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SAT®

6VSL01

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:

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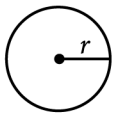
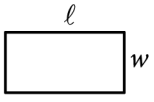
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

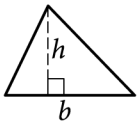
REFERENCE



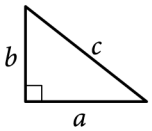
$A = \pi r^2$
$C = 2\pi r$



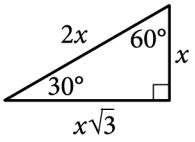
$A = \ell w$

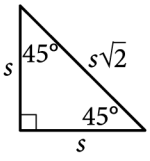


$A = \frac{1}{2}bh$

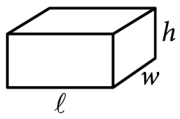


$c^2 = a^2 + b^2$

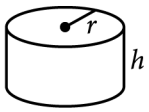




Special Right Triangles



$V = \ell wh$



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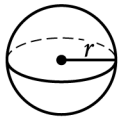
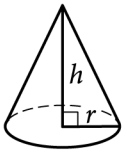
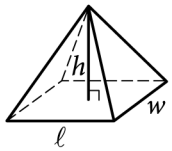


$V = \frac{4}{3}\pi r^3$



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



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

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.

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.

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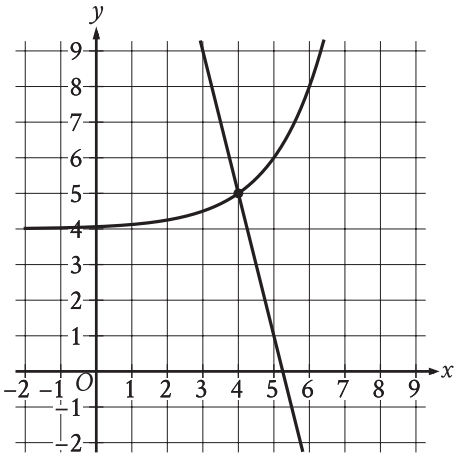
CONTINUE

1



The graph of a system of a linear equation and a nonlinear equation is shown. What is the solution (x, y) to this system?

A) $(0, 0)$

B) $(0, 4)$

C) $(4, 5)$

D) $(5, 0)$

2

On the first day of a semester, a film club has 90 members. Each day after the first day of the semester, 10 new members join the film club. If no members leave the film club, how many total members will the film club have 4 days after the first day of the semester?

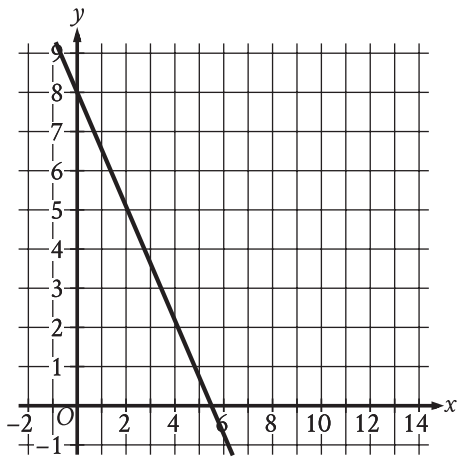
A) 400

B) 130

C) 94

D) 90

3



The graph of the linear function f is shown, where $y = f(x)$. What is the y-intercept of the graph of f?

A) $(0, 0)$

B) $\left(0, -\frac{16}{11}\right)$

C) $(0, -8)$

D) $(0, 8)$

CONTINUE

4

$$s + 7r = 27$$
$$r = 3$$

What is the solution (r, s) to the given system of equations?

A) $(6, 3)$

B) $(3, 6)$

C) $(3, 27)$

D) $(27, 3)$

5

The table shows selected values from function f.

x	$f(x)$
−1	16
0	17
1	18
2	19

Which of the following is the best description of function f ?

