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:

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- Figures provided are drawn to scale.
- All figures lie in a plane.
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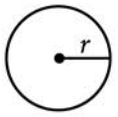
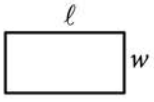
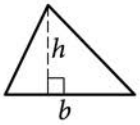
REFERENCE



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



$A = \ell w$



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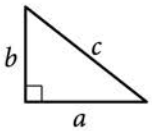

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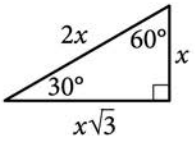
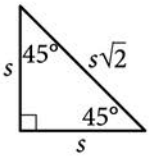
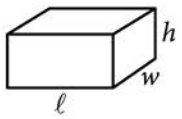
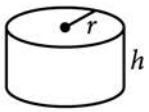




Special Right Triangles

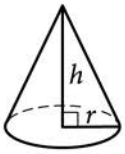


$V = \ell wh$



$V = \pi r^2 h$

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



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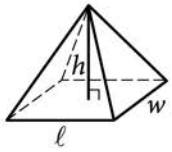

$V = \frac{1}{3}\ell wh$

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.

CONTINUE

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- Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

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?

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 ?

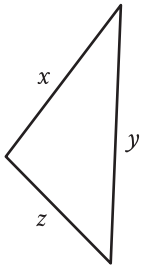
A) $f(x) = 3x$

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

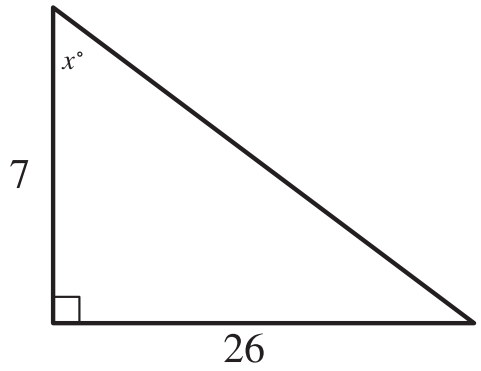
B) -10

C) 10

D) 13

CONTINUE

11



Note: Figure not drawn to scale.

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

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

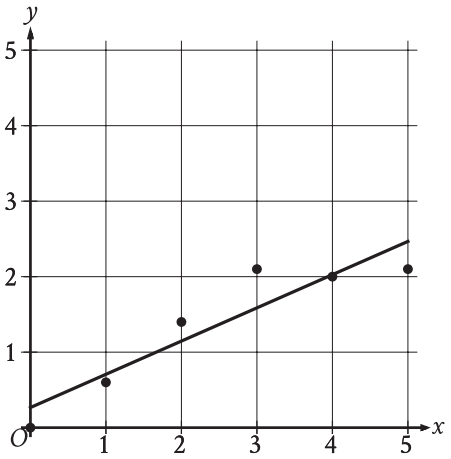
B) $\frac{19}{26}$

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

CONTINUE

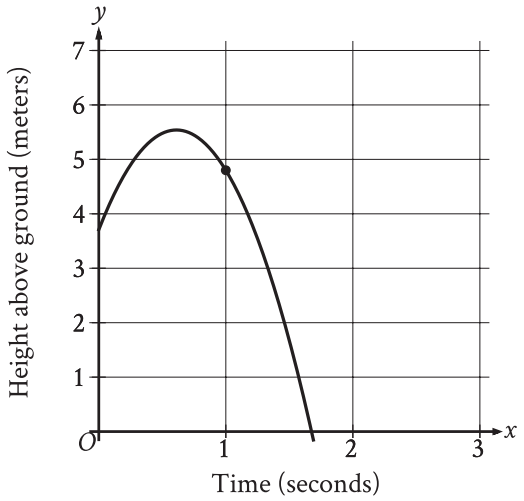
13

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.

CONTINUE

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

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) $\frac{3}{5}$

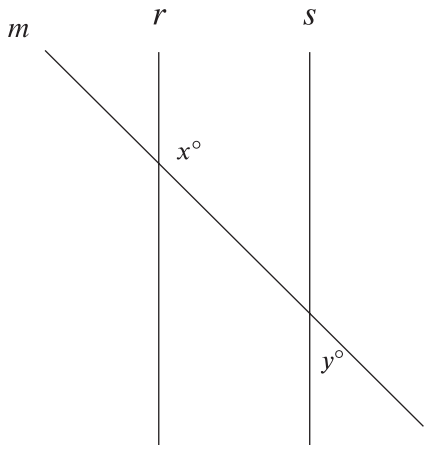
B) 3

C) 8

D) 37

CONTINUE

23



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

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.

