

Math

27 QUESTIONS

DIRECTIONS

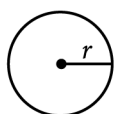
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

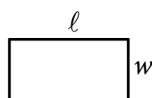
- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

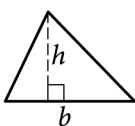


$$A = \pi r^2$$

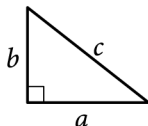
$$C = 2\pi r$$



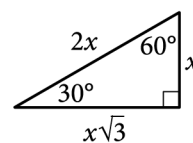
$$A = \ell w$$



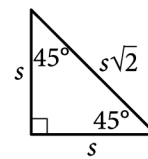
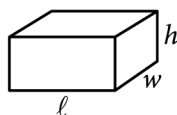
$$A = \frac{1}{2}bh$$



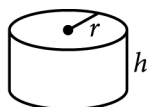
$$c^2 = a^2 + b^2$$



Special Right Triangles



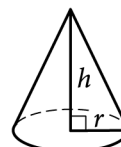
$$V = \ell wh$$



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



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



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



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

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.

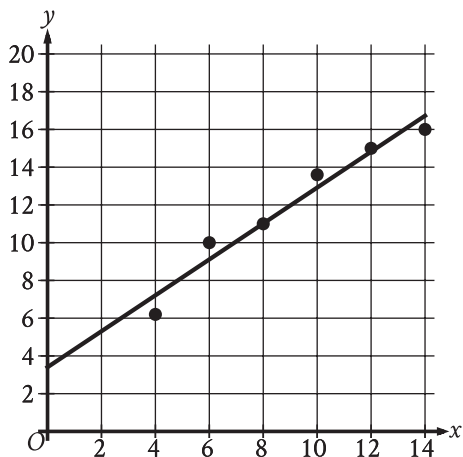
1

An object's speed is 64 yards per second. What is the object's speed, in feet per second? (1 yard = 3 feet)

- A) 61
- B) 67
- C) 94
- D) 192

2

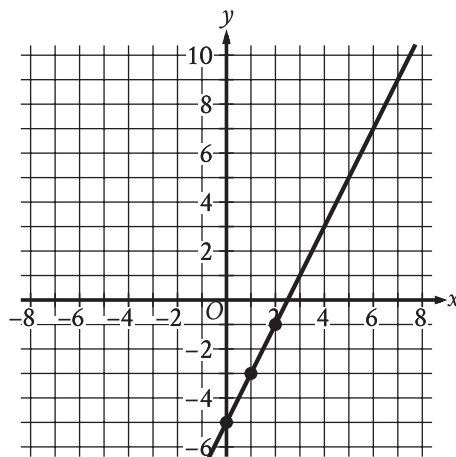
The scatterplot shows the relationship between two variables, x and y . A line of best fit is also shown.



Which of the following equations best represents the line of best fit shown?

- A) $y = x + 3.4$
- B) $y = x - 3.4$
- C) $y = -x + 3.4$
- D) $y = -x - 3.4$

3



The graph shows the linear relationship between x and y . Which table gives three values of x and their corresponding values of y for this relationship?

A)

x	y
0	0
1	-7
2	-9

B)

x	y
0	0
1	-3
2	-1

C)

x	y
0	-5
1	-7
2	-9

D)

x	y
0	-5
1	-3
2	-1

4

What is the perimeter, in inches, of a rectangle with a length of 4 inches and a width of 9 inches?

- A) 13
- B) 17
- C) 22
- D) 26

5

$$7m = 2(n + p)$$

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

- A) $m = \frac{2(n + p)}{7}$
- B) $m = 2(n + p)$
- C) $m = 2(n + p) - 7$
- D) $m = 2 - n - p - 7$

6

73, 74, 75, 77, 79, 82, 84, 85, 91

What is the median of the data shown?

7

The function f is defined by $f(x) = 4x$. For what value of x does $f(x) = 8$?

8

Of 300,000 paper clips, 234,000 are size large. What percentage of the paper clips are size large?

- A) 22%
- B) 33%
- C) 66%
- D) 78%

9

$$f(x) = 8x + 4$$

The function f gives the estimated height, in feet, of a willow tree x years after its height was first measured. Which statement is the best interpretation of 4 in this context?

- A) The tree will be measured each year for 4 years.
- B) The tree is estimated to grow to a maximum height of 4 feet.
- C) The estimated height of the tree increased by 4 feet each year.
- D) The estimated height of the tree was 4 feet when it was first measured.

10

$$y = 76$$
$$y = x^2 - 5$$

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

- A) $-\frac{76}{5}$
- B) -9
- C) 5
- D) 76

11

Each side of equilateral triangle S is multiplied by a scale factor of k to create equilateral triangle T. The length of each side of triangle T is greater than the length of each side of triangle S. Which of the following could be the value of k ?

- A) $\frac{29}{28}$
- B) 1
- C) $\frac{28}{29}$
- D) 0

12

$$66x = 66x$$

How many solutions does the given equation have?

