

## 2025 SAT Summer Class

Week 4

Jaehoon Song (Lecturer)

SAT/DSAT/SSAT

Hans edu LLC (Columbia Academy)

June 16, 2025

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Written by Jaehoon Song (Lecturer)

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**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**

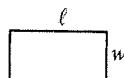
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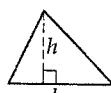
**REFERENCE**

$$A = \pi r^2$$

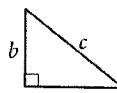
$$C = 2\pi r$$



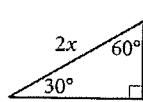
$$A = lw$$



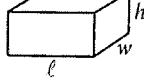
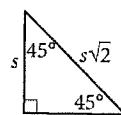
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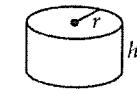
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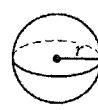
Special Right Triangles



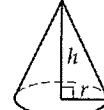
$$V = lwh$$



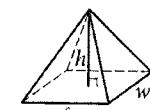
$$V = \pi r^2 h$$



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



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



$$V = \frac{1}{3}lwh$$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is  $2\pi$ .

The sum of the measures in degrees of the angles of a triangle is 180.

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1

$$\frac{(8 + 6k - 4k)}{2} = 7$$

What is the solution to the given equation?

- A) 1
- B) 3
- C) 6
- D) 10

2

If  $-4 \leq 1 - x \leq -2$ , what are the possible values of  $x$ ?

- A)  $3 \leq x \leq 5$
- B)  $-5 \leq x \leq -3$
- C)  $x \leq -5$  or  $x \geq -3$
- D)  $2 \leq x \leq 4$

3

If  $f(x) = 6x + 8$ , what is the value of  $f(0)$ ?

- A) 14
- B) 8
- C) 2
- D) 9

4

The whale population at the beginning of the study was 2100 whales. The number of whales in the population increased at a rate of approximately 35 per year. Which function  $f$  gives the number of whales  $t$  years after the beginning of the study?

- A)  $f(t) = 35t + 2100$
- B)  $f(t) = 35t - 2100$
- C)  $f(t) = (2100 + 35)t$
- D)  $f(t) = 2100 - 35t$

5

$$f(x) = ax^3 + x + c$$

The function  $f$  is defined above, where  $a$  and  $c$  are constants. If  $f(-1) = 3$  and  $f(1) = 7$ , what is the value of  $a$ ?

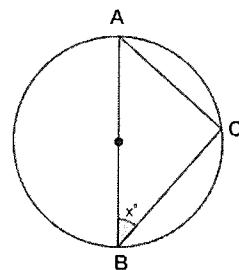
- A) 5
- B) 1
- C) 4
- D) 6

6

The slope of line  $l$  is  $-\frac{1}{2}$ , and line  $k$  is perpendicular to line  $l$  in the  $x$ - $y$ -plane. Which of the following functions could define line  $k$ ?

- A)  $f(x) = 2x + 5$
- B)  $f(x) = -2x + 3$
- C)  $f(x) = \frac{1}{2}x + 6$
- D)  $f(x) = -\frac{1}{2}x + 5$

7



In the circle above, the diameter  $AB$  is equal to 10 and the length of  $AC$  is equal to 6. What is the area of triangle  $ABC$ ?

## Practice Test 4

2

Module  
1

2

8

$$f(x) = -3x^2 + 12x + 6$$

For the function above, what is the maximum value?

- A) 18
- B) 2
- C) 15
- D) 9

9

Which of the following circles in the  $xy$ -plane has a diameter that is not equal to 12?

- A)  $x^2 + y^2 = 36$
- B)  $x^2 - 2x + y^2 - 4y = 31$
- C)  $x^2 - 2x + y^2 - 4y = 36$
- D)  $x^2 + 4x + y^2 + 6y = 23$

10

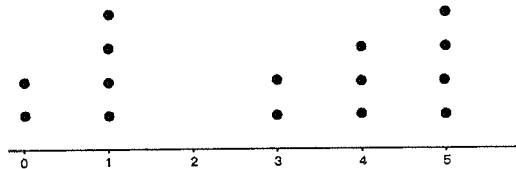
Bacteria reproduce by simple asexual binary fission. The initial population of *E.coli* is  $B$  and the population doubles every 20 minutes. Which of the following equations represents the total number of *E.coli* bacteria after 3 hours?

- A)  $y = B(2)^9$
- B)  $y = B(2)^{180}$
- C)  $y = B(2)^3$
- D)  $y = B(2)^{20}$

11

A car traveling at  $\frac{1}{2}$  of its usual speed takes an extra 20 minutes to reach its destination. What is the usual time the car takes to cover the same distance at its usual speed?

12



The dot plot represents the distribution of values in a data set. What is the mean value of this data set?

13

A box contains 80 glass beads. 26 beads are blue and 32 beads are red. A bead is picked randomly from the box. What is the probability that the bead is neither blue nor red?

- A)  $\frac{13}{40}$
- B)  $\frac{16}{20}$
- C)  $\frac{11}{40}$
- D)  $\frac{13}{16}$

14

$$m + 1 = 2m - 616$$

What is the solution to the given equation?

- A) 308
- B) 206
- C) 617
- D) 615



## Practice Test 4

**2****Module  
1****2****15**

The function  $f$  is defined by  $f(x) = (x^2 - 1)(x + 1)$ . What is the value of  $f(3)$ ?

- A) 32
- B) 40
- C) 24
- D) 12

**16**

The average of three numbers is 60. If two of the numbers have a sum of 135, what is the third number?

- A) 60
- B) 45
- C) 75
- D) 90

**17**

A side length of a square is 6 inches. What is the area of the square, in square centimeters? (1 inch = 2.54 centimeters)

- A) 36
- B) 91.44
- C) 232.26
- D) 165

**18**

A student went to a bookstore and paid a total of \$150 to purchase books and notebooks. If the student spent 70% of the money on books, how many dollars did he spend on notebooks?

**19**

Which expression is equivalent to  $(6x^3 - 2x^2) - (5x^3 - 2x^2)$ ?

- A)  $x^3$
- B)  $x^2(x - 4)x$
- C)  $x^2(11x - 4)$
- D)  $x^4(x^2 - 1)$

**20**

Square A has an area of 16 square inches. One side of Square B is 3 times the side of Square A. What is the area of Square B, in square inches?

**21**

The variable  $y$  is the value of  $x$  increased by 35% and then decreased by 25%. Which of the following expressions represents the relationship between  $x$  and  $y$ ?

- A)  $y = x(1 + 35\%) - 25\%$
- B)  $y = x(1 + 35\%)$
- C)  $y = x(1 + 35\%)(1 - 25\%)$
- D)  $y = x \cdot 35\% - x \cdot 25\%$

**22**

Lucas ran  $\frac{4}{5}$  of a kilometer in 6 minutes. How many miles can Lucas run in half an hour? (1 kilometer = 0.62 miles)

- A) 4
- B) 2.48
- C) 15.5
- D) 8



## Practice Test 4

**No Test Material On This Page**

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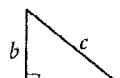
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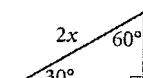
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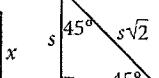
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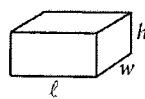


$$2x$$

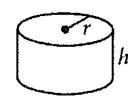


$$s$$

Special Right Triangles



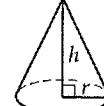
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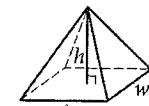
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$$V = \frac{1}{3}\pi r^2 h$$



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Module  
2

## 2

1

If  $\frac{x^2 - y^2}{3x + 3y} = \frac{7}{5}$ , what is the value of  $5(x - y)$ ?

2

The function  $f$  is defined by  $f(x) = kx^2 + 3x - 1$ , where  $k$  is constant and  $f(2) = -19$ . What is the value of  $f(-2)$ ?

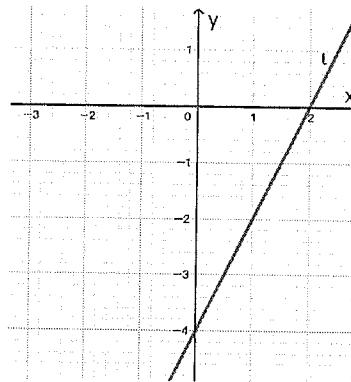
3

$$\begin{aligned} y + ax &= 5 \\ 3y - x &= 15 \end{aligned}$$

If the system of equations above has infinite solutions, what is the value of  $a$ ?

- A)  $\frac{1}{3}$
- B)  $-\frac{1}{3}$
- C) 3
- D) -3

4



Line  $l$  is shown in the  $x$ - $y$ -plane above. Line  $p$  is line  $l$  shifted 2 units. Which equation below represents the line  $p$ ?

- A)  $y = 2x + 4$
- B)  $y = 2x - 2$
- C)  $y = 2x$
- D)  $y = 2x - 6$

5

The median number of books Sally read each week over the past 9 weeks is 4. Which of the following changes could lead to the same median number of books Sally read per week?

- A) Read 2 more books in the first week and 1 less book in the last week
- B) Read 1 less book per week
- C) Read 2 more books in the week she reads the most
- D) Read 2 more books per week

6

Which of the following functions, when graphed in the  $x$ - $y$ -plane, has exactly one positive  $x$ -intercept and one negative  $x$ -intercept?

