

Math

27 QUESTIONS

DIRECTIONS

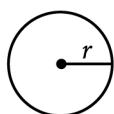
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

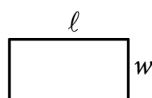
- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

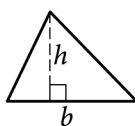


$$A = \pi r^2$$

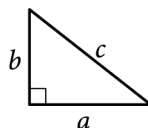
$$C = 2\pi r$$



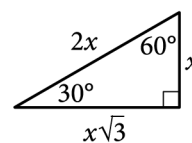
$$A = \ell w$$



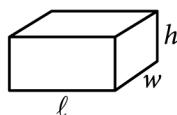
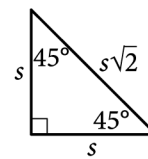
$$A = \frac{1}{2}bh$$



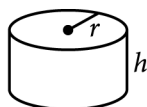
$$c^2 = a^2 + b^2$$



Special Right Triangles



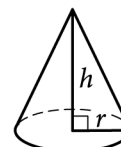
$$V = \ell wh$$



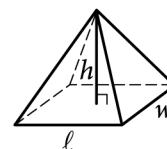
$$V = \pi r^2 h$$



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



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



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

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 lengths of two sides of a triangle are 4 centimeters and 6 centimeters. If the perimeter of the triangle is 18 centimeters, what is the length, in centimeters, of the third side of this triangle?

- A) 2
- B) 8
- C) 10
- D) 24

2

$$16x + 30 = 190$$

Which equation has the same solution as the given equation?

- A) $16x = 30$
- B) $16x = 130$
- C) $16x = 160$
- D) $16x = 190$

3

Ty set a goal to walk at least 24 kilometers every day to prepare for a multiday hike. On a certain day, Ty plans to walk at an average speed of 4 kilometers per hour. What is the minimum number of hours Ty must walk on that day to fulfill the daily goal?

- A) 4
- B) 6
- C) 20
- D) 24

4

The function g is defined by $g(x) = x^2 + 9$. For which value of x is $g(x) = 25$?

- A) 4
- B) 5
- C) 9
- D) 13

5

Which expression is equivalent to $9x^2 + 5x$?

- A) $x(9x + 5)$
- B) $5x(9x + 1)$
- C) $9x(x + 5)$
- D) $x^2(9x + 5)$

6

Each value in the data set shown represents the height, in centimeters, of a plant.

6, 10, 13, 2, 15, 22, 10, 4, 4, 4

What is the mean height, in centimeters, of these plants?

7

A student council group is selling school posters for a fundraiser. They use the function $p(x) = 5x - 220$ to determine their profit $p(x)$, in dollars, for selling x school posters. In order to earn a profit of \$900, how many school posters must they sell?

8

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) $3w + 5r = 112$

9

John paid a total of \$165 for a microscope by making a down payment of \$37 plus p monthly payments of \$16 each. Which of the following equations represents this situation?

- A) $16p - 37 = 165$
- B) $37p - 16 = 165$
- C) $16p + 37 = 165$
- D) $37p + 16 = 165$

10

$$y - 57 = px$$

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

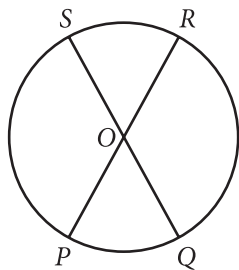
- A) $y = 57x + p$
- B) $y = px + 57$
- C) $y = 57px$
- D) $y = \frac{px}{57}$

11

A company opens an account with an initial balance of \$36,100.00. The account earns interest, and no additional deposits or withdrawals are made. The account balance is given by an exponential function A , where $A(t)$ is the account balance, in dollars, t years after the account is opened. The account balance after 13 years is \$68,071.93. Which equation could define A ?

- A) $A(t) = 36,100.00(1.05)^t$
- B) $A(t) = 31,971.93(1.05)^t$
- C) $A(t) = 31,971.93(0.05)^t$
- D) $A(t) = 36,100.00(0.05)^t$

12



Note: Figure not drawn to scale.

