READY *NCEXTEND2*
End-of-Course
Alternate Assessment
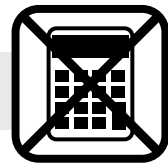# Algebra I/Integrated I

NCEXTEND2

Student Booklet

Academic Services and Instructional Support
Division of Accountability Services
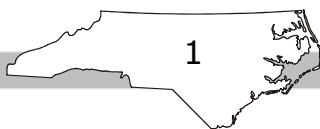
Sample Questions

S1   What is 50% of 100?

    A   5

    B   50

    C   150

S2   What is the value of x in the equation $2x + 7 = 1$?

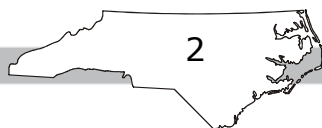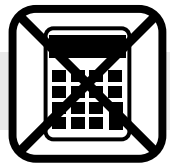S3   What is $1\frac{1}{2} \times 3$?

1

1   The amount of medicine in Elizabeth's blood is modeled by the function
     $M(t) = {}^-t^2 + 10t$, where t is the number of hours after she takes the medicine.
     How many hours after Elizabeth takes her medicine is the amount of medicine
     in her blood the highest?

   A   5 hours

   B   10 hours

   C   25 hours

2   What is the y-intercept of the function $f(x) = \frac{1}{2}(2x - 4)$?

   A $(0, {}^-4)$

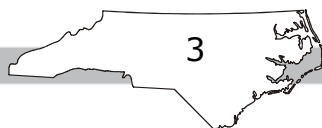   B $(0, {}^-2)$

   C $(0, 1)$

Go to the next page.

3   A girl drops a ball from a height of 10 feet. Each time the ball hits the ground, it bounces to $\frac{2}{3}$ its previous height. Which equation gives y, the height of the ball after x bounces?

A $y = 10^{\frac{2}{3}x}$
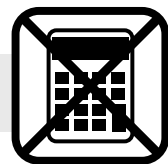
B $y = 10\left(\frac{2}{3}\right)^{x}$