- A)  $y = x^2 + 10x + 24$
- B)  $y = x^2 - 10x + 24$
- C)  $y = x^2 - 2x - 24$
- D)  $y = x^2 - 11x + 28$

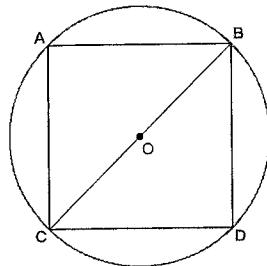
## Practice Test 4

2

Module  
2

2

7



The figure above shows a square ABCD inscribed in a circle, where the diameter of the circle is 18. What is the area of the square ABCD?

- A) 81
- B) 162
- C) 324
- D) 250

8

Homemade sugar-salt rehydration solutions should contain a ratio of 1000:20:5 of water-sugar-salt respectively. If the rehydration solution contains 15 grams of sugar, how many grams of salt is needed?

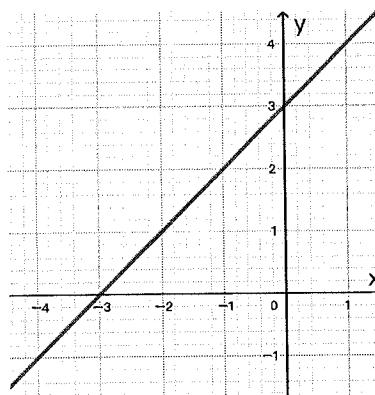
9

$$f(t) = A(1 + 2.5\%)^t$$

An investor deposited some money into his investment account at the end of 2021. The function  $f$  models the amount of money in his investment account  $t$  years after 2021, where  $0 \leq t \leq 5$ . Which of the following statements is the best interpretation of the  $A$  in the function  $f$ ?

- A) The increase of money every year in the investment account
- B) The money the investor deposited at the end of 2021
- C) The flat fee for opening the investment account
- D) The amount of money in the investment account after 2 years

10



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

- A) (3, 0)
- B) (-3, 0)
- C) (0, 3)
- D) (0, -3)

11

How many seconds is equal to one hour and thirty minutes?

- A) 5400
- B) 90
- C) 3600
- D) 6480000

12

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

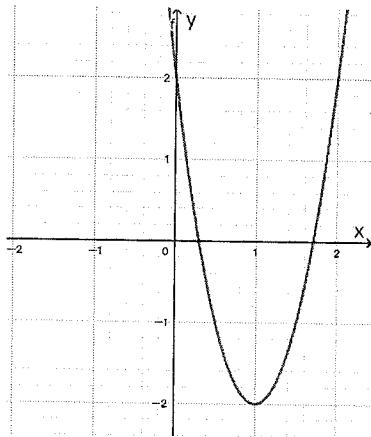
- A)  $(x - 1)(x + 1)$
- B)  $3x^2 + 11$
- C)  $3x^2 - 1$
- D)  $x^2 - 11$

13

Georgia and Victoria started from the same coffee shop and walked in opposite directions. Georgia walks 1 mile per hour faster than Victoria. After 2 hours, they are 26 miles apart. What is Georgia's average speed?

- A) 7
- B) 6
- C) 13
- D) 10

14



Which of the following quadratic functions is shown in the graph above?

- A)  $y = 2(x - 1)^2 - 2$
- B)  $y = 4(x - 1)^2 - 2$
- C)  $y = 4(x - 1)^2 + 2$
- D)  $y = 4(x + 1)^2 - 2$

15

$$\begin{aligned}y &= \frac{1}{2}x - 2 \\y &= 2x^2 - 4x + 1\end{aligned}$$

How many solutions does the given system of equations have?

- A) Zero
- B) Exactly one
- C) Exactly two
- D) Infinitely

16

Eight cube blocks each have the same volume of 64 units cubed respectively. When they are stacked together, they form a big cubic block. What is the length of one side of the big cube block?

17

Cocoa Delight sold 80 cups of hot chocolate. Of these, 56 contained marshmallows and 28 contained whipped cream. If 19 cups contained neither marshmallows nor whipped cream, how many cups must have contained both marshmallows and whipped cream?

18

Which expression is equivalent to  $(\frac{m}{3} - \frac{n}{2})^2$ ?

- A)  $\frac{1}{36}(m^2 - 2mn - n^2)$
- B)  $\frac{1}{9}m^2 - \frac{1}{4}n^2$
- C)  $\frac{1}{9}m^2 - \frac{1}{6}mn + \frac{1}{4}n^2$
- D)  $\frac{1}{9}m^2 - \frac{1}{3}mn + \frac{1}{4}n^2$

## Practice Test 4

2

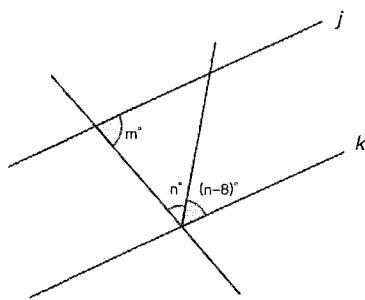
Module  
2

2

19

If  $2^m 2^n = 8$ , what is the value of  $4^m 4^n$ , where  $m$  and  $n$  are positive constants?

20



Lines  $j$  and  $k$  are parallel in the figure above. Which of the following expresses the value of  $m$  in terms of  $n$ ?

- A)  $m = 188 - 2n$
- B)  $m = 172 - 2n$
- C)  $m = 180 - n$
- D)  $m = 180 - 2n$

21

There were 3.12 million units of electric vehicle sold globally in 2020. Sales skyrocketed in 2021, increasing by 107% in comparison to 2020. How many vehicles, in million units, were sold globally in 2021? (Round to two decimal places)

- A) 3.34
- B) 5.30
- C) 6.46
- D) 8.42

22

The equation  $N(t) = 300(1.05)^t$  estimates the wildlife population during 2001–2004, where  $t$  represents the number of years since 2001. Which of the following is the best interpretation of  $(1.05)$ ?

- A) The number of wildlife increased by 50% from its previous year during 2001–2004
- B) The number of wildlife increased by 5% from its previous year during 2001–2004
- C) The number of wildlife increased by 1.05 times its previous year during 2001–2004
- D) The number of wildlife decreased by 50% from its previous year during 2001–2004

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**Math**

**22 QUESTIONS**  
**(TIME: 35 MIN)**

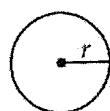
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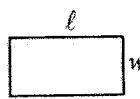
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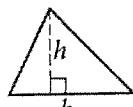
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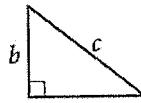
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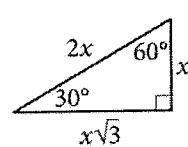
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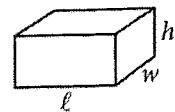
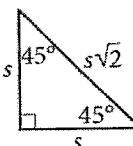
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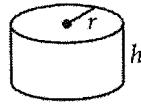
$$c^2 = a^2 + b^2$$



Special Right Triangles



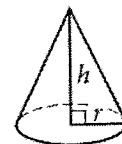
$$V = \ell wh$$



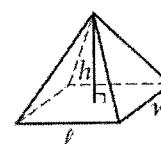
$$V = \pi r^2 h$$



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



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



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

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is  $2\pi$ .

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 (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

$$mx^2 + 10x + 1 = 0$$

In the equation above,  $c$  is a constant. If the equation has only one real solution, what is the value of  $m$ ?

- A) -25
- B) 25
- C) -50
- D) 50

3

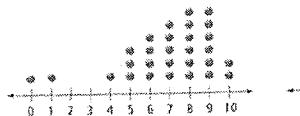
In a relation between two variables,  $x$  and  $y$ , they are related such that every increase by 1 in the value of  $x$ , the value of  $y$  decreases by a factor of 4. If  $y = 30$  when  $x = 0$ , which equation represents the relationship?

- A)  $y = 30 \left(\frac{3}{4}\right)^x$
- B)  $y = 30(x + 1)^4$
- C)  $y = 30 \left(\frac{1}{4}\right)^x$
- D)  $y = 30(-4)^x$

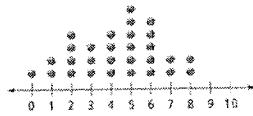
2

DISTRIBUTION OF NUMBER OF FOREIGN COUNTRIES VISITED

GROUP A



GROUP B



Which of the following statements must be true?

- I. The range of group A is bigger than the range of group B.
  - II. The mean value describes more accurately in data A than the median value because it has outliers
- A) I only  
B) II only  
C) I and II  
D) Neither I or II

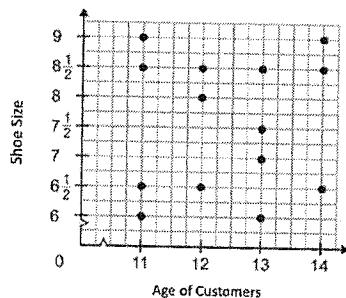
4

Elliott earns  $k$  dollars annually and pays  $r$  percent of what he earns for income taxes. Which of the following expressions represents the amount of money he earns after tax deduction?

- A)  $k(100 - r)$  dollars
- B)  $k(1 - r)$  dollars
- C)  $k(1 - 0.1r)$  dollars
- D)  $k(1 - 0.01r)$  dollars

5

Ages and Shoe Size of customers in kid's shoe store



Which of the following statements describes the most appropriate about the scatter plot above?

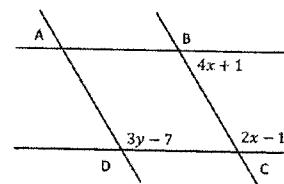
- A) The plot shows a positive correlation.
- B) The plot shows a negative correlation.
- C) The plot shows a constant trend.
- D) The plot shows no correlation.

6

In a certain survey, 25% of people were at most 20 years old and 75% were at most 50 years old. If 120 people in the survey were more than 20 years old and at most 50 years old, what was the total number of people surveyed?

