

Math

22 QUESTIONS

SAT 7

DIRECTIONS

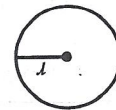
The questions in this section address a number of important math skills. Use of a calculator is permitted for all questions.

NOTES

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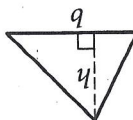


$$A = \pi r^2$$

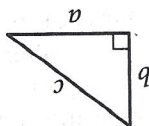
$$C = 2\pi r$$



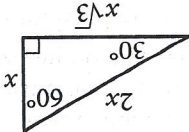
$$A = lw$$



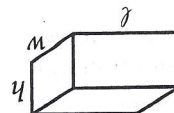
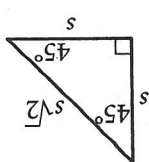
$$A = \frac{1}{2}bh$$



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



Special Right Triangles



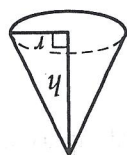
$$V = lwh$$



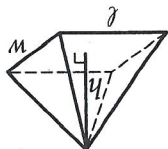
$$V = \pi r^2 h$$



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



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



$$V = \frac{1}{3}lwh$$

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.

1

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) $c = 25x + 11$

2

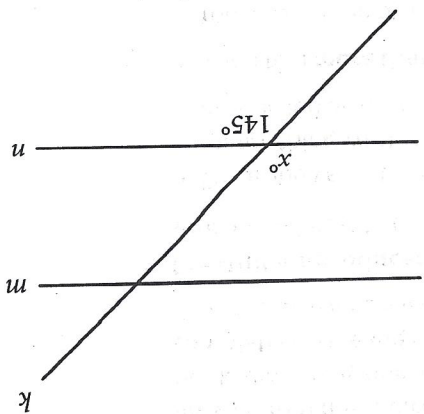
A special camera is used for underwater ocean research. The camera is at a depth of 39 fathoms. What is the camera's depth in feet? (1 fathom = 6 feet)

- A) 234
- B) 117
- C) 45
- D) 7

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.

Note: Figure not drawn to scale.



4

$$f(x) = 14 + 4x$$

The function f represents the total cost, in dollars, of attending an arcade when x games are played. How many games can be played for a total cost of \$58?

5

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

- A) -24
- B) -22
- C) -6
- D) -1

6

The amount of Hanna's bill for a food order was \$50. Hanna gave a tip of 20% of the amount of the bill. What is the amount, in dollars, of the tip Hanna gave?

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7

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.

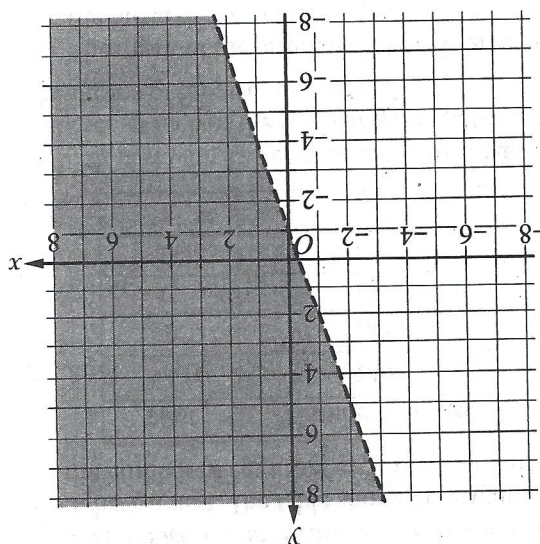
Nest	Number of eggs
A	149
B	144
C	148
D	136
E	139

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.

CONTINUE

8



The shaded region shown represents the solutions to which inequality?

- A) $y < -1 + 3x$
- B) $y < -1 - 3x$
- C) $y > -1 + 3x$
- D) $y > -1 - 3x$

9

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

- A) $8x^3 + 6$
- B) $7x^3 + 10$
- C) $8x^3 + 10$
- D) $7x^3 + 6$

478

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CONTINUE

10

In the xy -plane, line t passes through the points $(0, 9)$ and $(1, 17)$. Which equation defines line t ?

- A) $y = \frac{1}{8}x + 9$
- B) $y = x + \frac{1}{8}$
- C) $y = x + 8$
- D) $y = 8x + 9$

11

What is a solution to the given equation?

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

12

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?

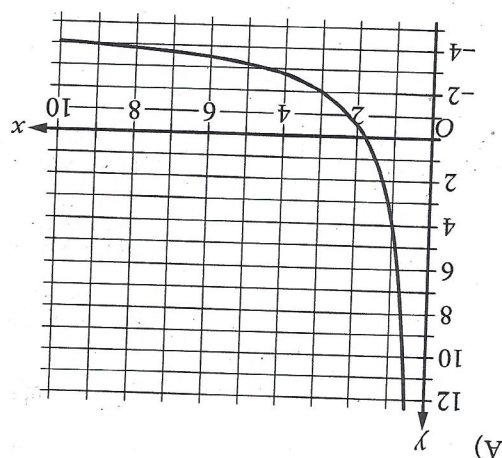
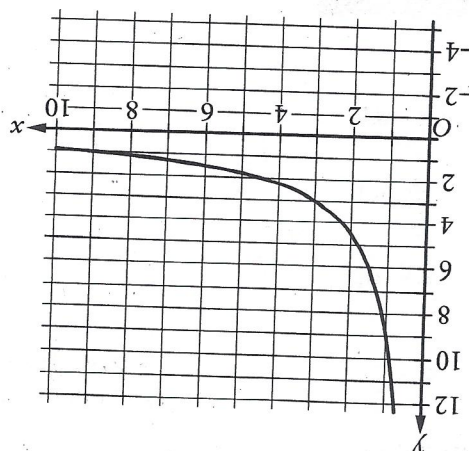
13

$$f(t) = 500(0.5)^{\frac{12}{t}}$$

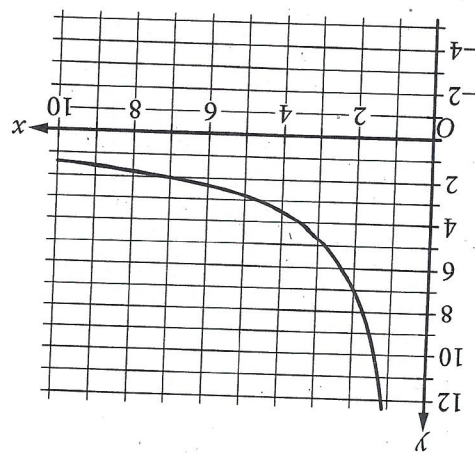
The function f models the intensity of an X-ray beam, in number of particles in the X-ray beam, t millimeters below the surface of a sample of iron. According to the model, what is the estimated number of particles in the X-ray beam when it is at the surface of the sample of iron?

- A) 500
- B) 12
- C) 5
- D) 2

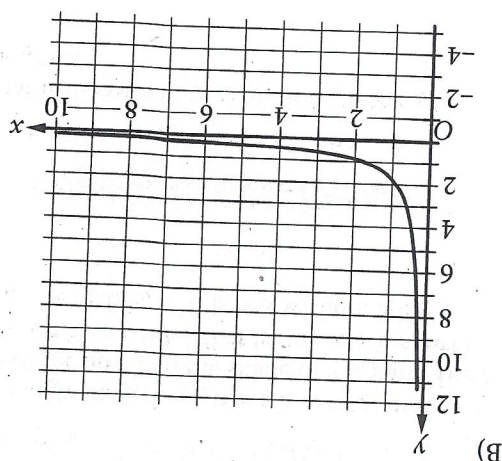
The graph of the rational function f is shown, where $y = f(x)$ and $x \geq 0$. Which of the following is the graph of $y = f(x) + 5$, where $x \geq 0$?



