

Math

27 QUESTIONS

DIRECTIONS

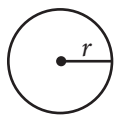
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

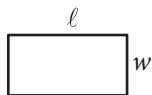
- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

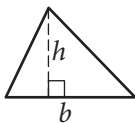


$$A = \pi r^2$$

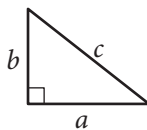
$$C = 2\pi r$$



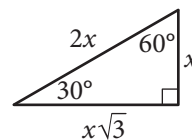
$$A = \ell w$$



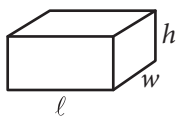
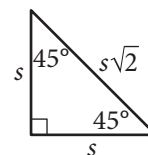
$$A = \frac{1}{2}bh$$



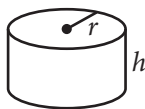
$$c^2 = a^2 + b^2$$



Special Right Triangles



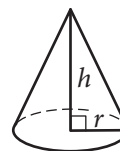
$$V = \ell wh$$



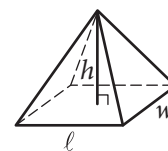
$$V = \pi r^2 h$$



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



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



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

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.

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 ($\frac{7}{2}$) or its decimal equivalent (3.5).
- Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

1

If $8x = 320$, what is the value of $4x$?

- A) 640
- B) 320
- C) 316
- D) 160

2

To earn a certificate of completion for a training program, participants are required to complete at least 120 training hours. If a participant has completed 44 training hours, what is the minimum number of additional training hours the participant is required to complete to earn the certificate of completion?

- A) 20
- B) 76
- C) 120
- D) 164

3

What length, in meters, is equivalent to a length of 130 decimeters? (1 meter = 10 decimeters)

- A) 1.3
- B) 13
- C) 130
- D) 1,300

4

A lab technician combines 30 grams of compound A, 40 grams of compound B, and x grams of compound C. The resulting mixture has a mass of 130 grams. What is the value of x ?

- A) 10
- B) 30
- C) 40
- D) 60

5

If x is a positive integer, the expression $0.24x$ represents what percent of x ?

- A) 176
- B) 124
- C) 76
- D) 24

6

The perimeter of a square is 388 centimeters. What is the side length, in centimeters, of this square?

7

The function g is defined by $g(x) = \sqrt{(3x - 9)(3x + 9)} + 4$. What is the value of $g(3)$?

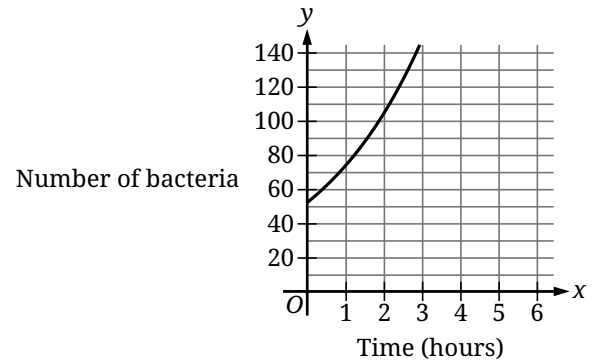
8

$$x + y = 50$$

Each member of a 50-member sports team uses either field A or field B at a practice. The given equation represents the possible combinations of the number of members who use field A, x , and the number of members who use field B, y , for this practice. If at this practice 24 members use field A, how many members use field B?

- A) 24
- B) 25
- C) 26
- D) 50

9



Under certain conditions, the number of bacteria in a population doubles every 2 hours. The graph models the number of bacteria, y , in the population x hours after an initial observation. Based on the graph, what is the estimated number of bacteria in the population 2 hours after the initial observation?

- A) 52
- B) 73
- C) 104
- D) 208

10

5 centimeters



20 centimeters

Note: Figure not drawn to scale.

What is the area, in square centimeters, of the rectangle shown?

- A) 5
- B) 15
- C) 25
- D) 100

11

Hexagon G and hexagon H are similar. The length of each side of hexagon G is 2.8 times the length of its corresponding side in hexagon H. If the length of one side of hexagon H is h , which expression represents the length of its corresponding side in hexagon G?

- A) $\frac{h}{2.8}$
- B) $\frac{2.8}{h}$
- C) $2.8h$
- D) $2.8 + h$

12

The equation $d = 29w + 100$ gives the total amount of money, d , in dollars, that Lorie has in a piggy bank w weeks after she starts to save. What is the total amount of money, in dollars, Lorie has in the piggy bank 10 weeks after she starts to save?

- A) 340
- B) 390
- C) 440
- D) 490

13

The graph of $9x + y = 14$ in the xy -plane is a line. What is the slope of the line?

14

$$18.5x + 29.25y = 154$$

A contractor ordered sand and landscaping pebbles, which cost a total of \$154, for a project. The given equation represents the relationship between the number of cubic yards of sand, x , and the number of tons of landscaping pebbles, y , the contractor ordered. How much more, in dollars, did a ton of landscaping pebbles cost the contractor than a cubic yard of sand?

15

Laura spent \$58 at a bake sale and bought a total of 21 baked goods. She bought t tarts for \$4 each and m muffins for \$2 each. Which system of equations represents this situation?

