Math

27 QUESTIONS

DIRECTIONS

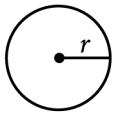
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

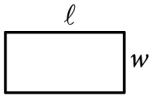
Unless otherwise indicated:

- 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.

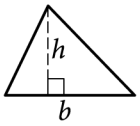
REFERENCE



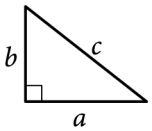
$A = \pi r^2$
$C = 2\pi r$



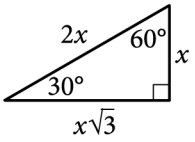
$A = \ell w$

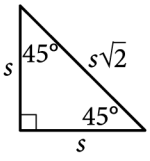


$A = \frac{1}{2}bh$

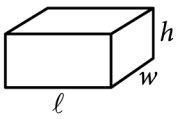


$c^2 = a^2 + b^2$

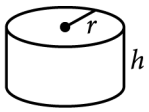




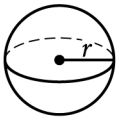
Special Right Triangles



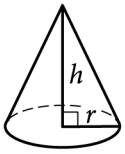
$V = \ell wh$



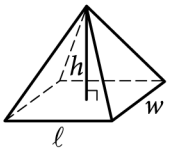
$V = \pi r^2 h$



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



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



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

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.

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CONTINUE

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 (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.

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CONTINUE

1

How many teaspoons are equivalent to 44 tablespoons? (3 teaspoons = 1 tablespoon)

A) 47
B) 88
C) 132
D) 176

2

The function f is defined by $f(x) = \frac{1}{6x}$. What is the value of $f(x)$ when $x = 3$?

A) $\frac{1}{3}$
B) $\frac{1}{6}$
C) $\frac{1}{9}$
D) $\frac{1}{18}$

3

If $x = 40$, what is the value of $x + 6$?

A) 34
B) 40
C) 46
D) 64

4

What is 23% of 100?

A) 23
B) 46
C) 77
D) 123

5

Which expression is equivalent to $50x^2 + 5x^2$?

A) $250x^2$
B) $10x^2$
C) $45x^2$
D) $55x^2$

6

The population density of Cedar County is 230 people per square mile. The county has a population of 85,100 people. What is the area, in square miles, of Cedar County?

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CONTINUE

7

$$\frac{-54}{w} = 6$$

What is the solution to the given equation?

8

For the function f, the graph of $y = f(x)$ in the xy-plane has a slope of 3 and passes through the point $(0, -8)$. Which equation defines f ?

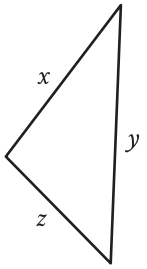
A) $f(x) = 3x$

B) $f(x) = 3x - 8$

C) $f(x) = 3x + 5$

D) $f(x) = 3x + 11$

9



Note: Figure not drawn to scale.

The triangle shown has a perimeter of 22 units. If $x = 9$ units and $y = 7$ units, what is the value of z, in units?

A) 6

B) 7

C) 9

D) 16

10

The function h is defined by $h(x) = 3x - 7$. What is the value of $h(-2)$?

A) -13

B) -10

C) 10

D) 13

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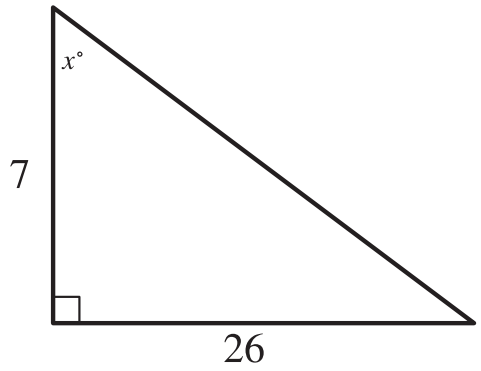
11



Note: Figure not drawn to scale.

In the triangle shown, what is the value of $\tan x°$?

A) $\frac{1}{26}$

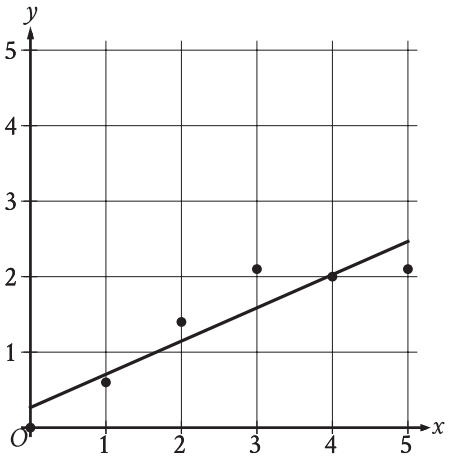
B) $\frac{19}{26}$

C) $\frac{26}{7}$

D) $\frac{33}{7}$

12

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



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

A) −2.27

B) −0.44

C) 0.44

D) 2.27

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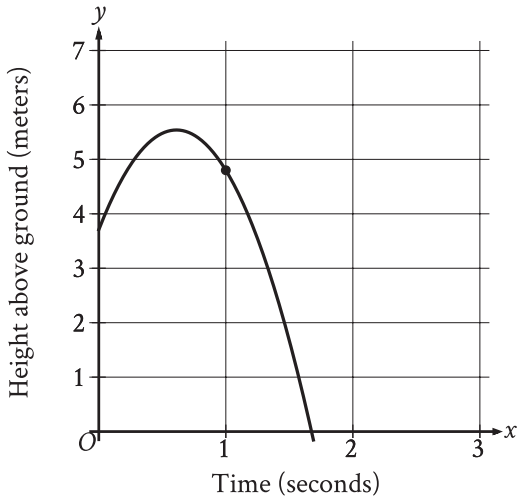
13

The y-intercept of the graph of $12x + 2y = 18$ in the xy-plane is $(0, y)$. What is the value of y ?