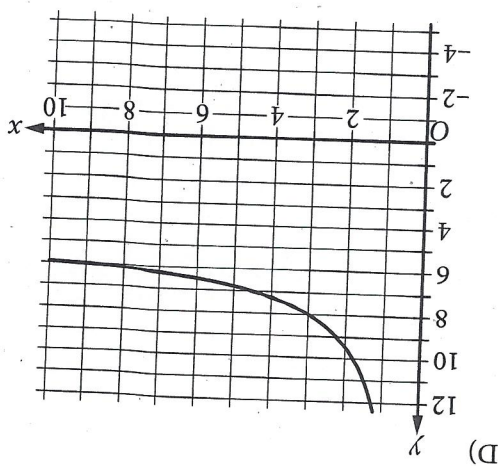
A)



C)



B)



D)

15

$$P = N(19 - C)$$

The given equation relates the positive numbers P , N , and C . Which equation correctly expresses C in terms of P and N ?

- A) $C = \frac{N}{19 + P}$
- B) $C = \frac{N}{19 - P}$
- C) $C = 19 + \frac{N}{P}$
- D) $C = 19 - \frac{P}{N}$

16

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?

17

$$|x - 9| + 45 = 63$$

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

18

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

- A) $-\sqrt{3}$
- B) $-\frac{\sqrt{3}}{3}$
- C) $\frac{\sqrt{3}}{3}$
- D) $\sqrt{3}$

19

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

20

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

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

21

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

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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22

The function f is defined by $f(x) = a\sqrt{x + b}$, where a and b are constants. In the xy -plane, the graph of $y = f(x)$ passes through the point $(-24, 0)$, and $f(24) < 0$. Which of the following must be true?

- A) $f(0) = 24$
- B) $f(0) = -24$
- C) $a > b$
- D) $a < b$

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DIRECTIONS

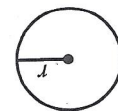
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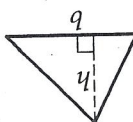


$$A = \pi r^2$$

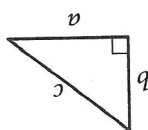
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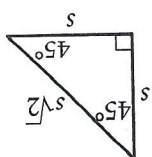
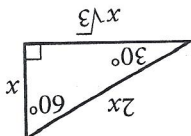
$$A = lw$$



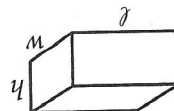
$$A = \frac{1}{2}bh$$



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



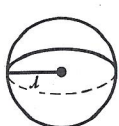
Special Right Triangles



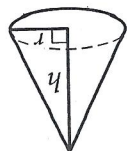
$$V = lwh$$



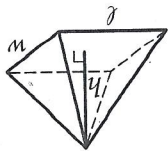
$$V = \pi r^2 h$$



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



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



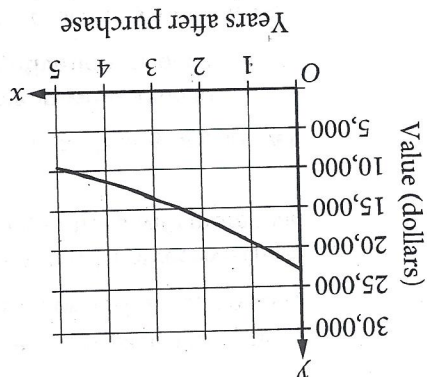
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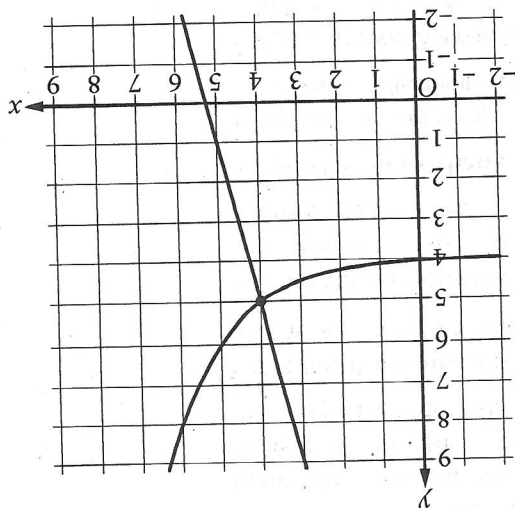
The graph shows the predicted value y , in dollars, of a certain sport utility vehicle x years after it is first purchased.



Which of the following is closest to the predicted value of the sport utility vehicle 3 years after it is first purchased?

- A) \$9,619
- B) \$13,632
- C) \$19,320
- D) \$23,000

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



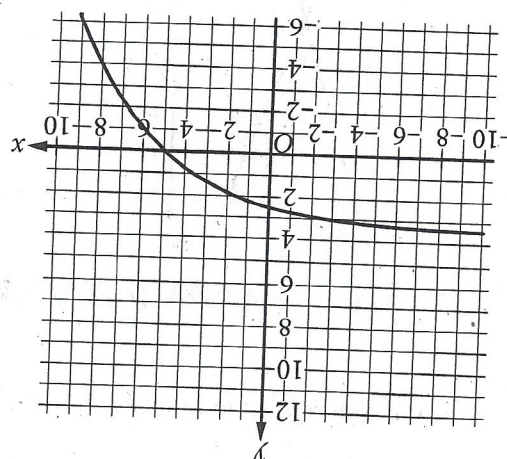
- A) $(0, 0)$
- B) $(0, 4)$
- C) $(4, 5)$
- D) $(5, 0)$

- A) $\frac{1}{7}$
 B) $\frac{2}{7}$
 C) $\frac{5}{7}$
 D) $\frac{7}{7}$

On a street with 7 houses, 2 houses are blue. If a house from this street is selected at random, what is the probability of selecting a house that is blue?

- A) $(-5, 0)$
 B) $(5, 0)$
 C) $(-2, 0)$
 D) $(2, 0)$

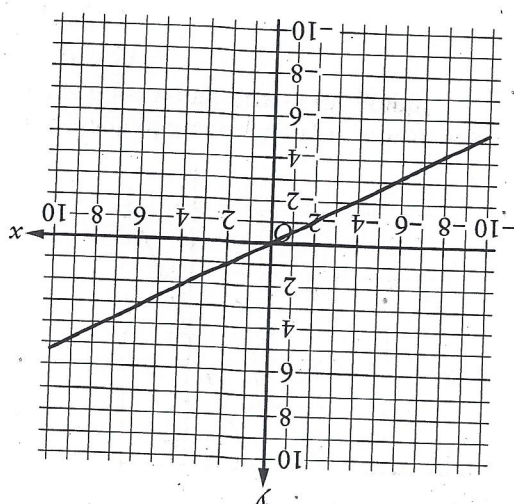
What is the x -intercept of the graph shown?



- A) -30
 B) 37
 C) 40
 D) 43
- The function f is defined by $f(x) = 4x - 3$. What is the value of $f(10)$?

