

Math

27 QUESTIONS

DIRECTIONS

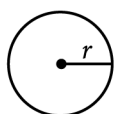
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

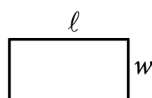
- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

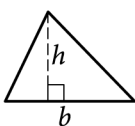


$$A = \pi r^2$$

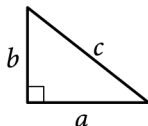
$$C = 2\pi r$$



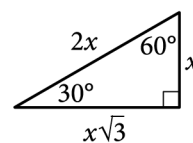
$$A = \ell w$$



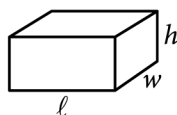
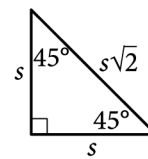
$$A = \frac{1}{2}bh$$



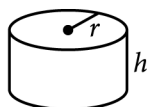
$$c^2 = a^2 + b^2$$



Special Right Triangles



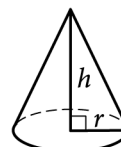
$$V = \ell wh$$



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



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



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



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

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.

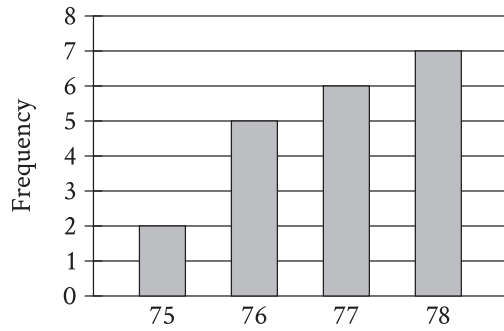
For multiple-choice questions, solve each problem, choose the correct answer from the choices provided, and then circle your answer in this book. Circle only one answer for each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer 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

The bar graph shows the distribution of the number of walnuts per container for 20 containers at a grocery store.

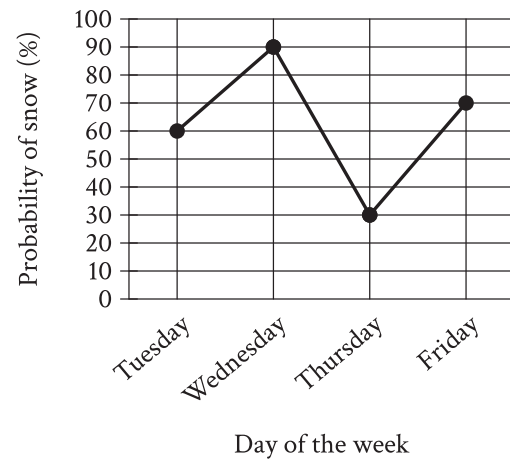


Number of walnuts per container

How many of these containers of walnuts contain exactly 78 walnuts?

- A) 2
- B) 7
- C) 20
- D) 78

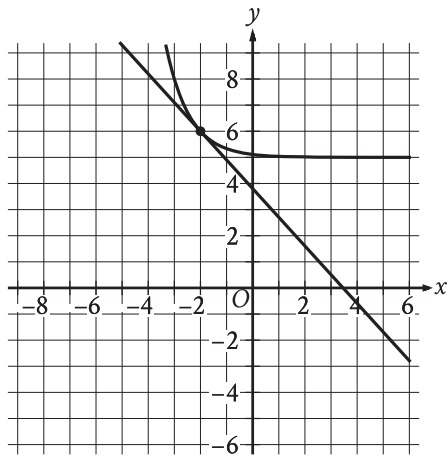
2



The line graph shows the probability of snow, as a percent, at a certain location for each day during a four-day period. According to the line graph, for which day during this four-day period is the probability of snow 30%?

- A) Tuesday
- B) Wednesday
- C) Thursday
- D) Friday

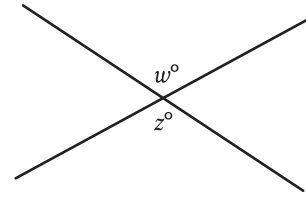
3



The graph of a system of a linear equation and a nonlinear equation is shown. What is the solution (x, y) to this system?

- A) $(6, 0)$
- B) $(-2, 6)$
- C) $(0, -2)$
- D) $(0, 0)$

4



Note: Figure not drawn to scale.

In the figure, two lines intersect at a point. If $w = 136$, what is the value of z ?

