

Math

27 QUESTIONS

DIRECTIONS

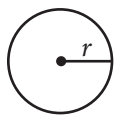
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

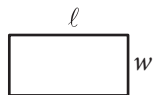
- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

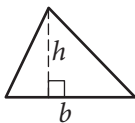


$$A = \pi r^2$$

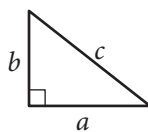
$$C = 2\pi r$$



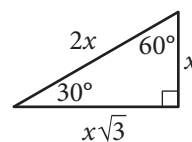
$$A = \ell w$$



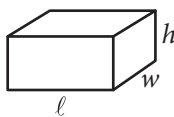
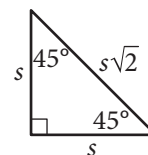
$$A = \frac{1}{2}bh$$



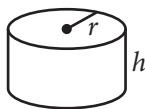
$$c^2 = a^2 + b^2$$



Special Right Triangles



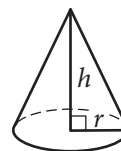
$$V = \ell wh$$



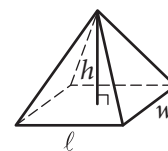
$$V = \pi r^2 h$$



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



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



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

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 vehicle travels 9 feet per second. How far, in feet, does the vehicle travel in 7 seconds?

- A) -9
- B) -2
- C) 7
- D) 63

2

Square X has a side length of 24 centimeters. The perimeter of square Y is 2 times the perimeter of square X. What is the length, in centimeters, of one side of square Y?

- A) 48
- B) 26
- C) 22
- D) 12

3

There are 45 business owners in a certain shopping mall. 100% of these business owners attended the first owners' meeting of the year. How many of these business owners attended the meeting?

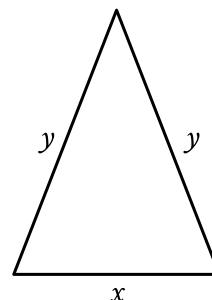
- A) 0
- B) 45
- C) 450
- D) 4,500

4

Which expression is equivalent to $10x + 2x + 10y + 7y + 3$?

- A) $32xy$
- B) $29xy + 3$
- C) $20x + 9y + 3$
- D) $12x + 17y + 3$

5



Note: Figure not drawn to scale.

The triangle shown has one side with a length of x inches and two sides each with a length of y inches. The perimeter of the triangle is 23 inches. Which equation represents this situation?

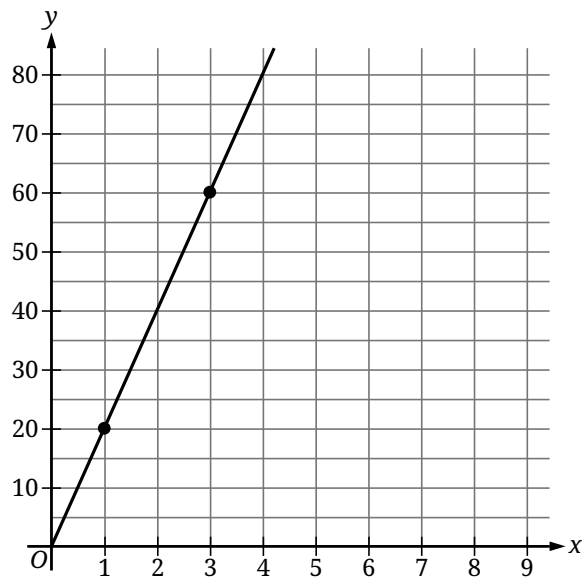
- A) $x + y = 23$
- B) $x + 2y = 23$
- C) $2x + y = 23$
- D) $2x + 2y = 23$

6

$$1.3x = 1,300$$

What value of x is the solution to the given equation?

7



The graph shows the relationship between two variables, x and y . If the value of x is 1, what is the value of y , to the nearest integer?

8

The function f is defined by $f(x) = \frac{1}{7}x - 7$. What is the value of $f(70)$?

