

Math

27 QUESTIONS

DIRECTIONS

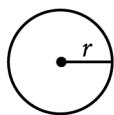
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

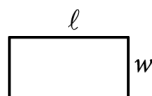
- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

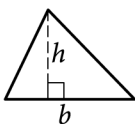


$$A = \pi r^2$$

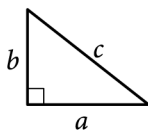
$$C = 2\pi r$$



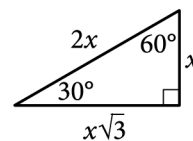
$$A = \ell w$$



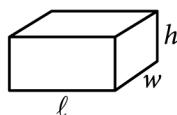
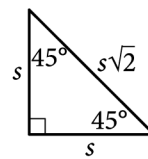
$$A = \frac{1}{2}bh$$



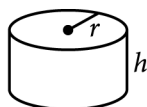
$$c^2 = a^2 + b^2$$



Special Right Triangles



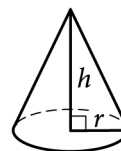
$$V = \ell wh$$



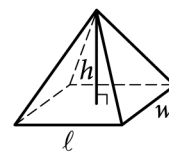
$$V = \pi r^2 h$$



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



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



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

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

What is 10% of 470?

- A) 37
- B) 47
- C) 423
- D) 460

2

$$4x + 6 = 18$$

Which equation has the same solution as the given equation?

- A) $4x = 108$
- B) $4x = 24$
- C) $4x = 12$
- D) $4x = 3$

3

The total cost, in dollars, to rent a surfboard consists of a \$25 service fee and a \$10 per hour rental fee. A person rents a surfboard for t hours and intends to spend a maximum of \$75 to rent the surfboard. Which inequality represents this situation?

- A) $10t \leq 75$
- B) $10 + 25t \leq 75$
- C) $25t \leq 75$
- D) $25 + 10t \leq 75$

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

Each face of a fair 14-sided die is labeled with a number from 1 through 14, with a different number appearing on each face. If the die is rolled one time, what is the probability of rolling a 2?

- A) $\frac{1}{14}$
- B) $\frac{2}{14}$
- C) $\frac{12}{14}$
- D) $\frac{13}{14}$

6

A printer produces posters at a constant rate of 42 posters per minute. At what rate, in posters per hour, does the printer produce the posters?

7

The function f is defined by the equation $f(x) = 7x + 2$. What is the value of $f(x)$ when $x = 4$?

8

A teacher is creating an assignment worth 70 points. The assignment will consist of questions worth 1 point and questions worth 3 points. Which equation represents this situation, where x represents the number of 1-point questions and y represents the number of 3-point questions?

- A) $4xy = 70$
- B) $4(x + y) = 70$
- C) $3x + y = 70$
- D) $x + 3y = 70$

9

Right triangles LMN and PQR are similar, where L and M correspond to P and Q , respectively. Angle M has a measure of 53° . What is the measure of angle Q ?

- A) 37°
- B) 53°
- C) 127°
- D) 143°

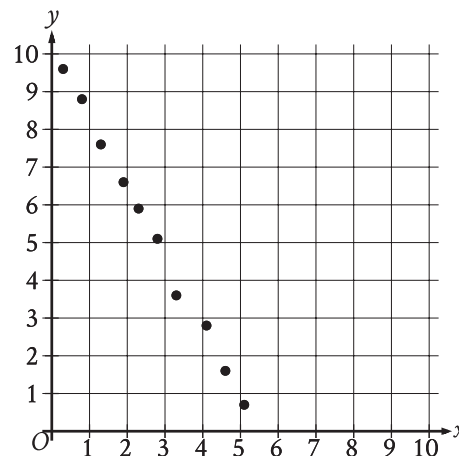
10

$$\begin{aligned} y &= -3x \\ 4x + y &= 15 \end{aligned}$$

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

- A) 1
- B) 5
- C) 15
- D) 45

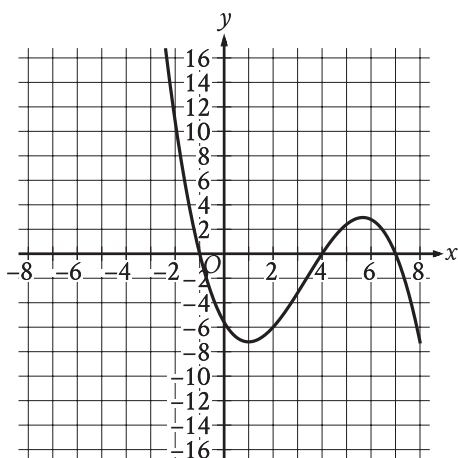
11



Which of the following equations is the most appropriate linear model for the data shown in the scatterplot?

- A) $y = -1.9x - 10.1$
- B) $y = -1.9x + 10.1$
- C) $y = 1.9x - 10.1$
- D) $y = 1.9x + 10.1$

12



The graph of $y = f(x)$ is shown, where the function f is defined by $f(x) = ax^3 + bx^2 + cx + d$ and a , b , c , and d are constants. For how many values of x does $f(x) = 0$?