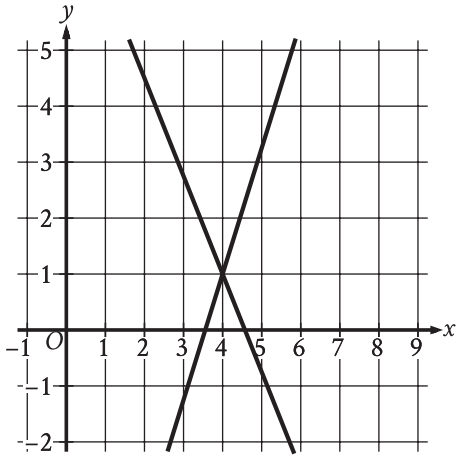
A) Decreasing linear

B) Increasing linear

C) Decreasing exponential

D) Increasing exponential

6



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

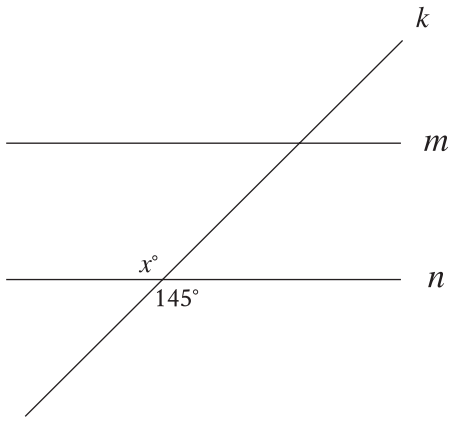
7

23, 27, 27, 32, 35, 36, 52

What is the range of the 7 scores shown?

CONTINUE

8



Note: Figure not drawn to scale.

In the figure, line m is parallel to line n, and line k intersects both lines. Which of the following statements is true?

A) The value of x is less than 145.

B) The value of x is greater than 145.

C) The value of x is equal to 145.

D) The value of x cannot be determined.

9

The equation $x + y = 1{,}440$ represents the number of minutes of daylight (between sunrise and sunset), x, and the number of minutes of non-daylight, y, on a particular day in Oak Park, Illinois. If this day has 670 minutes of daylight, how many minutes of non-daylight does it have?

A) 670

B) 770

C) 1,373

D) 1,440

10

Scott selected 20 employees at random from all 400 employees at a company. He found that 16 of the employees in this sample are enrolled in exactly three professional development courses this year. Based on Scott's findings, which of the following is the best estimate of the number of employees at the company who are enrolled in exactly three professional development courses this year?

A) 4

B) 320

C) 380

D) 384

11

If $4x - 28 = -24$, what is the value of $x - 7$?

A) -24

B) -22

C) -6

D) -1

CONTINUE

12

For a snowstorm in a certain town, the minimum rate of snowfall recorded was 0.6 inches per hour, and the maximum rate of snowfall recorded was 1.8 inches per hour. Which inequality is true for all values of s, where s represents a rate of snowfall, in inches per hour, recorded for this snowstorm?

A) $s \geq 2.4$

B) $s \geq 1.8$

C) $0 \leq s \leq 0.6$

D) $0.6 \leq s \leq 1.8$

13

$$y = 4x$$

$$y = x^2 - 12$$

A solution to the given system of equations is (x, y), where $x > 0$. What is the value of x ?

14

A store sells two different-sized containers of blueberries. The store's sales of these blueberries totaled 896.86 dollars last month. The equation $4.51x + 6.07y = 896.86$ represents this situation, where x is the number of smaller containers sold and y is the number of larger containers sold. According to the equation, what is the price, in dollars, of each smaller container?

15

A right circular cylinder has a base diameter of 22 centimeters and a height of 6 centimeters. What is the volume, in cubic centimeters, of the cylinder?

A) 132π

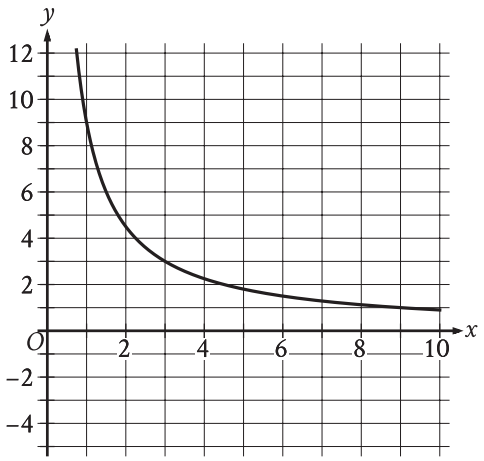
B) 264π

C) 726π

D) $2{,}904\pi$

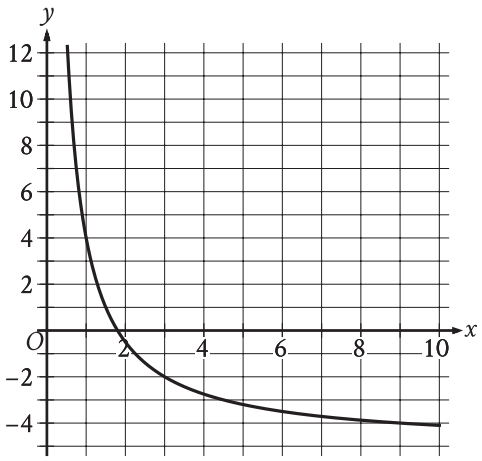
CONTINUE

16



The graph of the rational function f is shown, where $y = f(x)$ and $x \geq 0$. Which of the following is the graph of $y = f(x) + 5$, where $x \geq 0$?