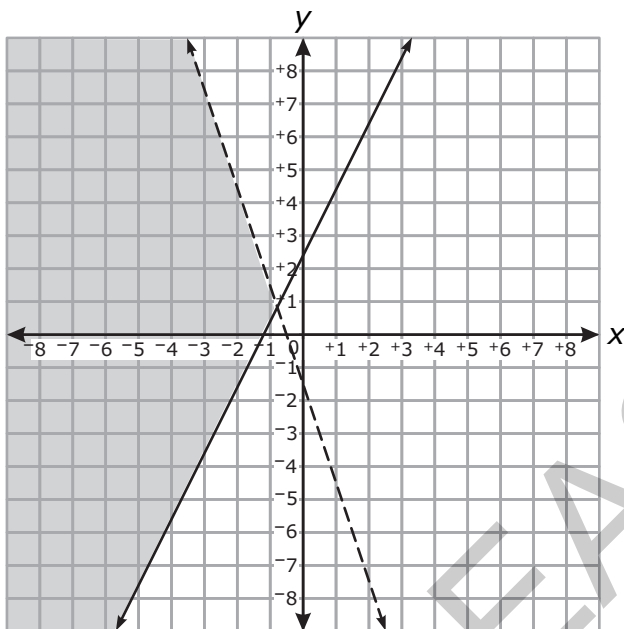C $y = \frac{2}{3}(10)^{x}$

4   Which graph shows the solution for the system of inequalities below?
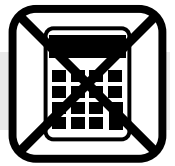
$$y \leq 2x + 2$$
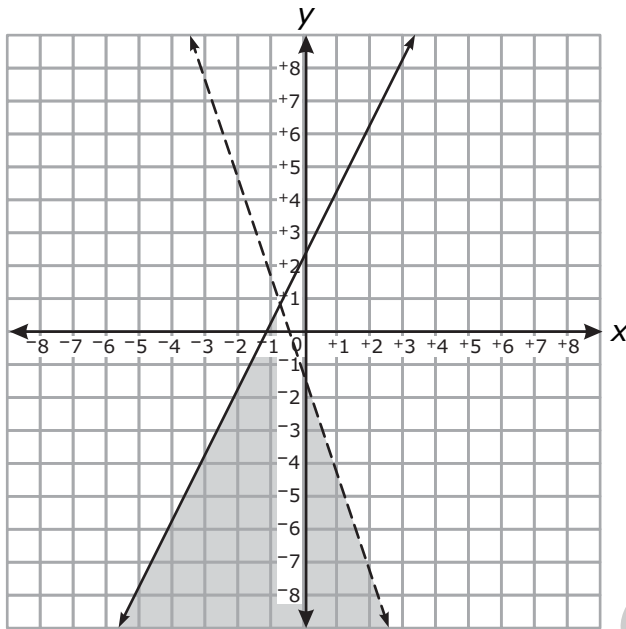
$$y > {}^{-}3x - 1$$

A

Answer choices B and C are on page 5.

B

C

Go to the next page.
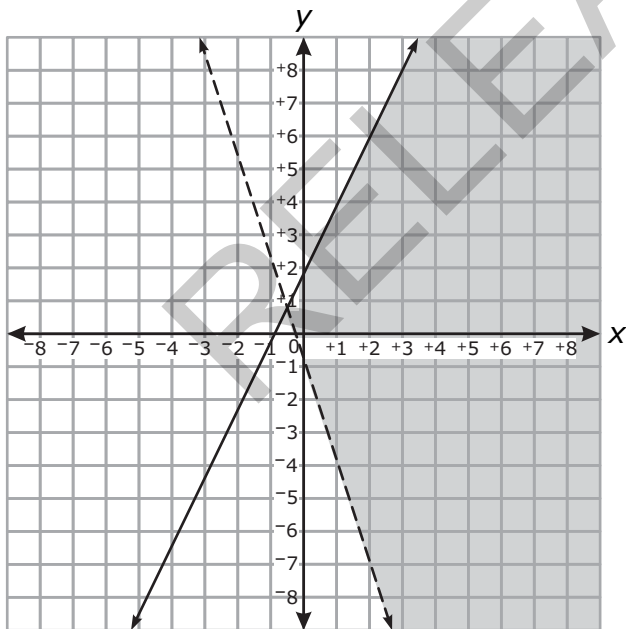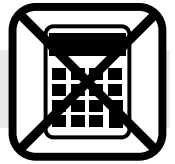
5   Which expression is equivalent to $3(x-4)^2$?

   A $3x^2 + 48$

   B $3x^2 - 24x + 48$

   C $9x^2 - 72x + 144$

Questions 6 through 12 require you to write your answers in the boxes provided on your answer sheet. Write only one number or symbol in each box and fill in the circle in each column that matches what you have printed. Fill in only one circle in each column.

6   A cubic centimeter equals 1 milliliter. How many liters are in 1 cubic meter?

   (Note: 1 milliliter is one-thousandth of a liter)

Go to the next page.
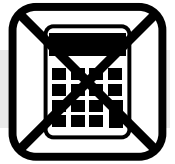
7   Jane owns *x* comic books. Derrek owns *y* comic books.

- The number of comic books Jane owns is 1 less than 2 times the number Derrek owns.
- Together they have a total of 11 comic books.

How many comic books does Derrek own?

8   James is at a gift sale where everything costs $4 (tax included).

- James has $50.
- James must have at least $28 remaining when he is finished buying gifts.

