Math

27 QUESTIONS

DIRECTIONS

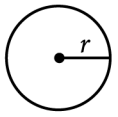
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

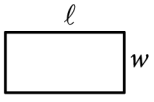
Unless otherwise indicated:

- 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.

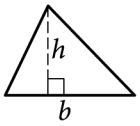
REFERENCE



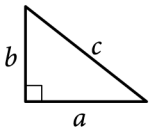
$A = \pi r^2$
$C = 2\pi r$



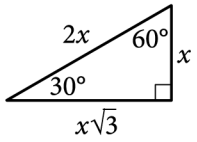
$A = \ell w$

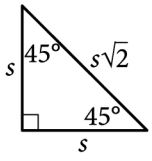


$A = \frac{1}{2}bh$

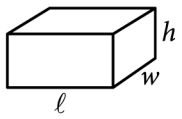


$c^2 = a^2 + b^2$

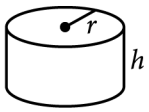




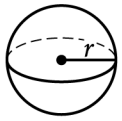
Special Right Triangles



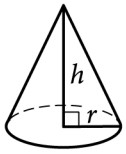
$V = \ell wh$



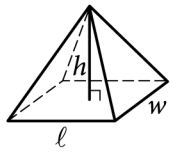
$V = \pi r^2 h$



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



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



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

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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CONTINUE

1

There are 55 students in Spanish club. A sample of the Spanish club students was selected at random and asked whether they intend to enroll in a new study program. Of those surveyed, 20% responded that they intend to enroll in the study program. Based on this survey, which of the following is the best estimate of the total number of Spanish club students who intend to enroll in the study program?

A) 11

B) 20

C) 44

D) 55

2

Jay walks at a speed of 3 miles per hour and runs at a speed of 5 miles per hour. He walks for w hours and runs for r hours for a combined total of 14 miles. Which equation represents this situation?

A) $3w + 5r = 14$

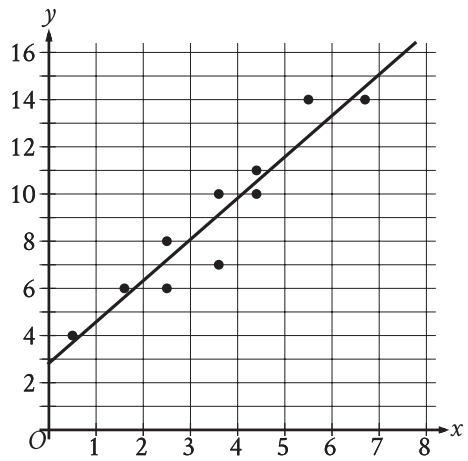
B) $\frac{1}{3}w + \frac{1}{5}r = 14$

C) $\frac{1}{3}w + \frac{1}{5}r = 112$

D) $3w + 5r = 112$

3

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



Which of the following equations best represents the line of best fit shown?

A) $y = 2.8 + 1.7x$

B) $y = 2.8 - 1.7x$

C) $y = -2.8 + 1.7x$

D) $y = -2.8 - 1.7x$

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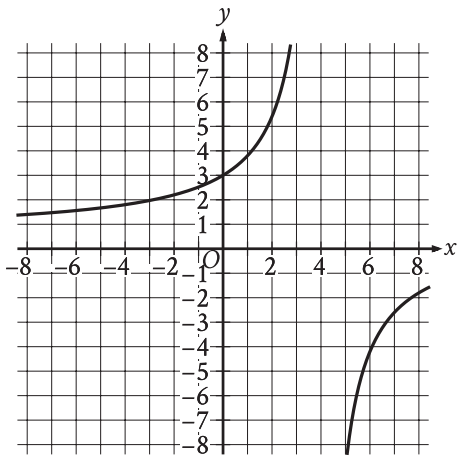
4



The graph of $y = f(x)$ is shown in the xy-plane. What is the value of $f(0)$?

A) -3

B) 0

C) $\frac{3}{5}$

D) 3

5

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

6

73, 74, 75, 77, 79, 82, 84, 85, 91

What is the median of the data shown?

7

$$x + 40 = 95$$

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

8

$$5x = 15$$
$$-4x + y = -2$$

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

A) -17

B) -13

C) 13

D) 17

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9

$$g(m) = -0.05m + 12.1$$

The given function g models the number of gallons of gasoline that remains from a full gas tank in a car after driving m miles. According to the model, about how many gallons of gasoline are used to drive each mile?

