

Math

22 QUESTIONS | 35 MINUTES

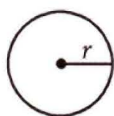
DIRECTIONS

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

NOTES

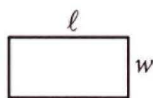
Unless otherwise indicated: • All variables and expressions represent real numbers. • Figures provided are drawn to scale. • All figures lie in a plane. • The domain of a given function is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

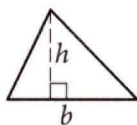


$$A = \pi r^2$$

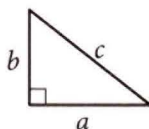
$$C = 2\pi r$$



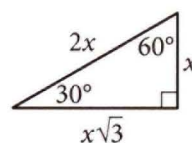
$$A = \ell w$$



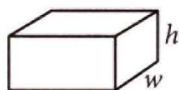
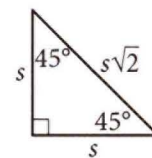
$$A = \frac{1}{2}bh$$



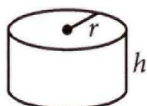
$$c^2 = a^2 + b^2$$



Special Right Triangles



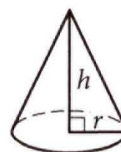
$$V = \ell wh$$



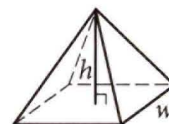
$$V = \pi r^2 h$$



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



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



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

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

$7x + 28 = 112$, What is the value of $x + 4$?

- A) -4
- B) 16
- C) 8
- D) 12

2

The radius of a ball is three times the radius of its prototype. If the prototype has a volume of 10cm^3 , what is the volume of the ball?

3

If the system of equations below has one solution, what is the value of k ?

$$y = 2x + k$$

$$y = x^2 - 10x + 30$$

- A) -6
- B) 3
- C) 6
- D) -3

4

If $\frac{27^{x-1}}{81^y} = 9$, what is the value of $6x - 8y$?

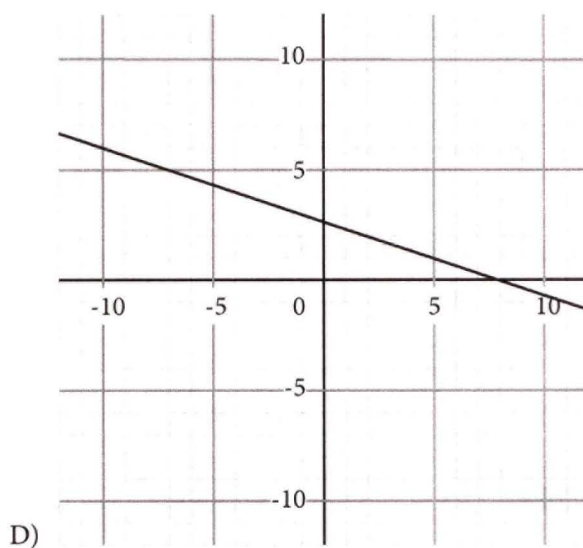
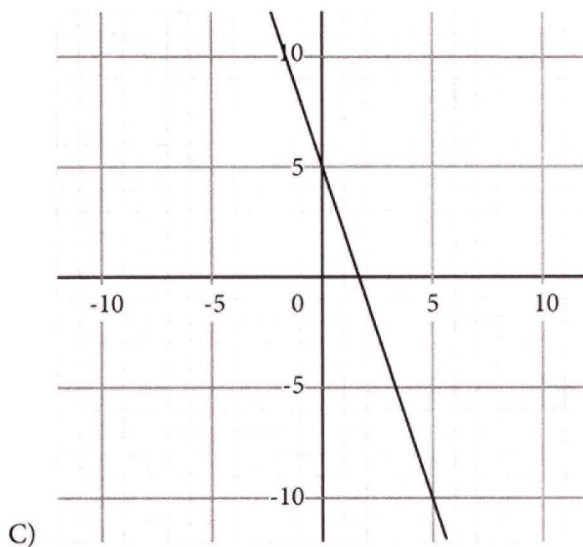
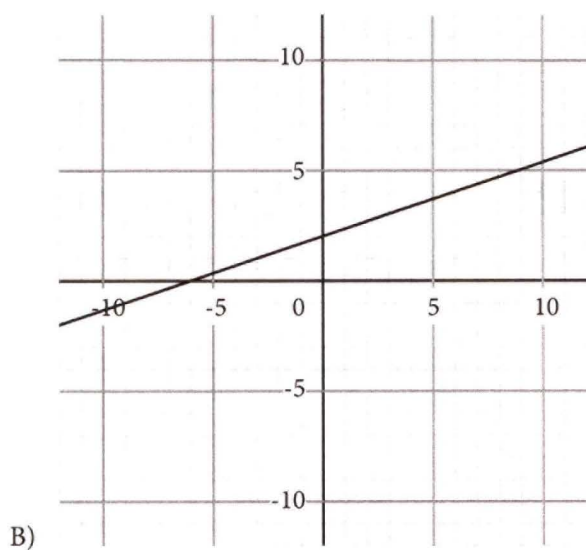
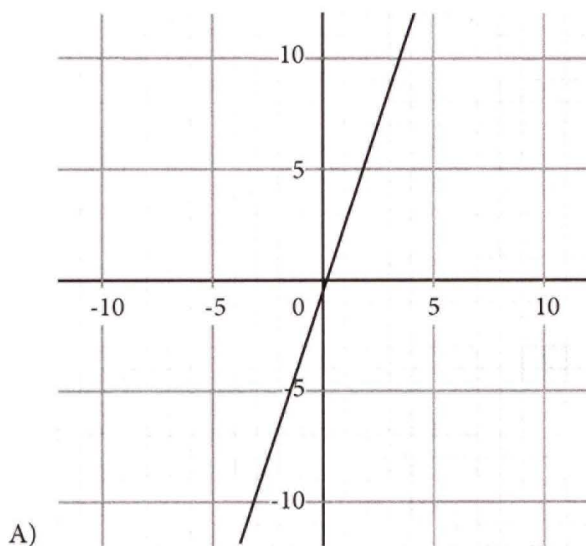
- A) 2
- B) 5
- C) 4
- D) 10