What is the greatest number of gifts James can buy?
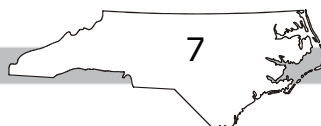
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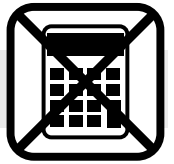
9   The expression $^-5t^2 + 40t$ predicts the height, in meters, of an object t seconds

after a person launches it into the air. Using this expression, how many seconds

will it take the object to hit the ground?

10   The function $f(x) = \frac{1}{2}x - 6$ was replaced with $f(x + k) = \frac{1}{2}x - 4$. What is the

value of k?
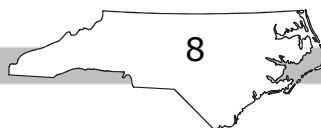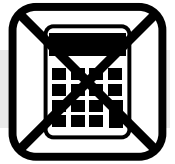
11   The function $f(x) = 10,000 - 1,500x$ can be used to predict the number of termites in an area x days after the area has been treated. How many termites are predicted in the area after 5 days?

12   What is the smallest positive integer for x, so that the value of $f(x) = 200(2)^x$ is greater than the value of $g(x) = 500x + 400$?
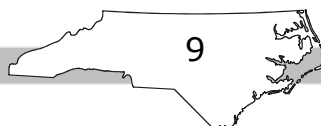
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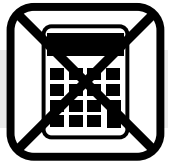
This is the end of the calculator inactive test questions.

Directions:

1. Look back over your answers for the calculator inactive questions. You will not be able to go back and work on these questions once you are given a calculator.

2. Raise your hand to let your teacher know you are ready to begin the calculator active test questions.

3. Do not begin work on the calculator active test questions until your teacher has given you a calculator.
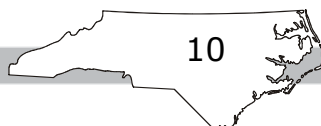
13　Which expression is equivalent to $\sqrt[4]{x^8}$?

　　A　　$x^{\frac{1}{2}}$

　　B　　x^2

　　C　　x^4

14　Fred has \$200. Each week he will save an additional \$50. If Fred does not spend any of the money, how many weeks will it take for Fred to have \$650?

　　A　　9

　　B　　13

　　C　　17
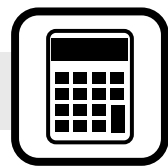
15   The density of an object can be found using the formula $D = \frac{m}{v}$.

- m is the mass of the object
- v is the volume of the object
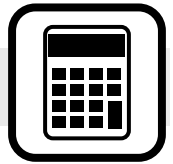
Which formula could be used to determine the volume of an object?

A $v = mD$

B $v = \frac{D}{m}$

C $v = \frac{m}{D}$

RELEASED

16   The graph below shows the amount of profit, *y*, a company makes from selling *x* units of merchandise.

Profit (thousands)

x **Units Sold** (hundreds)
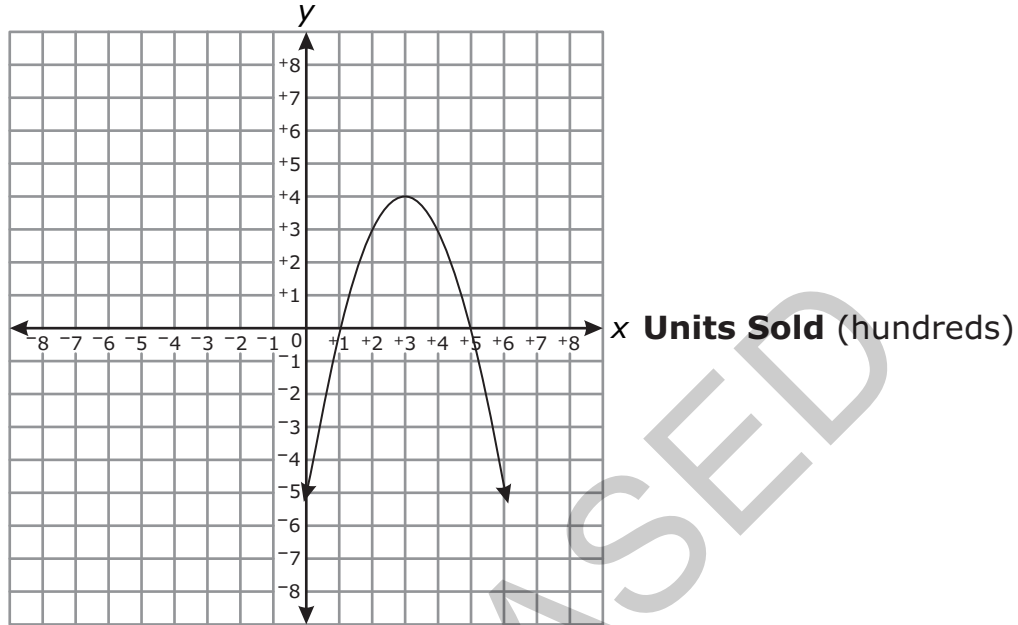
How many units of merchandise does the company need to sell to make the maximum profit?

