2 Module 2 2

Math

35 MINUTES, 22 QUESTIONS

DIRECTIONS

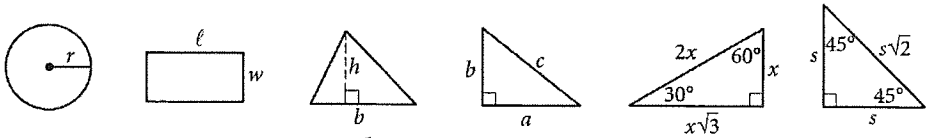
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

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



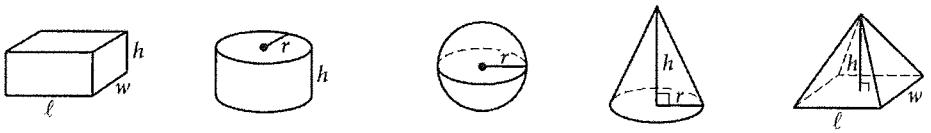
$A = \pi r^2$
$C = 2\pi r$

$A = \ell w$

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

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

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.

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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.

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1

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

2

If $f(x) = (x-3)^2 + 5$ and $g(x) = f(x+6)$, what is the value of $g(2)$?

A) 20

B) 126

C) 30

D) 80

3

A truck drives from city A to city B, which are y miles apart. If the truck drives at an average speed of 40 mph, it will cover the distance in x hours. If the average speed increases by 25%, the truck would arrive 30 minutes earlier. What is the distance, in miles, between city A and city B?

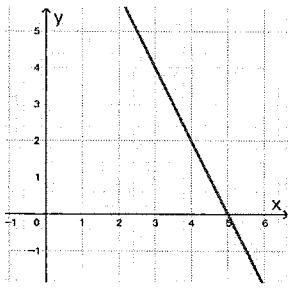
A) 125

B) 130

C) 150

D) 100

4



The line m is graphed in the x y-plane above. What is the y-intercept?

A) 5

B) 12

C) 10

D) 16

5

95, 62, 68, 55, 86, 92, 88, 79, 60, 90

The given data values represent the scores of 10 students on a recent science quiz. What was the median score of the 10 students on the science quiz?

A) 77.5

B) 82.5

C) 79

D) 86

6

The equation $x^2 + 9x - 16 = 0$ has two distinct real solutions m and n. What is the value of $m \cdot n$?

A) -16

B) -9

C) -25

D) -3

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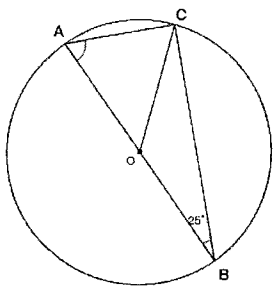
7



In the figure above, AB is the diameter of the circle with center O. If the measure of ∠ABC is 25°, what is the measure of ∠BAC?

A) 65°

B) 60°

C) 30°

D) 25°

8

A college student's total part-time wage last year was $5,500 and his total wage this year is $4,675. What is the percent decrease in the student's wage this year in comparison to last year?

A) 17.65%

B) 15%

C) 20%

D) 25%

9

$$f(t) = 1200(0.85)^t$$

The given function f models the number of gift cards a grocery store sent to their customers at the end of the year, where t represents the number of years since the end of 2004, and $0 \leq t \leq 5$. If $y = f(t)$ is graphed in the t y-plane, which of the following is the best interpretation of the y-intercept of the graph in this context?

A) The estimated number of gift cards the grocery store sent to their customers at the end of 2004 was 626.

B) The minimum estimated number of gift cards the grocery store sent to their customers during the 5 years was 1200.

C) The estimated number of gift cards the grocery store sent to their customers at the end of 2004 was 1200.

D) The minimum estimated number of gift cards the grocery store sent to their customers during the 5 years was 626.