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

- A) Increasing linear
 B) Decreasing linear
 C) Increasing exponential
 D) Decreasing exponential
- Which of the following describes function f ?



The graph of function f is shown, where $y = f(x)$.

13

For the linear function f , the graph of $y = f(x)$ in the xy -plane has a slope of 39 and passes through the point $(0, 0)$. Which equation defines f ?

- A) $f(x) = -39x$
- B) $f(x) = \frac{1}{39}x$
- C) $f(x) = x - 39$
- D) $f(x) = 39x$

14

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?

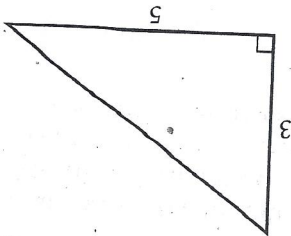
- A) $s \geq 2.4$
- B) $s \geq 1.8$
- C) $0 \leq s \leq 0.6$
- D) $0.6 \leq s \leq 1.8$

15

The function f defined by $f(t) = 14t + 9$ gives the estimated length, in inches, of a vine plant t months after Tavon purchased it. Which of the following is the best interpretation of 9 in this context?

- A) Tavon will keep the vine plant for 9 months.
- B) The vine plant is expected to grow 9 inches each month.
- C) The vine plant is expected to grow to a maximum length of 9 inches.
- D) The estimated length of the vine plant was 9 inches when Tavon purchased it.

16



Note: Figure not drawn to scale.

The figure shows the lengths, in inches, of two sides of a right triangle. What is the area of the triangle, in square inches?

17

x	y
3	21
2	16
1	11

The table shows three values of x and their corresponding values of y . Which equation represents the linear relationship between x and y ?

- A) $y = 5x + 6$
- B) $y = 5x + 11$
- C) $y = 6x + 5$
- D) $y = 6x + 11$

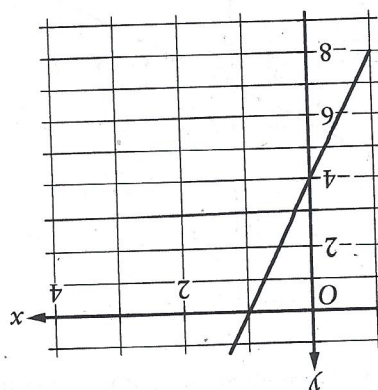
18

$$y = 4x$$

$$y = x^2 - 12$$

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

8



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

- A) $(0, -1)$
- B) $(0, -4)$
- C) $(0, 1)$
- D) $(0, 4)$

9

$$y = 12x - 20$$

$$y = 28$$

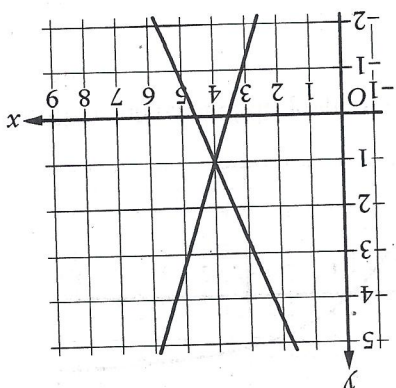
What is the solution (x, y) to the given system of equations?

- A) $(4, 28)$
- B) $(20, 28)$
- C) $(28, 4)$
- D) $(28, 20)$

10

23, 27, 27, 32, 35, 36, 52
What is the range of the 7 scores shown?

11



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

12

The function h is defined by $h(x) = \frac{5x+6}{8}$. What is the value of $h(2)$?

19

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) $\frac{26}{x}$
- B) $26x$
- C) $x + 26$
- D) $\frac{x}{26}$

20

$$f(x) = (1.84)^{\frac{4}{x}}$$

The function f is defined by the given equation. The equation can be rewritten as $f(x) = \left(1 + \frac{p}{100}\right)^x$, where p is a constant. Which of the following is closest to the value of p ?

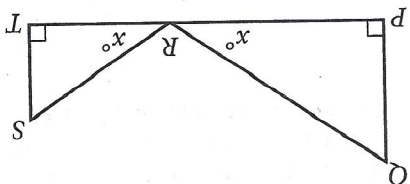
- A) 16
- B) 21
- C) 46
- D) 96

22

In triangle ABC , angle B is a right angle. The length of side AB is $10\sqrt{37}$ and the length of side BC is $24\sqrt{37}$. What is the length of side AC ?

- A) $14\sqrt{37}$
- B) $26\sqrt{37}$
- C) $34\sqrt{37}$
- D) $\sqrt{34 \cdot 37}$

21



Note: Figure not drawn to scale.

$\triangle QPR$ is similar to $\triangle STR$. The lengths represented by $\overline{ST}$, $\overline{QP}$, $\overline{PR}$, and $\overline{QR}$ in the figure are 14, 15, 20, and 25, respectively. What is the length of $\overline{SR}$?

- A) $\frac{15}{350}$
- B) $\frac{20}{350}$
- C) $\frac{20}{210}$
- D) $\frac{25}{210}$

21

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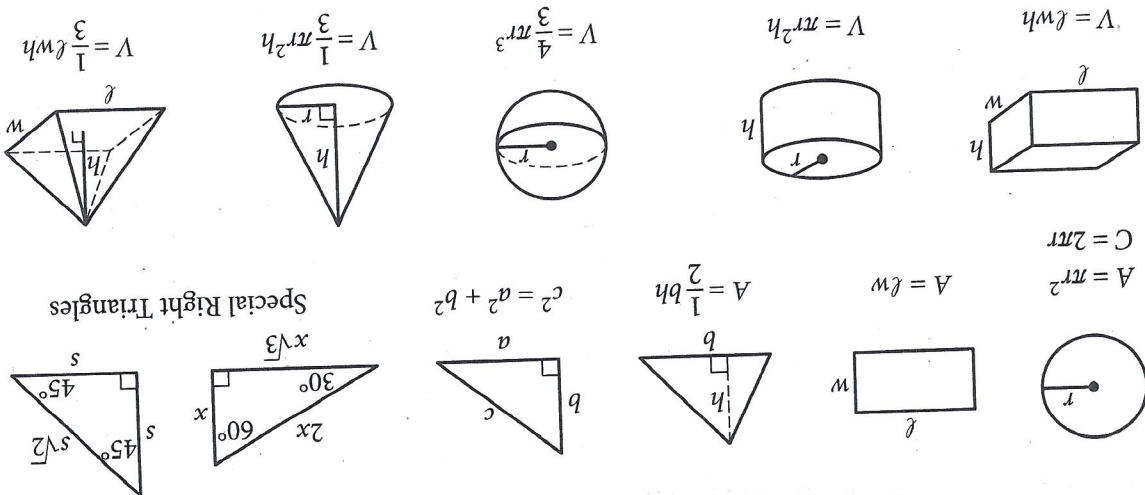
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The number of degrees of arc in a circle is 360.

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.

1

A right triangle has legs with lengths of 11 centimeters and 9 centimeters. What is the length of this triangle's hypotenuse, in centimeters?

- A) $\sqrt{40}$
 B) $\sqrt{202}$
 C) 20
 D) 202

2

For the linear function h , the graph of $y = h(x)$ in the xy -plane passes through the points $(7, 21)$ and $(9, 25)$. Which equation defines h ?

