

Math

27 QUESTIONS

DIRECTIONS

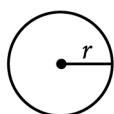
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

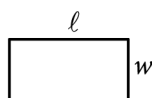
- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

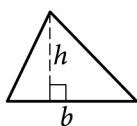


$$A = \pi r^2$$

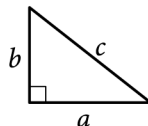
$$C = 2\pi r$$



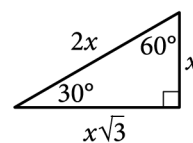
$$A = \ell w$$



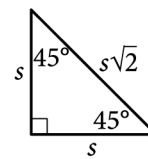
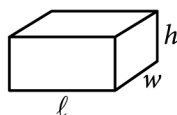
$$A = \frac{1}{2}bh$$



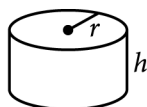
$$c^2 = a^2 + b^2$$



Special Right Triangles



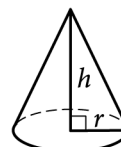
$$V = \ell wh$$



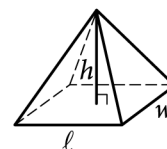
$$V = \pi r^2 h$$



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



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



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

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.

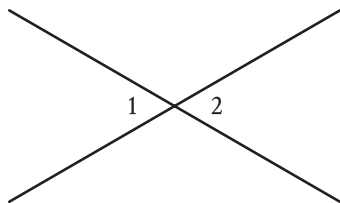
- Once you've written your answer, circle it clearly. You will not receive credit for anything written outside the circle, or for any questions with more than one circled answer.
- If you find **more than one correct answer**, write and circle only one answer.
- Your answer can be up to 5 characters 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

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

2



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°

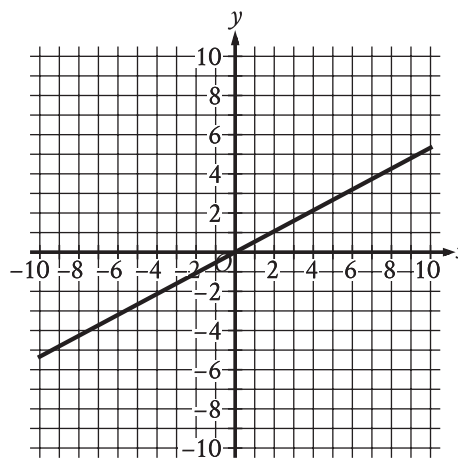
3

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

4

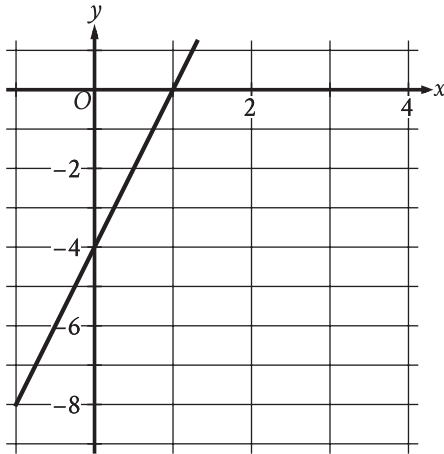
The graph of function f is shown, where $y = f(x)$.



Which of the following describes function f ?

- A) Increasing linear
- B) Decreasing linear
- C) Increasing exponential
- D) Decreasing exponential

5



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) $(0, 4)$

6

$$\begin{aligned}x &= 8 \\x + 3y &= 26\end{aligned}$$

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

7

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?

8

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) $6x^5(-6x^4 + 8x^3 + 1)$

9

The ratio of the length of line segment XY to the length of line segment ZV is 6 to 1. If the length of line segment XY is 102 inches, what is the length, in inches, of line segment ZV ?

- A) 17
- B) 96
- C) 102
- D) 612

10

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

Which equation has the same solution as the given equation?

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

11

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.

12

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

What is a positive solution to the given equation?

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

13

Brian saves $\frac{2}{5}$ 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?

14

A rectangle has an area of 155 square inches. The length of the rectangle is 4 inches less than 7 times the width of the rectangle. What is the width of the rectangle, in inches?

15

4, 10, 18, 4, 4, 5, 6, 5

What is the median of the data set shown?

- A) 4
- B) 5
- C) 7
- D) 14

16

A right circular cylinder has a volume of 432 cubic centimeters. The area of the base of the cylinder is 24 square centimeters. What is the height, in centimeters, of the cylinder?

- A) 18
- B) 24
- C) 216
- D) 10,368

17

$$x^2 = -841$$

How many distinct real solutions does the given equation have?

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

18

Line k is defined by $y = 7x + \frac{1}{8}$. Line j is

perpendicular to line k in the xy -plane. What is the slope of line j ?

- A) -8
- B) $-\frac{1}{7}$
- C) $\frac{1}{8}$
- D) 7

19

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

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) $55p - c = 9$

20

If $4^{8c} = \sqrt[3]{4^7}$, what is the value of c ?

21

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

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

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

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) $\sqrt{34 \cdot 37}$

23

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

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

24

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?

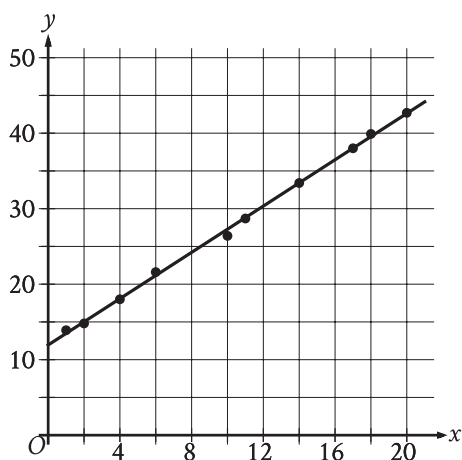
- A) $f(0) = 24$
- B) $f(0) = -24$
- C) $a > b$
- D) $a < b$

25

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 $\overline{AB}$?

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

26



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) $y = 12 + 1.5x$

27

$$48x - 64y = 48y + 24$$

$$ry = \frac{1}{8} - 12x$$

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

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