10

The mass of the radioactive isotope Cobalt-60 has a half-life of 5.3 years. Suppose that 10 pounds of Cobalt-60 was dumped in a nuclear waste site. Which of the following equations represents the mass y, in pounds, of Cobalt-60 remaining after x years?

A) $y = 10(\frac{1}{2})^{5.3x}$

B) $y = 10(1 + \frac{1}{2})^{5.3x}$

C) $y = 10(\frac{1}{2})^{\frac{x}{5.3}}$

D) $y = 10(1 + \frac{1}{2})^{\frac{x}{5.3}}$

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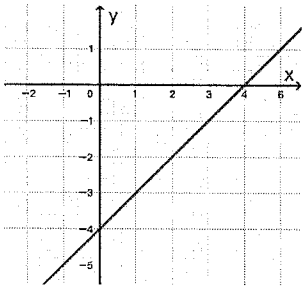
11



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

A) $(0, -4)$

B) $(4,0)$

C) $(0,4)$

D) $(-4,0)$

12

$$(x + 5)^2 = 36$$

What is the largest value of x that is a solution to the given equation?

A) -11

B) -1

C) 11

D) 1

13

A cyclist completes a trip in 5 hours. He travels the first $\frac{1}{3}$ of the trip at a rate of 6.5 mph, and the last $\frac{2}{3}$ of the trip at a rate of 13 mph. What is the total distance, in miles, the cyclist completed?

A) 32.50

B) 65

C) 48.75

D) 72

14

$$kx^2 - 2x + 3 = 0$$

In the given equation, k is a constant. If the equation has no real solutions, what is a possible value of k?

A) $\frac{2}{7}$

B) $\frac{1}{6}$

C) $\frac{1}{5}$

D) $\frac{2}{3}$

15

$$y + 6 = 5x$$
$$y = ax + bx + c$$

In the system of equations above, a, b, and c are constants, and x and y are variables. If the system of equations has infinite solutions, what is the value of $a + b + c$?

16

Right triangle ABC is similar to the right triangle DEF such that A, B, and C correspond to D, E, and F, respectively. The measure of $\angle A=26°$, $\angle C=90°$ and $\frac{EF}{BC} = 2$. What is the measure of $\angle E$?

A) 26°

B) 64°

C) 54°

D) 17°

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17

Jenny, the owner of a flower shop, sells a pot of orchid flowers for \$168, making 20% profit. During an on-sale period, the profit is cut to 10%. What is the discounted price of the flower pot?

18

$$\sqrt{16x^2 - 24x + 9} - (\sqrt{2x + 5})^2$$

Which expression is possibly equivalent to the given expression?

A) $2x + 2$

B) $4x - 8$

C) $2x + 8$

D) $2x - 8$

19

If $k^{-a} \cdot k^{a} \cdot k^{2a+1} = k^{35}$, where k and a are positive constants, what is the value of a ?

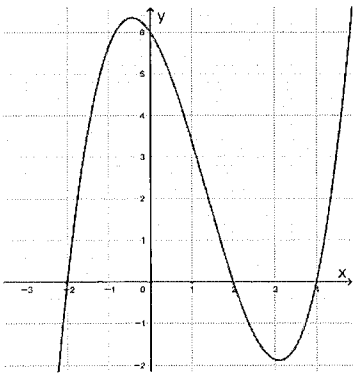
20

A square glass object has a side length of 10 cm. There is a spherical cavity with a radius of 3 cm in the square glass object. What is the volume, in cubic centimeters, of the square glass object? (round to the nearest whole number; $\pi = 3.14$)

21

An injured person called for help and the ambulance set off immediately. If the ambulance traveled 6 minutes at a constant speed of 80 mph and another 4 minutes at a constant speed of 75 mph before reaching the injured person, what is the distance, in miles, between the ambulance service station and the injured person?

22



The graph $y = f(x)$ is shown, where function f is defined by $f(x) = \frac{3}{2}(\frac{1}{4}x^3 - x^2 - x + 4)$. How many values of x are there at $f(x) = 3$?

A) One

B) Two

C) Three

D) Four