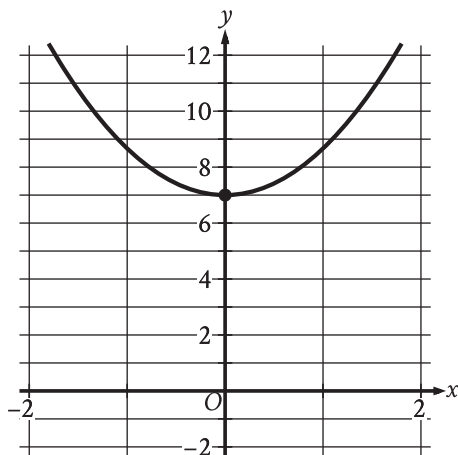
- A) 36
- B) 44
- C) 68
- D) 136

5

Which expression is equivalent to $19(x^2 - 7)$?

- A) $19x^2 - 133$
- B) $19x^2 - 26$
- C) $19x^2 - 7$
- D) $19x^2 + 12$

6



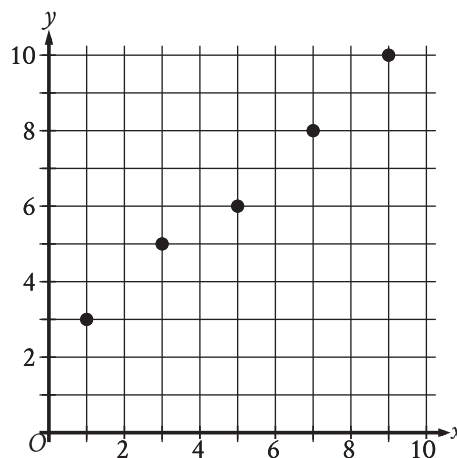
The parabola shown intersects the y -axis at the point (x, y) . What is the value of y ?

7

If $2x + 3 = 9$, what is the value of $6x - 1$?

8

The scatterplot shows the relationship between two variables, x and y .



Which equation is the most appropriate linear model for this relationship?

- A) $y = -0.9x - 2.2$
- B) $y = -0.9x + 2.2$
- C) $y = -0.9x$
- D) $y = 0.9x + 2.2$

9

$$d = 16 - \frac{x}{30}$$

The equation shown gives the estimated amount of diesel d , in gallons, that remains in the gas tank of a truck after being driven x miles, where $0 \leq x \leq 480$. What is the estimated amount of diesel, in gallons, that remains in the gas tank of the truck when $x = 300$?

- A) 0
- B) 6
- C) 14
- D) 16

10

$$g(x) = 11x + 4$$

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

A)

x	$g(x)$
-1	7
0	11
1	15

B)

x	$g(x)$
-1	-4
0	0
1	4

C)

x	$g(x)$
-1	-7
0	4
1	15

D)

x	$g(x)$
-1	-11
0	0
1	11

11

The pressure exerted on a scuba diver at sea level is 14.70 pounds per square inch (psi). For each foot the scuba diver descends below sea level, the pressure exerted on the scuba diver increases by 0.44 psi. What is the total pressure, in psi, exerted on the scuba diver at 105 feet below sea level?

- A) 60.90
- B) 31.50
- C) 14.70
- D) 0.44

12

The function f is defined by $f(x) = 4x^{-1}$. What is the value of $f(21)$?

- A) -84
- B) $\frac{1}{84}$
- C) $\frac{4}{21}$
- D) $\frac{21}{4}$

13

The area of a rectangle is 57 square inches. The length of the longest side of the rectangle is 19 inches. What is the length, in inches, of the shortest side of this rectangle?

14

How many yards are equivalent to 77 rods?
(5.5 yards = 1 rod)

15

$$x^2 - 12x + 27 = 0$$

How many distinct real solutions does the given equation have?

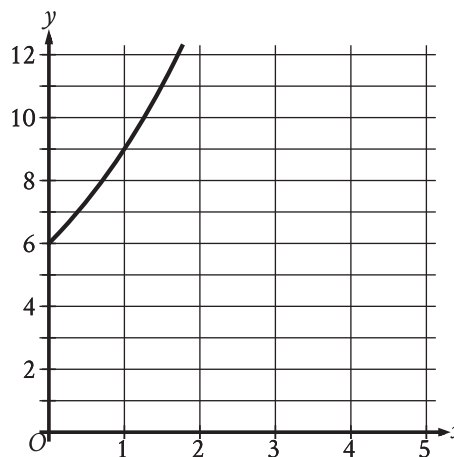
- A) Exactly two
- B) Exactly one
- C) Zero
- D) Infinitely many

16

For the linear function g , the graph of $y = g(x)$ in the xy -plane has a slope of 2 and passes through the point $(1, 14)$. Which equation defines g ?

