**Module
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.
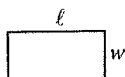
NOTES

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.
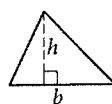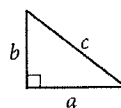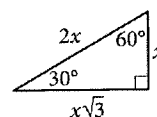
REFERENCE

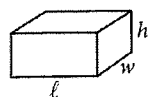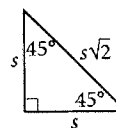
$A = \pi r^2$
$C = 2\pi r$

$A = \ell w$

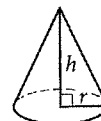$A = \frac{1}{2} bh$
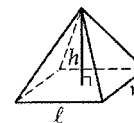
$c^2 = a^2 + b^2$

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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2 Module **2** **2**

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.

Practice Test 3

1

If $2 + \dfrac{3}{25}x^2 = 5$, what is the negative value of $x + 1$?

2

If $f(x) = 2x^2 + bx - 2$, where b is a constant and $f(2) = 8$, what is the value of $f(5)$?

3

A store sells apples for x dollars per pound and oranges for y dollars per pound. When Emily buys 3 pounds of apples and 5 pounds of oranges, the total cost is 17 dollars. When Emily buys 5 pounds of apples and 3 pounds of oranges, the total cost is 15 dollars. Which of the following systems of equations represents this situation?

A) $5x + 3y = 17$
   $3x + 5y = 15$

B) $5x + 3y = 15$
   $5x - 3y = 17$

C) $3x + 5y = 17$
   $5x + 3y = 15$

D) $3x + 5y = 15$
   $5x + 3y = 17$

4
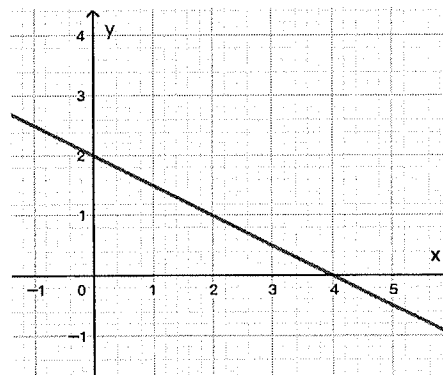
The equation $ax - by = 12$ is shown in the graph above, where a and b are constants. What is the value of a?

A) 4

B) 2

C) 6

D) 3

5

Data set A contains the heights of the 10 students in Ms. Kelly's class who participated in the basketball team, in which the mean height is 175 cm. Data set B contains the heights of the 40 students in Ms. Kelly's class who are not in the basketball team, in which the mean height is 165 cm. What is the mean height, in cm, of the 50 students in Ms. Kelly's class?

2 **Module 2** **2**

6

$$y = a x^2 + 16x + 5$$

The given equation relates the variables x and y, where a is a constant. The value of y reaches its maximum value when $x = 4$. What is the maximum value of y?

A) 4

B) 37

C) 2

D) 8

7

In the right triangle MQP, the length of the hypotenuse is $13x$ and the length of one leg is $5x$. What is the length of the other leg?

A) $4x$

B) $12x$

C) 12

D) $8x$

8

Alex paid $614.88 for a watch, of which the 5% HST tax was $27.45 and the 7% QST tax was $38.43. Which of the following expressions does not provide the price-before-tax of the watch, x?

A) $x(1 + 7\% + 5\%) = 614.88$

B) $x \cdot 7\% = 38.43$

C) $x \cdot 5\% = 27.45$

D) $x = 614.88(1 + 7\% + 5\%)$

9

A bacteria population doubles every five hours. If the initial bacteria population is 1200 and the function $P(t)$ gives the bacteria population size after t hours, which of the following functions defines $P(t)$?
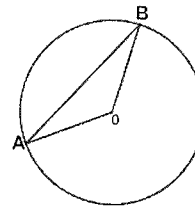
A) $P(t) = 1200(2)^{5t}$

B) $P(t) = 1200(\frac{1}{2})^{5t}$

C) $P(t) = 1200(\frac{1}{2})^{\frac{t}{5}}$

D) $P(t) = 1200(2)^{\frac{t}{5}}$

10

The function $y = f(x)$ is defined by $f(x) = 8x - k$, where k is a constant. The y-intercept of the graph in the xy-plane is $(0,5)$. What is the value of k?