Math

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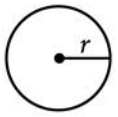

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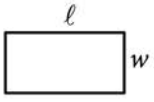

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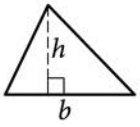

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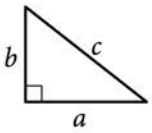

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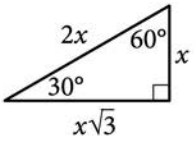

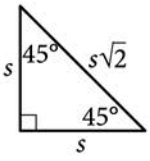

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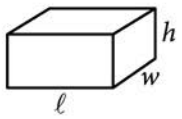

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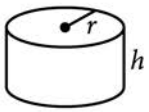

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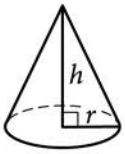

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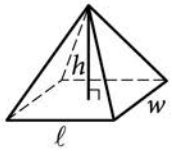

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The number of radians of arc in a circle is 2π.

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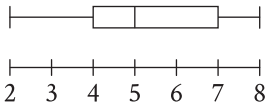
CONTINUE

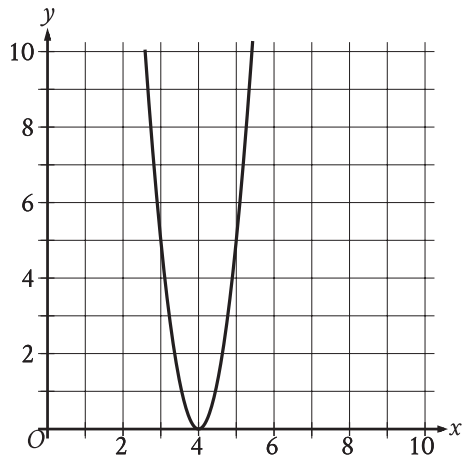
1



The box plot summarizes 15 data values. What is the median of this data set?

A) 2
B) 3
C) 5
D) 8

2



What is the x-intercept of the graph shown?

A) $(-5, 0)$
B) $(5, 0)$
C) $(-4, 0)$
D) $(4, 0)$

3

Henry receives a $60.00 gift card to pay for movies online. He uses his gift card to buy 3 movies for $7.50 each. If he spends the rest of his gift card balance on renting movies for $1.50 each, how many movies can Henry rent?

A) 10
B) 25
C) 35
D) 40

4

$$x = 49$$
$$y = \sqrt{x} + 9$$

The graphs of the given equations intersect at the point (x, y) in the xy-plane. What is the value of y ?

A) 16
B) 40
C) 81
D) 130

5

A cherry pitting machine pits 12 pounds of cherries in 3 minutes. At this rate, how many minutes does it take the machine to pit 96 pounds of cherries?

A) 8
B) 15
C) 24
D) 36

CONTINUE

6

If $2x = 12$, what is the value of $9x$?

7

Line k is defined by $y = \frac{1}{4}x + 1$. Line j is parallel to line k in the xy-plane. What is the slope of j ?

8

6, 6, 8, 8, 8, 10, 21

Which of the following lists represents a data set that has the same median as the data set shown?

A) 4, 6, 6, 6, 8, 8

B) 6, 6, 8, 8, 10, 10

C) 6, 8, 10, 10, 10, 12

D) 8, 8, 10, 10, 21, 21

9

The length of the base of a certain parallelogram is 89% of the height of the parallelogram. Which expression represents the length of the base of the parallelogram, where h is the height of the parallelogram?

A) $89h$

B) $0.089h$

C) $8.9h$

D) $0.89h$

10

For a camping trip a group bought x one-liter bottles of water and y three-liter bottles of water, for a total of 240 liters of water. Which equation represents this situation?

A) $x + 3y = 240$

B) $x + y = 240$

C) $3x + 3y = 240$

D) $3x + y = 240$

CONTINUE

11

$$y = -4x + 40$$

Which table gives three values of x and their corresponding values of y for the given equation?

A)

x	y
0	0
1	−4
2	−8

B)

x	y
0	40
1	44
2	48

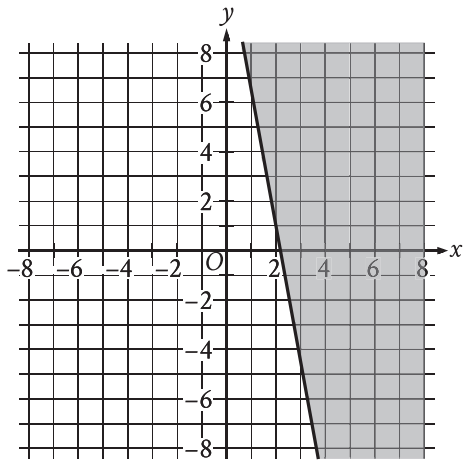
C)

x	y
0	40
1	36
2	32

D)

x	y
0	0
1	4
2	8

12



The shaded region shown represents solutions to an inequality. Which ordered pair (x, y) is a solution to this inequality?

A) (0, −4)

B) (0, 4)

C) (−4, 0)

D) (4, 0)

13

In triangle JKL, the measures of $\angle K$ and $\angle L$ are each 48°. What is the measure of $\angle J$, in degrees? (Disregard the degree symbol when entering your answer.)

CONTINUE

14

$$y = x^2 + 14x + 48$$
$$x + 8 = 11$$

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

15

A cleaning service that cleans both offices and homes can clean at most 14 places per day. Which inequality represents this situation, where f is the number of offices and h is the number of homes?