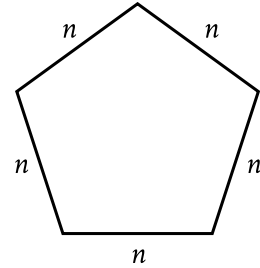
- A) $t + m = 21$
 $2t + 4m = 58$
- B) $t + m = 21$
 $4t + 2m = 58$
- C) $t + m = 58$
 $2t + 4m = 21$
- D) $t + m = 58$
 $4t + 2m = 21$

16

The length of a crystal formation was estimated to be 270 centimeters at the beginning of a study. The length of this crystal formation was estimated to increase at a rate of 9 centimeters per year. What was the estimated length, in centimeters, of this crystal formation 10 years after the study began?

- A) 90
- B) 279
- C) 360
- D) 2,700

17



The perimeter of the pentagon is 80 feet, and each side has length n feet. Which equation gives the perimeter in terms of n ?

- A) $80 = \frac{n}{5}$
- B) $80 = 5n$
- C) $80 = n - 5$
- D) $80 = n + 5$

18

The lengths of the legs of a right triangle are 6 and 9. The length of the hypotenuse is c . Which expression represents the value of c^2 ?

- A) $6^2 + 9^2$
- B) $9^2 - 6^2$
- C) $6^2 - 9^2$
- D) $(6^2) \cdot (9^2)$

19

For the linear function g , the graph of $y = g(x)$ in the xy -plane has a slope of 37 and passes through the point $(0, 6)$. Which of the following equations defines g ?

- A) $g(x) = \frac{37}{6}x$
- B) $g(x) = 6x + \frac{37}{6}$
- C) $g(x) = 37x + 6$
- D) $g(x) = 37x + 37$

20

$$\frac{x}{2} + 9(y - 11) = 25$$

$$\frac{x}{7} - 9(y - 11) = 47$$

The solution to the given system of equations is (x, y) . What is the value of $9x$?

21

A meteorologist created a data set by recording the daily low temperature, to the nearest integer, for each of the 31 days in January 2024 in a town in Ohio. The frequency table summarizes this data set.

Daily low temperature (degrees Fahrenheit)	Frequency
−5 to 4	1
5 to 14	4
15 to 24	4
25 to 34	7
35 to 44	10
45 to 54	4
55 to 64	1

Based on the frequency table, what could be the median of the recorded daily low temperatures, in degrees Fahrenheit?

22

If the equations $-10x + y = 19$ and $10x + y = 19$ are graphed in the xy -plane, at what point (x, y) do the graphs intersect?

- A) $(0, 19)$
- B) $(0, 10)$
- C) $(10, 0)$
- D) $(19, 0)$

23

$$12r + 13s = t$$

The given equation relates the numbers r , s , and t . Which equation correctly expresses s in terms of r and t ?

A) $s = \frac{t - 12r}{13}$

B) $s = \frac{1}{13}t - 12r$

C) $s = \frac{12r - t}{13}$

D) $s = 13t - 12r$

24

$$x^2 - 2x = 38$$

What is one of the solutions to the given equation?

A) $\sqrt{38}$

B) $1 + \sqrt{39}$

C) 39

D) $38 + \sqrt{2}$

25

A sphere has a radius of 3 inches and a density of 76 ounces per cubic inch. What is the mass, in ounces, of the sphere?

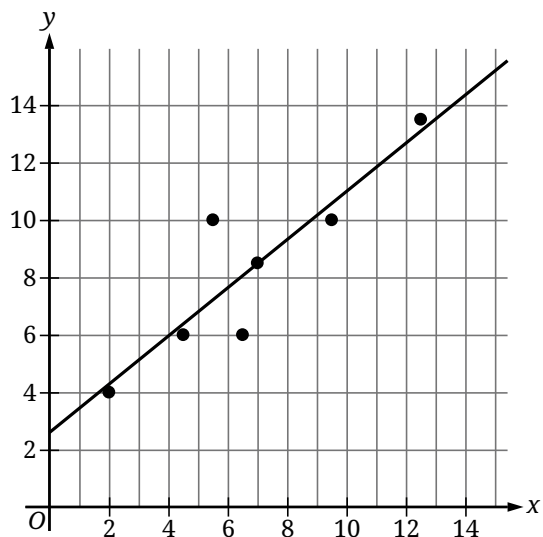
A) $\frac{9\pi}{19}$

B) $\frac{19\pi}{9}$

C) 228π

D) $2,736\pi$

26



The scatterplot shows the relationship between two variables, x and y , for the 7 data points in data set W. A line of best fit for data set W is also shown. This line can be represented by an equation in the form $y = a + cx$, where a and c are constants. Data set V consists of all the data points in data set W as well as the point $(14, 8)$. A line of best fit for data set V can be represented by the equation $y = j + kx$, where j and k are constants. Assuming the lines of best fit are calculated the same way, which of the following statements must be true?

- I. $a > j$
- II. $c > k$

- A) I only
- B) II only
- C) I and II
- D) Neither I nor II

27

$$\frac{7}{9}x^2 - \left(\frac{7}{9}r + s\right)x + rs = 0$$

In the given equation, r and s are positive constants. The product of the solutions to the given equation is rst , where t is a constant. What is the value of t ?

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.**

No Test Material On This Page