14

A model predicts that a certain animal weighed 241 pounds when it was born and that the animal gained 3 pounds per day in its first year of life. This model is defined by an equation in the form $f(x) = a + bx$, where $f(x)$ is the predicted weight, in pounds, of the animal x days after it was born, and a and b are constants. What is the value of a ?

15



The graph shows the height above ground, in meters, of a ball x seconds after the ball was launched upward from a platform. Which statement is the best interpretation of the marked point (1.0, 4.8) in this context?

A) 1.0 second after being launched, the ball's height above ground is 4.8 meters.

B) 4.8 seconds after being launched, the ball's height above ground is 1.0 meter.

C) The ball was launched from an initial height of 1.0 meter with an initial velocity of 4.8 meters per second.

D) The ball was launched from an initial height of 4.8 meters with an initial velocity of 1.0 meter per second.

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16

Based on a random sample from a population, a researcher estimated that the mean value of a certain variable for the population is 20.5, with an associated margin of error of 1. Which of the following is the most appropriate conclusion?

A) It is plausible that the actual mean value of the variable for the population is between 19.5 and 21.5.

B) It is not possible that the mean value of the variable for the population is less than 19.5 or greater than 21.5.

C) Every value of the variable in the population is between 19.5 and 21.5.

D) The mean value of the variable for the population is 20.5.

17

$$7m = 5(n + p)$$

The given equation relates the positive numbers m, n, and p. Which equation correctly gives n in terms of m and p ?

A) $n = \frac{5p}{7m}$

B) $n = \frac{7m}{5} - p$

C) $n = 5(7m) + p$

D) $n = 7m - 5 - p$

18

A rectangle has a length that is 15 times its width. The function $y = (15w)(w)$ represents this situation, where y is the area, in square feet, of the rectangle and $y > 0$. Which of the following is the best interpretation of $15w$ in this context?

A) The length of the rectangle, in feet

B) The area of the rectangle, in square feet

C) The difference between the length and the width of the rectangle, in feet

D) The width of the rectangle, in feet

19

$$x + 2y = 6$$
$$x - 2y = 4$$

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

A) 2.5

B) 5

C) 6

D) 10

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CONTINUE

20

The table shows the frequency of values in a data set.

Value	Frequency
19	7
21	1
23	7
25	4

What is the minimum value of the data set?

21

A number x is at most 17 less than 5 times the value of y. If the value of y is 3, what is the greatest possible value of x ?

22

$$5x^2 - 37x - 24 = 0$$

What is the positive solution to the given equation?

A) $\frac{3}{5}$

B) 3

C) 8

D) 37

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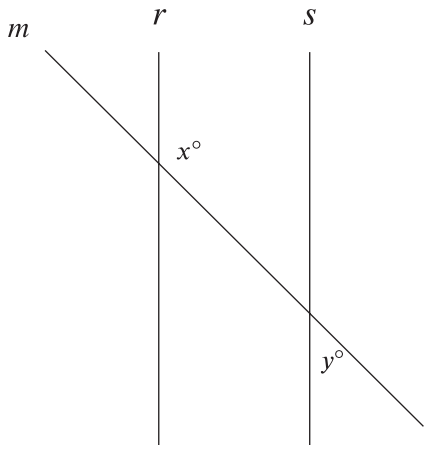
23



Note: Figure not drawn to scale.

In the figure shown, lines r and s are parallel, and line m intersects both lines. If $y < 65$, which of the following must be true?

A) $x < 115$

B) $x > 115$

C) $x + y < 180$

D) $x + y > 180$

24

$$f(x) = \frac{a - 19}{x} + 5$$

In the given function f, a is a constant. The graph of function f in the xy-plane, where $y = f(x)$, is translated 3 units down and 4 units to the right to produce the graph of $y = g(x)$. Which equation defines function g ?

A) $g(x) = \frac{a - 19}{x + 4} + 2$

B) $g(x) = \frac{a - 19}{x - 4} + 2$

C) $g(x) = \frac{a - 22}{x + 4} + 5$

D) $g(x) = \frac{a - 22}{x - 4} + 5$

25

A machine launches a softball from ground level. The softball reaches a maximum height of 51.84 meters above the ground at 1.8 seconds and hits the ground at 3.6 seconds. Which equation represents the height above ground h, in meters, of the softball t seconds after it is launched?

A) $h = -t^2 + 3.6$

B) $h = -t^2 + 51.84$

C) $h = -16(t - 1.8)^2 - 3.6$

D) $h = -16(t - 1.8)^2 + 51.84$

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CONTINUE

26

In triangle ABC, the measure of angle B is 90° and $\overline{BD}$ is an altitude of the triangle. The length of $\overline{AB}$ is 15 and the length of $\overline{AC}$ is 23 greater than the length of $\overline{AB}$. What is the value of $\frac{BC}{BD}$?

A) $\frac{15}{38}$

B) $\frac{15}{23}$

C) $\frac{23}{15}$

D) $\frac{38}{15}$

27

$$f(x) = (x + 7)^2 + 4$$

The function f is defined by the given equation. For what value of x does $f(x)$ reach its minimum?

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.

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