

Math

22 QUESTIONS | 35 MINUTES

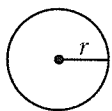
DIRECTIONS

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

NOTES

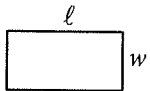
Unless otherwise indicated: • All variables and expressions represent real numbers. • Figures provided are drawn to scale. • All figures lie in a plane. • The domain of a given function is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

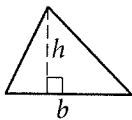


$$A = \pi r^2$$

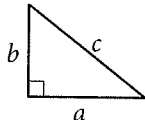
$$C = 2\pi r$$



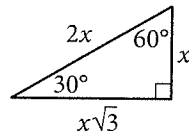
$$A = \ell w$$



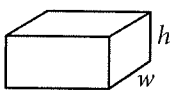
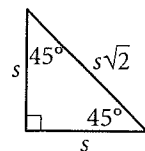
$$A = \frac{1}{2}bh$$



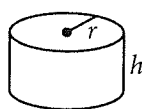
$$c^2 = a^2 + b^2$$



Special Right Triangles



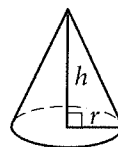
$$V = \ell wh$$



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



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



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



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

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 $4x + 16 = 24$, what is the value of $x + 4$?

- A) 8
- B) 6
- C) 2
- D) 4

2

Cocopine high school conducts annual surveys at its school to find out the number of teachers and students by gender. The results of the survey showed that there were 35 teachers and 245 students in the school.

	Students	Teacher
Male	131	
Female		16

Using the table above, if a person is chosen at random, what is the probability that the person is a male teacher?

- A) $\frac{19}{280}$
- B) $\frac{19}{150}$
- C) $\frac{19}{35}$
- D) $\frac{19}{131}$

3

If a is a solution to this equation below and $a > 0$, what is the value of a ?

$$|2x - 3| = 11$$

4

Line k is a line perpendicular to line m . Given that the equation for line m is $5y = 4x + 15$, which of the following could be the equation for line k ?

- A) $y = \frac{4}{5}x - 12$
- B) $y = \frac{5}{4}x + 6$
- C) $y = -\frac{5}{4}x - 2$
- D) $y = \frac{5}{4}x + 10$

5

What is the center of the circle, given that its equation is $x^2 + y^2 - 6x + 4y = 36$?

- A) $(-3, 2)$
- B) $(2, -3)$
- C) $(3, -2)$
- D) $(-2, 3)$

6

If $(8^x)^x \times 4^{2x}$ is equivalent to $\left(\frac{2^{ax}}{2^{-b}}\right)^x$, what is the value of a ?

7

If (x, y) is a solution to the following system of inequalities, which of the following could be (x, y) ?

$$\begin{aligned} -6x + 3 &< y \\ y &< x + 6 \end{aligned}$$

- A) $(-2, -4)$
- B) $(4, 7)$
- C) $(-2, 1)$
- D) $(-4, -2)$

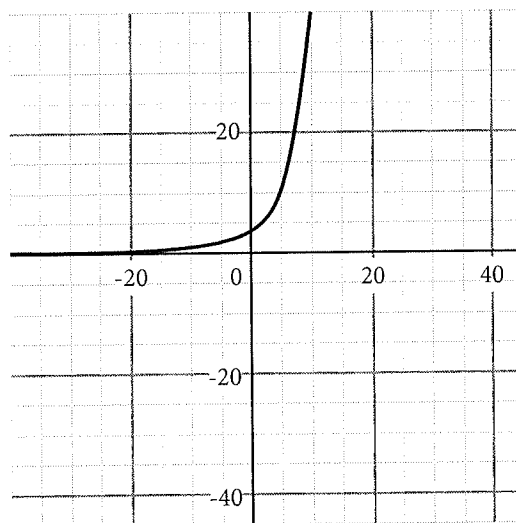
8

If $f(x) = 2(x-3)^2 + 8$ is transformed to $g(x) = 2(x-5)^2 + 5$, which of the following describes the transformation?

