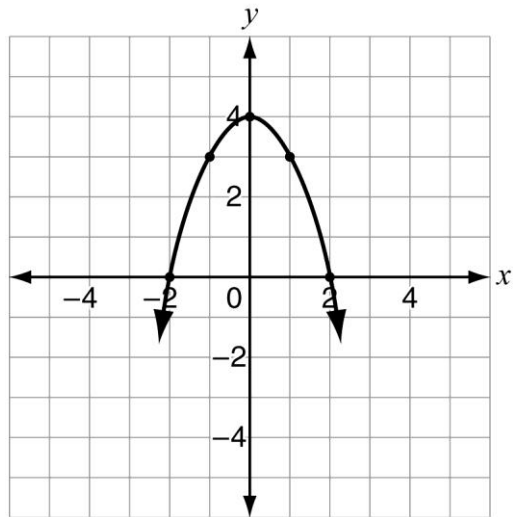
4. This equation can be used to find the amount of money, in dollars, that Mr. Lewis will have in his account after t years.

$$20,000(1.15)^t$$

How much money will Mr. Lewis have in his account after 3 years?

- A. \$23,000.00
B. \$30,417.50
C. \$52,173.91
D. \$69,000.00

5. A student sketched this graph of a function.



Which equation is a zero of the student's function?

- A. $x = -2$
B. $x = 0$
C. $x = 1$
D. $x = 4$
6. Which expression is equivalent to $-(x^{-2})^{-4}$?

A. $-\frac{1}{x^8}$

B. $\frac{1}{x^8}$

C. $-x^8$

D. x^8

7. Two bicycle shops rent bikes by the hour. The cost to rent a bike for h hours from each shop is represented by these functions.

- Shop 1: $f(h) = 3h + 4$
- Shop 2: $g(h) = 2h + 11$

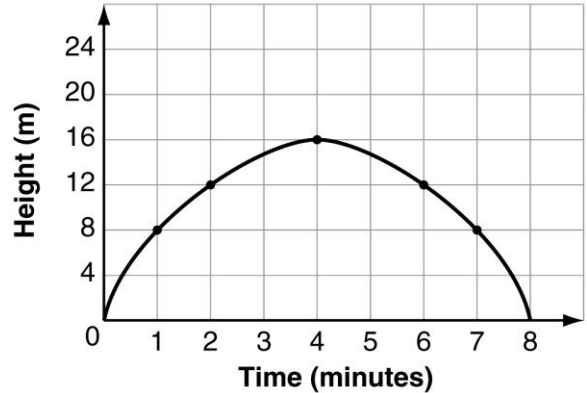
Ellen rented a bike from Shop 1. Roger rented a bike from Shop 2. They rented their bikes for the same number of hours and paid the same rental costs.

For how many hours did Ellen and Roger each rent their bike?

- A. 3
 - B. 5
 - C. 7
 - D. 25
8. What are the roots of the equation $y = x^2 - 3x - 28$?
- A. $x = 4$ and $x = 7$
 - B. $x = 4$ and $x = -7$
 - C. $x = -4$ and $x = 7$
 - D. $x = -4$ and $x = -7$

9. This parabola represents the height of a toy plane with respect to amount of time after takeoff.

Height of a Toy Plane



During which interval was the rate of change of the plane's height greatest?

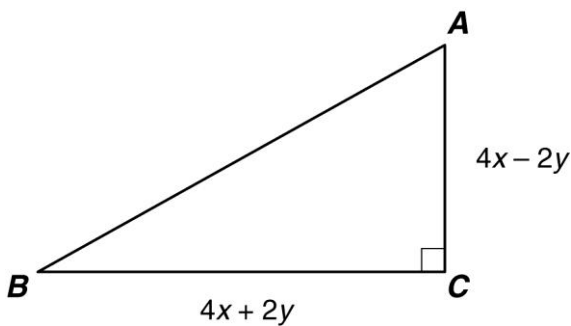
- A. from 0 to 1 minute
- B. from 1 to 2 minutes
- C. from 2 to 4 minutes
- D. from 4 to 6 minutes

10. Which expression is equivalent to

$$\sqrt{45x^9y^4z^2}?$$

- A. $3x^3y^2\sqrt{5z^2}$
- B. $3x^4y^2z\sqrt{5x}$
- C. $9x^3y^2\sqrt{5z^2}$
- D. $9x^4y^2z\sqrt{5x}$

11. Triangle ABC is shown in this diagram.



Which expression represents the area of triangle ABC ?

