

Math

27 QUESTIONS

DIRECTIONS

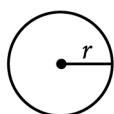
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

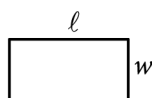
- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

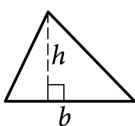


$$A = \pi r^2$$

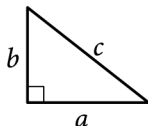
$$C = 2\pi r$$



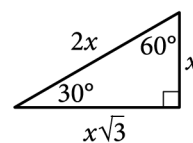
$$A = \ell w$$



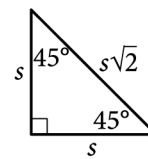
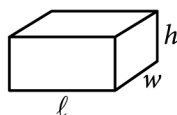
$$A = \frac{1}{2}bh$$



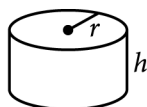
$$c^2 = a^2 + b^2$$



Special Right Triangles



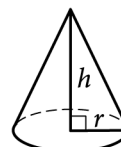
$$V = \ell wh$$



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



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



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



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

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.

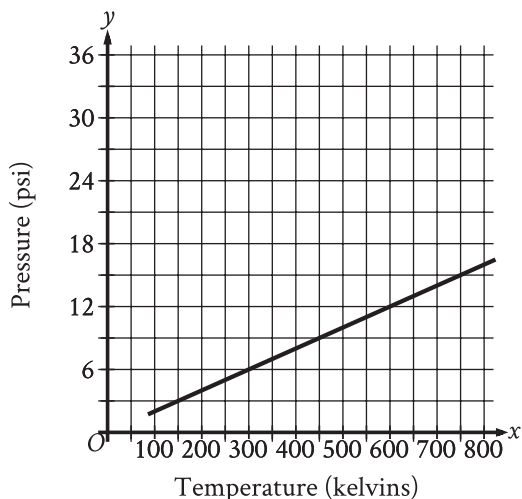
1

What is 20% of 440?

- A) 44
- B) 88
- C) 880
- D) 1,760

2

Argon is placed inside a container with a constant volume. The graph shows the estimated pressure y , in pounds per square inch (psi), of the argon when its temperature is x kelvins.



What is the estimated pressure of the argon, in psi, when the temperature is 600 kelvins?

- A) 6
- B) 12
- C) 300
- D) 600

3

The function f is defined by $f(x) = 4x - 3$. What is the value of $f(10)$?

- A) -30
- B) 37
- C) 40
- D) 43

4

Which expression is equivalent to $16x^3y^2 + 14xy$?

- A) $2xy(8xy + 7)$
- B) $2xy(8x^2y + 7)$
- C) $14xy(2x^2y + 1)$
- D) $14xy(8x^2y + 1)$

5

A veterinarian recommends that each day a certain rabbit should eat 25 calories per pound of the rabbit's weight, plus an additional 11 calories. Which equation represents this situation, where c is the total number of calories the veterinarian recommends the rabbit should eat each day if the rabbit's weight is x pounds?

- A) $c = 25x$
- B) $c = 36x$
- C) $c = 11x + 25$
- D) $c = 25x + 11$

6

If $6n = 12$, what is the value of $n + 4$?

7

$$(d - 30)(d + 30) - 7 = -7$$

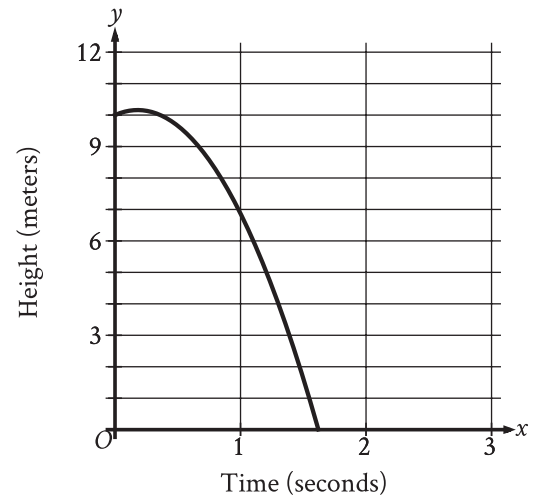
What is a solution to the given equation?

8

Line r in the xy -plane has a slope of 4 and passes through the point $(0, 6)$. Which equation defines line r ?

- A) $y = -6x + 4$
- B) $y = 6x + 4$
- C) $y = 4x - 6$
- D) $y = 4x + 6$

9



A competitive diver dives from a platform into the water. The graph shown gives the height above the water y , in meters, of the diver x seconds after diving from the platform. What is the best interpretation of the x -intercept of the graph?

- A) The diver reaches a maximum height above the water at 1.6 seconds.
- B) The diver hits the water at 1.6 seconds.
- C) The diver reaches a maximum height above the water at 0.2 seconds.
- D) The diver hits the water at 0.2 seconds.

10

The kinetic energy, in joules, of an object with mass 9 kilograms traveling at a speed of v meters per

second is given by the function K , where

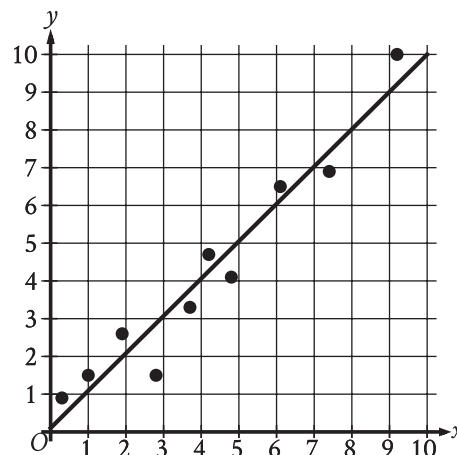
$$K(v) = \frac{9}{2}v^2. \text{ Which of the following is the best}$$

interpretation of $K(34) = 5,202$ in this context?