- A) The x coordinate moves to the right 2 units and the y coordinate moves 3 units down.
- B) The x coordinate moves to the left 2 units and the y coordinate moves 3 units down.
- C) The x coordinate moves to the right 2 units and the y coordinate moves 3 units up.
- D) The x coordinate moves to the left 2 units and the y coordinate moves 3 units up.

9

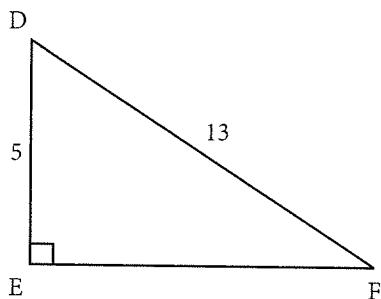
Which of the following equation best represents the graph below?



- A) $y = 5(0.7)^x$
- B) $y = 5(1.3)^x$
- C) $y = 3(0.7)^x$
- D) $y = 3(1.3)^x$

10

If triangle PQR (not shown) is similar to triangle DEF shown below and $DE = 2PQ$, what is the value of $\sin R$?



11

The average SAT score of 7 students in a class is 1,320. If a student with an SAT score of 1,460 joins the class, what will be the new average SAT score (rounded off to the nearest 10)?

- A) 1,390
- B) 1,340
- C) 1,300
- D) 1,460

12

A researcher studies bacteria in a pond and models a function that shows how the bacteria populate in the pond. Let t be the number of days since the bacteria began to populate the pond. Which of the following is the best interpretation of $(3)^{\frac{t}{14}}$ in the equation: $p(t) = 2,034(3)^{\frac{t}{14}}$?

- A) The number of bacteria at the beginning of the study
- B) The number of bacteria triples every two weeks
- C) The number of bacteria increases by 3 every two weeks
- D) The number of bacteria in the pond after two weeks

13

What is the value of p , if the equation below has no solutions?

$$5(x + 3) - 3(2 - x) = px + 7$$

14

How many solutions does the following system of equations have?

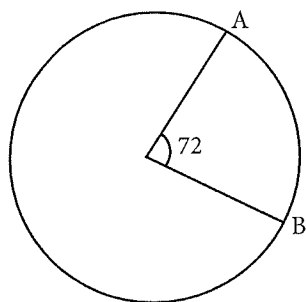
$$3x - 4y = 16$$

$$-6x = -8y + 32$$

- A) One solution
- B) Two solutions
- C) Infinitely many solutions
- D) No solution

15

What is the length of the minor arc AB, given that the diameter of the circle is 12 cm and the measure of the angle of sector AOB is 72° ?



- A) 2.4π
- B) 28.8π
- C) 12π
- D) $\frac{\pi}{6}$

16

The expression $y = -2(x + 3)^2 + 6$ is equivalent to $ax^2 + bx + c$, where $a < 0$ and $b < 0$. What is the value of c ?

17

If the coordinates of the midpoint of line segment AB are (8, 10) and the coordinates of point A are (6, 11), which of the following would represent the coordinates of point B?

- A) (7, 10.5)
- B) (2, 0.5)
- C) (10, 9)
- D) (7, 11)

18

How many solutions does the equation $|x + 3| = 0$ have?

- A) 1
- B) 2
- C) 0
- D) There is not enough information to answer the question.

19

What is the value of $|f(2)|$ where
 $f(x) = x^2 - 20x + 9$?

- A) 27
- B) -27
- C) 53
- D) 35

20

The price of oil increased by 20% at the beginning of May. Some policies were then put in place which reduced the price of oil by 14% two weeks after the initial increase. What is the overall percentage increase or decrease in the oil?

21

A circle is inscribed in a square. If the length of one side of the square is $4\sqrt{2}$ and the area of the circle is $p\pi$, what is the value of p ?

- A) 32
- B) 16
- C) 8
- D) 64

22

Which of the following is not a solution to the inequality below?

$$-3x + 6 \leq 2 - x$$

- A) 2
- B) 0
- C) 3
- D) 4



No Test Material On This Page