- A. $8x^2 - 2y^2$
- B. $16x^2 - 4y^2$
- C. $8x^2 - 4xy - 2y^2$
- D. $16x^2 - 8xy - 4y^2$

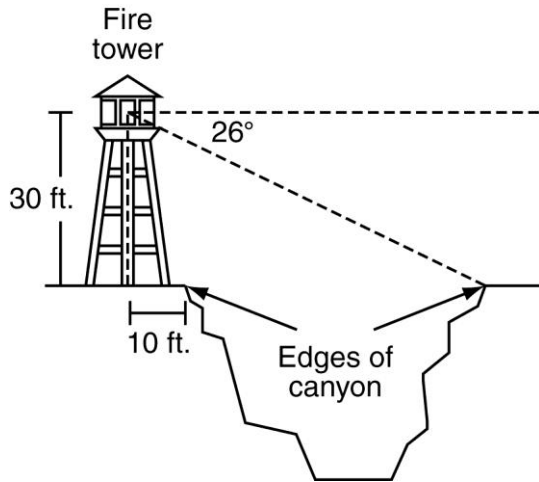
12. The domain of the function

$f(x) = 2\left(\frac{1}{4}\right)^x$ is $x \geq 0$. What is the range of the function?

- A. $-\infty < f(x) < 2$
- B. $-\infty < f(x) \leq 2$
- C. $0 < f(x) \leq 2$
- D. $0 \leq f(x) \leq 2$

Domain 2: Geometry

13. A fire tower is located 10 feet from one edge of a canyon. This diagram shows the angle of depression from the tower to the far edge of the canyon.



What is the approximate width of the widest part of the canyon?

- A. 52 ft.
 - B. 58 ft.
 - C. 62 ft.
 - D. 68 ft.
14. The sum of all the interior **and** exterior angles of a polygon is 2880° . How many sides does the polygon have?
- A. 8
 - B. 12
 - C. 14
 - D. 16

15. The length of \overline{AB} is 10 units. Point A is located at $(1, -3)$ on a coordinate grid.

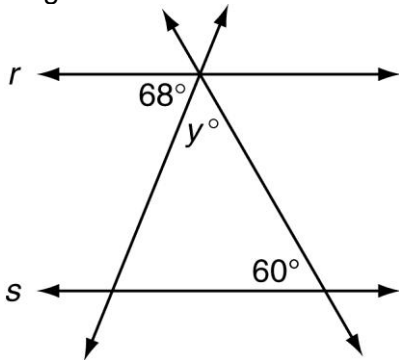
Which coordinates could represent the location of point B?

- A. $(-4, -8)$
 - B. $(4, -2)$
 - C. $(7, 5)$
 - D. $(11, 7)$
16. An ice-cream shop sells spherical scoops of ice cream. Each scoop has a diameter of 2 inches. One half-gallon container holds about 115 cubic inches of ice cream.

About how many 2-inch scoops can be made from one half-gallon container of ice cream?

- A. 9
- B. 14
- C. 24
- D. 27

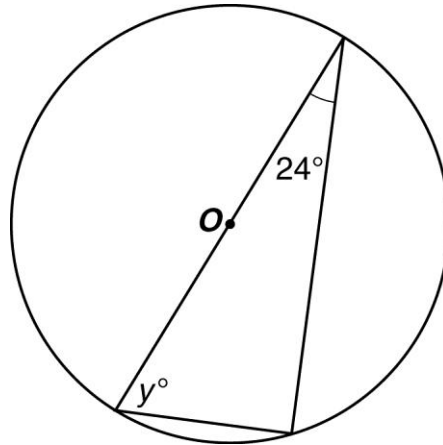
17. Lines r and s are parallel in this diagram.



What is the value of y ?

- A. 22°
 - B. 52°
 - C. 60°
 - D. 68°
18. If m and n are odd integers, which of the following must also be an odd integer?
- A. $(m + n)(m - n)$
 - B. $m(n + 1)$
 - C. $mn + 1$
 - D. $2m + n$

19. This diagram shows a triangle inscribed in circle O .



What is the measure of angle y ?