- A) $h(x) = \frac{1}{2}x - \frac{7}{2}$
 B) $h(x) = 2x + 7$
 C) $h(x) = 7x + 21$
 D) $h(x) = 9x + 25$

3

A company that produces socks wants to estimate the percent of the socks produced in a typical week that are defective. A random sample of 310 socks produced in a certain week were inspected. Based on the sample, it is estimated that 12% of all socks produced by the company in this week are defective, with an associated margin of error of 3.62%. Based on the estimate and associated margin of error, which of the following is the most appropriate conclusion about all socks produced by the company during this week?

A) 3.62% of the socks are defective.
 B) It is plausible that between 8.38% and 15.62% of the socks are defective.
 C) 12% of the socks are defective.
 D) It is plausible that more than 15.62% of the socks are defective.

4

A truck can haul a maximum weight of 5,630 pounds. During one trip, the truck will be used to haul a 190-pound piece of equipment as well as several crates. Some of these crates weigh 25 pounds each and the others weigh 62 pounds each. Which inequality represents the possible combinations of the number of 25-pound crates, x , and the number of 62-pound crates, y , the truck can haul during one trip if only the piece of equipment and the crates are being hauled?

- A) $25x + 62y \leq 5,440$
 B) $25x + 62y \geq 5,440$
 C) $62x + 25y \leq 5,630$
 D) $62x + 25y \geq 5,630$

5

$$y - 9x = 13$$

$$5x = 2y$$

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

- A) $\left(\frac{5}{2}, 1\right)$
 B) $\left(1, \frac{5}{2}\right)$
 C) $(-2, -5)$
 D) $(-5, -2)$

6

What is the range of the 7 scores shown?
 23, 27, 27, 32, 35, 36, 52

7

Two customers purchased the same kind of bread and eggs at a store. The first customer paid 12.45 dollars for 1 loaf of bread and 2 dozen eggs. The second customer paid 19.42 dollars for 4 loaves of bread and 1 dozen eggs. What is the cost, in dollars, of 1 dozen eggs?

- A) 3.77
- B) 3.88
- C) 4.15
- D) 4.34

8

If the given equations are graphed in the xy -plane, at how many points do the graphs of the equations intersect?

- A) Exactly one
- B) Exactly two
- C) Infinitely many
- D) Zero

$$y = x + 9$$

$$y = x^2 + 16x + 63$$

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

- A) -6
- B) 7
- C) 9
- D) 63

9

10

In the xy -plane, line p has a slope of $-\frac{3}{5}$ and an x -intercept of $(-6, 0)$. What is the y -coordinate of the y -intercept of line p ?

How many solutions does the equation $12(x - 3) = -3(x + 12)$ have?

- A) Exactly one
- B) Exactly two
- C) Infinitely many
- D) Zero

12

Kaylani used fabric measuring 5 yards in length to make each suit for a mens 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.

13

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

14

$$f(x) = (1.84)^{\frac{1}{4}x}$$

The function f is defined by the given equation. The equation can be rewritten as $f(x) = \left(1 + \frac{100}{p}\right)^x$, where p is a constant. Which of the following is closest to the value of p ?

- A) 16
- B) 21
- C) 46
- D) 96

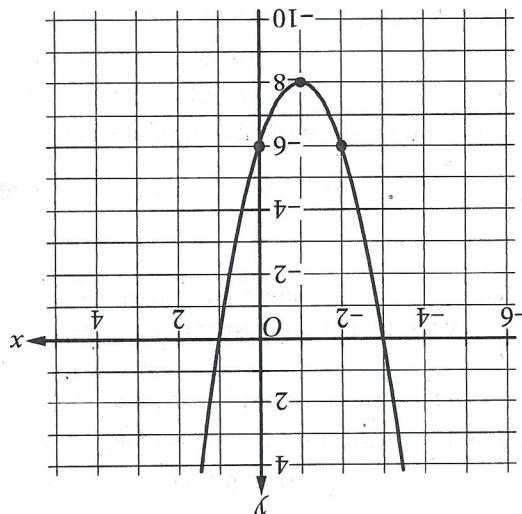
15

$$6 + 7r = pw$$

$$7r - 5w = 5w + 11$$

In the given system of equations, p is a constant. If the system has no solution, what is the value of p ?

16

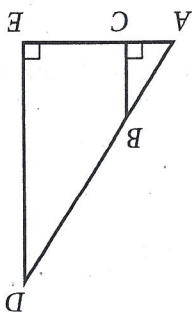


The graph of $y = 2x^2 + bx + c$ is shown, where b and c are constants. What is the value of bc ?

494

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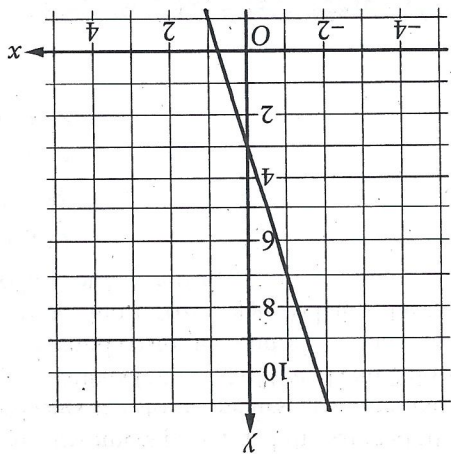
18



Note: Figure not drawn to scale.

In the figure shown, $AB = \sqrt{34}$ units, $AC = 3$ units, and $CE = 21$ units. What is the area, in square units, of triangle ADE ?

17



The graph of the linear function $y = f(x) + 19$ is shown. If c and d are positive constants, which equation could define f ?

- A) $f(x) = -d - cx$
- B) $f(x) = d - cx$
- C) $f(x) = -d + cx$
- D) $f(x) = d + cx$

CONTINUE

19

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

20

In the xy -plane, a circle has center C with coordinates (h, k) . Points A and B lie on the circle. Point A has coordinates $(h + 1, k + \sqrt{102})$, and $\angle ACB$ is a right angle. What is the length of AB ?

- A) $\sqrt{206}$
- B) $2\sqrt{102}$
- C) $103\sqrt{2}$
- D) $103\sqrt{3}$

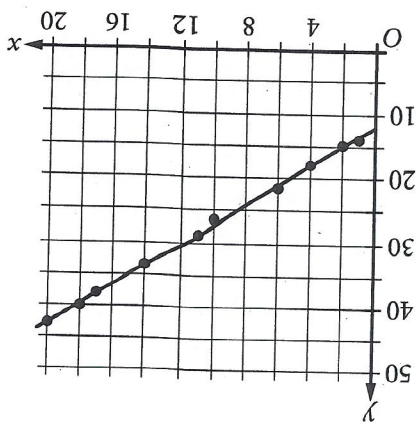
21

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 $\cdot$ meters, what is the electric flux, in volts $\cdot$ 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.

22



The scatterplot shows the relationship between two variables, x and y , for data set E. A line of best fit is shown. Data set F is created by multiplying the y -coordinate of each data point from data set E by 3.9. Which of the following could be an equation of a line of best fit for data set F?

- A) $y = 46.8 + 5.9x$
- B) $y = 46.8 + 1.5x$
- C) $y = 12 + 5.9x$
- D) $y = 12 + 1.5x$

SAT Practice Test Worksheet:

Answer Key

Mark each of your correct answers below, then add them up to get your raw score on each module. As a reminder, use only the answer key for the second-stage module you chose to complete as part of your practice test, either module 2 (lower difficulty) or module 2 (higher difficulty). Please note that the questions that appear in grayed-out rows below are unscored questions for research purposes. Do not consider these questions when calculating your raw scores. (Because of these unscored questions, the answer key has two more questions than the conversion tables.) Finally, add your scores from your two modules together to get your raw score for each section.