- A) 120
- B) 180
- C) 220
- D) 240

7



In the diagram above, if  $\overline{AB} \parallel \overline{DC}$  and  $\overline{AD} \parallel \overline{BC}$ , what is the sum of values of  $x$  and  $y$ ?

- A) 22
- B) 30
- C) 52
- D) 62

8

Julie's income in 2021 was 40 percent higher than her income in 2020. What is the ratio of her income in 2021 to her income in 2020?

- A) 7 to 5
- B) 5 to 7
- C) 5 to 2
- D) 2 to 5

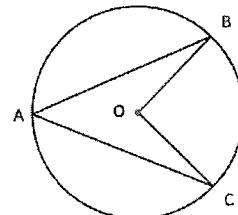
9

$$S(m) = 50,000(0.98)^m$$

The function,  $S(m)$ , above represents the population of bacteria in a certain colony  $m$  minutes after exposing them into partial sunlight. Which of the following functions best models the population of bacteria after  $h$  hours?

- E)  $P(h) = 50,000 \left(\frac{0.98}{60}\right)^h$
- F)  $P(h) = 50,000(0.98)^{\frac{h}{60}}$
- G)  $P(h) = 50,000(0.98)^{60h}$
- H)  $P(h) = \frac{50,000}{60} (0.98)^h$

11



The circle  $O$  is shown above, if the radius of the circle is 6 and the measure of angle  $\angle BAC = 30^\circ$ , what is the length of arc  $BC$ ?

- A)  $2\pi$
- B)  $4\pi$
- C)  $6\pi$
- D)  $8\pi$

10

$$f(x) = -2x^2 + 4x + 3$$

In the quadratic function,  $f(x)$ , shown above, what is the maximum value of the function  $f(x)$ ?

12

The average (arithmetic mean) of three positive integers,  $a$ ,  $b$ , and  $c$  is 32 where  $c < b < a$ . If the sum of two smaller numbers is 46, what is the value of  $a$ ?

14

$$f(x) = (x - 1)(x - 3)(x + 1)$$

The function  $f$  is shown above. Which of the following table values represents  $y = f(x) + 1$ ?

A) 

| x  | y |
|----|---|
| 1  | 2 |
| 3  | 4 |
| -1 | 0 |

B) 

| x  | y |
|----|---|
| 1  | 0 |
| 3  | 0 |
| -1 | 0 |

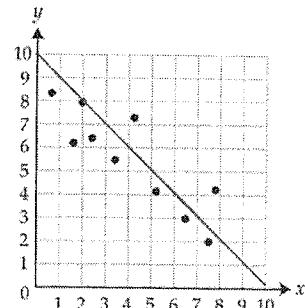
C) 

| x  | y  |
|----|----|
| 1  | -1 |
| 3  | -1 |
| -1 | -1 |

D) 

| x  | y |
|----|---|
| 1  | 1 |
| 3  | 1 |
| -1 | 1 |

15



In the scatterplot shown above, which of the following equations best represents the line of best fit shown?

- A)  $y = -x + 8$
- B)  $y = -x + 10$
- C)  $y = 10 + x$
- D)  $y = 10 - 2x$

14

The number of tiles needed to cover 50 square feet of wall is 100. A bathroom has a total of  $t$  square feet on the wall to cover. Which of the following could represent the total number of tiles needed to cover three bathrooms in terms of  $t$ ?

- A)  $2t$
- B)  $3t$
- C)  $5t$
- D)  $6t$

16

$$\frac{(m^{-2}n^3)(m^2n^{-2})^2}{(mn^{-1})^{-1}}$$

If the algebraic expression above is simplified to  $\frac{m^x}{n^y}$ , where  $x$  and  $y$  are positive integers. What is the value of the sum of  $x$  and  $y$ ?

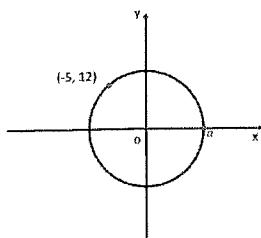
17

$$\frac{1}{r_t} = \frac{1}{r_a} + \frac{1}{r_b}$$

To calculate the total resistance in a parallel circuit, we can use the formula above. Which equation correctly expresses  $r_t$  in term of  $r_a$  and  $r_b$ ?

- A)  $r_t = r_a + r_b$
- B)  $r_t = \frac{r_a + r_b}{r_a r_b}$
- C)  $r_t = \frac{r_a r_b}{r_a + r_b}$
- D)  $r_t = \frac{r_a}{r_a + r_b}$

18



In the circle above, if  $(-5, 12)$  is one point on the circle as shown, what are the coordinates of point  $a$ ?

- A)  $(0, 13)$
- B)  $(13, 0)$
- C)  $(5, 0)$
- D)  $(\sqrt{159}, 0)$

19

Demographic Characteristics of Education for random 200 participants

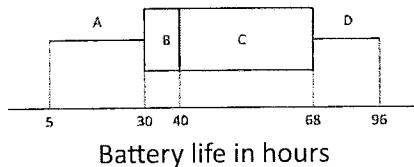
|                             | Male | Female | Total |
|-----------------------------|------|--------|-------|
| Less than high school       | 8    | 5      | 13    |
| High school degree          | 30   | 56     | 86    |
| College degree              | 22   | 50     | 72    |
| Bachelor's degree or higher | 19   | 59     | 78    |
| Total                       | 100  | 100    | 200   |

In the survey above, some data were deleted by accident. If a female was chosen at random, what is the probability that the person has a high school degree or college degree?

- A) 0.38
- B) 0.69
- C) 0.76
- D) 0.81

20

ULTRA POWER COMPANY'S BATTERY LIFE



The boxplot represents the distribution of battery life in hours for Ultra Power Company in 2022. Which of the following must be true?

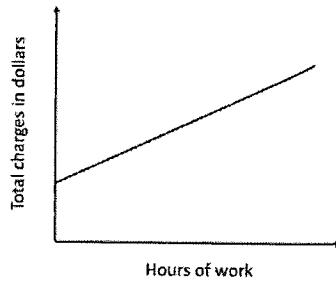
- I. The number of batteries in region B is smaller than in region C.
  - II. Approximately 75% of the batteries have a battery life 30 hours or more.
  - III. The range of data above is 38.
- 
- A) I only
  - B) II only
  - C) I and II only
  - D) I, II, and III

21

What is the equation of the line which is perpendicular to  $y = -\frac{1}{2}x + 3$  and passes through the point  $(1, 4)$  in the XY-plane?

- A)  $y = \frac{1}{2}x + \frac{7}{2}$
- B)  $y = -\frac{1}{2}x + \frac{9}{2}$
- C)  $y = 2x + 2$
- D)  $y = -2x + 6$

22



The graph above represents total charges of plumbing work by a certain plumber. The plumber charges the basic fee plus an hourly rate. What is the best interpretation of the y intercept in the graph?

- A) The plumber's total charge
- B) The plumber's hourly rate
- C) One-time basic fee
- D) The plumber's minimum hourly rate

## STOP

If you finish before time is called, you may check your work on this module only. Do not turn to any other module in the test.

# Math

**22 QUESTIONS**  
**(TIME: 35 MIN)**

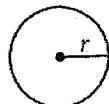
**DIRECTIONS**

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

**NOTES**

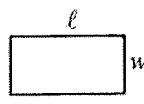
Unless otherwise indicated:

- 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.

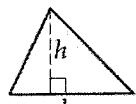
**REFERENCE**

$$A = \pi r^2$$

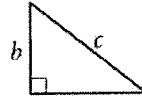
$$C = 2\pi r$$



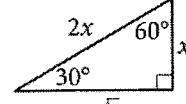
$$A = lw$$



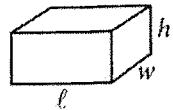
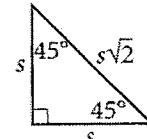
$$A = \frac{1}{2}bh$$



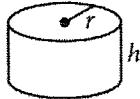
$$c^2 = a^2 + b^2$$



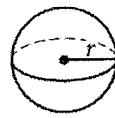
Special Right Triangles



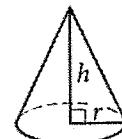
$$V = lwh$$



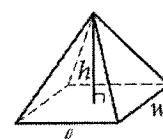
$$V = \pi r^2 h$$



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



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



$$V = \frac{1}{3}lwh$$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is  $2\pi$ .

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.

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- 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.

1

$$f(t) = 3000(1 + 0.05)^t$$

Margaux opened a CD account for her saving. This account offers a certain annual interest rate. If  $t$  is time in year after she deposit money into her account, what is the best interpretation of 0.05 in the function above?

- A) Her annual contribution in amount of money.
- B) The annual interest rate in decimal for her account.
- C) The first deposit when she opened her account.
- D) The extra one-time bonus from the bank.

2

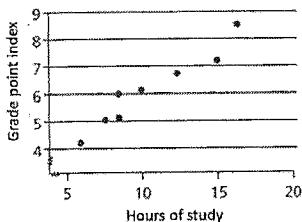
| $x$ | $f(x)$ |
|-----|--------|
| 1   | 22     |
| 2   | 25     |
| 3   | 28     |

The table shows some values of  $x$  and their corresponding  $f(x)$  values. If  $f(x)$  is a linear function, which of the following function defines  $f(x)$ ?

- A)  $f(x) = -3x + 25$
- B)  $f(x) = 3x + 19$
- C)  $f(x) = 3x + 22$
- D)  $f(x) = -3x + 19$

3

Grade point Index vs Hours of Study



The scatterplot above shows the relationship between Grade point index (0 – 10) and Weekly hours of study for a calculus class. Which of the following statements best interprets the graph?

- A) It is guaranteed that more hours of study will result in higher grade point index.
- B) It is plausible that more hours of study could result in higher grade point index.
- C) This scatter plot shows very weak relationship.
- D) We can assume that anyone can get at least 5 in grade point index with no hours of study.