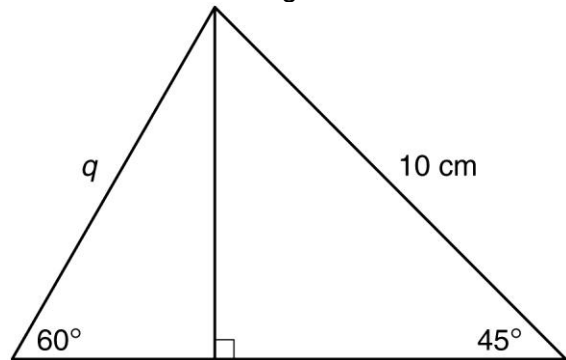
- A. 45°
 - B. 59°
 - C. 66°
 - D. 78°
20. A student is drawing a triangle. She has already drawn two sides.
- The length of the first side is 11 inches.
 - The length of the second side is 23 inches.
- Which length can the student use for the third side?
- A. 11 inches
 - B. 12 inches
 - C. 33 inches
 - D. 34 inches

21. A student drew a quadrilateral that has four congruent sides. The opposite sides of his quadrilateral are parallel.

Which type of quadrilateral did the student draw?

- A. a kite
- B. a rhombus
- C. a rectangle that is not a square
- D. a trapezoid that is not a square

22. A student drew this figure.



Which expression represents the length of the side the student labeled q ?

- A. $\frac{10}{\sqrt{2}}$ cm
- B. $\frac{10}{\sqrt{6}}$ cm
- C. $\frac{20}{\sqrt{2}}$ cm
- D. $\frac{20}{\sqrt{6}}$ cm

23. Quadrilateral $FGHJ$ is plotted on a coordinate grid.

- Vertex F is at $(-3, -4)$.
- Vertex G is at $(2, -1)$.
- Vertex H is at $(7, -4)$.
- Vertex J is at $(2, -6)$.

Which shape **best** describes quadrilateral $FGHJ$?

- A. kite
- B. rhombus
- C. trapezoid
- D. parallelogram

Domain 3: Data Analysis

24. A team of 5 members of the math club will be selected to go to a tournament. There are a total of 12 members in the math club.

How many different teams of 5 can be selected from the members of the math club?

- A. 120
- B. 792
- C. 95,040
- D. 248,832

25. This table shows the number of points earned after a fair number cube is rolled in a game.

Points Earned

Number Rolled	Points Earned
1	5
2	10
3	20
4	20
5	10
6	5

What is the expected value of points earned on any given roll?

- A. $11\frac{2}{3}$
- B. $12\frac{1}{2}$
- C. 15
- D. 20

26. Two classes took the same science test.

- The first class had a mean score of 79 points with a standard deviation of 5 points.
- The second class had a mean score of 79 points with a standard deviation of 8 points.
- Each class has the same number of students.

Based on the data, which statement **must** be true?

- A. The first class had the highest average score.
- B. The second class had the highest average score.
- C. More students in the first class scored within 5 points of the mean than in the second class.
- D. More students in the second class scored within 5 points of the mean than in the first class.

27. A student is playing a game with colored cards. He has 5 blue, 5 green, 5 red, and 5 yellow cards.

The student will shuffle the cards and take the top 4 cards from the pile. Which value is closest to the probability that all 4 cards the student takes will be the same color?

- A. 0.001
- B. 0.004
- C. 0.050
- D. 0.200

28. This double stem-and-leaf plot shows the daily attendance at a water park during July and August.

Water Park Attendance

July						August				
					14					
					15					
7	7	5	2	0	16	1	1	3	8	8
					17	0	3	6		
8	2	1	1	0	18	2	5	5		
7	5	5	5	3	19	1	2	4	4	9
					20	3	3	3	4	9
					21	3	3	3	4	9

Key		
3	19	1
represents		
193 cars		
and		
191 cars		

Which statement is correct?

- A. The interquartile range of attendance was much less for July than for August.
- B. The interquartile range of attendance was slightly less for July than for August.
- C. The interquartile range of attendance was much greater for July than for August.
- D. The interquartile range of attendance was slightly greater for July than for August.

29. A student has a bag containing red balls, yellow balls, and green balls. The student will take a ball from the bag without looking.

- The probability that the ball he takes will be red is 0.55.
- The probability that the ball he takes will be yellow is 0.35.

What is the probability that the ball the student takes from the bag will be green?