Module 1		Module 2		Module 2	
(Routing)		(Lower Difficulty)		(Higher Difficulty)	
QUESTION #	CORRECT	QUESTION #	CORRECT	QUESTION #	CORRECT
1	D	1	B	1	B
2	A	2	C	2	B
3	C	3	B	3	B
4	11	4	B	4	A
5	C	5	A	5	C
6	10	6	6	6	29
7	A	7	B	7	D
8	D	8	B	8	D
9	B	9	A	9	A
10	D	10	29	10	-10
11	30; -30	11	4	11	A
12	4.51; 451/100	12	.5; 1/2	12	D
13	A	13	D	13	D
14	D	14	D	14	A
15	D	15	D	15	10
16	4205	16	7.5; 15/2	16	-24
17	18	17	A	17	A
18	A	18	6	18	480
19	D	19	B	19	A
20	B	20	A	20	A
21	D	21	A	21	4176
22	D	22	B	22	A

MATH SECTION RAW SCORE (Total # of Correct Answers)

Module 1 (Routing) + Module 2 (Lower Difficulty) OR Module 2 (Higher Difficulty) =

Math

22 QUESTIONS

SAT 8

DIRECTIONS

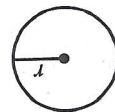
The questions in this section address a number of important math skills. Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

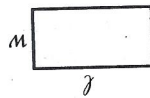
- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

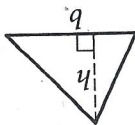


$$A = \pi r^2$$

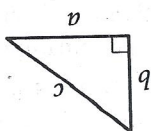
$$C = 2\pi r$$



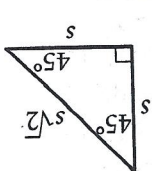
$$A = lw$$



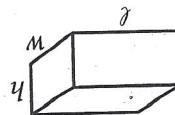
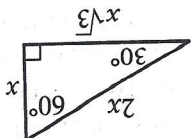
$$A = \frac{1}{2}bh$$



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



Special Right Triangles



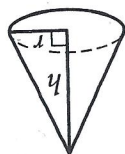
$$V = lwh$$



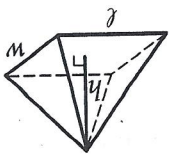
$$V = \pi r^2 h$$



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



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



$$V = \frac{1}{3}lwh$$

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

1

A certain bird species can fly at an average speed of 16 meters per second when in continuous flight. At this rate, how many meters would this bird species fly in 4 seconds?

- A) 64
- B) 20
- C) 16
- D) 12

2

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) $y = 4x + 6$

3

Which expression is equivalent to $5x^5 - 6x^4 + 8x^3$?

- A) $x^4(5x - 6)$
- B) $x^3(5x^2 - 6x + 8)$
- C) $8x^3(5x^2 - 6x + 1)$
- D) $6x^5(-6x^4 + 8x^3 + 1)$

4

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

5

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

6

$$7(2x - 3) = 63$$

Which equation has the same solution as the given equation?

- A) $2x - 3 = 9$
- B) $2x - 3 = 56$
- C) $2x - 21 = 63$
- D) $2x - 21 = 70$

7

$$c - 7 = 25p + k$$

The given equation relates the positive numbers c , p , and k . Which equation correctly expresses c in terms of p and k ?

- A) $c = 25p + k + 7$
- B) $c = 25p + k - 7$
- C) $c = 7(25p + k)$
- D) $c = \frac{7}{25p + k}$

8

A function p estimates that there were 2,000 animals in a population in 1998. Each year from 1998 to 2010, the function estimates that the number of animals in this population increased by 3% of the number of animals in the population the previous year. Which equation defines this function, where $p(x)$ is the estimated number of animals in the population x years after 1998?

- A) $p(x) = 2,000(3)^x$
- B) $p(x) = 2,000(1.97)^x$
- C) $p(x) = 2,000(1.03)^x$
- D) $p(x) = 2,000(0.97)^x$

9

Which expression is equivalent to $(x^2 + 11)^2 + (x - 5)(x + 5)$?

- A) $x^4 + 23x^2 - 14$
- B) $x^4 + 23x^2 + 96$
- C) $x^4 + 12x^2 + 121$
- D) $x^4 + x^2 + 146$

10

An egg is thrown from a rooftop. The equation $h = -4.9t^2 + 9t + 18$ represents this situation, where h is the height of the egg above the ground, in meters, t seconds after it is thrown. According to the equation, what is the height, in meters, from which the egg was thrown?

11

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

- A) 24
- B) 48
- C) 72
- D) 96

12

The relationship between two variables, x and y , is linear. For every increase in the value of x by 1, the value of y increases by 8. When the value of x is 2, the value of y is 18. Which equation represents this relationship?

- A) $y = 2x + 18$
- B) $y = 2x + 8$
- C) $y = 8x + 2$
- D) $y = 3x + 26$

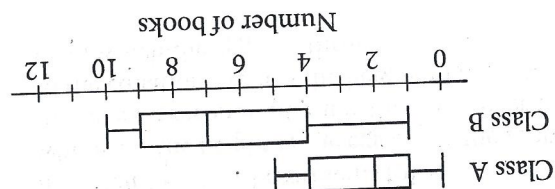
13

How many distinct real solutions does the given equation have?

$$x^2 = -841$$

- A) Exactly one
- B) Exactly two
- C) Infinitely many
- D) Zero

14



The two box plots show the distribution of number of books read over the summer by the students in two different English classes. What is the positive difference between the ranges of number of books read over the summer for the two classes?

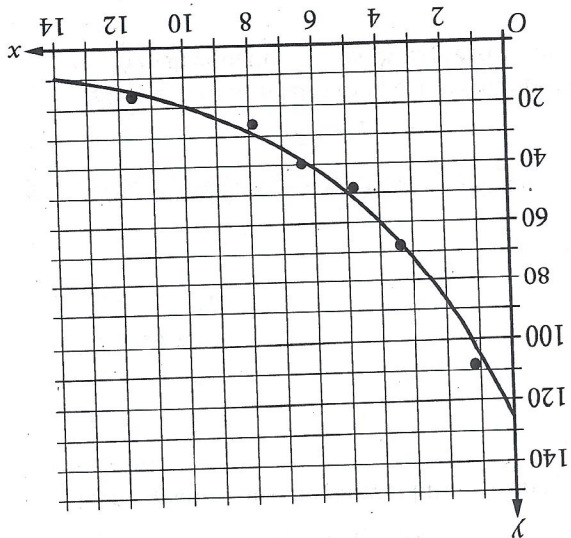
15

The length of the edge of the base of a right square prism is 6 units. The volume of the prism is 2,880 cubic units. What is the height, in units, of the prism?

- A) $4\sqrt{30}$
- B) 36
- C) $24\sqrt{5}$
- D) 80

CONTINUE

16

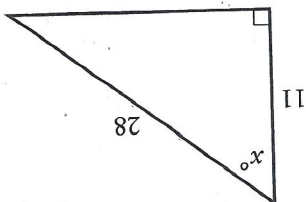


The scatterplot shows the relationship between two variables, x and y . An equation for the exponential model shown can be written as $y = a(b)^x$, where a and b are positive constants. Which of the following is closest to the value of b ?