A)



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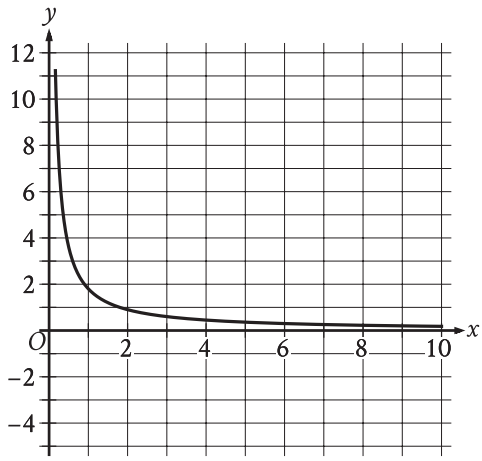

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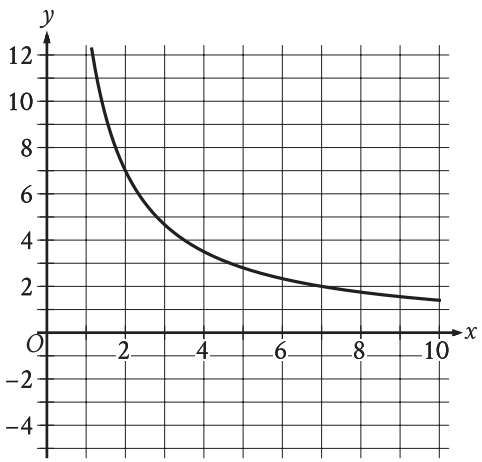
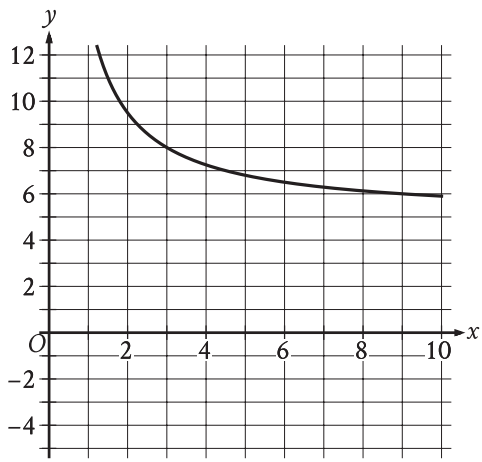


D)



CONTINUE

17

At a particular track meet, the ratio of coaches to athletes is 1 to 26. If there are x coaches at the track meet, which of the following expressions represents the number of athletes at the track meet?

A) $\frac{x}{26}$

B) $26x$

C) $x + 26$

D) $\frac{26}{x}$

18

Kaylani used fabric measuring 5 yards in length to make each suit for a men's choir. The relationship between the number of suits that Kaylani made, x, and the total length of fabric that she purchased y, in yards, is represented by the equation $y - 5x = 6$. What is the best interpretation of 6 in this context?

A) Kaylani made 6 suits.

B) Kaylani purchased a total of 6 yards of fabric.

C) Kaylani used a total of 6 yards of fabric to make the suits.

D) Kaylani purchased 6 yards more fabric than she used to make the suits.

19

What is the value of $\tan \frac{92\pi}{3}$?

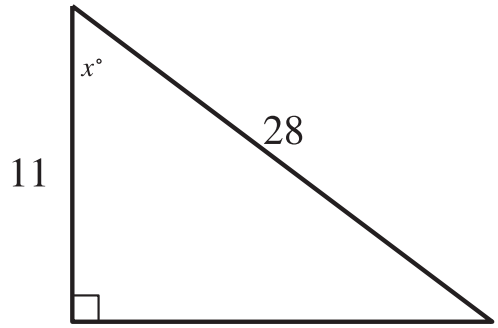
A) $-\sqrt{3}$

B) $-\frac{\sqrt{3}}{3}$

C) $\frac{\sqrt{3}}{3}$

D) $\sqrt{3}$

20



Note: Figure not drawn to scale.