A   100

B   300

C   500

17   John collected data on the number of new movies produced in different years.

- Suppose that the number of movies made in 2005 was 595, and the number made in 2010 was 895.

What is the average rate of change in the number of new movies between 2005 and 2010?

A   50 movies per year

B   60 movies per year

C   300 movies per year

18   Patrick compared the slope of the function $g(x) = {}^-2x - 8$ to the slope of the linear function shown in the table below. Let m = the slope of $g(x)$ and n = the slope of $h(x)$.

x	h(x)
⁻3	1
⁻2	⁻2
⁻1	⁻5
0	⁻8

Which statement is true?

A $m < n$

B $m > n$

C   m = n

Go to the next page.

19   The function $f(x) = 4(2.0)^x$ models the population of rabbits on a farm after x months with no removal. The function $g(x) = 2(2.0)^x$ models the number of rabbits removed from the population after x months. Which function, $h(x)$, models the total number of rabbits on the farm after x months?

    A $h(x) = 2(1.0)^x$

    B $h(x) = 2(2.0)^x$

    C $h(x) = 6(2.0)^x$

20   Which situation could be best modeled with an exponential function?

    A   the value of a car that loses 6% of its value per year

    B   the cost to purchase different weights of bananas at a store

    C   the total number of miles run by a person who runs 8 miles per day

Go to the next page.
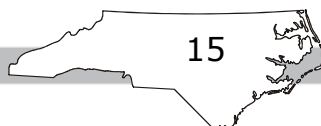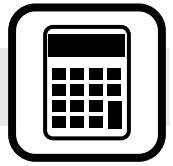
21   The cost to mail a box of textbooks can be modeled by the function
      $f(x) = 1.75x + 5.25$, where x is the number of books mailed. What does the
      y-intercept of the function represent?

      A   the cost to mail a box with no textbooks

      B   the number of books mailed

      C   the cost per book

22   Which equation has a graph which is perpendicular to the line $y = {}^-2x$ and which
      passes through the point $({}^-2, 3)$?

      A $x - 2y = 8$

      B $x + 2y = {}^-8$

      C $x - 2y = {}^-8$

Go to the next page.

