

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

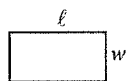
Unless otherwise indicated:

- 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.

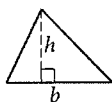
REFERENCE

$$A = \pi r^2$$

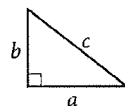
$$C = 2\pi r$$



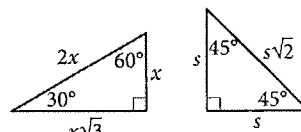
$$A = \ell w$$



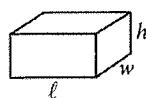
$$A = \frac{1}{2}bh$$



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



Special Right Triangles



$$V = \ell wh$$



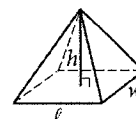
$$V = \pi r^2 h$$



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



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



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

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.

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

If $\frac{x+2}{3} + \frac{x+4}{2} = 6$, what is the value of x^2 ?

- A) 2
- B) 4
- C) 16
- D) 9

2

On a real number line, a number, k , is more than twice as far from -5 as it is from 5 . Which of the following statements indicates all possible values of k ?

- A) $|k+5| < 2|k-5|$
- B) $|k+5| > 2|k-5|$
- C) $2|k+5| > |k-5|$
- D) $2|k+5| < |k-5|$

3

If $f(x) = 2x^3 - (3-x)$, what is the value of $f(-3)$?

- A) 60
- B) -60
- C) -48
- D) -54

4

At a community center swimming pool, an adult ticket costs \$6.50 and a child, 5-12 years old, ticket costs \$3 less than an adult ticket. A group bought 12 adult tickets and spent a total of \$92. How many children were there in the group?

- A) 12
- B) 4
- C) 3
- D) 8

5

$$f(x) = 2x^2 + 4x + 8$$

For the given function $f(x)$, what is the minimum value of $f(x)$?

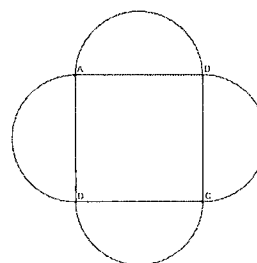
- A) -2
- B) 4
- C) 6
- D) 12

6

In the x - y -plane, line l has a slope of $\frac{2}{3}$ and line k has a slope of $-\frac{2}{3}$. For which of the following statements represent the relationship between line l and line k ?

- A) parallel
- B) perpendicular
- C) both lines contain the point (x,y)
- D) none of the above

7



For the given function $f(x)$, what is the minimum value of $f(x)$?

- A) 9π
- B) 18π
- C) 36π
- D) 72π

8

If $x - k$ is a factor of $x^2 - 22x - 48$, where k is a positive constant, what is a possible value of k ?

9

Which of the following equations represents a circle in the x - y -plane that intersects the x -axis at $(-2, 0)$ and $(4, 0)$?

- A) $(x - 1)^2 + (y - 4)^2 = 16$
 B) $(x - 1)^2 + (y - 4)^2 = 9$
 C) $(x - 1)^2 + (y - 4)^2 = 4$
 D) $(x - 1)^2 + (y - 4)^2 = 25$

10

Researchers estimated the population, P , of fish in a certain ocean area t years after starting to observe the fish with the function $P(t) = 8000(1 + 3.6\%)^t$. Which of the following functions can estimate the fish population m months after starting to observe the fish?

- A) $P(x) = 8000(1 + 3.6\%)^{12m}$
 B) $P(x) = 8000(1 + 3.6\%)^{\frac{m}{12}}$
 C) $P(x) = 8000(1 + \frac{0.036}{12})^m$
 D) $P(x) = 4000(1 + 3.6\%)^{\frac{m}{12}}$

11

A ball is tossed upward from the ground. The equation $h(t) = -2t^2 + 8t$ represents the height, h , of the ball above the ground t seconds after it is tossed. How many seconds does the ball take to reach its highest position after being tossed?

12

Roll	Frequency
1	6
3	8
4	5
2	5
6	4
5	7

A six-sided die was rolled 35 times and the results are shown above. What is the median of the rolls?

13

	Number of steps	
	0-5000	5001-10000
Ages 30-40	30	80
Ages 40-50	50	20
Total	80	100

A group of people were asked how many steps they walked last Sunday. The results are shown above. If a person from the group was selected at random, what is the probability of selecting a person who walked 6000 steps last Sunday at age 45?

- A) $\frac{2}{7}$
 B) $\frac{1}{5}$
 C) $\frac{1}{9}$
 D) $\frac{1}{3}$

14

$$\frac{x-5}{x+6} = \frac{1}{12}$$

What is the solution to the given equation?

- A) 6
- B) 12
- C) $\frac{5}{6}$
- D) $\frac{6}{5}$

15

If $x^2 - 3 = 0$, what is the value of $(x + 1)(x - 1)$?

- A) $2\sqrt{3}$
- B) 6
- C) 8
- D) 2

16

The perimeter of a rectangle is 56 cm. The length of the rectangle is 8 cm less than 3 times the width. What is the area of the rectangle in cm²?

17

The area of a circle is 12.5 square centimeters. What is the area of the circle in square inches? (1 centimeter \approx 0.4 inches)

- A) 2π
- B) 5π
- C) 2
- D) 5

18

The price of a t-shirt is \$24 but Mike only paid \$18. How much was the discount, in percent, on the t-shirt?

- A) 75%
- B) 33%
- C) 25%
- D) 52%

19

Which expression is equivalent to $\frac{x-5}{y-2} - \frac{x(x+2)}{xy-2x}$, where $y \neq 2, x \neq 0$?

- A) $\frac{7}{2-y}$
- B) $\frac{7}{y-2}$
- C) $\frac{2x-7}{2-y}$
- D) $-\frac{7}{2-y}$

20

A cone and a cylinder have the same radius of 5 inches. If the height of the cylinder is 3 times the height of the cone, what is the ratio of the volume of the cylinder to the volume of the cone?

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

21

Which of the following equations represents a circle in the x y -plane with radius 5?

- A) $x^2 + y^2 - 6y = 25$
- B) $x^2 + y^2 + 6y = 25$
- C) $x^2 + y^2 - 6y = 16$
- D) $x^2 + 2x + y^2 = 9$

22

A large sphere has a radius of 13 centimeters and the radius of a small sphere is $\frac{2}{3}$ the radius of the large sphere. What is the ratio of the volume of the small sphere to the volume of the large sphere?

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No Test Material On This Page