- A) One
- B) Two
- C) Three
- D) Four

13

Vivian bought party hats and cupcakes for \$71. Each package of party hats cost \$3, and each cupcake cost \$1. If Vivian bought 10 packages of party hats, how many cupcakes did she buy?

14

$$z^2 + 10z - 24 = 0$$

What is one of the solutions to the given equation?

15

Bacteria are growing in a liquid growth medium. There were 300,000 cells per milliliter during an initial observation. The number of cells per milliliter doubles every 3 hours. How many cells per milliliter will there be 15 hours after the initial observation?

- A) 1,500,000
- B) 2,400,000
- C) 4,500,000
- D) 9,600,000

16

Which expression is equivalent to $6x^8y^2 + 12x^2y^2$?

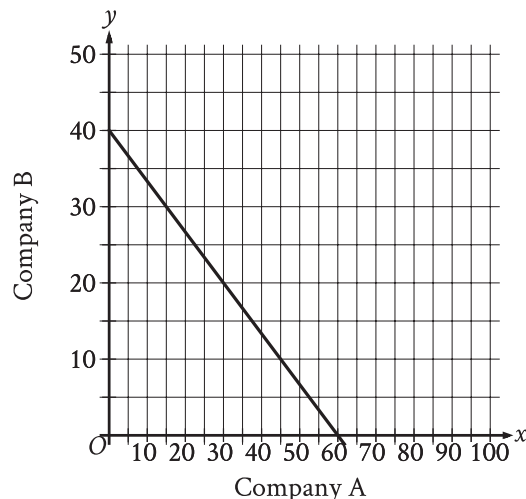
- A) $6x^2y^2(2x^6)$
- B) $6x^2y^2(x^4)$
- C) $6x^2y^2(x^6 + 2)$
- D) $6x^2y^2(x^4 + 2)$

17

A neighborhood consists of a 2-hectare park and a 35-hectare residential area. The total number of trees in the neighborhood is 3,934. The equation $2x + 35y = 3,934$ represents this situation. Which of the following is the best interpretation of x in this context?

- A) The average number of trees per hectare in the park
- B) The average number of trees per hectare in the residential area
- C) The total number of trees in the park
- D) The total number of trees in the residential area

18



The graph shows the relationship between the number of shares of stock from Company A, x , and the number of shares of stock from Company B, y , that Simone can purchase. Which equation could represent this relationship?

- A) $y = 8x + 12$
- B) $8x + 12y = 480$
- C) $y = 12x + 8$
- D) $12x + 8y = 480$

19

Circle A has a radius of $3n$ and circle B has a radius of $129n$, where n is a positive constant. The area of circle B is how many times the area of circle A?

- A) 43
- B) 86
- C) 129
- D) 1,849

20

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?

21

A circle in the xy -plane has a diameter with endpoints $(2, 4)$ and $(2, 14)$. An equation of this circle is $(x - 2)^2 + (y - 9)^2 = r^2$, where r is a positive constant. What is the value of r ?

22

The measure of angle R is $\frac{2\pi}{3}$ radians. The measure of angle T is $\frac{5\pi}{12}$ radians greater than the measure of angle R . What is the measure of angle T , in degrees?

- A) 75
- B) 120
- C) 195
- D) 390

23

A certain town has an area of 4.36 square miles. What is the area, in square yards, of this town? (1 mile = 1,760 yards)

- A) 404
- B) 7,674
- C) 710,459
- D) 13,505,536

24

x	y
18	130
23	160
26	178

For line h , the table shows three values of x and their corresponding values of y . Line k is the result of translating line h down 5 units in the xy -plane. What is the x -intercept of line k ?

- A) $\left(-\frac{26}{3}, 0\right)$
- B) $\left(-\frac{9}{2}, 0\right)$
- C) $\left(-\frac{11}{3}, 0\right)$
- D) $\left(-\frac{17}{6}, 0\right)$

25

In the xy -plane, the graph of the equation $y = -x^2 + 9x - 100$ intersects the line $y = c$ at exactly one point. What is the value of c ?

- A) $-\frac{481}{4}$
- B) -100
- C) $-\frac{319}{4}$
- D) $-\frac{9}{2}$

26

$$\begin{aligned}2x + 3y &= 7 \\ 10x + 15y &= 35\end{aligned}$$

For each real number r , which of the following points lies on the graph of each equation in the xy -plane for the given system?

- A) $\left(\frac{r}{5} + 7, -\frac{r}{5} + 35\right)$
- B) $\left(-\frac{3r}{2} + \frac{7}{2}, r\right)$
- C) $\left(r, \frac{2r}{3} + \frac{7}{3}\right)$
- D) $\left(r, -\frac{3r}{2} + \frac{7}{2}\right)$

27

The perimeter of an equilateral triangle is 624 centimeters. The height of this triangle is $k\sqrt{3}$ centimeters, where k is a constant. What is the 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