Math

27 QUESTIONS

DIRECTIONS

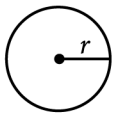
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

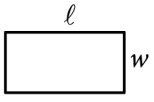
Unless otherwise indicated:

- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

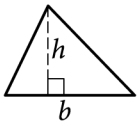
REFERENCE



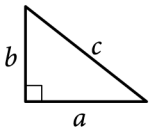
$A = \pi r^2$
$C = 2\pi r$



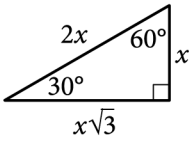
$A = \ell w$

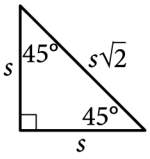


$A = \frac{1}{2}bh$

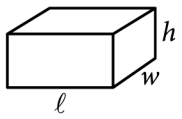


$c^2 = a^2 + b^2$

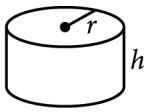




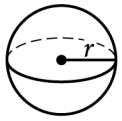
Special Right Triangles



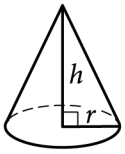
$V = \ell wh$



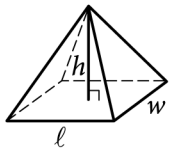
$V = \pi r^2 h$



$V = \frac{4}{3}\pi r^3$



$V = \frac{1}{3}\pi r^2 h$



$V = \frac{1}{3}\ell wh$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is 2π.

The sum of the measures in degrees of the angles of a triangle is 180.

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CONTINUE

For multiple-choice questions, solve each problem, choose the correct answer from the choices provided, and then circle your answer in this book. Circle only one answer for each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer circled, or for questions with no answers circled.

For student-produced response questions, solve each problem and write your answer next to or under the question in the test book as described below.

- Once you've written your answer, circle it clearly. You will not receive credit for anything written outside the circle, or for any questions with more than one circled answer.
- If you find **more than one correct answer**, write and circle only one answer.
- Your answer can be up to 5 characters for a **positive** answer and up to 6 characters (including the negative sign) for a **negative** answer, but no more.
- If your answer is a **fraction** that is too long (over 5 characters for positive, 6 characters for negative), write the decimal equivalent.
- If your answer is a **decimal** that is too long (over 5 characters for positive, 6 characters for negative), truncate it or round at the fourth digit.
- If your answer is a **mixed number** (such as $3\frac{1}{2}$), write it as an improper fraction (7/2) or its decimal equivalent (3.5).
- Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

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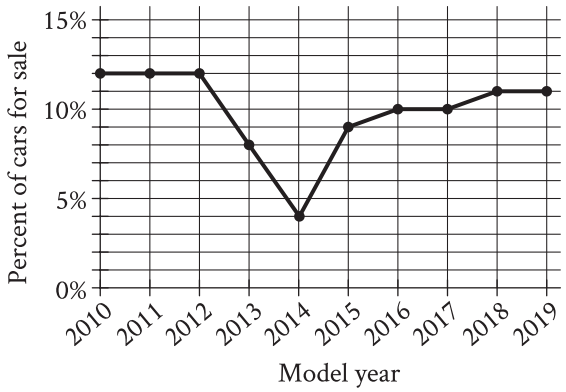
1

The line graph shows the percent of cars for sale at a used car lot on a given day by model year.



For what model year is the percent of cars for sale the smallest?

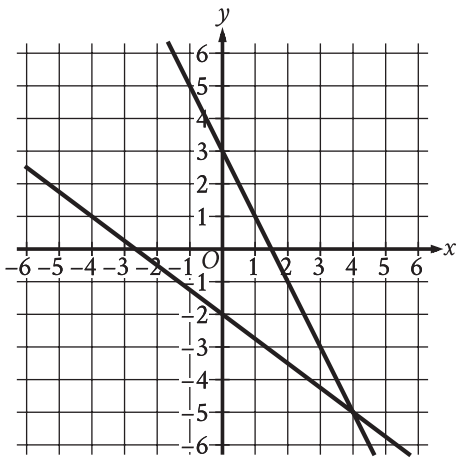
A) 2012

B) 2013

C) 2014

D) 2015

2



The graph of a system of linear equations is shown. What is the solution (x, y) to the system?

A) $(4, -5)$

B) $(0, 3)$

C) $(0, -2)$

D) $(-2, 3)$

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CONTINUE

3

The total cost, in dollars, to rent a surfboard consists of a \$25 service fee and a \$10 per hour rental fee. A person rents a surfboard for t hours and intends to spend a maximum of \$75 to rent the surfboard. Which inequality represents this situation?

