2 Module 2 2

Math

35 MINUTES, 22 QUESTIONS

DIRECTIONS

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

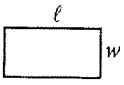
NOTES

Unless otherwise indicated:

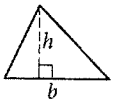
- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

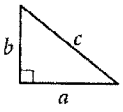
$A = \pi r^2$
$C = 2\pi r$



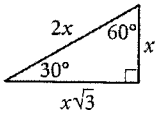
$A = \ell w$

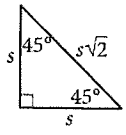


$A = \frac{1}{2}bh$

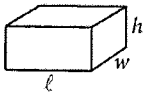


$c^2 = a^2 + b^2$

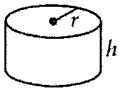




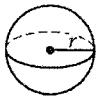
Special Right Triangles



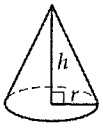
$V = \ell wh$



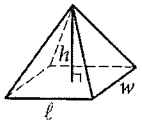
$V = \pi r^2 h$



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



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



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

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.

2 Module 2 2

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.

2 Module 2 2

1

If $\frac{x^2 - y^2}{3x + 3y} = \frac{7}{5}$, what is the value of $5(x - y)$?

2

The function f is defined by $f(x) = kx^2 + 3x - 1$, where k is constant and $f(2) = -19$. What is the value of $f(-2)$?

3

$$y + ax = 5$$
$$3y - x = 15$$

If the system of equations above has infinite solutions, what is the value of a?

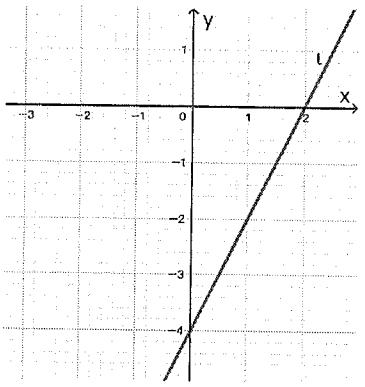
A) $\frac{1}{3}$

B) $-\frac{1}{3}$

C) 3

D) -3

4



Line l is shown in the x y-plane above. Line p is line l shifted left 2 units. Which equations below represents the line p?

A) $y = 2x + 4$

B) $y = 2x - 2$

C) $y = 2x$

D) $y = 2x - 6$

5

The median number of books Sally read each week over the past 9 weeks is 4. Which of the following changes could lead to the same median number of books Sally read per week?

A) Read 2 more books in the first week and 1 less book in the last week

B) Read 1 less book per week

C) Read 2 more books in the week she reads the most

D) Read 2 more books per week

6

Which of the following functions, when graphed in the x y -plane, has exactly one positive x-intercept and one negative x -intercept?

A) $y = x^2 + 10x + 24$

B) $y = x^2 - 10x + 24$

C) $y = x^2 - 2x - 24$

D) $y = x^2 - 11x + 28$

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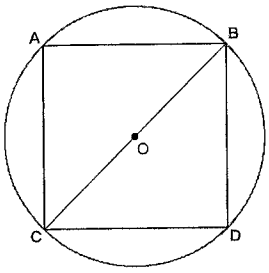
7



The figure above shows a square ABCD inscribed in a circle, where the diameter of the circle is 18. What is the area of the square ABCD?

A) 81

B) 162

C) 324

D) 250

8

Homemade sugar-salt rehydration solutions should contain a ratio of 1000:20:5 of water-sugar-salt respectively. If the rehydration solution contain 15 grams of sugar, how many grams of salt is needed?

9

$$f(t) = A(1 + 2.5\%)^t$$

An investor deposited some money into his investment account at the end of 2021. The function f models the amount of money in his investment account t years after 2021, where $0 \leq t \leq 5$. Which of the following statements is the best interpretation of the A in the function f?

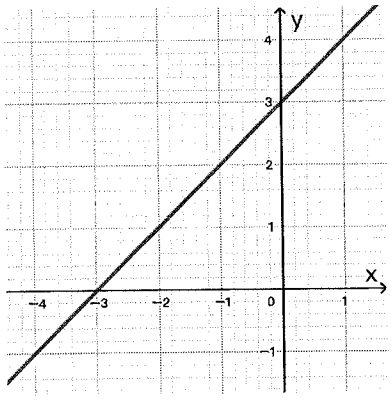
A) The increase of money every year in the investment account

B) The money the investor deposited at the end of 2021

C) The flat fee for opening the investment account

D) The amount of money in the investment account after 2 years

10



The graph of the linear function f is shown. What is the y-intercept of the graph of f?