- A) 3
- B) 4
- C) 9
- D) 17

9

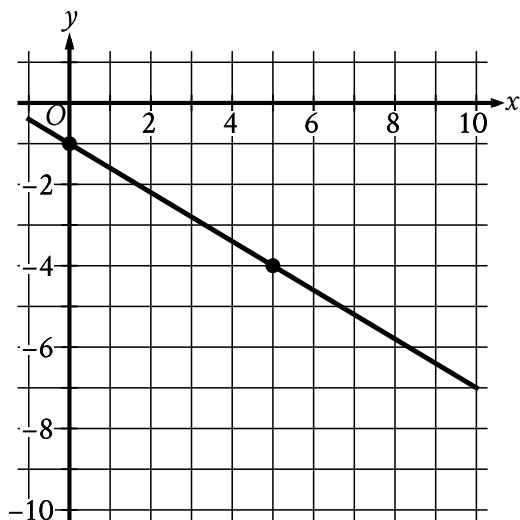
Data set A: 8, 8, 8, 9, 9, 10, 11, 11, 12, 12, 12

Data set B: 8, 9, 9, 10, 10, 10, 10, 10, 11, 11, 12

Data set A and data set B each have 11 values. Which of the following statements best compares the median of data set A and the median of data set B?

- A) The median of data set A is greater than the median of data set B.
- B) The median of data set A is less than the median of data set B.
- C) The medians of data sets A and B are equal.
- D) There is not enough information to compare the medians.

10



The graph of the linear function f is shown, where $y = f(x)$. Which equation defines f ?

- A) $f(x) = \frac{3}{5}x - 1$
- B) $f(x) = \frac{5}{3}x - 1$
- C) $f(x) = -\frac{3}{5}x - 1$
- D) $f(x) = -\frac{5}{3}x - 1$

11

Which expression is equivalent to $114t^3 - 26t^2u$?

- A) $2t(57t^2 - 13u)$
- B) $2t^2(57t - 13u)$
- C) $2tu(57t^2 - 13)$
- D) $2t^2u(57t - 13)$

12

To win a skills challenge, a competitor needs to score at least 90 total points from two rounds. Completed tasks in the first round are worth 5 points each, and completed tasks in the second round are worth 6 points each. Which inequality models this situation, where x is the number of completed tasks in the first round and y is the number of completed tasks in the second round?

- A) $x + y \leq 90$
- B) $5x + 6y \geq 90$
- C) $6x + y \geq 90$
- D) $6x + 5y \leq 90$

13

$$3x + 8y = 68$$

$$y = 7$$

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

14

A total of 50 people joined a gym during a promotion and were given a free T-shirt in a choice of 4 colors. The table shows the number of people who chose each color of T-shirt.

Color of T-shirt	Number of people
White	14
Red	24
Blue	3
Green	9
Total	50

If one of these people is selected at random, what is the probability of selecting a person who chose a green T-shirt? (Express your answer as a decimal or fraction, not as a percent.)

15

In $\triangle DEF$, the measure of $\angle D$ is 163° . Which of the following could be the measure, in degrees, of $\angle E$?

- A) 16
- B) 18
- C) 90
- D) 164

16

A plant's stem will grow at a constant rate from a length of 3 inches to a length of 7 inches. The equation $0.6t + 3 = 7$ describes this situation, where t is the number of weeks it will take for the plant's stem to reach a length of 7 inches. Which of the following is the best interpretation of 0.6 in this context?

- A) The time, in weeks, it will take the plant's stem to grow 1 inch
- B) The length, in inches, the plant's stem will grow each week
- C) The time, in weeks, it will take the plant's stem to reach a length of 7 inches
- D) The length, in inches, the plant's stem will grow in 7 weeks

17

A right square pyramid has a base with side lengths of 13 centimeters. The height of the pyramid is 15 centimeters. What is the volume, in cubic centimeters, of this pyramid?

- A) 65
- B) 130
- C) 845
- D) 2,535

18

A company takes out a loan where a bank starts adding interest to the balance of the loan 1 year after the loan is taken out. The function $f(x) = 53,000(1.02)^{x-1}$ gives the balance of the loan $f(x)$, in dollars, x years after the loan is taken out, where $x \geq 1$, if no payments are made to the loan. What is the best interpretation of 53,000 in this context?

- A) The balance of the loan, in dollars, 1 year after the loan is taken out
- B) 2% less than the balance of the loan, in dollars, 1 year after the loan is taken out
- C) The balance of the loan, in dollars, 1 year after the bank starts adding interest to the loan
- D) 2% more than the balance of the loan, in dollars, 1 year after the bank starts adding interest to the loan

19

$$g(x) = \frac{1}{8}(3)^x$$

If the given function g is graphed in the xy -plane, where $y = g(x)$, what is the y -intercept of the graph?

- A) $(0, 0)$
- B) $\left(0, \frac{1}{8}\right)$
- C) $\left(0, \frac{3}{8}\right)$
- D) $(0, 3)$

20

A polar bear weighs 94 stones. What is the weight of the polar bear, in **kilograms**? (Use 1 stone = 14 pounds and 1 kilogram = 2.2 pounds.)