23   The quadrilateral shown below has vertices at ($^-$8, 0), ($^-$4, $^-$4), (0, 8), and (4, 4).
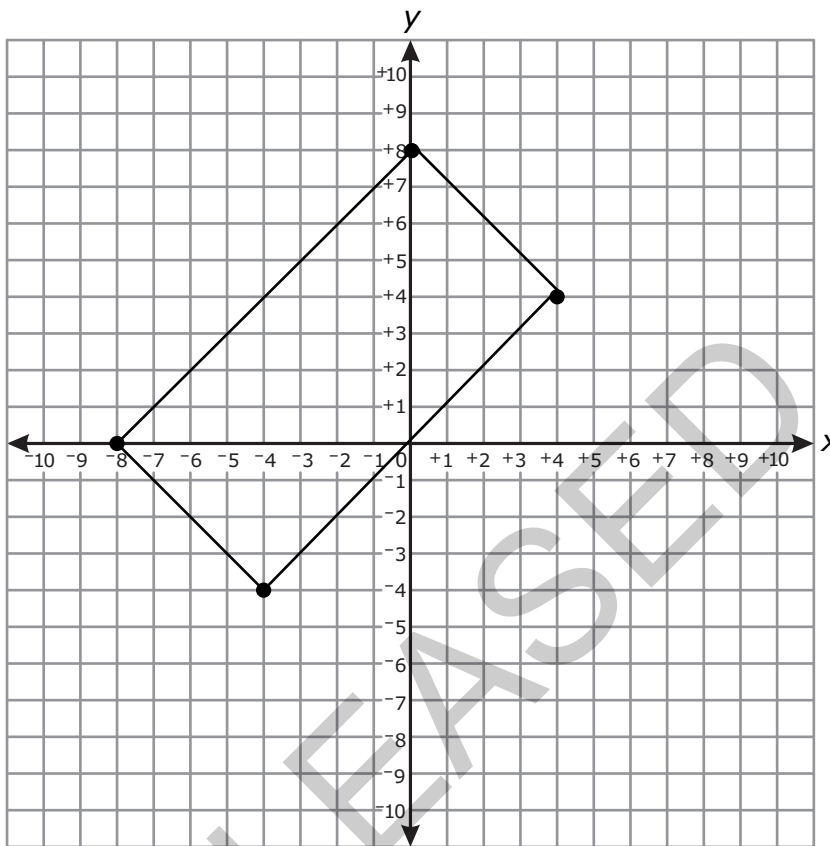
What is the area of the quadrilateral?

A   32 units^2

B   45 units^2

C   64 units^2

24   Mr. Franklin determined that the mean diving score for Diver 1 was 8.1 with a standard deviation of 1.07. The mean diving score for Diver 2 was 8.8 with a standard deviation of 2.24. Which conclusion can be made about the scores of the divers?

   A   Diver 1 had scores that were less spread out around the mean than Diver 2.

   B   Diver 2 had scores that were less spread out around the mean than Diver 1.

   C   Diver 1 and Diver 2 had scores that were equally spread around the mean.

25   A teacher surveyed 160 students to see how many students leave school during lunch. The results of the survey are shown in the relative frequency table below.

	Boys	Girls
Leave School	0.125	0.1875
Stay at School	0.40625	0.28125

Approximately what percent of the boys surveyed leave school during lunch?

   A   13%

   B   24%

   C   31%
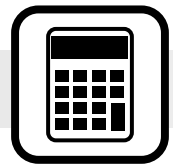
26   The table below shows the cost of a season ticket to an amusement park for various years.

Years Since 1990 (x)	Ticket Price (in dollars) (y)
9	25.00
14	46.25
16	54.75
20	71.75

What is represented by the *y*-intercept of the line of best fit for this data set?

A   the predicted average change in ticket price per year

B   the predicted number of years per $1 increase in ticket price

C   the predicted price of a ticket in 1990

27   What is the area of the rectangle below?

$2x + 6$

$3x - 2$
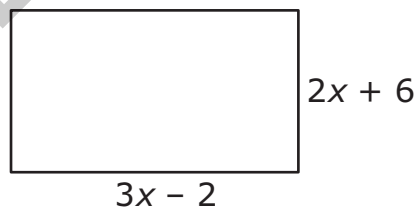
A $5x + 4$

B $6x^2 + 14x - 12$

C $6x^2 - 22x - 12$
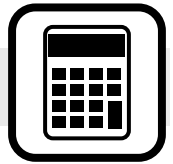
28   A clothing store sells pants and shirts.

- The store can buy up to a total of 500 pants and shirts each month.
- The store wants to buy at least as many shirts as pants.
- The store wants to buy at least 100 pants each month.

