Math

22 QUESTIONS | 35 MINUTES

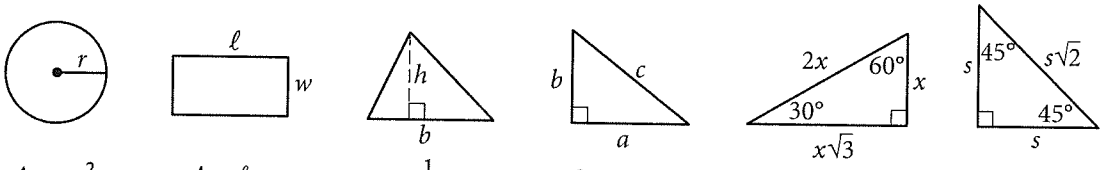
DIRECTIONS

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



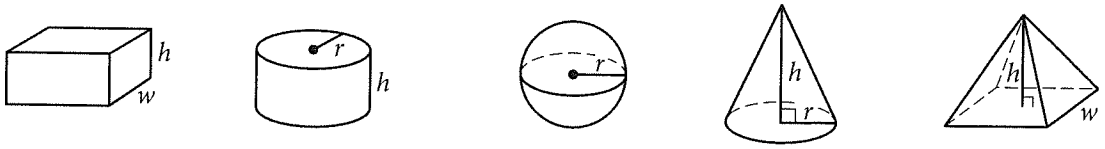
$A = \pi r^2$
$C = 2\pi r$

$A = \ell w$

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

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

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.!. 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.

CONTINUE

1

If m and n are solutions to the equation $f(x)=3x^2+9x-27$, what is the value of $m+n$?

A) 3

B) -9

C) -3

D) 9

2

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

A) $6x^2y-3x^2y^2+5x$

B) $x^2y-3x^2y^2+5x$

C) $6x^2y-2x^2y^2+5x$

D) $-3x^2y^2+5x^2y+5x$

3

What is the least integer value of y that satisfies the inequality below?

$$-2y+2<6$$

4

How many solutions does the following system of equations have?

$$y=2x-5$$

$$y=2x^2-18x+45$$

A) 1

B) 2

C) 0

D) Infinite

5

If $3x-y=11$ and $2x-2y=2$, what is the value of $x+y$?

A) 9

B) 5

C) 3

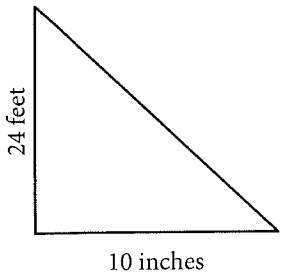
D) 13

6

If *sin* 32° = 0.551, what is the value of *cos* 58°?

7

If 1 *foot* = 12 *inches*, what is the area of the triangle (not drawn to scale) below in ft^2?



A) 120

B) 20

C) 1,440

D) 10

8

For all values of $x > 0$, which of the following is equivalent to the following equation $\frac{-5}{x} - \frac{x}{x-4}$?

A) -6

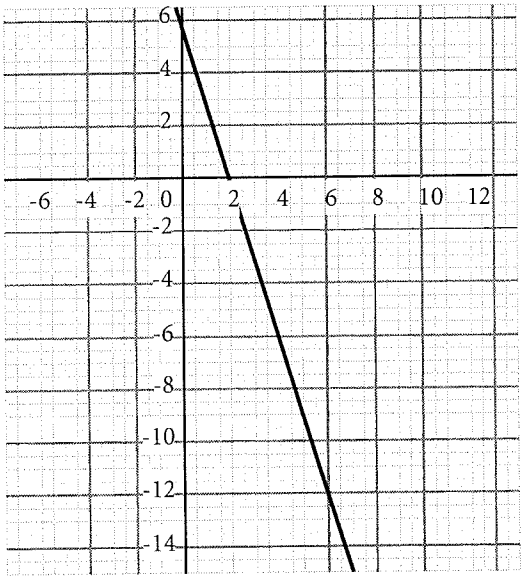
B) $\frac{x^2 + -20}{4}$

C) $\frac{-x^2 - 5x + 20}{x^2 - 4x}$

D) $\frac{-9 - x}{x - 4}$

9

Which of the following equations best represents the equation of the following graph?



A) $3y - 9x = 18$

B) $3y + 9x = 18$

C) $6y - 12x = 36$

D) $5y + 20x = 30$

10

What is the y–intercept for the equation below?

$$y - 7 = 3^x - 5$$

CONTINUE

11

For what value of x does the function $h(x)=\dfrac{3x-5}{x^2-2x-15}$ become undefined if $x<0$?

A) 5

B) −5

C) −3

D) −4

12

If $f(3)=-1$ and $f(4)=-3$, what is the *x-intercept* for the line represented by the function $f(x)$?

A) 2.5

B) 5

C) −2

D) $\dfrac{2}{5}$

13

If $f(x+3)=5x-17$, what is the value of $f(2)$?

14

Amber travels from her home to the mall in $1\frac{1}{2}$ *hours*. She completes her errands in one hour and she then travels back home in $2\frac{1}{2}$ *hours*.

If the distance from the mall to her home is x miles, find the average speed of her trip in terms of x.

A) $\dfrac{x}{4}$

B) $\dfrac{x}{2}$

C) $\dfrac{2x}{5}$

D) $2x$

15

Given that the length of a rectangle is 3 *meters* more than its width, what is the perimeter of the rectangle given that the area is 28 *square meters*?

A) 11

B) 22

C) 14

D) 32

16

A study conducted by a school's medical board found that 23 out of the 48 students surveyed practice sanitary routines such as washing their hands before meals. If there are 2,280 students in the school, approximately how many students in the school do not practice sanitary routines (rounded up to the nearest whole number)?

17

Which of the following is the equation of $g(x)=2x$ when it's moved 1 unit to the left and 1 unit up?

A) $y=2x-1$

B) $y=2x+1$

C) $y=2x+5$

D) $y=2x+3$

18

What is the *x coordinate* of the vertex for the parabola represented by the equation $y=2x^2+8x+12$?

A) 6

B) −4

C) 2

D) −2

19

If $\frac{x^2-6x+10}{x+2}=A+\frac{B}{x+2}$, what is the value of B?

20

If triangle ABC is a right triangle and B is 90° and the longest side of the triangle is 61 and the shortest side is 11, what is the length of the third side of the triangle?

A) 40

B) 60

C) 62

D) 59

CONTINUE

21

The psychology department of a school conducted a study on 20 random students in a third grade class of 58 students. 20 of the students were then offered a supplement. The study found that 15 of these students did better in their end-term exams compared to those who did not take the supplements. Which of the following statements can best be concluded from the above study?

A) Students who take supplements do better on exams.

B) Students who do not take supplements do not do well on their exams.

C) Supplements improve students' performance in their exams.

D) No conclusion can be drawn about the cause-and-effect relationship between test taking and supplement taking.

22

If $x+3y=9$ and $2x+2y=14$, what is the value of $y-x$?

A) -5

B) 5

C) 1

D) 6

STOP