- A) Exactly one
- B) Exactly two
- C) Infinitely many
- D) Zero

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

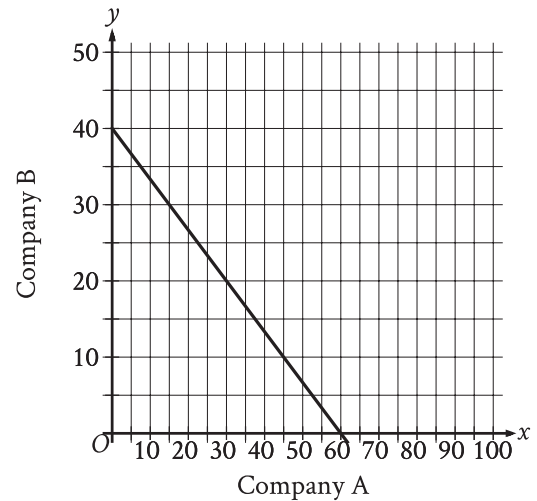
The exponential function g is defined by $g(x) = 19 \cdot a^x$, where a is a positive constant. If $g(3) = 2,375$, what is the value of $g(4)$?

15

In right triangle RST , the sum of the measures of angle R and angle S is 90 degrees. The value of $\sin(R)$ is $\frac{\sqrt{15}}{4}$. What is the value of $\cos(S)$?

- A) $\frac{\sqrt{15}}{15}$
- B) $\frac{\sqrt{15}}{4}$
- C) $\frac{4\sqrt{15}}{15}$
- D) $\sqrt{15}$

16



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) $12x + 8y = 480$

17

Which expression is equivalent to

$$\frac{8x(x-7) - 3(x-7)}{2x-14}, \text{ where } x > 7?$$

- A) $\frac{x-7}{5}$
- B) $\frac{8x-3}{2}$
- C) $\frac{8x^2-3x-14}{2x-14}$
- D) $\frac{8x^2-3x-77}{2x-14}$

18

The function f is defined by $f(x) = (-8)(2)^x + 22$. What is the y -intercept of the graph of $y = f(x)$ in the xy -plane?

- A) $(0, 14)$
- B) $(0, 2)$
- C) $(0, 22)$
- D) $(0, -8)$

19

Keenan made 32 cups of vegetable broth. Keenan then filled x small jars and y large jars with all the vegetable broth he made. The equation $3x + 5y = 32$ represents this situation. Which is the best interpretation of $5y$ in this context?

- A) The number of large jars Keenan filled
- B) The number of small jars Keenan filled
- C) The total number of cups of vegetable broth in the large jars
- D) The total number of cups of vegetable broth in the small jars

20

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 ?

21

Line ℓ is defined by $3y + 12x = 5$. Line n is perpendicular to line ℓ in the xy -plane. What is the slope of line n ?

22

$$|-5x + 13| = 73$$

What is the sum of the solutions to the given equation?

- A) $-\frac{146}{5}$
- B) -12
- C) 0
- D) $\frac{26}{5}$

23

For the exponential function f , the value of $f(1)$ is k , where k is a constant. Which of the following equivalent forms of the function f shows the value of k as the coefficient or the base?

- A) $f(x) = 50(1.6)^{x+1}$
- B) $f(x) = 80(1.6)^x$
- C) $f(x) = 128(1.6)^{x-1}$
- D) $f(x) = 204.8(1.6)^{x-2}$

24

$$-9x^2 + 30x + c = 0$$

In the given equation, c is a constant. The equation has exactly one solution. What is the value of c ?

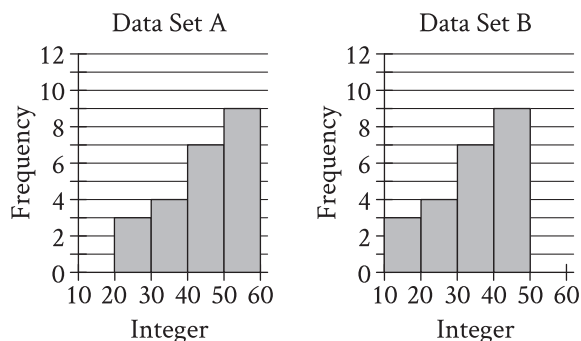
- A) 3
- B) 0
- C) -25
- D) -53

25

Which of the following expressions has a factor of $x + 2b$, where b is a positive integer constant?

- A) $3x^2 + 7x + 14b$
- B) $3x^2 + 28x + 14b$
- C) $3x^2 + 42x + 14b$
- D) $3x^2 + 49x + 14b$

26



Two data sets of 23 integers each are summarized in the histograms shown. For each of the histograms, the first interval represents the frequency of integers greater than or equal to 10, but less than 20. The second interval represents the frequency of integers greater than or equal to 20, but less than 30, and so on. What is the smallest possible difference between the mean of data set A and the mean of data set B?

- A) 0
- B) 1
- C) 10
- D) 23

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