21

A researcher is investigating the properties of 175 chemical compounds by finding the boiling point of each chemical compound. The mean boiling point of all 175 chemical compounds is 184 degrees Celsius. The researcher classifies each of these chemical compounds as either Type A or Type B. Of the 175 chemical compounds, 50 were classified as Type A, and these 50 chemical compounds have a mean boiling point of 339 degrees Celsius. The remaining 125 chemical compounds were classified as Type B. What is the mean boiling point, in degrees Celsius, of the 125 chemical compounds classified as Type B?

22

The gas mileage of a certain car is 25 miles per gallon when driven on the highway. If the car begins with 15 gallons of gas in the tank, which function predicts the amount of gas remaining in the tank, $f(d)$, after the car is driven d miles on the highway?

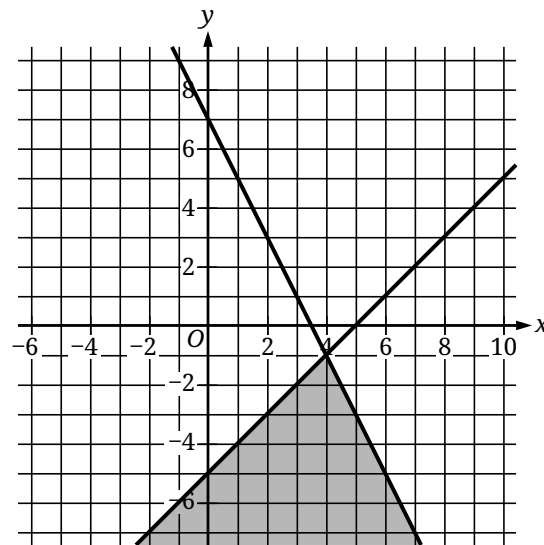
A) $f(d) = \frac{d}{25} - 15$

B) $f(d) = d - 15$

C) $f(d) = 15 - \frac{d}{25}$

D) $f(d) = 15 - d$

23



The graphs of $y = -2x + 7$ and $y = x - 5$ are shown. Point P (not shown) has coordinates $(4, -5)$ and lies in the shaded region. The coordinates of P satisfy which of the following inequalities?

I. $y < -2x + 7$

II. $y > x - 5$

A) I only

B) II only

C) I and II

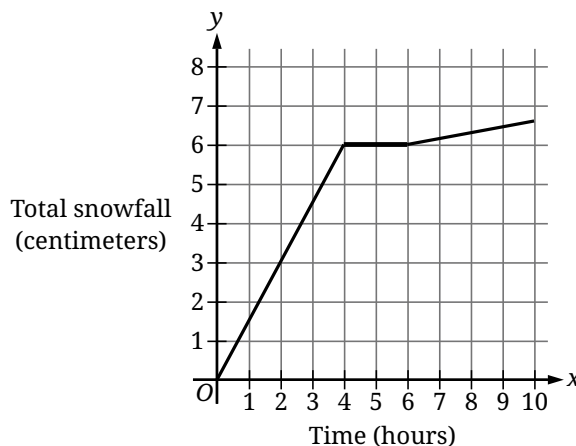
D) Neither I nor II

24

In the xy -plane, line k passes through the points $(5, 0)$ and $(0, 7)$. Which of the following is an equation of line k ?

- A) $7x + 5y = 35$
- B) $5x + 7y = 35$
- C) $7x - 5y = 35$
- D) $5x - 7y = 35$

25



The graph shows the total amount of snowfall y , in centimeters, from the start of a 10-hour period in Anchorage, Alaska, where x is the number of hours after the start of the period. Which of the following statements about the snowfall during this time period is true?

- A) The rate of snowfall was 6 centimeters per hour between $x = 4$ and $x = 6$.
- B) The rate of snowfall was the greatest between $x = 6$ and $x = 10$.
- C) The rate of snowfall increased between $x = 0$ and $x = 4$.
- D) The rate of snowfall was 0 centimeters per hour between $x = 4$ and $x = 6$.

26

A square drawing has a side length of 45 inches, and 1 inch on the drawing represents an actual measurement of 13 feet. A smaller version of the same drawing is printed as a square with the side length 85% shorter than the side length of the previous drawing. On the smaller drawing, which of the following is closest to the actual measurement, in feet, represented by 1 inch?

- A) 1.95
- B) 7.03
- C) 38.25
- D) 86.67

27

A right rectangular prism has a height of 29 units and a volume of 5,568 cubic units. The length of the base of the prism is 75% of the width of the base of the prism. What is the perimeter of the base of the prism, in units?

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.**