In the triangle shown, what is the value of $\cos x°$?

CONTINUE

21

The function g is defined by $g(x) = (x + 14)(t - x)$, where t is a constant. In the xy-plane, the graph of $y = g(x)$ passes through the point $(24, 0)$. What is the value of $g(0)$?

22

$$(x + 4)^2 + (y - 19)^2 = 121$$

The graph of the given equation is a circle in the xy-plane. The point (a, b) lies on the circle. Which of the following is a possible value for a ?

A) -16

B) -14

C) 11

D) 19

23

A right rectangular prism has a height of 9 inches. The length of the prism's base is x inches, which is 7 inches more than the width of the prism's base. Which function V gives the volume of the prism, in cubic inches, in terms of the length of the prism's base?

A) $V(x) = x(x + 9)(x + 7)$

B) $V(x) = x(x + 9)(x - 7)$

C) $V(x) = 9x(x + 7)$

D) $V(x) = 9x(x - 7)$

24

Which of the following functions has(have) a minimum value at -3 ?

I. $f(x) = -6(3)^x - 3$

II. $g(x) = -3(6)^x$

A) I only

B) II only

C) I and II

D) Neither I nor II

CONTINUE

25

The result of increasing the quantity x by 400% is 60. What is the value of x ?

A) 12

B) 15

C) 240

D) 340

26

The function f is defined by $f(x) = ax^2 + bx + c$, where a, b, and c are constants. The graph of $y = f(x)$ in the xy-plane passes through the points $(7, 0)$ and $(-3, 0)$. If a is an integer greater than 1, which of the following could be the value of $a + b$?

A) -6

B) -3

C) 4

D) 5

27

The function g is defined by $g(x) = x(x - 2)(x + 6)^2$. The value of $g(7 - w)$ is 0, where w is a constant. What is the sum of all possible values of w ?

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.

Math

27 QUESTIONS

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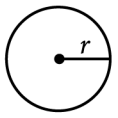

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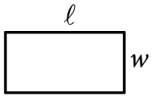

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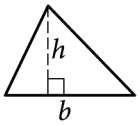

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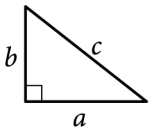

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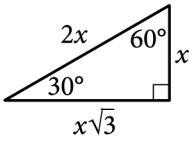

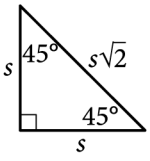

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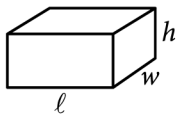

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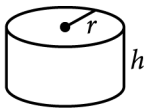

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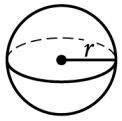

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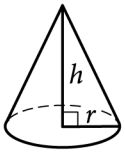
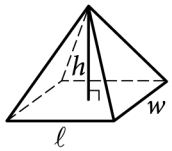


$V = \frac{1}{3}\pi r^2 h$



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CONTINUE

1

What is 20% of 440?

A) 44

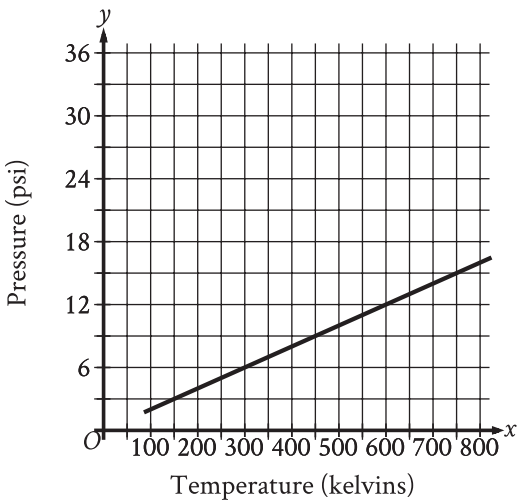
B) 88

C) 880

D) 1,760

2

Argon is placed inside a container with a constant volume. The graph shows the estimated pressure y, in pounds per square inch (psi), of the argon when its temperature is x kelvins.



What is the estimated pressure of the argon, in psi, when the temperature is 600 kelvins?

A) 6

B) 12

C) 300

D) 600

3

The function f is defined by $f(x) = 4x - 3$. What is the value of $f(10)$?

A) -30

B) 37

C) 40

D) 43

4

Which expression is equivalent to $16x^3y^2 + 14xy$?