A) (3,0)

B) (−3,0)

C) (0,3)

D) (0, − 3)

11

How many seconds is equal to one hour and thirty minutes?

A) 5400

B) 90

C) 3600

D) 6480000

12

Which of the following is equivalent to $2(x^2 - 3) - (x^2 - 5)$?

A) $(x - 1)(x + 1)$

B) $3x^2 + 11$

C) $3x^2 - 1$

D) $x^2 - 11$

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13

Georgia and Victoria started from the same coffee shop and walked in opposite directions. Georgia walks 1 mile per hour faster than Victoria. After 2 hours, they are 26 miles apart. What is Georgia's average speed?

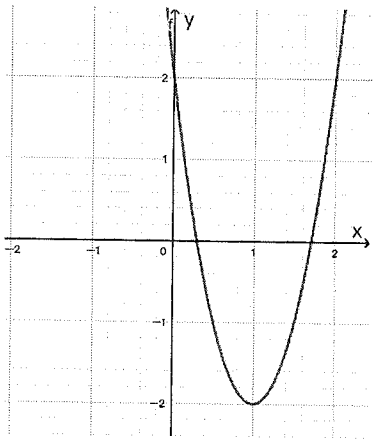
A) 7

B) 6

C) 13

D) 10

14



Which of the following quadratic functions is shown in the graph above?

A) $y = 2(x - 1)^2 - 2$

B) $y = 4(x - 1)^2 - 2$

C) $y = 4(x - 1)^2 + 2$

D) $y = 4(x + 1)^2 - 2$

15

$$y = \frac{1}{2}x - 2$$
$$y = 2x^2 - 4x + 1$$

How many solutions does the given system of equations have?

A) Zero

B) Exactly one

C) Exactly two

D) Infinitely

16

Eight cube blocks each have the same volume of 64 units cubed respectively. When they are stacked together, they form a big cubic block. What is the length of one side of the big cube block?

17

Cocoa Delight sold 80 cups of hot chocolate. Of these, 56 contained marshmallows and 28 contained whipped cream. If 19 cups contained neither marshmallows nor whipped cream, how many cups must have contained both marshmallows and whipped cream?

18

Which expression is equivalent to $(\frac{m}{3} - \frac{n}{2})^2$?

A) $\frac{1}{36}(m^2 - 2mn - n^2)$

B) $\frac{1}{9}m^2 - \frac{1}{4}n^2$

C) $\frac{1}{9}m^2 - \frac{1}{6}mn + \frac{1}{4}n^2$

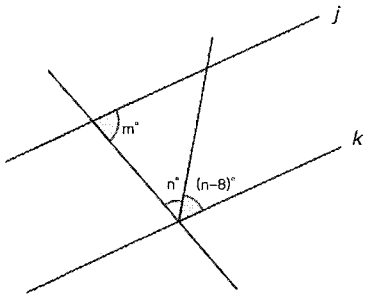
D) $\frac{1}{9}m^2 - \frac{1}{3}mn + \frac{1}{4}n^2$

2 Module 2 2

19

If $2^m2^n = 8$, what is the value of 4^m4^n, where m and n are positive constants?

20



Lines j and k are parallel in the figure above. Which of the following expresses the value of m in terms of n?

A) $m = 188 - 2n$

B) $m = 172 - 2n$

C) $m = 180 - n$

D) $m = 180 - 2n$

21

There were 3.12 million units of electric vehicle sold globally in 2020. Sales skyrocketed in 2021, increasing by 107% in comparison to 2020. How many vehicles, in million units, were sold globally in 2021? (Round to two decimal places)

A) 3.34

B) 5.30

C) 6.46

D) 8.42

22

The equation $N(t) = 300(1.05)^t$ estimates the wildlife population during 2001-2004, where t represents the number of years since 2001. Which of the following is the best interpretation of (1.05)?

A) The number of wildlife increased by 50% from its previous year during 2001-2004

B) The number of wildlife increased by 5% from its previous year during 2001-2004

C) The number of wildlife increased by 1.05 times its previous year during 2001-2004

D) The number of wildlife decreased by 50% from its previous year during 2001-2004