4

If a triangle has lengths of sides  $3\sqrt{3}$ ,  $4\sqrt{3}$ , and  $\sqrt{75}$  units, what is the area of the triangle, in square units?

- A) 18
- B) 22.5
- C) 30
- D)  $6\sqrt{3}$

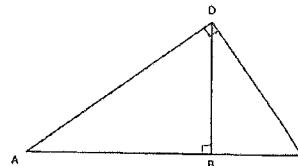
5

$$2(4 - x) - 5 = 3 - 3y$$

From the equation shown above, which of the following equations represents correctly between  $x$  and  $y$ ?

- A)  $\frac{x-4}{y-1} = 1$
- B)  $\frac{x}{y} = \frac{3}{2}$
- C)  $\frac{y}{x} = \frac{3}{2}$
- D)  $y = 6x$

7



Note: Not drawn to scale.

In the right triangle above,  $\overline{AD} = 8$  and  $\cos A = 0.5$ . What is the length of  $\overline{BD}$ ?

- A)  $4\sqrt{3}$
- B)  $16\sqrt{3}$
- C) 6
- D)  $6\sqrt{3}$

6

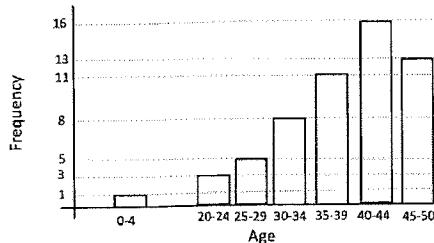
$$2\sqrt[3]{27x^{36}} \cdot \sqrt[5]{-32x^{10}}$$

The expression above could be simplified as  $kx^m$ , where  $k$  and  $m$  are positive numbers. What is the value of  $m - k$ ?

8

The function  $f$  in the  $xy$ -plane is defined by  $f(x) = a \cdot b^x$ , where  $a$  and  $b$  are constants. If the function is translated down 3 units, the  $y$  intercept of the function is  $(0, 5)$  and passes through  $(1, 0)$ . What is the value of the product of  $a$  and  $b$ ?

9



In the bar graph above, which of the following statements must be true?

- The mean age of the data is located more left than the median of the data.
  - If the smallest age is removed, the mean value will change more than the median value of the data will change.
  - The range of data is 50.
- A) I only  
 B) II only  
 C) I and II only  
 D) I, II, and III

10

$$y < x + 2$$

$$y > -2x - 1$$

If the point  $(1, k)$  is a solution to the inequality system above in the  $xy$ -plane. How many integers of  $k$  satisfies the system?

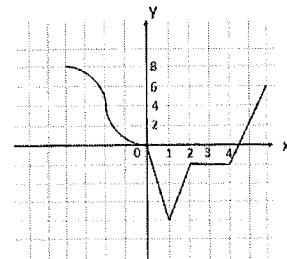
- I) 2  
 J) 4  
 K) 5  
 L) 7

11

Adrian studies SAT practice test book for his upcoming test. He finishes one page for 15 minutes in Math and two pages for 10 minutes in English, respectively. He wants to know how long, in minutes, it will take in total to complete the practice book. If the book consists of  $k$  pages for Math and  $w$  pages for English, which expression best represents the situation?

- A)  $15k + 10w$   
 B)  $10w + 15k$   
 C)  $15k + 5w$   
 D)  $15k + 20w$

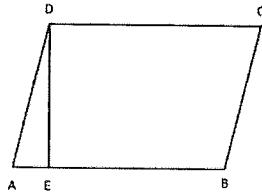
12



The graph of  $y = f(x)$  is shown above in the  $xy$ -plane. What is the value of  $f(-f(2))$ ?

- A) -2  
 B) -4  
 C) 4  
 D) 1

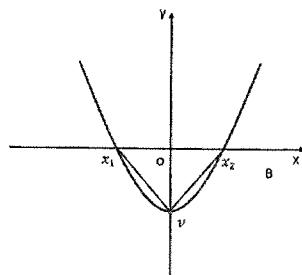
13



In the parallelogram ABCD above,  $\overline{AD} = 6$  and  $\overline{DE} \perp \overline{AB}$ . Which of the following expressions represents the height,  $\overline{DE}$ , of the parallelogram?

- A)  $6\cos\angle A$
- B)  $6\tan\angle A$
- C)  $6\sin\angle A$
- D)  $\frac{\sin\angle A}{6}$

15



The graph of  $f(x) = 2x^2 - 8$  is shown above in the XY-plane. What is the area of  $\Delta x_1 x_2 v$ ?

14

$$\begin{aligned}x^2 + y^2 &= 26 \\2xy &= 23\end{aligned}$$

In the system of non-linear equations above, if  $x$  and  $y$  are positive numbers, what is the sum of  $x$  and  $y$ ?

16

Each worker is in either department A or department B in XYZ company. If the number of workers in department A is three times the number of workers in department B and the average salary of workers in department A is \$50,000 and the average salary for workers in department B is \$54,000, what is the average of salary of the entire workers in the company?

- A) \$51,000
- B) \$51,500
- C) \$52,000
- D) \$52,500

17

Annual percent change in sales for five stores 2006-2008

| Store | Percent Change from 2006 to 2007 | Percent Change from 2007 to 2008 |
|-------|----------------------------------|----------------------------------|
| P     | 10                               | -10                              |
| Q     | -20                              | 9                                |
| R     | 5                                | 12                               |
| S     | -7                               | -15                              |
| T     | 17                               | -8                               |

The table above shows Annual percent change in sales for 5 stores for 2006-2008. Which of the statements must be true?

- I. The net percent change for store P from 2006 to 2007 is 0.
  - II. Total sales amount in dollars in store R for 2006-2008 is larger than total sales amount in store S.
- A) I only  
 B) II only  
 C) I and II  
 D) None

18

If  $y = 4x$  and  $z = -2y$ , what is  $\frac{x+2y+3z}{5}$  in terms of  $x$ ?

- A)  $3x$   
 B)  $-3x$   
 C)  $\frac{3}{5}x$   
 D)  $\frac{9}{5}x$

19

$$2x^2 - 4x + 2y^2 + 8y = -2$$

In the circle equation above, what is the value of the radius of the circle?

20

|                 |                |
|-----------------|----------------|
| Thomas Williams | Fran Rodriguez |
| 456             | 395            |

The table above shows the result of a survey which was conducted at random for a total of 851 voters for a certain election. If 4,255 people vote for the actual election, by how many votes would Thomas Williams be expected to win the election?

21

$f(x)$  equals 82 percent of  $x$

For  $x > 0$ , the function is defined as above. Which of the following best describes the function?

- A) Linearly decreasing
- B) Exponentially decreasing
- C) Linearly increasing
- D) Exponentially increasing

22

Which of the following rational expressions are equivalent to  $\frac{1}{x+1} - \frac{x}{x-2} + \frac{x^2+2}{x^2-x-2}$ ?

- A) 0
- B)  $\frac{2x}{x^2-x-2}$
- C)  $\frac{-4}{x^2-x-2}$
- D)  $\frac{x^2-x-1}{x^2+x-3}$

## STOP

If you finish before time is called, you may check your work on this module only. Do not turn to any other module in the test.

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# Math

**35 MINUTES, 22 QUESTIONS**

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## DIRECTIONS

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Use of a calculator is permitted for all questions.

## NOTES

Unless otherwise indicated:

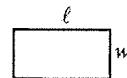
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## REFERENCE

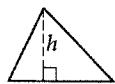


$$A = \pi r^2$$

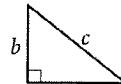
$$C = 2\pi r$$



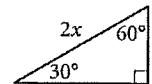
$$A = lw$$



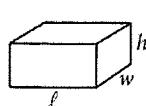
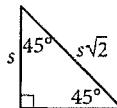
$$A = \frac{1}{2}bh$$



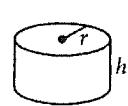
$$c^2 = a^2 + b^2$$



Special Right Triangles



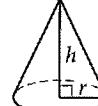
$$V = lwh$$



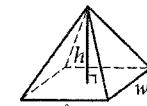
$$V = \pi r^2 h$$



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



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



$$V = \frac{1}{3}lw h$$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is  $2\pi$ .

The sum of the measures in degrees of the angles of a triangle is 180.

---

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- Don't include symbols such as a percent sign, comma, or dollar sign in your circled answer.

1

If  $\frac{5}{3}y + 2 = 7$ , what is the value of  $y$ ?

- A) 5
- B)  $\frac{3}{5}$
- C)  $\frac{19}{5}$
- D) 3

4

An ice cream vendor sells ice cream at a night market on Sunday night. Each ice cream costs him \$4, so he charges \$8 for each ice cream at the night market. He also has to pay \$20 per hour to rent a booth. If the vendor sells  $c$  ice creams and rents the booth for  $h$  hours, which of the following is equivalent to the vendor's profit,  $p$ , in dollars?

- A)  $p = 8c - 20h - 4$
- B)  $p = 4c - 20h$
- C)  $p = 4h - 8c$
- D)  $p = 12c - 20h$

2

A school plans to spend a total of \$800 to buy some pens and notebooks. If each pen costs \$2 and each notebook costs \$5, which inequality represents the possible number of pens,  $p$ , and notebooks,  $n$ , the school can buy?

- A)  $2p + 5n < 800$
- B)  $\frac{1}{2}p + \frac{1}{5}n \leq 800$
- C)  $2p + 5n \leq 800$
- D)  $\frac{p}{2} + \frac{n}{5} < 800$

3

If  $f(x) = 5x^2 + 3$  and  $f(k) = 48$ , what is the value of  $k^2$ ?