Which system of inequalities represents the constraints on the number of shirts, *s*, and number of pants, *p*, the store buys each month?

A $s + p \leq 500$
     $s \leq p$
     $p \geq 100$

B $s + p \geq 500$
     $s \geq p$
     $p \geq 100$

C $s + p \leq 500$
     $s \geq p$
     $p \geq 100$

29   A system of equations is shown below.

$$y = {}^{-}2x + 4$$

$$y = (2)^x + 1$$

What is the **approximate** value of *x* in the solution of the system?

A   0.69

B   0.75

C   3.24

30   The function $y = 45x + 6$ can be used to determine the cost for a person to purchase x tickets to a concert. A person can purchase up to 8 tickets. What is an appropriate domain for the function?

A   all integers ≤ 8

B   all positive integers ≤ 8

C   all positive real numbers ≤ 8

31   A liquid is evaporating. The amount of a liquid remaining, in liters, after x weeks is modeled by the equation $y = 100(0.78)^{3x}$. ***Approximately*** what percent of the liquid evaporates per week?

A   47%

B   53%

C   78%

Go to the next page.

32   A sequence is shown below.

$$10, 12, 14, 16, \ldots$$

Which function can be used to determine the nth number in the sequence?

A $F(n) = n + 2$

B $F(n) = 2n + 8$

C $F(n) = 2n + 10$

33   Jenna cut a piece of cloth several times. The table below shows the number of pieces of cloth she had after making several cuts.

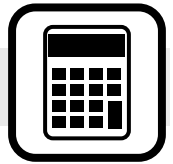| Cuts	1	2	3	4	5	6
Pieces of Cloth	2	4	8	16	32	64

Which equation could be used to determine the number of pieces of cloth, y, Jenna had after making x cuts?

A $y = 2x$

B $y = 2^x$

C $y = x^2$

34   A school opened with 100 students. The number of students has increased by 25% each year since the school opened. Which function can be used to determine the number of students at the school x years after it opened?

A $f(x) = 0.25x + 100$

B $f(x) = 100(0.25)^x$

C $f(x) = 100(1.25)^x$

35   A quadrilateral has vertices located at ($^-$3, $^-$5), (4, 2), (4, 1), and (2, $^-$1). Which *best* describes the figure?

A   rhombus

B   rectangle

C   trapezoid

Go to the next page.
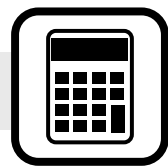
36   *M* is the midpoint of $\overline{KL}$. *M* is at (5, ⁻2) and *L* is at (3, 6). What are the coordinates of *K*?

A   (2, ⁻8)

B   (4, 2)

C   (7, ⁻10)

37   The volume of a cone can be found using the formula $V = \frac{1}{3}Bh$, where *B* is the area of the base of the cone and *h* is the height. A cone has a volume of 262 cubic inches and a height of 10 inches. What is the ***approximate*** length of the radius of the cone?

A   2.5 inches

B   5 inches

C   25 inches
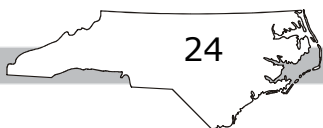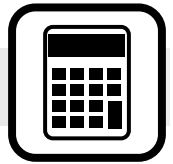
38   The table below shows the monthly profit for a company that sells greeting cards.

Month	Profit
January	$60,000
February	$45,000
March	$70,000
April	$65,000
May	$58,000
June	$75,000
July	$51,000
August	$62,000
September	$58,000
October	$82,000

The company expects that the profits for November will be $96,000, and the profits for December will be $122,000. How will including the expected profits for November and December affect the data?

A   The expected profits will cause the year's data to have greater spread and be skewed to the right.

B   The expected profits will cause the year's data to be more clustered and be skewed to the right.