- A) 0.83
- B) 1.83
- C) 18.36
- D) 126.35

17

Note: Figure not drawn to scale.



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

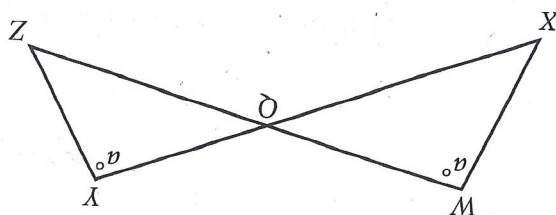
18

$$(x+2)(x-5)(x+9) = 0$$

What is a positive solution to the given equation?

- A) 3
B) 4
C) 5
D) 18

19



Note: Figure not drawn to scale.

In the figure shown, $\overline{WZ}$ and $\overline{XY}$ intersect at point Q. $\angle YQZ = 63^\circ$, $\angle WQZ = 70^\circ$, $\angle WXZ = 60^\circ$, and $\angle XQZ = 120^\circ$. What is the length of $\overline{YZ}$?

20

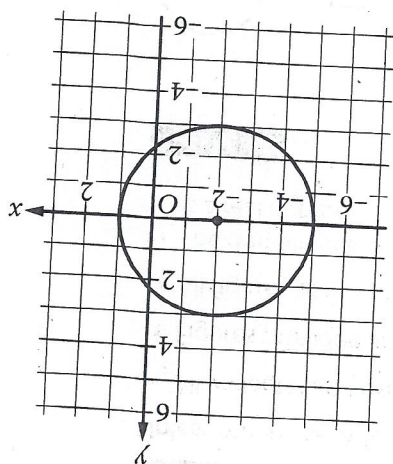
The function g is defined by $g(x) = (x + 14)(t - x)$, where t is a constant. In the xy -plane, the graph of $y = g(x)$ passes through the point $(24, 0)$. What is the value of $g(0)$?

STOP

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22



- Circle A (shown) is defined by the equation $(x+2)^2 + y^2 = 9$. Circle B (not shown) is the result of shifting circle A down 6 units and increasing the radius so that the radius of circle B is 2 times the radius of circle A. Which equation defines circle B?
- A) $(x+2)^2 + (y+6)^2 = (4)(9)$
 B) $2(x+2)^2 + 2(y+6)^2 = 9$
 C) $(x+2)^2 + (y-6)^2 = (4)(9)$
 D) $2(x+2)^2 + 2(y-6)^2 = 9$

21

The number of zebras in a population in 2018 was 1.27 times the number of zebras in this population in 2014. If the number of zebras in this population in 2014 is $p\%$ of the number of zebras in this population in 2018, what is the value of p , to the nearest whole number?

Math

22 QUESTIONS

DIRECTIONS

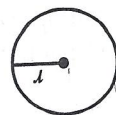
The questions in this section address a number of important math skills. Use of a calculator is permitted for all questions.

NOTES

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REFERENCE

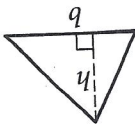


$$A = \pi r^2$$

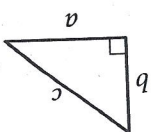
$$C = 2\pi r$$



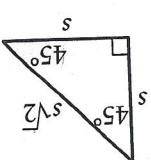
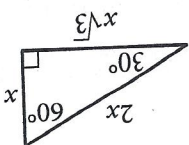
$$A = \ell w$$



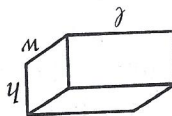
$$A = \frac{1}{2}bh$$



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



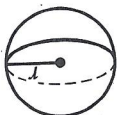
Special Right Triangles



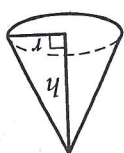
$$V = \ell wh$$



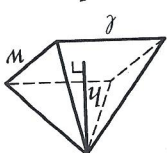
$$V = \pi r^2 h$$



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



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



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

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.

1

How many meters are equivalent to 2,300 centimeters? (100 centimeters = 1 meter)

A) 0.043
B) 23
C) 2,400
D) 230,000

2

The function f is defined by $f(x) = 8x$. For what value of x does $f(x) = 72$?

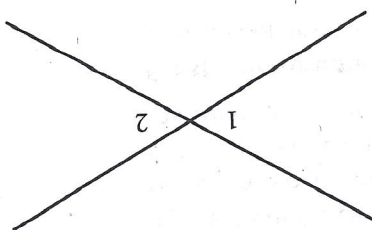
A) 8
B) 9
C) 64
D) 80

3

What is 20% of 440?

A) 44
B) 88
C) 880
D) 1,760

4



Note: Figure not drawn to scale.

In the figure, two lines intersect at a point. Angle 1 and angle 2 are vertical angles. The measure of angle 1 is 72° . What is the measure of angle 2?

- A) 72°
B) 108°
C) 144°
D) 288°

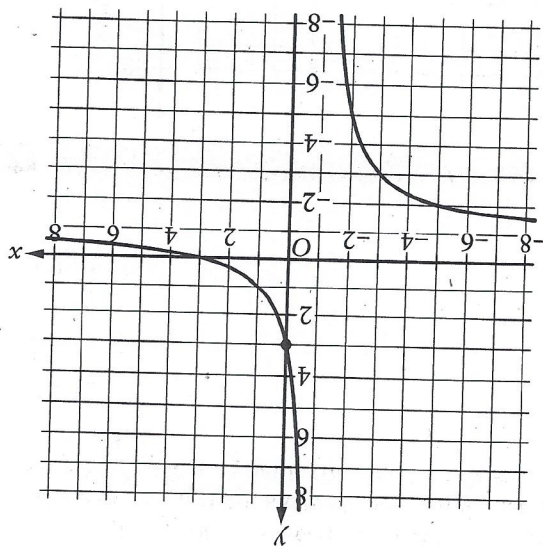
5

$$(p + 3) + 8 = 10$$

What value of p is the solution to the given equation?

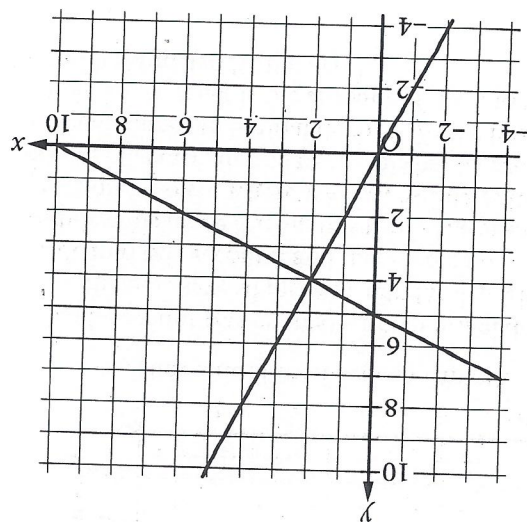
- A) -1
B) 5
C) 15
D) 21

6



What is the y -coordinate of the y -intercept of the graph shown?

7



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

- A) $(0, 5)$
- B) $(2, 4)$
- C) $(5, 10)$
- D) $(10, 0)$

8

$$k^2 - 53 = 91$$

What is the positive solution to the given equation?