- A) 3
- B) -3
- C) 9
- D) 5

5

If  $f(x) = x - \sqrt{3x - 1}$ , at which of the following values is  $f(x)$  undefined?

- A)  $x \leq \frac{1}{3}$
- B)  $x < \frac{1}{3}$
- C)  $x = 1$
- D) none

6

In the  $x$ - $y$ -plane, a circle has center  $(0, m)$  and radius 5. The point  $(4, 3)$  is on the circle. If  $m$  is a constant and  $m \neq 0$ , what is a possible value of  $m$ ?

- A) 6
- B) 3
- C) -6
- D) 0

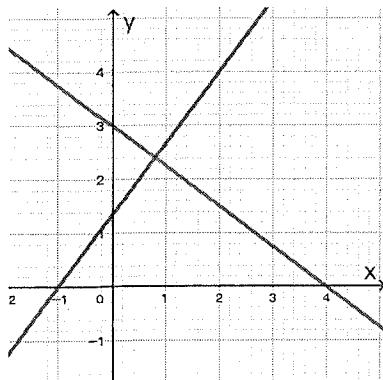
## Practice Test 5

2

Module  
1

2

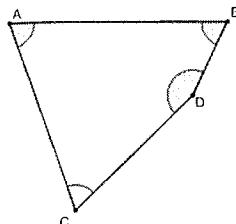
7



The graph shown above represents which of the following systems of equations?

- A)  $4y - 3x = 12$   
 $3y + 4x = 4$
- B)  $4y - 3x = 12$   
 $3y - 4x = 4$
- C)  $4y + 3x = 12$   
 $4y - 3x = 4$
- D)  $4y + 3x = 12$   
 $3y - 4x = 4$

8



The quadrilateral  $ABCD$  is shown, where  $\angle A = 70^\circ$ ,  $\angle B = 65^\circ$ , and  $\angle C = 63^\circ$ . How many degrees is the angle  $D$ ?

9

$$f(x) = a(x - m)^2 + n$$

In the function  $f$  above,  $a$ ,  $m$ , and  $n$  are constants and are greater than zero. Which of the following graphs represents the function  $f$ ?

- A)
- C)
- B)
- D)

10

For a bank savings account, the annual interest rate was  $2.5\%$  in 2021 and the annual interest rate was  $3.5\%$  in 2022. If Jack deposited \$1,000 into his savings account on January 1, 2021, how many dollars would Jack withdraw on December 31, 2022? (Round to the nearest dollar)

- A) 1035
- B) 1061
- C) 1071
- D) 1051

11

A cyclist rides from his house to a park in 5 hours at a constant speed of 12 mph while he rides back home at a constant speed of 15 mph. How many hours did he take to return to his house?

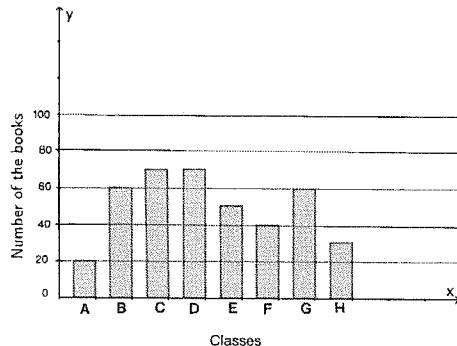
## Practice Test 5

2

Module  
1

2

12



The histogram above shows the number of books read by each class during a school reading event. If the students in the 8 classes read a total of 420 books, how many books did the students in class E read?

13

|        | Vegetarian | Non-vegetarian | Total |
|--------|------------|----------------|-------|
| Female | 160        | 200            | 360   |
| Male   | 50         | 200            | 260   |
| Total  | 210        | 400            | 610   |

A researcher conducted a survey to determine the number of vegetarians in a small community. The results are shown above. If a female is selected at random, what is the probability that the female is vegetarian?

- A)  $\frac{16}{61}$
- B)  $\frac{4}{9}$
- C)  $\frac{36}{61}$
- D)  $\frac{5}{9}$

14

$$6x + 8 = 20$$

Which equation has the same solutions as the given equation above?

- A)  $6x = 28$
- B)  $2x + 4 = 10$
- C)  $5x + 8 = 18$
- D)  $3x + 4 = 20$

15

The function is defined by  $f(x) = x^3 + 3x^2 - 6$ . What is the value of  $f(-2)$ ?

- A) -2
- B) -10
- C) 14
- D) -26

16

A person spent a total of \$25,500 to buy two stocks, A and B, and sold both when the values of stock A rose by 15% and the values of stock B fell by 10%, making a total profit of \$1,650. What was the value of stock A when the person first purchased it?

17

The price of potatoes is \$2.25 per pound. How many kilograms of potatoes would cost 20 dollars? (1 pound = 0.45 kilograms)

- A) 45
- B) 8
- C) 4
- D) 49.38

## Practice Test 5

2

Module  
1

2

18

If 20% of the total books Lucas plans to read this year is 60, how many books does Lucas plan to read?

- A) 24
- B) 300
- C) 48
- D) 150

19

Which expression is equivalent to :

$$(x^5 \cdot y^{-3} \cdot z^2)(x^{-4} \cdot y^2 \cdot z^{-1})?$$

- A)  $x \cdot y^{-1} \cdot z$
- B)  $x \cdot y^{-6} \cdot z$
- C)  $x^{-9} \cdot y^{-5} \cdot z^{-3}$
- D)  $x \cdot y \cdot z$

20

Circle  $x$  has an area of  $4\pi$  and the perimeter of circle  $y$  is 4 times the perimeter of circle  $x$ . How many times the radius of circle  $x$  is the radius of circle  $y$ ?

- A) 4
- B) 2
- C) 3
- D) 5

21

A company's number of employees increased from 900 at the beginning of the year to 1008 at the end of the year. What is the percent increase in the company's number of employees?

- A) 12%
- B) 10.7%
- C) 11%
- D) 13%

22

$$f(x) = -x^2 - 2x + 3$$

The function  $f$  is given. Which table of values represents  $y = f(x) + 3$ ?

A)

| $x$ | $y$ |
|-----|-----|
| -1  | 7   |
| -2  | 6   |
| 1   | 4   |

B)

| $x$ | $y$ |
|-----|-----|
| -1  | 7   |
| -2  | 6   |
| 1   | 5   |

C)

| $x$ | $y$ |
|-----|-----|
| -1  | 7   |
| -2  | 6   |
| 1   | 3   |

D)

| $x$ | $y$ |
|-----|-----|
| -1  | 7   |
| -2  | 6   |
| 1   | 2   |



**No Test Material On This Page**

**Math****35 MINUTES, 22 QUESTIONS****DIRECTIONS**

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**NOTES**

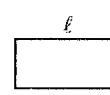
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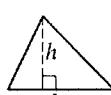
**REFERENCE**

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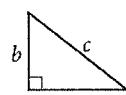
$$C = 2\pi r$$



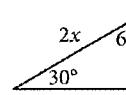
$$A = \ell w$$



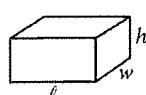
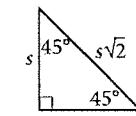
$$A = \frac{1}{2}bh$$



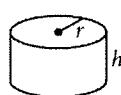
$$c^2 = a^2 + b^2$$



Special Right Triangles



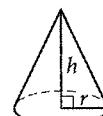
$$V = \ell wh$$



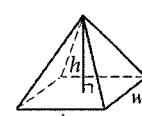
$$V = \pi r^2 h$$



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



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



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

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is  $2\pi$ .

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## Practice Test 5

2

Module  
2

2

1

If  $6x - 3y = 4$ , what is the value of  $\frac{3y + 4}{3x}$ ?

2

$f(x) = x^2 + 8x + 17$ , if  $y = f(x)$  in the  $xy$ -plane, what is the value of  $f(x)$ ?

- A) 1
- B) 65
- C) -31
- D) 4

3

$$\begin{aligned} y - 2x &= 2 \\ 2y + 4x &= 5 \end{aligned}$$

Based on the system of equations above, what is the value of  $2(y^2 - 4x^2)$ ?

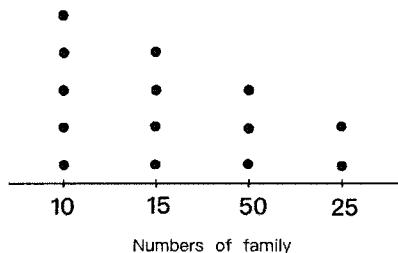
- A) 9
- B) 11
- C) 5
- D) 10

4

In a graph of the  $x$ - $y$ -plane, line  $l$  is perpendicular to line  $m$ . Which of the following systems of equations represents the two lines?

- A)  $5y - 4x = 20$   
 $4y + 5x = 15$
- B)  $4y - 2x = 5$   
 $4y + 2x = 6$
- C)  $3y - x = 5$   
 $2y + x = 3$
- D)  $y - 3x = 2$   
 $y + 3x = 3$

5



100 families in a certain area were asked how many children they had, and the results are shown in the dot plot above. What is the median number of children per family for the 100 families?

6

$$x^2 + 6x + c = 0$$

In the given equation,  $c$  is a constant. If the equation has no real solution, what is the value of  $c$ ?

- A) 4
- B) 9
- C) 10
- D) 8

7

In the right triangle MQP, the angle Q has a measure of  $90^\circ$  and the two legs of the triangle have lengths of 4 and 8, respectively. What is the measure of the largest acute angle?

- A)  $45^\circ$
- B)  $60^\circ$
- C)  $30^\circ$
- D)  $20^\circ$

8

What number is 120% of 80?