- A) $g(x) = 2x$
- B) $g(x) = 2x + 2$
- C) $g(x) = 2x + 12$
- D) $g(x) = 2x + 14$

17



The graph gives the estimated population y , in thousands, of a town x years since 2003, where $0 \leq x \leq 5$. Which of the following best describes the increase in the estimated population from $x = 0$ to $x = 1$?

- A) The estimated population at $x = 1$ is 0.5 times the estimated population at $x = 0$.
- B) The estimated population at $x = 1$ is 1.5 times the estimated population at $x = 0$.
- C) The estimated population at $x = 1$ is 2.5 times the estimated population at $x = 0$.
- D) The estimated population at $x = 1$ is 3.5 times the estimated population at $x = 0$.

18

In March, the price of a collectible card was \$15.50. In April, the price of the collectible card was \$17.36. The price of the collectible card in April was $p\%$ of the price of the collectible card in March. What is the value of p ?

- A) 12
- B) 88
- C) 112
- D) 188

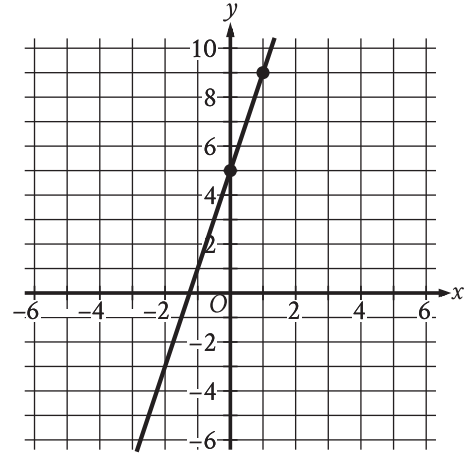
19

$$x = 8a(b + 9)$$

The given equation relates the positive numbers a , b , and x . Which equation correctly expresses a in terms of b and x ?

- A) $a = \frac{x}{8} - (b + 9)$
- B) $a = \frac{x}{8(b + 9)}$
- C) $a = \frac{8(b + 9)}{x}$
- D) $a = 8x(b + 9)$

20



Line j is shown in the xy -plane. Line k (not shown) is parallel to line j . What is the slope of line k ?

21

A line segment that has a length of 115 centimeters (cm) is divided into three parts. One part is 47 cm long. The other two parts have lengths that are equal to each other. What is the length, in cm, of one of the other two parts of equal length?

22

$$p(x) + 57 = x^2$$

The given equation relates the value of x and its corresponding value of $p(x)$ for the function p . What is the minimum value of the function p ?

- A) $-3,249$
- B) -57
- C) 57
- D) $3,249$

23

x	y
-18	-48
7	52

The table shows two values of x and their corresponding values of y . In the xy -plane, the graph of the linear equation representing this relationship passes through the point $\left(\frac{1}{7}, a\right)$. What is the value of a ?

- A) $-\frac{4}{11}$
- B) $-\frac{4}{77}$
- C) $\frac{4}{7}$
- D) $\frac{172}{7}$

24

$$y = 576^{(2x+2)}$$

The graph of the given equation in the xy -plane has a y -intercept of (r, s) . Which of the following equivalent equations displays the value of s as a constant, a coefficient, or the base?

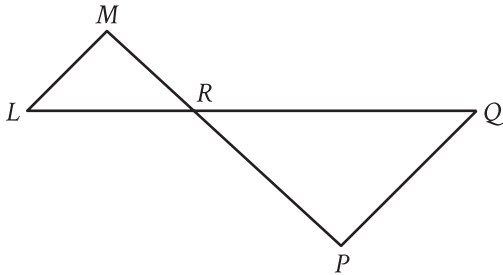
- A) $y = 331,776^{(x+1)}$
- B) $y = 24^{(4x+4)}$
- C) $y = \frac{1}{24}(24)^{(4x+5)}$
- D) $y = \frac{1}{576}(576)^{(2x+3)}$

25

If $k - x$ is a factor of the expression $-x^2 + \frac{1}{29}nk^2$, where n and k are constants and $k > 0$, what is the value of n ?

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

26



Note: Figure not drawn to scale.

In the figure, $\overline{LQ}$ intersects $\overline{MP}$ at point R , and $\overline{LM}$ is parallel to $\overline{PQ}$. The lengths of $\overline{MR}$, $\overline{LR}$, and $\overline{RP}$ are 6, 7, and 11, respectively. What is the length of $\overline{LQ}$?

- A) $\frac{119}{11}$
- B) $\frac{77}{6}$
- C) $\frac{113}{6}$
- D) $\frac{119}{6}$

27

$$5(x + 7) = 15(x - 17)(x + 7)$$

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

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