A) $2xy(8xy + 7)$

B) $2xy(8x^2y + 7)$

C) $14xy(2x^2y + 1)$

D) $14xy(8x^2y + 1)$

5

A veterinarian recommends that each day a certain rabbit should eat 25 calories per pound of the rabbit's weight, plus an additional 11 calories. Which equation represents this situation, where c is the total number of calories the veterinarian recommends the rabbit should eat each day if the rabbit's weight is x pounds?

A) $c = 25x$

B) $c = 36x$

C) $c = 11x + 25$

D) $c = 25x + 11$

CONTINUE

6

If $6n = 12$, what is the value of $n + 4$?

7

$$(d - 30)(d + 30) - 7 = -7$$

What is a solution to the given equation?

8

Line r in the xy-plane has a slope of 4 and passes through the point $(0, 6)$. Which equation defines line r ?

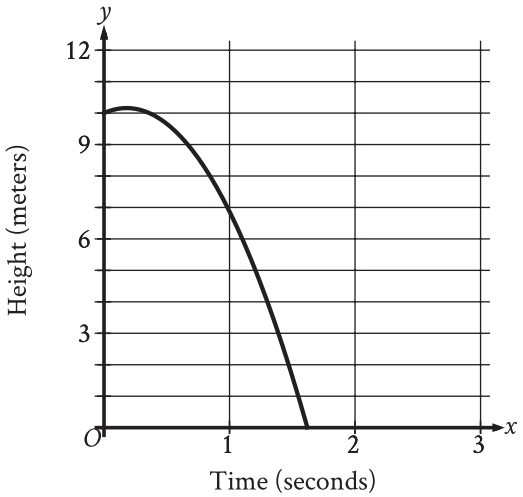
A) $y = -6x + 4$

B) $y = 6x + 4$

C) $y = 4x - 6$

D) $y = 4x + 6$

9



A competitive diver dives from a platform into the water. The graph shown gives the height above the water y, in meters, of the diver x seconds after diving from the platform. What is the best interpretation of the x-intercept of the graph?

A) The diver reaches a maximum height above the water at 1.6 seconds.

B) The diver hits the water at 1.6 seconds.

C) The diver reaches a maximum height above the water at 0.2 seconds.

D) The diver hits the water at 0.2 seconds.

CONTINUE

10

The kinetic energy, in joules, of an object with mass 9 kilograms traveling at a speed of v meters per second is given by the function K, where $K(v) = \frac{9}{2}v^2$. Which of the following is the best interpretation of $K(34) = 5{,}202$ in this context?

A) The object traveling at 34 meters per second has a kinetic energy of 5,202 joules.

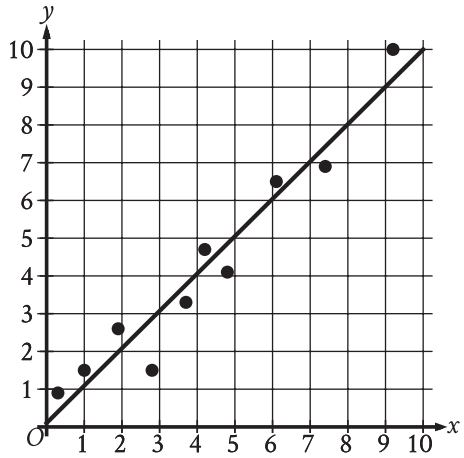
B) The object traveling at 340 meters per second has a kinetic energy of 5,202 joules.

C) The object traveling at 5,202 meters per second has a kinetic energy of 34 joules.

D) The object traveling at 23,409 meters per second has a kinetic energy of 34 joules.

11

The scatterplot shows the relationship between two variables x and y. A line of best fit for the data is also shown.



For how many of the 10 data points is the actual y-value greater than the y-value predicted by the line of best fit?

A) 3

B) 4

C) 6

D) 7

CONTINUE

12

At a movie theater, there are a total of 350 customers. Each customer is located in either theater A, theater B, or theater C. If one of these customers is selected at random, the probability of selecting a customer who is located in theater A is 0.48, and the probability of selecting a customer who is located in theater B is 0.24. How many customers are located in theater C?

A) 28

B) 40

C) 84

D) 98

13

What is the slope of the graph of

$y = \frac{1}{3}(29x + 10) + 5x$ in the xy-plane?

14

The length of each edge of a box is 29 inches. Each side of the box is in the shape of a square. The box does not have a lid. What is the exterior surface area, in square inches, of this box without a lid?