A) $10t \leq 75$

B) $10 + 25t \leq 75$

C) $25t \leq 75$

D) $25 + 10t \leq 75$

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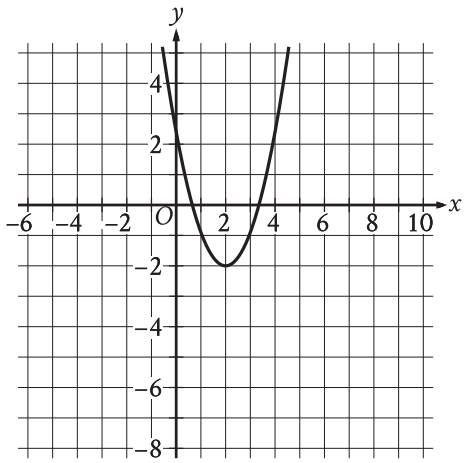
4



The graph shown will be translated up 4 units. Which of the following will be the resulting graph?

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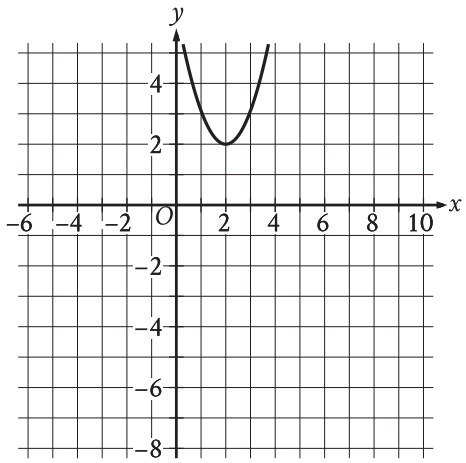
A)



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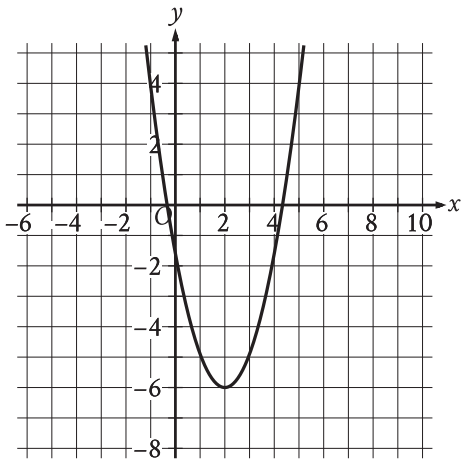
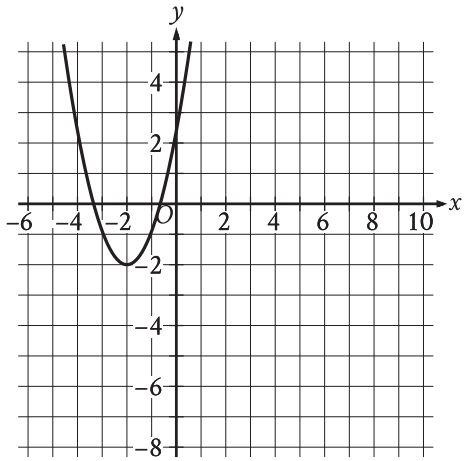
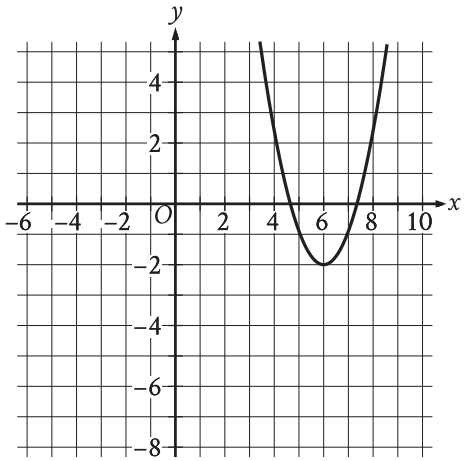


C)



D)



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5

$$s = 40 + 3t$$

The equation gives the speed s, in miles per hour, of a certain car t seconds after it began to accelerate. What is the speed, in miles per hour, of the car 5 seconds after it began to accelerate?

A) 40

B) 43

C) 45

D) 55

6

The function f is defined by $f(x) = x^2 + x + 71$. What is the value of $f(2)$?

7

An event planner is planning a party. It costs the event planner a onetime fee of \$35 to rent the venue and \$10.25 per attendee. The event planner has a budget of \$300. What is the greatest number of attendees possible without exceeding the budget?

8

The table gives the distribution of votes for a new school mascot and grade level for 80 students.

	Grade level			
Mascot	Sixth	Seventh	Eighth	Total
Badger	4	9	9	22
Lion	9	2	9	20
Longhorn	4	6	4	14
Tiger	6	9	9	24
Total	23	26	31	80

If one of these students is selected at random, what is the probability of selecting a student whose vote for new mascot was for a lion?

A) $\frac{1}{9}$

B) $\frac{1}{5}$

C) $\frac{1}{4}$

D) $\frac{2}{3}$

9

Triangles ABC and DEF are congruent, where A corresponds to D, and B and E are right angles. The measure of angle A is 18°. What is the measure of angle F ?

A) 18°

B) 72°

C) 90°

D) 162°

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CONTINUE

10

If $4x + 2 = 12$, what is the value of $16x + 8$?

A) 40

B) 48

C) 56

D) 60

11

Which expression is equivalent to $(m^4q^4z^{-1})(mq^5z^3)$, where m, q, and z are positive?