- A) 144
- B) 72
- C) 38
- D) 12

9

$$x = 8$$

$$x + 3y = 26$$

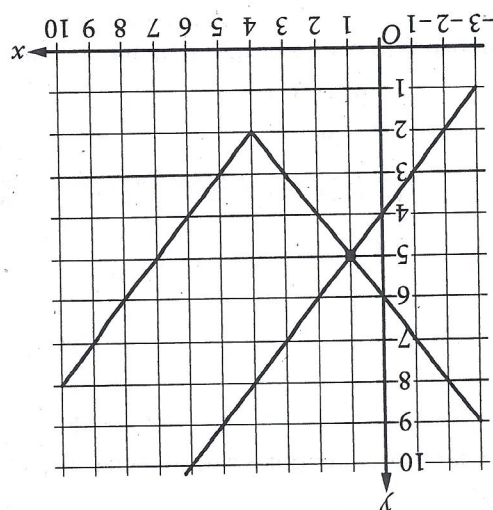
The solution to the given system of equations is (x, y) . What is the value of y ?

10

During a portion of a flight, a small airplane's cruising speed varied between 150 miles per hour and 170 miles per hour. Which inequality best represents this situation, where s is the cruising speed, in miles per hour, during this portion of the flight?

- A) $s \leq 20$
- B) $s \leq 150$
- C) $s \leq 170$
- D) $150 \leq s \leq 170$

11



The graph of a system of an absolute value function and a linear function is shown. What is the solution (x, y) to this system of two equations?

- A) $(-1, 5)$
- B) $(0, 4)$
- C) $(1, 5)$
- D) $(4, 2)$

12

The function g is defined by $g(x) = |x + 18|$. What is the value of $g(4)$?

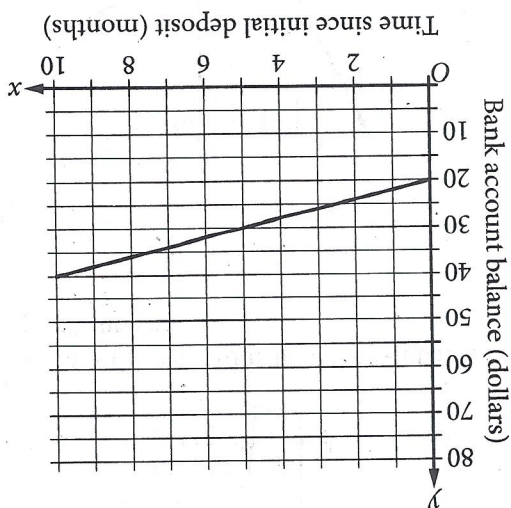
- A) -18
- B) -4
- C) 14
- D) 22

13

The perimeter of an isosceles triangle is 36 feet. Each of the two congruent sides of the triangle has a length of 10 feet. What is the length, in feet, of the third side?

- A) 10
- B) 12
- C) 16
- D) 18

14



A bank account was opened with an initial deposit. Over the next several months, regular deposits were made into this account, and there were no withdrawals made during this time. The graph of the function f shown, where $y = f(x)$, estimates the account balance, in dollars, in this bank account x months since the initial deposit. To the nearest whole dollar, what is the amount of the initial deposit estimated by the graph?

15

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

16

Brian saves $\frac{5}{2}$ of the \$215 he earns each week from his job. If Brian continues to save at this rate, how much money, in dollars, will Brian save in 9 weeks?

17

$$q(x) = 32(2^x)$$

Which table gives three values of x and their corresponding values of $q(x)$ for function q ?

A)

x	$q(x)$
1	-1
0	0
64	-64

B)

x	$q(x)$
1	-1
0	2
64	$\frac{1}{16}$

C)

x	$q(x)$
1	-1
0	32
64	$\frac{1}{16}$

D)

x	$q(x)$
1	-1
0	32
64	64

18

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) $2,904\pi$

19

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

20

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?

21

$$2x - y > 883$$

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

The combined original price for a mirror and a vase is \$60. After a 25% discount to the mirror and a 45% discount to the vase are applied, the combined sale price for the two items is \$39. Which system of equations gives the original price m , in dollars, of the mirror and the original price v , in dollars, of the vase?

- A) $m + v = 60$
 $0.55m + 0.75v = 39$
- B) $m + v = 60$
 $0.45m + 0.25v = 39$
- C) $m + v = 60$
 $0.75m + 0.55v = 39$
- D) $m + v = 60$
 $0.25m + 0.45v = 39$

22

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

22 QUESTIONS

DIRECTIONS

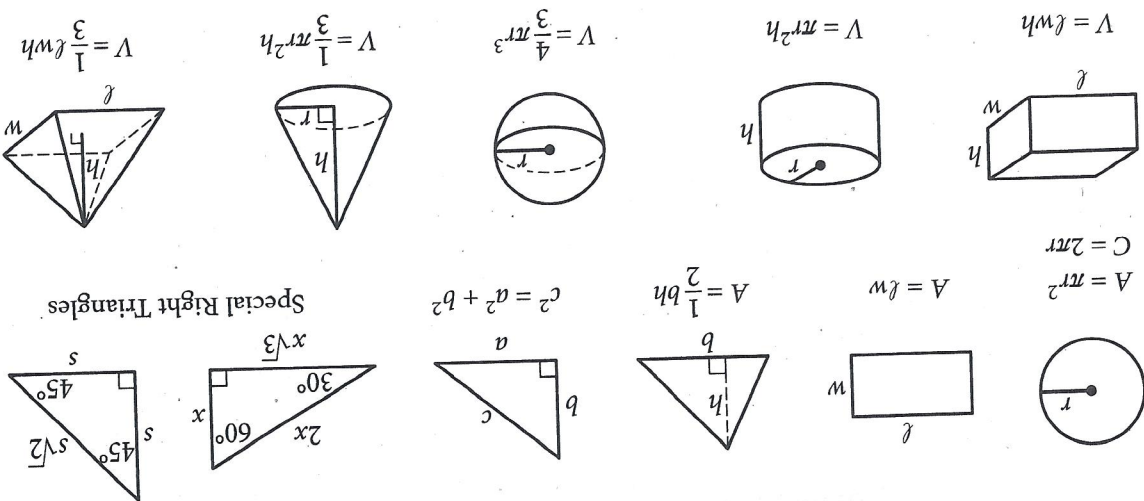
The questions in this section address a number of important math skills. Use of a calculator is permitted for all questions.

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



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.

1

A manager is responsible for ordering supplies for a shaved ice shop. The shop's inventory starts with 4,500 paper cups, and the manager estimates that 70 of these paper cups are used each day. Based on this estimate, in how many days will the supply of paper cups reach 1,700?

- A) 20
B) 40
C) 60
D) 80

2

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

4

The function f is defined by $f(x) = \frac{9}{7}x + \frac{7}{9}$. For what value of x does $f(x) = 5$?