## Practice Test 5

2

Module  
2

2

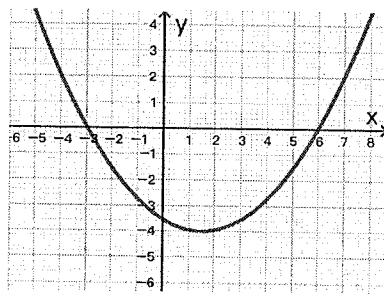
9

$$P(x) = 150(F)^x$$

The function  $P(x)$  models the specific population of wildlife  $t$  years after the start of the study, where  $F$  is a constant. If the population of wildlife decreases by 12% each year, what is the value of  $F$ ?

- A) 1.12
- B) 0.88
- C) 0.12
- D) 0.10

10



What is the  $y$ -intercept of the graph shown?

- A)  $(-3.5, 0)$
- B)  $(-3, 0)$
- C)  $(0, -3.5)$
- D)  $(6, 0)$

11

Alex walked at a constant speed of 8 kilometres per hour for thirty minutes and slowly walked for another thirty minutes at an average rate of 5 miles per hour. What is the total distance Alex traveled, in miles? (1 kilometer = 0.62 miles)

- A) 4.98
- B) 6.5
- C) 8.03
- D) 7

12

In the  $x$ - $y$ -plane, if  $y = f(x) = x^2 + 6x - 3$ , and  $y = g(x) = x^2 - 11x + 14$ ,  $f(x)$  and  $g(x)$  intersect at point  $(m, n)$ , what is the value of  $n$ ?

13

From Los Angeles to Vancouver, the driving distance is 2055 kilometers, which takes approximately 24.5 hours. The flight distance is 1740 kilometers and the flight time is approximately 3 hours. Approximately how many times the average driving speed is the average flying speed? (To the nearest whole number)

- A) 8
- B) 7
- C) 10
- D) 15

14

$$f(x) = ax^2 - 16x + 24$$

The given equation  $y = f(x)$  intersects  $x$ -axis at  $(2, 0)$  and  $(m, 0)$  in the  $x$ - $y$ -plane, where  $a$  and  $m$  are constants. What is the value of  $m$ ?

15

$$\begin{aligned}x - 6 &= -10 \\y &= x^2 - 3x - 9\end{aligned}$$

Which ordered pair  $(x, y)$  is a solution to the given system of equations?

- A)  $(-4, -5)$
- B)  $(-4, 19)$
- C)  $(4, 5)$
- D)  $(4, 19)$

## Practice Test 5

2

Module  
2

2

16

An isosceles triangle has a height of 4 inches and a base of 6 inches. What is the perimeter of this triangle, in inches?

- A) 12
- B) 16
- C) 13
- D) 32

17

Mike and Alex typed at constant speeds and together they typed a total of 1440 words in 4 minutes. If Mike typed 14 less words per minute than Alex, how many words did Mike type per minute?

18

Which expression is equivalent to  $(5x^3 + 9) - (5x^3 + x^2)$ ?

- A)  $10x^3 - x^2 + 9$
- B)  $(3 + x)(3 - x)$
- C)  $10x^3 + x^2 + 9$
- D)  $x^2 - 9$

19

Which expression is equivalent to  $\sqrt[3]{p^2} \cdot \sqrt[15]{p^5}$ , where  $p > 0$ ?

- A)  $\sqrt[18]{p^7}$
- B)  $\sqrt[12]{p^3}$
- C)  $\sqrt[45]{p}$
- D)  $p$

20

Line  $l$  is tangent to the circle  $x^2 + y^2 = 2$  at the point  $(1, -1)$ . Which of the following equations represents the line  $l$ ?

- A)  $x - y = 4$
- B)  $x - y = 2$
- C)  $x + y = 2$
- D)  $x + y = 4$

21

| Marks              | English Test |    |   | French Test |    |   |
|--------------------|--------------|----|---|-------------|----|---|
|                    | A            | B  | C | A           | B  | C |
| Number of Students | 18           | 15 | 5 | 15          | 17 | 6 |

Grade 11 has 38 students. The table above shows the results of the recent English and French tests. If one of the students is chosen at random, what is the probability that the person received a B on the French test?

- A)  $\frac{17}{38}$
- B)  $\frac{17}{76}$
- C)  $\frac{17}{32}$
- D)  $\frac{32}{38}$

22

Victor reads books at an average rate of 3 days per book. Which function,  $y$ , models the number of days it will take Victor to read  $x$  books at this rate?

- A)  $y = 3x$
- B)  $y = \frac{1}{3}x$
- C)  $y = x - \frac{1}{3}$
- D)  $y = x + \frac{1}{3}$

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# Math

**22 QUESTIONS**  
**(TIME: 35 MIN)**

**DIRECTIONS**

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**REFERENCE**

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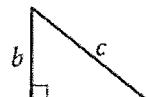
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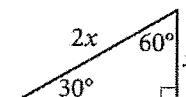
$$A = \ell w$$



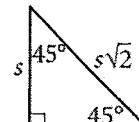
$$A = \frac{1}{2}bh$$



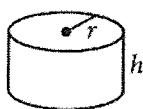
$$c^2 = a^2 + b^2$$



Special Right Triangles



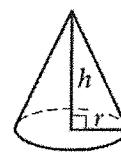
$$V = \ell wh$$



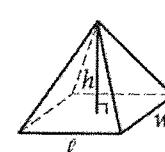
$$V = \pi r^2 h$$



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



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



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

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is  $2\pi$ .

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.

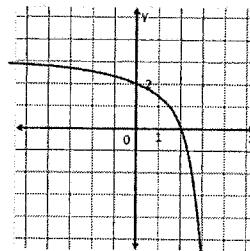
- Once you've written your answer, circle it clearly. You will not receive credit for anything written outside the circle, or for any questions with more than one circled answer.
- If you find **more than one correct answer**, write and circle only one answer.
- Your answer can be up to 5 characters 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 ( $7/2$ ) or its decimal equivalent (3.5).
- Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

$$\frac{3x - 9}{x^2 - x - 20} \cdot \frac{x^2 - 25}{x^2 + 2x - 15}$$

If  $x \neq 5, -5$ , and  $-4$ , Which of the following expressions is equivalent to the above?

- A)  $\frac{3}{-x-4}$
- B)  $\frac{3(x-3)}{(x+4)(x-5)}$
- C)  $\frac{3}{x+4}$
- D)  $\frac{3}{x-5}$

3



The partial graph of rational function  $f(x) = \frac{k}{x+m} + 3$  is shown above, where  $k$  and  $m$  are constants. What is the value of  $k + m$ ?

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

4

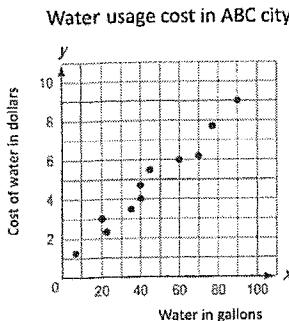
Two dice are rolled at the same time. If both dice show the same numbers, then the player wins \$70. Otherwise, the player receives \$4. The cost of game is \$10. What is the expected value per game considering the cost?

- A) \$50
- B) \$15
- C) \$5
- D) \$3.33

The maximum value of  $m$  is 8 less than two times the quantity of  $n - 4$ . Which inequality represents the values of  $m$ ?

- A)  $m \geq 2(n - 4) - 8$
- B)  $m \leq 2(n - 4) - 8$
- C)  $m \leq 8 - 2(n - 4)$
- D)  $m \geq 8 - 2(n - 4)$

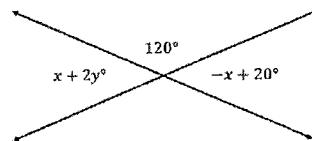
5



The scatterplot above shows the relationship between the amount of water used in gallons and the cost of water usage in ABC city. If you predict the cost using the line of best fit, what is the closest amount, in dollars, to the cost of a 120 gallons water usage?

- A) \$11
- B) \$15
- C) \$20
- D) \$22

7



In the diagram above, what is the sum of values of  $x$  and  $y$ ?

- E) 10
- F) 20
- G) 90
- H) 120

8

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

In the quadratic equation above,  $k$  is a constant. The equation has no real solution if  $k > m$ . What is the greatest possible value of  $m$ ?

6

For an exponential function  $f$ , if  $f(0)$  is  $a$ , where  $a$  is a constant. Which of the following equivalent forms of the function  $f$  shows the value of  $a$  as the coefficient of the function?

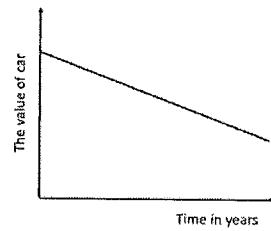
- A)  $f(x) = 23(1.2)^{x-1}$
- B)  $f(x) = -2(0.9)^x$
- C)  $f(x) = 3(1.1)^{x+1}$
- D)  $f(x) = 1.2(0.23)^{x-1}$

9

PSA test is a blood test that is commonly used to detect possible prostate cancer but it is known to produce false positive result which induces a patient undergoes unnecessary biopsy to confirm they don't have prostate cancer. If PSA test generates one false positive in 20 tests and a doctor conducts the test to three patients, which of the following shows the probability that none of patients will generate false positive?

- A)  $\left(\frac{1}{20}\right)\left(\frac{1}{20}\right)\left(\frac{1}{20}\right)$
- B)  $\left(\frac{19}{20}\right)\left(\frac{19}{20}\right)\left(\frac{19}{20}\right)$
- C)  $\left(\frac{3}{20}\right)$
- D)  $\left(\frac{1}{8000}\right)$

10



The graph above represents the values of a certain car over the years. If the value of the car follows the graph, which of the following statements best interprets the slope of the line?