5

If the diagonal of a square is $16\sqrt{2}$, what is the perimeter of the square?

6

Which of the following graphs represents the equation $12x + 4y = 8$?



7

If the system of equations below has no solution, what is the value of p ?

$$\frac{3}{2}x + 5 = px + \frac{3}{2}$$

8

A researcher created a model $p(x)$, which is a function for the height of a girl in feet. Where t is in years and t is $2 \leq t \leq 5$. If $p(x) = 1.23(1.32)^t$, which of the following best represents the model in m months?

A) $p(x) = 1.23(1.32)^{12m}$

B) $p(x) = 1.23\left(\frac{1.32}{12}\right)^m$

C) $p(x) = 1.23(1.32)^{\frac{m}{12}}$

D) $p(x) = 1.23(1.32)^m$

9

If $\frac{-2x^2 + 5x + 10}{x - 3} = A + \frac{7}{x - 3}$, which of the following expressions best represents A ?

A) $-2x - 1$

B) $2x + 3$

C) $-2x - 3$

D) $-2x^2 + 4x + 13$

10

If $3x = -5y$ and $2x + 3y = -1$, what is the value of x ?

A) 3

B) -5

C) 2

D) -8

11

What is the greatest possible integer value of k if the quadratic equation below has two distinct solutions?

$$4x^2 - 12x + k = 0$$

12

How many solutions does the equation below have?

$$3(x + 6) + x = 4x + 5$$

A) 0

B) 1

C) 2

D) Infinite

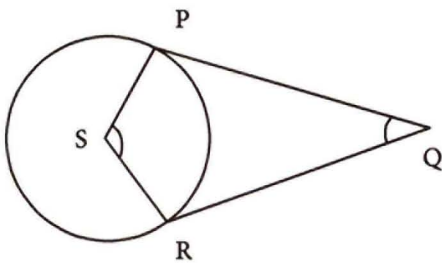
13

Which of the following is equivalent to the expression below?

$$\frac{1}{\frac{1}{x-2} + \frac{1}{x+2}}$$

- A) $\frac{x^2 - 4}{2x}$
 B) x
 C) $\frac{2x}{x^2 - 4}$
 D) $\frac{x^2 + 4}{2x}$

14



PQ and PR are tangents and points P and R lie on the circle. If $\angle PSR = 80^\circ$ and $\angle PQR = a\pi$, what is the value of a ?

- A) $\frac{5}{18}$
 B) $\frac{13}{18}$
 C) $\frac{5}{9}$
 D) 1

15

What is the area of a circle whose circumference is 12π ?

16

Which of the following expressions is equivalent to the expression below?

$$3p^{\frac{1}{3}}\sqrt{p}$$

- A) $3\sqrt[5]{p}$
 B) $\sqrt[6]{3p^5}$
 C) $3\sqrt[6]{p}$
 D) $3\sqrt[6]{p^5}$

17

What is the volume of a cylinder with a radius of 9 cm and a height of 6 cm?

- A) 270π
 B) 486π
 C) 81π
 D) 108π

18

If lines $3x + 5y = 6$ and $-6x + py = 18$ are parallel, what is the value of p ?

- A) -10
- B) 5
- C) 10
- D) 3

19

If $3xy(5x + 2) + 2y(3x - 1) = ax^2y + bxy + cy$, what is the value of b ?

20

How many solutions does the absolute value equation below have?

$$-2|x + 4| = -8$$

- A) 0
- B) 1
- C) 2
- D) Infinite

21

If $xy = 5$ and $x^2 + y^2 = 45$, what is the value of $(x + y)^2$?

- A) 9
- B) 55
- C) 110
- D) 35

22

A study was conducted on 1,200 residents in a particular town. 950 of the residents surveyed owned a dog or a cat and the rest owned a different type of pet. If there are 62,500 residents in the town, approximately how many of them own a different type of pet?

- A) 62,500
- B) 49,480
- C) 13,020
- D) 61,550

STOP