D)

x	y
2	13
4	21
6	29

C)

x	y
2	13
4	18
6	23

B)

x	y
2	8
4	16
6	24

A)

x	y
2	19
4	30
6	41

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

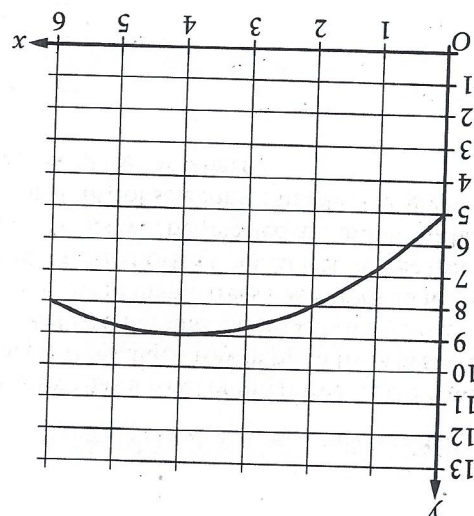
$$y > 4x + 8$$

3

During a portion of a flight, a small airplane's cruising speed varied between 150 miles per hour and 170 miles per hour. Which inequality best represents this situation, where s is the cruising speed, in miles per hour, during this portion of the flight?

- A) $s \leq 20$
- B) $s \leq 150$
- C) $s \leq 170$
- D) $150 \leq s \leq 170$

6



The graph models the number of active projects a company was working on x months after the end of November 2012, where $0 \leq x \leq 6$. According to the model, what is the predicted number of active projects the company was working on at the end of November 2012?

- A) 0
- B) 5
- C) 8
- D) 9

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5

In the linear function h , $h(28) = 15$ and $h(26) = 22$. Which equation defines h ?

- A) $h(x) = -\frac{7}{2}x + 23$
- B) $h(x) = -\frac{7}{2}x + 113$
- C) $h(x) = -\frac{2}{7}x + 23$
- D) $h(x) = -\frac{2}{7}x + 113$

7

Maximum number of passengers and crew	Number of cars
174	3
284	5
559	10

The table shows the linear relationship between the number of cars, c , on a commuter train and the maximum number of passengers and crew, p , that the train can carry. Which equation represents the linear relationship between c and p ?

- A) $55c - p = -9$
- B) $55c - p = 9$
- C) $55p - c = -9$
- D) $55p - c = 9$

8

$$w^2 + 12w - 40 = 0$$

Which of the following is a solution to the given equation?

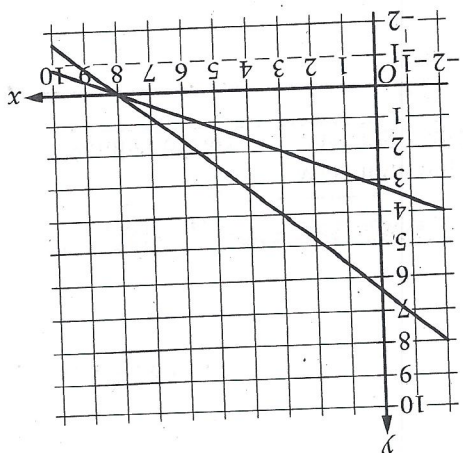
- A) $6 - 2\sqrt{19}$
- B) $2\sqrt{19}$
- C) $\sqrt{19}$
- D) $-6 + 2\sqrt{19}$

9

10

What is the y -coordinate of the y -intercept of the graph of $\frac{7}{3}x = -\frac{5}{9}y + 21$ in the xy -plane?

11



What system of linear equations is represented by the lines shown?

- A) $8x + 4y = 32$
 $-10x - 4y = -64$
- B) $8x - 4y = 32$
 $-10x + 4y = -64$
- C) $4x - 10y = 32$
 $-8x + 10y = -64$
- D) $4x + 10y = 32$
 $-8x - 10y = -64$

12

$$(x - 2) - 4(y + 7) = 117$$

$$(x - 2) + 4(y + 7) = 442$$

The solution to the given system of equations is (x, y) . What is the value of $6(x - 2)$?

13

$$f(x) = x^2 - 48x + 2,304$$

What is the minimum value of the given function?

14

$$-49x = -98x$$

How many solutions does the given equation have?

- A) Zero
- B) Exactly one
- C) Exactly two
- D) Infinitely many

15

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 ?

16

A grove has 6 rows of birch trees and 5 rows of maple trees. Each row of birch trees has 8 trees 20 feet or taller and 6 trees shorter than 20 feet. Each row of maple trees has 9 trees 20 feet or taller and 7 trees shorter than 20 feet. A tree from one of these rows will be selected at random. What is the probability of selecting a maple tree, given that the tree is 20 feet or taller?

- A) $\frac{9}{164}$
- B) $\frac{10}{3}$
- C) $\frac{31}{15}$
- D) $\frac{17}{9}$

17

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?

18

The positive number a is 2,241% of the sum of the positive numbers b and c , and b is 83% of c . What percent of b is a ?

- A) 23.24%
- B) 49.41%
- C) 2,324%
- D) 4,941%

19

$$\frac{7}{8}y - \frac{5}{8}x = \frac{7}{4} - \frac{8}{7}y$$

$$\frac{4}{5}x + \frac{4}{7} = py + \frac{4}{15}$$

In the given system of equations, p is a constant. If the system has no solution, what is the value of p ?

20

x	$g(x)$
3	-27
0	-9
5	21

The table shows three values of x and their corresponding values of $g(x)$, where $g(x) = \frac{f(x)}{x+3}$ and f is a linear function. What is the y -intercept of the graph of $y = f(x)$ in the xy -plane?

- A) (0, 36)
- B) (0, 12)
- C) (0, 4)
- D) (0, -9)

22

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

21

A circle has center G , and points M and N lie on the circle. Line segments MH and NH are tangent to the circle at points M and N , respectively. If the radius of the circle is 168 millimeters and the perimeter of quadrilateral $GMHN$ is 3,856 millimeters, what is the distance, in millimeters, between points G and H ?

- A) 168
- B) 1,752
- C) 1,760
- D) 1,768

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.

SAT Practice Test Worksheet:

Answer Key

Mark each of your correct answers below, then add them up to get your raw score on each module. As a reminder, use only the answer key for the second-stage module you chose to complete as part of your practice test, either module 2 (lower difficulty) or module 2 (higher difficulty). Please note that the questions that appear in grayed-out rows below are unscored questions for research purposes. Do not consider these questions when calculating your raw scores. (Because of these unscored questions, the answer key has two more questions than the conversion tables.) Finally, add your scores from your two modules together to get your raw score for each section.

Module 1 (Routing)			Module 2 (Lower Difficulty)			Module 2 (Higher Difficulty)		
QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS	QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS	QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS
1	A		1	B		1	B	
2	D		2	B		2	A	
3	B		3	B		3	A	
4	B		4	A		4	3	
5	B		5	A		5	D	
6	A		6	3		6	B	
7	A		7	B		7	D	
8	C		8	D		8	A	
9	B		9	6		9	D	
10	18		10	D		10	189/5; 37.8	
11	B		11	C		11	D	
12	C		12	D		12	1677	
13	D		13	C		13	1728	
14	4		14	20		14	B	
15	D		15	D		15	25	
16	A		16	774		16	C	
17	.3928; .3929; 11/28		17	D		17	66	
18	C		18	C		18	D	
19	54		19	14.66; 14.67; 44/3		19	3.5; 7/2	
20	336		20	66		20	A	
21	79		21	D		21	D	
22	A		22	C		22	A	

MATH SECTION RAW SCORE (Total # of Correct Answers) =
 Module 1 (Routing)
 +
 Module 2 (Lower Difficulty)
 OR
 Module 2 (Higher Difficulty)