C   The expected profits will cause the year's data to have greater spread and be skewed to the left.
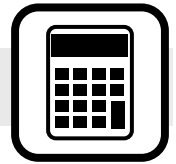
39   The table below shows monthly pet expenses based on the number of pets owned.

Number of pets owned (x)	0	1	2	4	6
Monthly pet expenses (y)	$0	$22	$43	$100	$160

Using the line of best fit for the data in the table, what is the *approximate* predicted monthly expense for owning 3 pets?

A $66

B $76

C $80

40   The table below shows the amount of money Bernard earned selling newspapers during a 6-week time period.

Week	1	2	3	4	5	6
Money Earned	$100.00	$110.60	$130.10	$130.80	$150.15	$170.25

Which describes the relationship between the week, x, and the money Bernard earned, y?

A   a weak, positive relationship

B   a strong, negative relationship

C   a strong, positive relationship
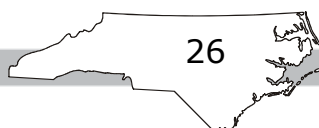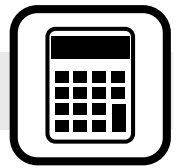
Directions:

This is the end of the Algebra I test.

1. **Put all of your papers inside your test book and close your test book.**

2. **Place your calculator on top of the test book.**
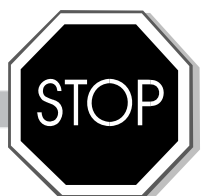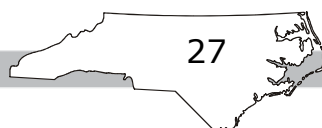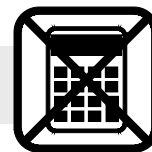
3. **Stay quietly in your seat until your teacher tells you that testing is finished.**

NCEXTEND2 Algebra I/Integrated I

RELEASED Form

2012–2013

Answer Key

Item Number	Type	Key	Conceptual Category
S1	MC	B	
S2	GR	-3	
S3	GR	4.5	

Calculator Inactive

Item Number	Type	Key	Conceptual Category
1	MC	A	F — Functions
2	MC	B	F — Functions
3	MC	B	A — Algebra
4	MC	C	A — Algebra
5	MC	B	A — Algebra
6	GR	1000	N — Number and Quantity
7	GR	4	A — Algebra
8	GR	5	A — Algebra
9	GR	8	A — Algebra
10	GR	4	F — Functions
11	GR	2500	F — Functions
12	GR	4	F — Functions

Calculator Active

Item Number	Type	Key	Conceptual Category
13	MC	B	N — Number and Quantity
14	MC	A	A — Algebra
15	MC	C	A — Algebra
16	MC	B	F — Functions
17	MC	B	F — Functions
18	MC	B	F — Functions
19	MC	B	F — Functions
20	MC	A	F — Functions
21	MC	A	F — Functions
22	MC	C	G — Geometry
23	MC	C	G — Geometry
24	MC	A	S — Statistics and Probability
25	MC	B	S — Statistics and Probability
26	MC	C	S — Statistics and Probability
27	MC	B	A — Algebra
28	MC	C	A — Algebra
29	MC	A	A — Algebra
30	MC	B	F — Functions
31	MC	B	F — Functions
32	MC	B	F — Functions
33	MC	B	F — Functions
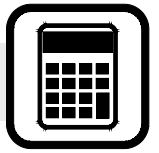
Item Number	Type	Key	Conceptual Category
34	MC	C	F — Functions
35	MC	C	G — Geometry
36	MC	C	G — Geometry
37	MC	B	G — Geometry
38	MC	A	S — Statistics and Probability
39	MC	B	S — Statistics and Probability
40	MC	C	S — Statistics and Probability

Item Types:

MC = multiple choice

GR = gridded response (requiring numerical response)

Links to instructions for the gridded-response items can be found under "Guidelines, Practice, and Examples for Math Gridded Response Items" on the main accountability page.