

Math

27 QUESTIONS

DIRECTIONS

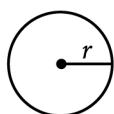
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

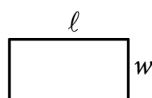
- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

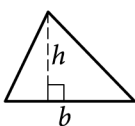


$$A = \pi r^2$$

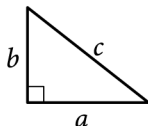
$$C = 2\pi r$$



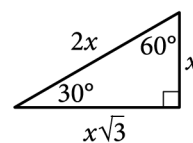
$$A = \ell w$$



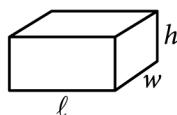
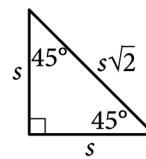
$$A = \frac{1}{2}bh$$



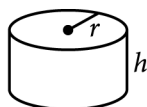
$$c^2 = a^2 + b^2$$



Special Right Triangles



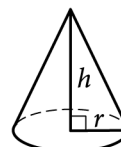
$$V = \ell wh$$



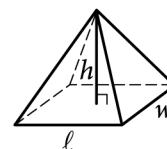
$$V = \pi r^2 h$$



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



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



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

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

A total of 165 people contributed to a charity event as either a donor or a volunteer. 130 people contributed as a donor. How many people contributed as a volunteer?

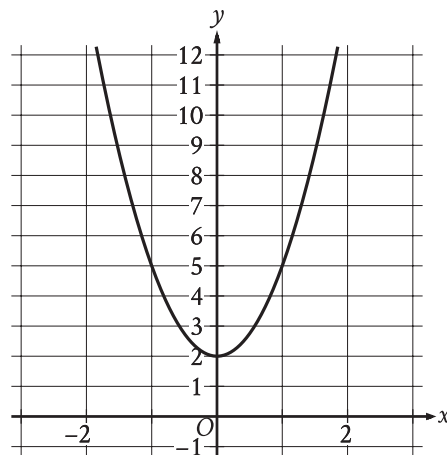
- A) 35
- B) 130
- C) 165
- D) 330

2

There are 250 trees in a park. Of these trees, 6% are birch trees. How many birch trees are in the park?

- A) 6
- B) 15
- C) 75
- D) 244

3



The graph of the quadratic function $y = f(x)$ is shown. What is the vertex of the graph?

- A) $(0, -2)$
- B) $(0, -3)$
- C) $(0, 2)$
- D) $(0, 3)$

4

The number of raccoons in a 131-square-mile area is estimated to be 2,358. What is the estimated population density, in raccoons per square mile, of this area?

- A) 18
- B) 131
- C) 149
- D) 2,376

5

 $-11, -9, 26$

A data set of three numbers is shown. If a number from this data set is selected at random, what is the probability of selecting a positive number?

- A) 0
- B) $\frac{1}{3}$
- C) $\frac{2}{3}$
- D) 1

6

$$f(x) = 45x + 600$$

The function f gives the monthly fee $f(x)$, in dollars, a facility charges to keep x crates in storage. What is the monthly fee, in dollars, the facility charges to keep 50 crates in storage?

7

The function f is defined by $f(x) = 5\left(\frac{1}{4} - x\right)^2 + \frac{11}{4}$.

What is the value of $f\left(\frac{1}{4}\right)$?

8

If $8x = 6$, what is the value of $72x$?

- A) 3
- B) 15
- C) 54
- D) 57

9

Which expression is equivalent to $23x^3 + 2x^2 + 9x$?

- A) $23x(x^2 + 2x + 9)$
- B) $9x(23x^3 + 2x^2 + 1)$
- C) $x(23x^2 + 2x + 9)$
- D) $34(x^3 + x^2 + x)$

10

Which expression is equivalent to $(9x^3 + 5x + 7) + (6x^3 + 5x^2 - 5)$?

- A) $15x^6 + 5x^2 - 5x - 35$
- B) $15x^3 + 10x^2 + 2$
- C) $15x^6 + 5x^2 + 5x + 2$
- D) $15x^3 + 5x^2 + 5x + 2$

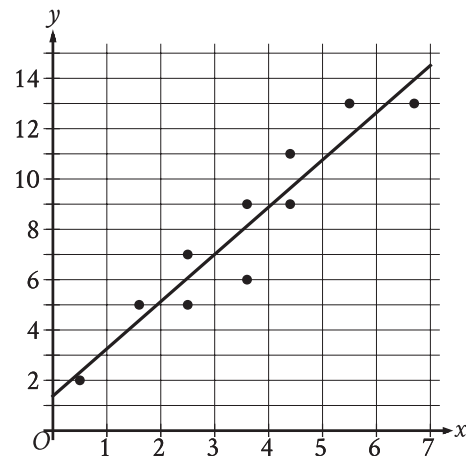
11

At a state fair, attendees can win tokens that are worth a different number of points depending on the shape. One attendee won S square tokens and C circle tokens worth a total of 1,120 points. The equation $80S + 90C = 1,120$ represents this situation. How many more points is a circle token worth than a square token?