A) $m^4q^{20}z^{-3}$

B) $m^5q^9z^2$

C) $m^6q^8z^{-1}$

D) $m^{20}q^{12}z^{-2}$

12

An airplane descends from an altitude of 9,500 feet to 5,000 feet at a constant rate of 400 feet per minute. What type of function best models the relationship between the descending airplane's altitude and time?

A) Decreasing exponential

B) Decreasing linear

C) Increasing exponential

D) Increasing linear

13

$$3x + 6 = 4y$$
$$3x + 4 = 2y$$

The solution to the given system of equations is (x, y). What is the value of y ?

14

The function f is defined by $f(x) = (x - 6)(x - 2)(x + 6)$. In the xy-plane, the graph of $y = g(x)$ is the result of translating the graph of $y = f(x)$ up 4 units. What is the value of $g(0)$?

15

The function $f(w) = 6w^2$ gives the area of a rectangle, in square feet (ft^2), if its width is w ft and its length is 6 times its width. Which of the following is the best interpretation of $f(14) = 1{,}176$?

A) If the width of the rectangle is 14 ft, then the area of the rectangle is 1,176 ft^2.

B) If the width of the rectangle is 14 ft, then the length of the rectangle is 1,176 ft.

C) If the width of the rectangle is 1,176 ft, then the length of the rectangle is 14 ft.

D) If the width of the rectangle is 1,176 ft, then the area of the rectangle is 14 ft^2.

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CONTINUE

16

The number of bacteria in a liquid medium doubles every day. There are 44,000 bacteria in the liquid medium at the start of an observation. Which of the following represents the number of bacteria, y, in the liquid medium t days after the start of the observation?

A) $y = \frac{1}{2}(44{,}000)^t$

B) $y = 2(44{,}000)^t$

C) $y = 44{,}000\left(\frac{1}{2}\right)^t$

D) $y = 44{,}000(2)^t$

17

x	$h(x)$
0	1.23
2	1.54
4	1.94

The table shows the exponential relationship between the number of years, x, since Hana started training in pole vault, and the estimated height $h(x)$, in meters, of her best pole vault for that year. Which of the following functions best represents this relationship, where $x \leq 4$?

A) $h(x) = 1.12(0.23)^x$

B) $h(x) = 1.12(1.23)^x$

C) $h(x) = 1.23(0.12)^x$

D) $h(x) = 1.23(1.12)^x$

18

The function h is defined by $h(x) = 4x + 28$. The graph of $y = h(x)$ in the xy-plane has an x-intercept at $(a, 0)$ and a y-intercept at $(0, b)$, where a and b are constants. What is the value of $a + b$?

A) 21

B) 28

C) 32

D) 35

19

$$y < 5x + 6$$

For which of the following tables are all the values of x and their corresponding values of y solutions to the given inequality?

A)

x	y
3	17
5	27
7	37

B)

x	y
3	17
5	35
7	37

C)

x	y
3	25
5	35
7	45

D)

x	y
3	21
5	31
7	41

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CONTINUE

20

$$y = 4x + 1$$
$$4y = 15x - 8$$

The solution to the given system of equations is (x, y). What is the value of $x - y$?

21

A right triangle has legs with lengths of 24 centimeters and 21 centimeters. If the length of this triangle's hypotenuse, in centimeters, can be written in the form $3\sqrt{d}$, where d is an integer, what is the value of d ?

22

The floor of a ballroom has an area of 600 square meters. An architect creates a scale model of the floor of the ballroom, where the length of each side of the model is $\frac{1}{10}$ times the length of the corresponding side of the actual floor of the ballroom. What is the area, in square meters, of the scale model?

A) 6
B) 10
C) 60
D) 150

23

Which of the following equations represents a circle in the xy-plane that intersects the y-axis at exactly one point?

A) $(x - 8)^2 + (y - 8)^2 = 16$
B) $(x - 8)^2 + (y - 4)^2 = 16$
C) $(x - 4)^2 + (y - 9)^2 = 16$
D) $x^2 + (y - 9)^2 = 16$

24

In triangles ABC and DEF, angles B and E each have measure 27° and angles C and F each have measure 41°. Which additional piece of information is sufficient to determine whether triangle ABC is congruent to triangle DEF ?

A) The measure of angle A
B) The length of side AB
C) The lengths of sides BC and EF
D) No additional information is necessary.

25

The result of increasing the quantity x by 1,800% is 684. What is the value of x ?

A) 12,996
B) 12,312
C) 38
D) 36

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CONTINUE

26

A window repair specialist charges $220 for the first two hours of repair plus an hourly fee for each additional hour. The total cost for 5 hours of repair is $400. Which function f gives the total cost, in dollars, for x hours of repair, where $x \geq 2$?

A) $f(x) = 60x + 100$

B) $f(x) = 60x + 220$

C) $f(x) = 80x$

D) $f(x) = 80x + 220$

27

$$x(x + 1) - 56 = 4x(x - 7)$$

What is the sum of the solutions to the given equation?

STOP

If you finish before time is called, you may check your work on this module only.
Do not turn to any other module in the test.

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No Test Material On This Page