The circle shown has center O , circumference 144π , and diameters $\overline{PR}$ and $\overline{QS}$. The length of arc PS is twice the length of arc PQ . What is the length of arc QR ?

- A) 24π
- B) 48π
- C) 72π
- D) 96π

13

$$\begin{aligned} y &= -2x \\ 3x + y &= 40 \end{aligned}$$

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

14

Data value	Frequency
6	3
7	3
8	8
9	8
10	9
11	11
12	9
13	0
14	6

The frequency table summarizes the 57 data values in a data set. What is the maximum data value in the data set?

15

One leg of a right triangle has a length of 43.2 millimeters. The hypotenuse of the triangle has a length of 196.8 millimeters. What is the length of the other leg of the triangle, in millimeters?

- A) 43.2
- B) 120
- C) 192
- D) 201.5

16

A wire with a length of 106 inches is cut into two parts. One part has a length of x inches, and the other part has a length of y inches. The value of x is 6 more than 4 times the value of y . What is the value of x ?

- A) 25
- B) 28
- C) 56
- D) 86

17

$$f(x) = (x + 6)(x + 5)(x - 4)$$

The function f is given. Which table of values represents $y = f(x) - 3$?

A)

x	y
-6	-9
-5	-8
4	1

B)

x	y
-6	-3
-5	-3
4	-3

C)

x	y
-6	-3
-5	-2
4	7

D)

x	y
-6	3
-5	3
4	3

18

A landscaper uses a hose that puts $88x$ ounces of water in a bucket in $5y$ minutes. Which expression represents the number of ounces of water the hose puts in the bucket in $9y$ minutes at this rate?

- A) $\frac{9x}{440}$
- B) $\frac{440x}{9}$
- C) $\frac{5x}{792}$
- D) $\frac{792x}{5}$

19

$$\begin{aligned} 4x - 9y &= 9y + 5 \\ hy &= 2 + 4x \end{aligned}$$

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

- A) -9
- B) 0
- C) 9
- D) 18

20

13 is $p\%$ of 25. What is the value of p ?

21

$$\sqrt{(x-2)^2} = \sqrt{3x+34}$$

What is the smallest solution to the given equation?

22

Function f is defined by

$f(x) = (x+6)(x+5)(x+1)$. Function g is defined by $g(x) = f(x-1)$. The graph of $y = g(x)$ in the xy -plane has x -intercepts at $(a, 0)$, $(b, 0)$, and $(c, 0)$, where a , b , and c are distinct constants. What is the value of $a + b + c$?

- A) -15
- B) -9
- C) 11
- D) 15

23

For $x > 0$, the function f is defined as follows:

$f(x)$ equals 201% of x

Which of the following could describe this function?

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

24

$$f(x) = 4x^2 + 64x + 262$$

The function g is defined by $g(x) = f(x+5)$. For what value of x does $g(x)$ reach its minimum?

- A) -13
- B) -8
- C) -5
- D) -3

25

One gallon of stain will cover 170 square feet of a surface. A yard has a total fence area of w square feet. Which equation represents the total amount of stain S , in gallons, needed to stain the fence in this yard twice?

- A) $S = \frac{w}{170}$
- B) $S = 170w$
- C) $S = 340w$
- D) $S = \frac{w}{85}$

26

Poll Results

Angel Cruz	483
Terry Smith	320

The table shows the results of a poll. A total of 803 voters selected at random were asked which candidate they would vote for in the upcoming election. According to the poll, if 6,424 people vote in the election, by how many votes would Angel Cruz be expected to win?

- A) 163
- B) 1,304
- C) 3,864
- D) 5,621

27

Right rectangular prism X is similar to right rectangular prism Y. The surface area of right rectangular prism X is 58 square centimeters (cm^2), and the surface area of right rectangular prism Y is $1,450 \text{ cm}^2$. The volume of right rectangular prism Y is $1,250 \text{ cm}^3$. What is the sum of the volumes, in cm^3 , of right rectangular prism X and right rectangular prism Y?

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.**