- A. 0.10
- B. 0.45
- C. 0.65
- D. 0.90

30. This scatter plot shows the relationship between x , an employee's years of experience, and y , the time it takes the employee to complete a task.



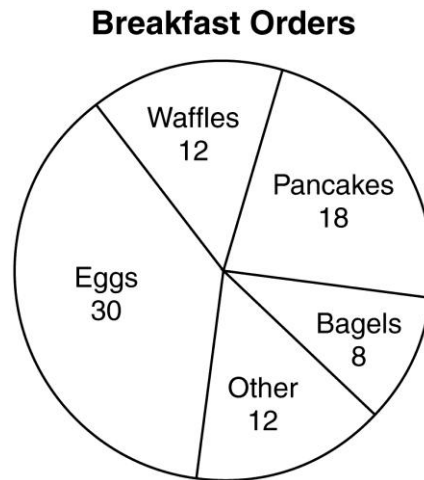
What is the value of the y -intercept for the linear regression line that **best** models the data?

- A. -6.5
 B. 50
 C. 70
 D. 90
31. There are 6 students running for class president. Each student must give a speech. The order in which they give their speeches will be randomly selected.

In how many ways can the students' speeches be ordered?

- A. 36
 B. 720
 C. 5,040
 D. 46,656

32. This circle graph shows the number of customers that ordered different breakfasts at a diner.



What is the probability that a customer chosen at random from the diner ordered either eggs **or** pancakes?

- A. 0.3
 B. 0.48
 C. 0.6
 D. 0.75
33. Mr. Lee bought 6 new pants and 7 new shirts. Now he needs to buy new ties.
- Mr. Lee wants to be able to wear a different combination of one pant, one shirt, and one tie every day for one year. What is the minimum number of ties he should buy?

- A. 8
 B. 9
 C. 10
 D. 11

ANSWERS TO PRACTICE QUESTIONS

Question Number	Domain	DOK Level	Answer
1	Algebra	1	C
2	Algebra	2	B
3	Algebra	1	A
4	Algebra	1	B
5	Algebra	1	A
6	Algebra	1	C
7	Algebra	2	C
8	Algebra	1	C
9	Algebra	2	A
10	Algebra	1	B
11	Algebra	2	A
12	Algebra	2	C
13	Geometry	2	A
14	Geometry	2	D
15	Geometry	1	C
16	Geometry	2	D
17	Geometry	2	B
18	Geometry	2	D
19	Geometry	2	C
20	Geometry	2	C
21	Geometry	1	B
22	Geometry	2	D
23	Geometry	2	A
24	Data Analysis	2	B
25	Data Analysis	2	A
26	Data Analysis	2	C
27	Data Analysis	3	B
28	Data Analysis	2	D
29	Data Analysis	2	A
30	Data Analysis	2	C
31	Data Analysis	2	B
32	Data Analysis	2	C
33	Data Analysis	2	B

PERFORMANCE LEVEL DESCRIPTORS

Honors

Students performing at this level demonstrate comprehensive understanding and mastery of the procedures and concepts in the content domains of algebra, geometry, and data analysis. They routinely apply their understanding by making connections, reasoning, communicating, using representations, and solving problems. Outstanding performance at this level is indicated by the use of complex strategies to analyze and solve mathematical and real-world problems using higher-level cognitive skills.

Advanced Proficiency

Students performing at this level demonstrate an advanced understanding of and proficiency with the procedures and concepts in the content domains of algebra, geometry, and data analysis. They consistently apply their understanding by making connections, reasoning, communicating, using representations, and solving problems. Advanced performance at this level is indicated by the use of some complex strategies to analyze and solve mathematical and real-world problems using higher-level cognitive skills.

Basic Proficiency

Students performing at this level demonstrate a basic understanding of and proficiency with the procedures and concepts in the content domains of algebra, geometry, and data analysis. They generally apply their understanding by making connections, reasoning, communicating, using representations, and solving problems. Performance at this level is indicated by the use of effective strategies to analyze and solve mathematical and real-world problems using some higher-level cognitive skills.

Below Proficiency

Students performing at this level demonstrate minimal understanding of and proficiency with the procedures and concepts in the content domains of algebra, geometry, and data analysis. They are occasionally able to make connections, reason, communicate, use representations, and solve problems. Problem solving is based on their ability to memorize some key concepts and perform routine procedures.