- A) The price when it was purchased
- B) One time charge from the dealership
- C) The annual decrease rate of the value of the car over years
- D) The value of the car over years

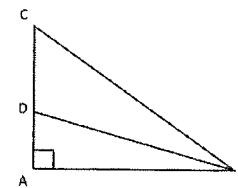
11

$$x = \frac{-b \pm \sqrt{D}}{2a}$$

In the quadratic equation of  $ax^2 + bx + c = 0$ , we can derive the quadratic formula as shown above. Which of the following equations shows  $D$  in terms of  $a$ ,  $b$ , and  $x$ ?

- A)  $D = \left(x + \frac{b}{2a}\right)^2$
- B)  $D = (b + 2ax)^2$
- C)  $D = \left(x - \frac{b}{2a}\right)^2$
- D)  $D = \frac{(x+b)^2}{2a}$

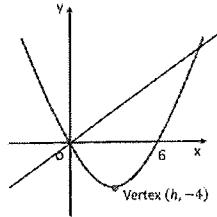
12



Note: Not drawn to scale.

In the figure above,  $\overline{BD}$  bisects  $\angle ABC$ . If the length of  $\overline{BD}$  is twice the length of  $\overline{AD}$  and  $\overline{AB} = 4$ , What is the length of  $\overline{BC}$ ?

13



The graphs of linear and quadratic functions in the XY-plane are shown above. If the vertex of parabola graph is  $(h, -4)$  and the equation of line is  $y = 4x$ , what are the coordinates of the point of intersection?

- A) (3, 12)
- B) (10, 20)
- C) (12, 40)
- D) (15, 60)

14

$$\frac{m^{\frac{2}{3}}(m^{-2}m^4)^3}{m^4}$$

Which of the following expressions is equivalent to the expression above, where  $m > 0$ ?

- A)  $\sqrt[3]{m^8}$
- B)  $\sqrt[8]{m^3}$
- C)  $\sqrt[4]{m^3}$
- D)  $\sqrt{m^{-3}}$

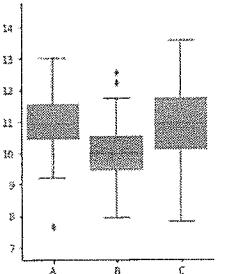
15

7, 4, 5, 4, 5, 6, 6, 7, 3, 10

Ten people were selected at random to participate in a survey. The numbers represent the scale of satisfaction of life from 1 to 10. The list above shows the result of the survey. What is the fraction of the number of people who gave a number of 5 or higher to the number of people who gave a number of lower than 5?

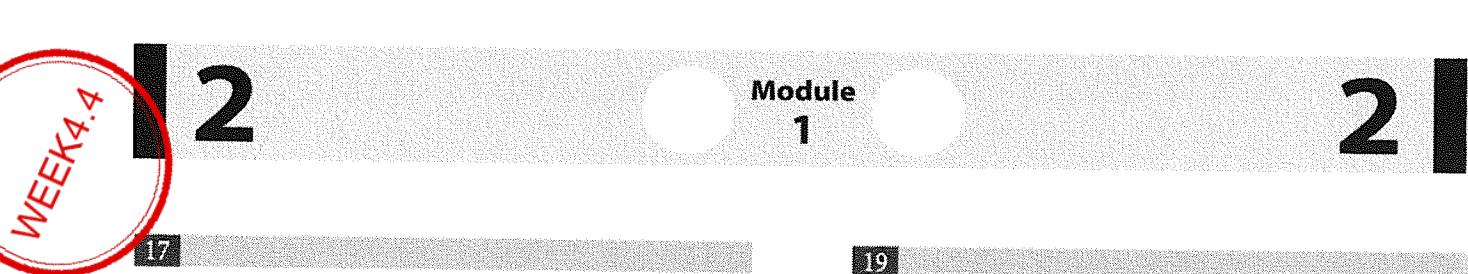
- A)  $\frac{3}{7}$
- B)  $\frac{7}{3}$
- C)  $\frac{3}{2}$
- D)  $\frac{2}{3}$

16



The box plots summarize the number of vacation days for the employees for three companies. Which of following statements represents correctly for the plots above?

- I. The range of numbers of vacation days of company C is the largest.
  - II. The mode of number of vacation days is 11 for two companies.
  - III. The median value of vacation days for company B is the smallest.
- A) I only  
 B) I and II only  
 C) I and III only  
 D) I, II, and III



17

| x | f(x) |
|---|------|
| 0 | 4    |
| 2 | 36   |
| 4 | 324  |

For the exponential function  $f(x)$ , if  $f(x) = a \cdot b^x$ , where  $a$  and  $b$  are constants. Which of the following functions represents the data in the table above?

- E)  $f(x) = 3 \cdot 4^x$
- F)  $f(x) = 4 \cdot 3^x$
- G)  $f(x) = 3 \cdot \left(\frac{1}{4}\right)^x$
- H)  $f(x) = 4 \cdot \left(\frac{1}{3}\right)^x$

18

The average price per pound of lamb meat in a certain butcher shop started at \$7.20. However, it was increased at a constant rate each week for several weeks until it reached \$8.45 because of high inflation. The equation,  $7.20 + 0.25x = 8.45$ , represents this situation, where  $x$  stands for the number of weeks after the average price per pound started to increase. Which of the following statements best represents 0.25 in this context?

- A) The average price per pound of lamb meat
- B) The weekly rate of change in the average price per pound of lamb meat
- C) The percent change in average price per pound of lamb meat
- D) The total increase in average price per pound while it reached \$8.45.

19

The monthly payment for a certain gym in 2021 was 1.45 times the monthly payment in 2020. By how much percent did the monthly payment increase from 2020 to 2021?

- A) 0.45%
- B) 1.45%
- C) 145%
- D) 45%

20

$$-2ax + by - 3 = 0$$

In the linear equation above, where  $a$  and  $b$  are non-zero constants. If  $2a + b = 0$ , which of the following statements correctly describes the graph in the XY-plane?

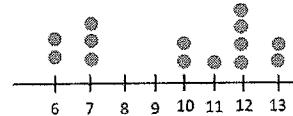
- A) The y intercept of the graph is positive.
- B) The slope of the graph is positive.
- C) The slope of the graph is zero.
- D) The slope of the graph is -1.

21

The television broadcasting company conducts a survey for a tax raise issue. A telephone number is provided and respondents are asked to call and register their opinions by pressing 1 if they support it and 2 if they oppose it. Which of the following statements best represents this survey?

- A) This survey is non-biased because the survey is open to anyone.
- B) This survey could be biased because only those who feel strongly either for or against will call and register their opinions voluntarily.
- C) This survey is well designed because of simple random samples.
- D) This survey is not trustworthy because some radio broadcasting company can do the same survey.

22



In the dot-plots shown above, what is the value of median of data?

### STOP

If you finish before time is called, you may check your work on this module only. Do not turn to any other module in the test.

# Math

**22 QUESTIONS**  
**(TIME: 35 MIN)**

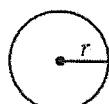
**DIRECTIONS**

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

**NOTES**

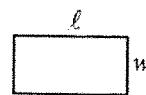
Unless otherwise indicated:

- 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**

$$A = \pi r^2$$

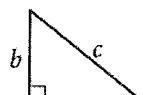
$$C = 2\pi r$$



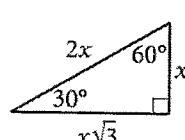
$$A = lw$$



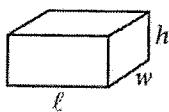
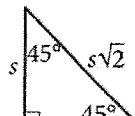
$$A = \frac{1}{2}bh$$



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



Special Right Triangles



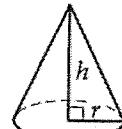
$$V = lwh$$



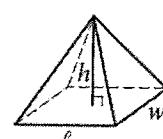
$$V = \pi r^2 h$$



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



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



$$V = \frac{1}{3}lwh$$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is  $2\pi$ .

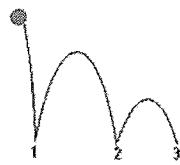
The sum of the measures in degrees of the angles of a triangle is 180.

**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.

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- 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.

Ball Free-fall diagram



A tennis ball bounces on the ground as shown. The ball is released from the initial height,  $h_0$  and reaches out approximately two third the previous height after each bounce. Which of the following equations best represents the height of the ball after  $n$  bounce, where  $n$  is the number of bounce after it is released?

- A)  $h(n) = h_0 \left(\frac{1}{3}\right)^n$
- B)  $h(n) = h_0 \left(\frac{2}{3}\right)^n$
- C)  $h(n) = h_0 - \frac{h_0}{3^n}$
- D)  $h(n) = h_0 \left(1 - \left(\frac{2}{3}\right)^n\right)$

2

The chance of an accident on the freeway 23 on a dry day is 0.10%. but the chance of an accident will go up to 0.50% on a rainy day. If there is a 30% chance of the weather being rainy today, what is the probability that there will be an accident on the freeway 23 today?

- A) 0.22
- B) 0.0022
- C) 0.38
- D) 0.0038

3

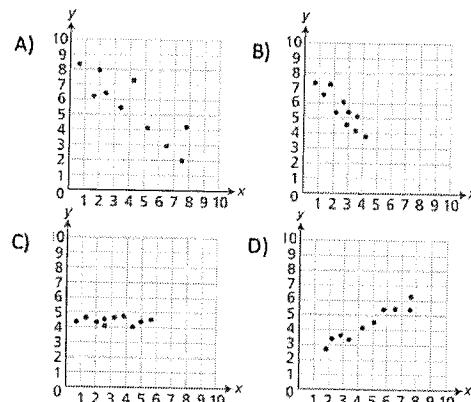
$$4r^2q^4 + r^3 - 4(q^2 + rq^2)^2$$

Which of the followings is equivalent to the expression above?