A) $f + h \leq 14$

B) $f + h \geq 14$

C) $f - h \leq 14$

D) $f - h \geq 14$

16

Which expression is a factor of $2x^2 + 38x + 10$?

A) 2

B) $5x$

C) $38x$

D) $2x^2$

17

The equation $40x + 20y = 160$ represents the number of sweaters, x, and number of shirts, y, that Yesenia purchased for \$160. If Yesenia purchased 2 sweaters, how many shirts did she purchase?

A) 3

B) 4

C) 8

D) 40

18

$$y = 0.25x^2 - 7.5x + 90.25$$

The equation gives the estimated stock price y, in dollars, for a certain company x days after a new product launched, where $0 \leq x \leq 20$. Which statement is the best interpretation of $(x, y) = (1, 83)$ in this context?

A) The company's estimated stock price increased \$83 every day after the new product launched.

B) The company's estimated stock price increased \$1 every 83 days after the new product launched.

C) 1 day after the new product launched, the company's estimated stock price is \$83.

D) 83 days after the new product launched, the company's estimated stock price is \$1.

CONTINUE

19

$f(x) = 39$

For the given linear function f, which table gives three values of x and their corresponding values of $f(x)$?

A)

x	$f(x)$
0	0
1	0
2	0

B)

x	$f(x)$
0	39
1	39
2	39

C)

x	$f(x)$
0	0
1	39
2	78

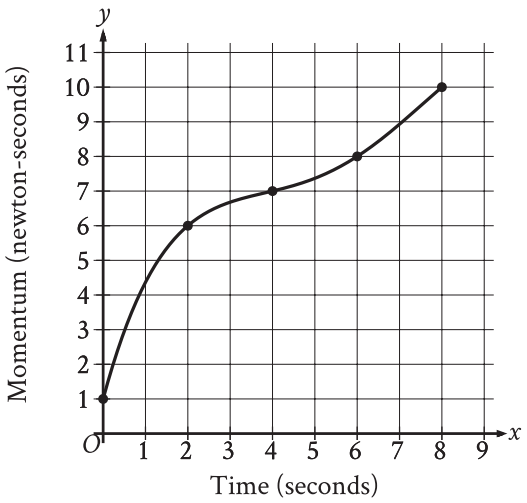
D)

x	$f(x)$
0	39
1	0
2	−39

20

A triangular prism has a height of 8 centimeters (cm) and a volume of 216 cm^3. What is the area, in cm^2, of the base of the prism? (The volume of a triangular prism is equal to Bh, where B is the area of the base and h is the height of the prism.)

21



The graph shows the momentum y, in newton-seconds, of an object x seconds after the object started moving, for $0 \le x \le 8$. What is the average rate of change, in newton-seconds per second, in the momentum of the object from $x = 2$ to $x = 6$?

22

$-15x + 25y = 65$

One of the two equations in a system of linear equations is given. The system has infinitely many solutions. Which of the following could be the second equation in the system?

A) $12x + 20y = 52$

B) $12x + 20y = -52$

C) $-12x + 20y = 52$

D) $-12x + 20y = -52$

CONTINUE

23

A bus traveled on the highway and on local roads to complete a trip of 160 miles. The trip took 4 hours. The bus traveled at an average speed of 55 miles per hour (mph) on the highway and an average speed of 25 mph on local roads. If x is the time, in hours, the bus traveled on the highway and y is the time, in hours, it traveled on local roads, which system of equations represents this situation?

A) $55x + 25y = 4$
$x + y = 160$

B) $55x + 25y = 160$
$x + y = 4$

C) $25x + 55y = 4$
$x + y = 160$

D) $25x + 55y = 160$
$x + y = 4$

24

Quadrilateral $P'Q'R'S'$ is similar to quadrilateral $PQRS$, where P, Q, R, and S correspond to P', Q', R', and S', respectively. The measure of angle P is 30°, the measure of angle Q is 50°, and the measure of angle R is 70°. The length of each side of $P'Q'R'S'$ is 3 times the length of each corresponding side of $PQRS$. What is the measure of angle P' ?

A) 10°

B) 30°

C) 40°

D) 90°

25

$$f(x) = 2x + 244$$

The given function f represents the perimeter, in centimeters (cm), of a rectangle with a length of x cm and a fixed width. What is the width, in cm, of the rectangle?

A) 2

B) 122

C) 244

D) 488

CONTINUE

26

The functions f and g are defined by the given equations, where $x \geq 0$. Which of the following equations displays, as a constant or coefficient, the maximum value of the function it defines, where $x \geq 0$?

I. $f(x) = 33(0.4)^{x+3}$

II. $g(x) = 33(0.16)(0.4)^{x-2}$

A) I only

B) II only

C) I and II

D) Neither I nor II

27

$$64x^2 - (16a + 4b)x + ab = 0$$

In the given equation, a and b are positive constants. The sum of the solutions to the given equation is $k(4a + b)$, 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.