A) 0.05

B) 12.1

C) 20

D) 242.0

10

$$\frac{1}{7b} = \frac{11x}{y}$$

The given equation relates the positive numbers b, x, and y. Which equation correctly expresses x in terms of b and y ?

A) $x = \frac{7by}{11}$

B) $x = y - 77b$

C) $x = \frac{y}{77b}$

D) $x = 77by$

11

$$y = 76$$

$$y = x^2 - 5$$

The graphs of the given equations in the xy-plane intersect at the point (x, y). What is a possible value of x ?

A) $-\frac{76}{5}$

B) -9

C) 5

D) 76

12

$$y > 14$$

$$4x + y < 18$$

The point $(x, 53)$ is a solution to the system of inequalities in the xy-plane. Which of the following could be the value of x ?

A) -9

B) -5

C) 5

D) 9

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CONTINUE

13

Out of 300 seeds that were planted, 80% sprouted. How many of these seeds sprouted?

14

The function f is defined by $f(x) = 4x$. For what value of x does $f(x) = 8$?

15

Which expression is equivalent to $\frac{8x(x-7)-3(x-7)}{2x-14}$, where $x > 7$?

A) $\frac{x-7}{5}$

B) $\frac{8x-3}{2}$

C) $\frac{8x^2-3x-14}{2x-14}$

D) $\frac{8x^2-3x-77}{2x-14}$

16

Line p is defined by $2y + 18x = 9$. Line r is perpendicular to line p in the xy-plane. What is the slope of line r ?

A) -9

B) $-\frac{1}{9}$

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

D) 9

17

$$f(t) = 8{,}000(0.65)^t$$

The given function f models the number of coupons a company sent to their customers at the end of each year, where t represents the number of years since the end of 1998, and $0 \le t \le 5$. If $y = f(t)$ is graphed in the ty-plane, which of the following is the best interpretation of the y-intercept of the graph in this context?

A) The minimum estimated number of coupons the company sent to their customers during the 5 years was 1,428.

B) The minimum estimated number of coupons the company sent to their customers during the 5 years was 8,000.

C) The estimated number of coupons the company sent to their customers at the end of 1998 was 1,428.

D) The estimated number of coupons the company sent to their customers at the end of 1998 was 8,000.

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CONTINUE

18

Triangle XYZ is similar to triangle RST such that X, Y, and Z correspond to R, S, and T, respectively. The measure of $\angle Z$ is 20° and $2XY = RS$. What is the measure of $\angle T$?

A) 2°

B) 10°

C) 20°

D) 40°

19

$$y = 6x + 18$$

One of the equations in a system of two linear equations is given. The system has no solution. Which equation could be the second equation in the system?

A) $-6x + y = 18$

B) $-6x + y = 22$

C) $-12x + y = 36$

D) $-12x + y = 18$

20

What is the area, in square centimeters, of a rectangle with a length of 34 centimeters (cm) and a width of 29 cm?

21

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

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

22

$$5x^2 + 10x + 16 = 0$$

How many distinct real solutions does the given equation have?

A) Exactly one

B) Exactly two

C) Infinitely many

D) Zero

23

A certain park has an area of 11,863,808 square yards. What is the area, in square miles, of this park? (1 mile = 1,760 yards)

A) 1.96

B) 3.83

C) 3,444.39

D) 6,740.8

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CONTINUE

24

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) $x^2+(y-9)^2=16$

25

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 ?

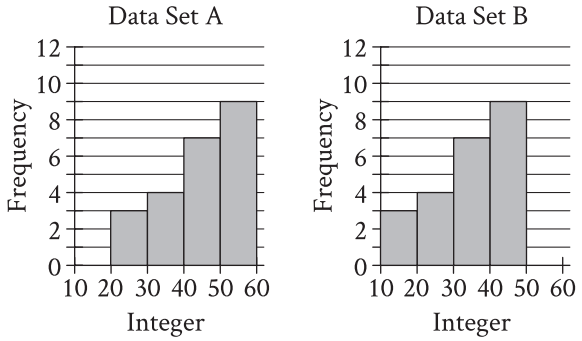
A) The measure of angle A

B) The length of side AB

C) The lengths of sides BC and EF

D) No additional information is necessary.

26



Two data sets of 23 integers each are summarized in the histograms shown. For each of the histograms, the first interval represents the frequency of integers greater than or equal to 10, but less than 20. The second interval represents the frequency of integers greater than or equal to 20, but less than 30, and so on. What is the smallest possible difference between the mean of data set A and the mean of data set B?

A) 0

B) 1

C) 10

D) 23

27

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 ?

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