- A) 950
- B) 90
- C) 80
- D) 10

12

In the given scatterplot, a line of best fit for the data is shown.



Which of the following is closest to the slope of the line of best fit shown?

- A) 0
- B) $\frac{1}{2}$
- C) 1
- D) 2

13

A circle has a radius of 2.1 inches. The area of the circle is $b\pi$ square inches, where b is a constant. What is the value of b ?

14

In triangle XYZ , angle Y is a right angle, point P lies on $\overline{XZ}$, and point Q lies on $\overline{YZ}$ such that $\overline{PQ}$ is parallel to $\overline{XY}$. If the measure of angle XZY is 63° , what is the measure, in degrees, of angle XPQ ?

15

An investment account was opened with an initial value of \$890. The value of the account doubled every 10 years. Which equation represents the value of the account $M(t)$, in dollars, t years after the account was opened?

A) $M(t) = 890\left(\frac{1}{2}\right)^{\frac{t}{10}}$

B) $M(t) = 890\left(\frac{1}{10}\right)^{\frac{t}{2}}$

C) $M(t) = 890(2)^{\frac{t}{10}}$

D) $M(t) = 890(10)^{\frac{t}{2}}$

16

$$y < x$$

$$x < 22$$

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

A)

x	y
19	18
20	19
21	20

B)

x	y
19	20
20	21
21	22

C)

x	y
23	22
24	23
25	24

D)

x	y
23	24
24	25
25	26

17

Which expression is equivalent to $\frac{h^{15}q^7}{h^5q^{21}}$,

where $h > 0$ and $q > 0$?

A) $\frac{h^{10}}{q^{14}}$

B) $\frac{h^3}{q^3}$

C) $h^{10}q^{14}$

D) h^3q^3

18

$$\begin{aligned} 3y &= 4x + 17 \\ -3y &= 9x - 23 \end{aligned}$$

The solution to the given system of equations is (x, y) . What is the value of $39x$?

A) -18

B) -6

C) 6

D) 18

19

$$h(t) = -16t^2 + b$$

The function h estimates an object's height, in feet, above the ground t seconds after the object is dropped, where b is a constant. The function estimates that the object is 3,364 feet above the ground when it is dropped at $t = 0$. Approximately how many seconds after being dropped does the function estimate the object will hit the ground?

A) 7.25

B) 14.50

C) 105.13

D) 210.25

20

$$2x^2 - 8x - 7 = 0$$

One solution to the given equation can be written as

$$\frac{8 - \sqrt{k}}{4}, \text{ where } k \text{ is a constant. What is the value}$$

of k ?

21

A line intersects two parallel lines, forming four acute angles and four obtuse angles. The measure of one of the acute angles is $(9x - 560)^\circ$. The sum of the measures of one of the acute angles and three of the obtuse angles is $(-18x + w)^\circ$. What is the value of w ?

22

x	$f(x)$
-4	0
$-\frac{19}{5}$	1
$-\frac{18}{5}$	2

For the linear function f , the table shows three values of x and their corresponding values of $f(x)$. If $h(x) = f(x) - 13$, which equation defines h ?

- A) $h(x) = 5x - 4$
- B) $h(x) = 5x + 7$
- C) $h(x) = 5x + 9$
- D) $h(x) = 5x + 20$

23

The linear function g is defined by $g(x) = b - 15x$, where b is a constant. If $g(c + 7) = \frac{c}{4}$, where c is a constant, which of the following expressions represents the value of b ?

- A) $\frac{15c}{4}$
- B) $\frac{19c}{4} + 7$
- C) $\frac{61c}{4} + 105$
- D) $15c + 105$

24

In triangle XYZ , angle Z is a right angle and the length of $\overline{YZ}$ is 24 units. If $\tan X = \frac{12}{35}$, what is the perimeter, in units, of triangle XYZ ?

- A) 188
- B) 168
- C) 84
- D) 71

25

$$x^2 + 14x + y^2 = 6y + 109$$

In the xy -plane, the graph of the given equation is a circle. What is the length of the circle's radius?

- A) $\sqrt{109}$
- B) $\sqrt{149}$
- C) $\sqrt{167}$
- D) $\sqrt{341}$

26

The speed of a vehicle is increasing at a rate of 7.3 meters per second squared. What is this rate, in **miles per minute squared**, rounded to the nearest tenth? (Use 1 mile = 1,609 meters.)

- A) 0.3
- B) 16.3
- C) 195.8
- D) 220.4

27

$$y = -2.5$$

$$y = x^2 + 8x + k$$

In the given system of equations, k is a positive integer constant. The system has no real solutions. What is the least possible value of k ?

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