- A) The object traveling at 34 meters per second has a kinetic energy of 5,202 joules.
- B) The object traveling at 340 meters per second has a kinetic energy of 5,202 joules.
- C) The object traveling at 5,202 meters per second has a kinetic energy of 34 joules.
- D) The object traveling at 23,409 meters per second has a kinetic energy of 34 joules.

11

The scatterplot shows the relationship between two variables x and y . A line of best fit for the data is also shown.



For how many of the 10 data points is the actual y -value greater than the y -value predicted by the line of best fit?

- A) 3
- B) 4
- C) 6
- D) 7

12

At a movie theater, there are a total of 350 customers. Each customer is located in either theater A, theater B, or theater C. If one of these customers is selected at random, the probability of selecting a customer who is located in theater A is 0.48, and the probability of selecting a customer who is located in theater B is 0.24. How many customers are located in theater C?

- A) 28
- B) 40
- C) 84
- D) 98

13

What is the slope of the graph of

$$y = \frac{1}{3}(29x + 10) + 5x \text{ in the } xy\text{-plane?}$$

14

The length of each edge of a box is 29 inches. Each side of the box is in the shape of a square. The box does not have a lid. What is the exterior surface area, in square inches, of this box without a lid?

15

Five *Eretmochelys imbricata*, a type of sea turtle, each have a nest. The table shows an original data set of the number of eggs that each turtle laid in its nest.

Nest	Number of eggs
A	149
B	144
C	148
D	136
E	139

A sixth nest with 121 eggs is added to create a new data set. Which of the following correctly compares the means of the two data sets?

- A) The mean of the original data set is greater than the mean of the new data set.
- B) The mean of the original data set is less than the mean of the new data set.
- C) The means of both data sets are equal.
- D) There is not enough information to compare the means.

16

In $\triangle RST$, the measure of $\angle R$ is 63° . Which of the following could be the measure, in degrees, of $\angle S$?

- A) 116
- B) 118
- C) 126
- D) 180

17

Which expression is equivalent to $(8x^3 + 8) - (x^3 - 2)$?

- A) $8x^3 + 6$
- B) $7x^3 + 10$
- C) $8x^3 + 10$
- D) $7x^3 + 6$

18

If $4\sqrt{2x} = 16$, what is the value of $6x$?

- A) 24
- B) 48
- C) 72
- D) 96

19

$$2x - y > 883$$

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

A)

x	y
440	0
441	-2
442	-4

B)

x	y
440	0
442	-2
441	-4

C)

x	y
442	0
440	-2
441	-4

D)

x	y
442	0
441	-2
440	-4

20

$$5y = 10x + 11$$

$$-5y = 5x - 21$$

The solution to the given system of equations is (x, y) . What is the value of $30x$?

21

A rectangle is inscribed in a circle, such that each vertex of the rectangle lies on the circumference of the circle. The diagonal of the rectangle is twice the length of the shortest side of the rectangle. The area of the rectangle is $1,089\sqrt{3}$ square units. What is the length, in units, of the diameter of the circle?

22

Rectangles $ABCD$ and $EFGH$ are similar. The length of each side of $EFGH$ is 6 times the length of the corresponding side of $ABCD$. The area of $ABCD$ is 54 square units. What is the area, in square units, of $EFGH$?

- A) 9
- B) 36
- C) 324
- D) 1,944

23

Which expression is equivalent to $\frac{42a}{k} + 42ak$, where $k > 0$?

- A) $\frac{84a}{k}$
- B) $\frac{84ak^2}{k}$
- C) $\frac{42a(k+1)}{k}$
- D) $\frac{42a(k^2+1)}{k}$

24

Which quadratic equation has no real solutions?

- A) $x^2 + 14x - 49 = 0$
- B) $x^2 - 14x + 49 = 0$
- C) $5x^2 - 14x - 49 = 0$
- D) $5x^2 - 14x + 49 = 0$

25

$$P(t) = 260(1.04)^{\left(\frac{6}{4}\right)t}$$

The function P models the population, in thousands, of a certain city t years after 2003. According to the model, the population is predicted to increase by 4% every n months. What is the value of n ?

- A) 8
- B) 12
- C) 18
- D) 72

26

A circle in the xy -plane has its center at $(-1, 1)$. Line t is tangent to this circle at the point $(5, -4)$. Which of the following points also lies on line t ?

- A) $\left(0, \frac{6}{5}\right)$
- B) $(4, 7)$
- C) $(10, 2)$
- D) $(11, 1)$

27

For an electric field passing through a flat surface perpendicular to it, the electric flux of the electric field through the surface is the product of the electric field's strength and the area of the surface. A certain flat surface consists of two adjacent squares, where the side length, in meters, of the larger square is 3 times the side length, in meters, of the smaller square. An electric field with strength 29.00 volts per meter passes uniformly through this surface, which is perpendicular to the electric field. If the total electric flux of the electric field through this surface is 4,640 volts $\cdot$ meters, what is the electric flux, in volts $\cdot$ meters, of the electric field through the larger square?

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