15

Five *Eretmochelys imbricata*, a type of sea turtle, each have a nest. The table shows an original data set of the number of eggs that each turtle laid in its nest.

Nest	Number of eggs
A	149
B	144
C	148
D	136
E	139

A sixth nest with 121 eggs is added to create a new data set. Which of the following correctly compares the means of the two data sets?

A) The mean of the original data set is greater than the mean of the new data set.

B) The mean of the original data set is less than the mean of the new data set.

C) The means of both data sets are equal.

D) There is not enough information to compare the means.

16

In $\triangle RST$, the measure of $\angle R$ is 63°. Which of the following could be the measure, in degrees, of $\angle S$?

A) 116

B) 118

C) 126

D) 180

CONTINUE

17

Which expression is equivalent to $(8x^3 + 8) - (x^3 - 2)$?

A) $8x^3 + 6$

B) $7x^3 + 10$

C) $8x^3 + 10$

D) $7x^3 + 6$

18

If $4\sqrt{2x} = 16$, what is the value of $6x$?

A) 24

B) 48

C) 72

D) 96

19

$$2x - y > 883$$

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
440	0
441	−2
442	−4

B)

x	y
440	0
442	−2
441	−4

C)

x	y
442	0
440	−2
441	−4

D)

x	y
442	0
441	−2
440	−4

20

$$5y = 10x + 11$$
$$-5y = 5x - 21$$

The solution to the given system of equations is (x, y). What is the value of $30x$?

CONTINUE

21

A rectangle is inscribed in a circle, such that each vertex of the rectangle lies on the circumference of the circle. The diagonal of the rectangle is twice the length of the shortest side of the rectangle. The area of the rectangle is $1{,}089\sqrt{3}$ square units. What is the length, in units, of the diameter of the circle?

22

Rectangles *ABCD* and *EFGH* are similar. The length of each side of *EFGH* is 6 times the length of the corresponding side of *ABCD*. The area of *ABCD* is 54 square units. What is the area, in square units, of *EFGH*?

A) 9

B) 36

C) 324

D) 1,944

23

Which expression is equivalent to $\frac{42a}{k} + 42ak$, where $k > 0$?

A) $\frac{84a}{k}$

B) $\frac{84ak^2}{k}$

C) $\frac{42a(k+1)}{k}$

D) $\frac{42a(k^2+1)}{k}$

24

Which quadratic equation has no real solutions?

A) $x^2 + 14x - 49 = 0$

B) $x^2 - 14x + 49 = 0$

C) $5x^2 - 14x - 49 = 0$

D) $5x^2 - 14x + 49 = 0$

CONTINUE

25

$$P(t) = 260(1.04)^{\left(\frac{6}{4}\right)t}$$

The function P models the population, in thousands, of a certain city t years after 2003. According to the model, the population is predicted to increase by 4% every n months. What is the value of n ?

A) 8

B) 12

C) 18

D) 72

26

A circle in the xy-plane has its center at $(-1, 1)$. Line t is tangent to this circle at the point $(5, -4)$. Which of the following points also lies on line t ?

A) $\left(0, \frac{6}{5}\right)$

B) $(4, 7)$

C) $(10, 2)$

D) $(11, 1)$

27

For an electric field passing through a flat surface perpendicular to it, the electric flux of the electric field through the surface is the product of the electric field's strength and the area of the surface. A certain flat surface consists of two adjacent squares, where the side length, in meters, of the larger square is 3 times the side length, in meters, of the smaller square. An electric field with strength 29.00 volts per meter passes uniformly through this surface, which is perpendicular to the electric field. If the total electric flux of the electric field through this surface is 4,640 volts · meters, what is the electric flux, in volts · meters, of the electric field through the larger square?

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.

The SAT®

GENERAL DIRECTIONS

- You may work on only one module at a time.
- If you finish a module before time is called, check your work on that module only. You may NOT turn to any other module.

TIMING

Reading and Writing, Module 1: 39 minutes

Reading and Writing, Module 2: 39 minutes

10-minute break

Math, Module 1: 43 minutes

Math, Module 2: 43 minutes

The above are standard times. If you are approved for accommodations involving additional time, you should give yourself that time when you practice.

MARKING YOUR ANSWERS

- Be sure to answer your questions properly in this book.
- Circle only one answer to 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.

USING YOUR TEST BOOK

- You may use the test book for scratch work.
- You may not fold or remove pages or portions of a page from this book, or take the book from the testing room.