A) 5

B) -5

C) -8

D) 8

11

In the figure shown above, the point O is the center of the circle and the angle of AOB is $\frac{2}{3}\pi$ radians. How many degrees is the angle AOB?

2 Module **2** **2**

12

$$(2x + 5) - (3 - x)$$

Which of the following is equivalent to the given expression?

A) $x + 8$

B) $3x + 8$

C) $3x + 2$

D) $x + 2$

13

The equation above can be used to calculate the distance d, in miles, traveled by a car moving at an average speed of 45 miles per hour. For any positive constant n, the distance the car traveled after $6n$ hours is $d = 45t$ how many times the distance the car traveled after $2n$ hours?

A) 2

B) $3k$

C) 3

D) $2k$

14

When the quadratic function f is graphed in the xy-plane, where $y = f(x)$, its vertex is (2,4). If one of the x-intercepts of this graph is $(-1,0)$, what is the other x-intercept?

A) (4,0)

B) (7,0)

C) (5,0)

D) (6,0)

15

$$y = 6x + 24$$
$$3y = 14x + 2y$$

The solution to the given system of equations is (m, n), where m and n are constants. What is the value of $m - n$?

A) 39

B) 45

C) -39

D) 24

16

There are three metal spheres with radii of 6, 8, and 10, respectively. If these three metal spheres are melted together to make one large metal sphere, what is the radius of the large metal sphere?

A) 12

B) 24

C) 1720

D) 18

17

Amy wrote 26 Valentine's Day cards to her friends on Saturday and Sunday. On Sunday, she wrote 2 more than 2 times the number of cards that she wrote on Saturday. How many Valentine's Day cards did Amy write on Sunday?

18

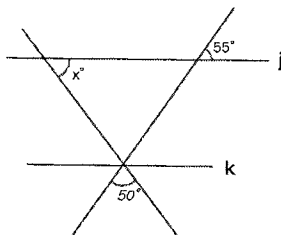Which expression is equivalent to $9x^2 + 3$?

A) $(3x + 5)(3x - 5) - 28$

B) $(3x + 5)(3x - 5) + 28$

C) $3(x + 2)(x - 2) - 15$

D) $3(x + 2)(x - 2) + 9$

19

If $2^{2m} = a^{\frac{2}{5}}$ and $2^{2n} = b^{\frac{2}{5}}$, which of the following is equivalent to $(\frac{a}{b})^2$?

A) 4^{m-n}

B) 32^{m-n}

C) 64^{m-n}

D) 1024^{m-n}

2   **Module 2**   **2**

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In the figure above, lines j and k are parallel. What is the value of x?

21

Data Set A		Data Set B	
Value	Frequency	Value	Frequency
15	2	15	1
16	2	16	1
17	2	17	6
18	2	18	3
19	1	19	2
20	2	20	2

Data Set A and B are shown in the tables above. Which of the following statements best compares the standard deviation and the means of the two data sets?

A) The mean of Data Set A is greater than the mean of Data Set B, and the standard deviation of Data Set A is greater than the standard deviation of Data Set B.

B) The mean of Data Set A is greater than the mean of Data Set B, and the standard deviation of Data Set A is less than the standard deviation of Data Set B.

C) The mean of Data Set A is less than the mean of Data Set B, and the standard deviation of Data Set A is greater than the standard deviation of Data Set B.

D) The mean of Data Set A is less than the mean of Data Set B, and the standard deviation of Data Set A is less than the standard deviation of Data Set B.

22

$$y = \frac{2x + p}{x - p}$$

The equation above expresses y in terms of p and x. Which of the following equations expresses x in terms of p and y?

A) $x = \dfrac{p(y - 1)}{y - 2}$

B) $x = \dfrac{p(y + 1)}{y + 2}$

C) $x = \dfrac{p\,y}{y + p}$

D) $x = \dfrac{p(y + 1)}{y - 2}$