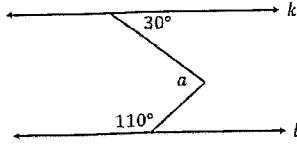
- A)  $r^3 - 4q^4 + 8rq^4$
- B)  $r^3 - 4q^4 - 8r^2q^4$
- C)  $r^3 - 4q^4 - 8rq^4$
- D)  $r^3 - 4q^4 - 4rq^4$

4

Which of the following scatter plots could be described the line of best fit  $y = kx$ , where  $k$  is a constant?



5



In the diagram above, lines  $k$  and  $l$  are parallel.  
What is the measure of angle  $a$  in degrees?

- A)  $80^\circ$
- B)  $90^\circ$
- C)  $100^\circ$
- D)  $110^\circ$

7

$$\begin{aligned}|x - 2| &= 8 \\ -|y + 3| &= -4\end{aligned}$$

In the system of absolute value equations above, what is the least possible value of  $x + y$ ?

- A) -5
- B) -7
- C) -13
- D) -17

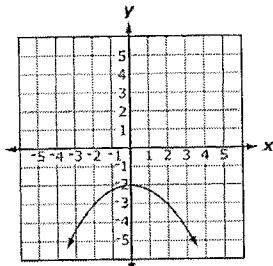
6

$$-x^2 + 5x + 3 = 0$$

In the quadratic equation above, what is the solution to the equation?

- A)  $\frac{-5 \pm \sqrt{37}}{2}$
- B)  $\frac{5 \pm \sqrt{37}}{-2}$
- C)  $\frac{5 \pm \sqrt{37}}{2}$
- D)  $\frac{\sqrt{37} \pm 5}{2}$

8



Which of the following equations represents the graph above?

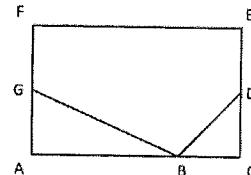
- A)  $y = -\frac{1}{4}x^2 - 2$
- B)  $y = -4x^2 - 2$
- C)  $y = -\frac{1}{2}x^2 - 2$
- D)  $y = \frac{1}{4}x^2 - 2$

9

Which of the following equations is correct for a circle with center  $(2, 0)$  and diameter 6?

- A)  $(x + 2)^2 + y^2 = 9$
- B)  $(x - 2)^2 + y^2 = 36$
- C)  $(x + 2)^2 + y^2 = 36$
- D)  $(x - 2)^2 + y^2 = 9$

11



In the rectangle shown above, D and G are the midpoints of  $\overline{CE}$  and  $\overline{AF}$ , respectively and the length of  $\overline{BC}$  is the same as the length of  $\overline{DC}$ . If the length of  $\overline{BG}$  is twice the length of  $\overline{AG}$ , what is the measure of  $\angle DBG$ , in degrees?

10

$$f(x) = -(2)^x + 1$$

What are the x intercept and y intercept, respectively, for the exponential function above?

- A)  $(0, 0)$  on both
- B)  $(1, 0), (0, -1)$
- C)  $(-1, 0), (1, 0)$
- D)  $(1, 0), (0, 0)$

12

80, 39, 210, 152, 244, 239, 232, 112

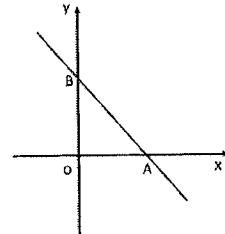
The internet store manager kept on track of the number of items sold over an eight-week period. The results are shown above. What is the positive difference between mean and median of these lists?

- A) 11.5
- B) 17.5
- C) 46.5
- D) 48.5

13

If  $2xy = 3$ , what is the value of  $\left(\frac{y}{3x}\right) \cdot (2x)^2$ ?

15



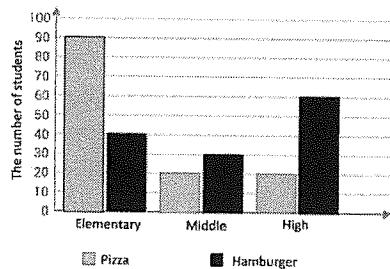
If a line passes through two points  $A(n, 0)$  and  $B(0, m)$  on the axes in the XY-plane as shown above. Which one is correct expression for  $\cos\angle OAB$  in terms of  $m$  and  $n$ ?

14

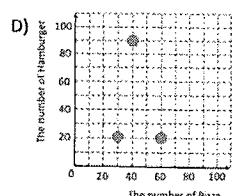
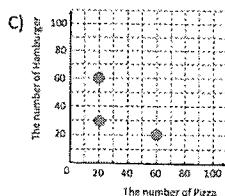
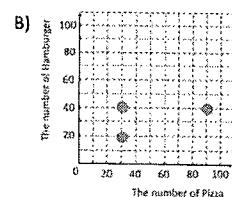
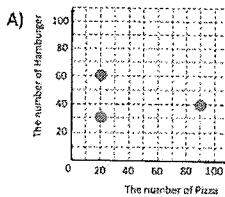
If a function  $f$ , is defined as  $y = f(x)$ . Which of the following statements is correctly described the transformation for  $y = -f(x + 1)$ ?

- A) Translate the graph horizontally 1 unit to the right and then reflect it over the x axis.
- B) Reflect the graph over the x axis and then translate it horizontally 1 unit to the left.
- C) Translate the graph horizontally 1 unit to the right and then reflect it over the x axis.
- D) Reflect the graph over the y axis and then translate it vertically 1 unit up.

16



The bar graph above shows the distribution of lunch choices for 130 orders of pizza and 130 orders of hamburger in ABC school district. Which of the scatter plots correctly represents the bar graph?

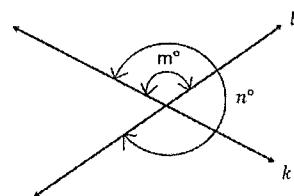


17

Julie bought a new phone with promotion. She paid a promotion discount price that was 30% less than the list price (\$1,200). She also paid a sales tax equal to 9% of the list price. What is the total amount of cost in dollars for her purchase?

- A) \$915.60
- B) \$948.00
- C) \$764.40
- D) \$756.00

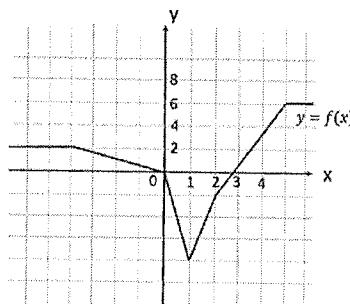
18



Note: Not drawn to scale.

In the figure above, lines  $l$  and  $k$  intersect at one point and form angles. If  $n = 3m$ , what is the measure of angle  $m$ , in degrees?

19



The graph of  $f$  in the XY-plane is shown above. What is the value of  $-f(2) + 2 \cdot f(-5)$ ?

- E) 3
- F) 4
- G) 5
- H) 6

20

If  $\sin(2a - 15)^\circ = \cos(a + 30)^\circ$ , what is the value of  $a$ ?

- A) 25
- B) 35
- C) 45
- D) 55

22

$$f(k) = 2.88(0.94)^k$$

The function above represents the number of ICU (Internal Combustion Units), in billions, in a certain country, where  $k$  is the number of years since 2020. Which of the following best represents the number 0.94 in this context?

- A) The estimated percent decrease of ICU in the entire country in 2020.
- B) The number shows that the number of ICU in the country is decreasing 6% from the number of ICU in the previous year.
- C) The number shows that the number of ICU in the country is increasing 94% annually for the number of ICU in the previous year.
- D) The estimated number of ICU in billions in  $k$  years after 2020.

21

$$C(x) = \frac{450x}{270 - x}$$

The cost  $C$ , in thousands of dollars, to pave  $x\%$  of the entire dirt road in a certain rural area with brand-new asphalt is modeled by the function above. Approximately what percent of the entire dirt road could be paved with 120 thousand dollars budget?

- A) 50
- B) 57
- C) 62
- D) 67

**STOP**

If you finish before time is called, you may check your work on this module only. Do not turn to any other module in the test.

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**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**

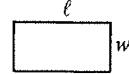
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- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function  $f$  is the set of all real numbers  $x$  for which  $f(x)$  is a real number.

**REFERENCE**

$$A = \pi r^2$$

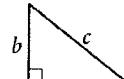
$$C = 2\pi r$$



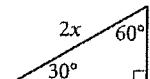
$$A = lw$$



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



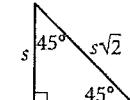
$$c^2 = a^2 + b^2$$



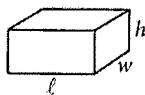
$$2x$$

$$x\sqrt{3}$$

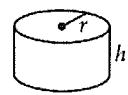
$$x$$



Special Right Triangles



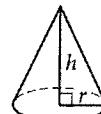
$$V = lwh$$



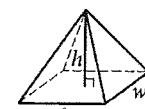
$$V = \pi r^2 h$$



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



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



$$V = \frac{1}{3}lwh$$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is  $2\pi$ .

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.

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- Don't include symbols such as a percent sign, comma, or dollar sign in your circled answer.

1

If  $\frac{1}{2}x + \frac{2}{3}x = 7$ , what is the value of  $\frac{5}{6}x$ ?

- A) 5
- B) 1
- C) 6
- D)  $\frac{7}{6}$

2

$$|m - 3| < 6$$

How many integers  $m$  satisfy the inequality above?

- A) 10
- B) 12
- C) 11
- D) 13

3

$f(x) = \frac{(x^2 - 2x + 1)}{x - 1}$ , where  $x \neq 1$ . Which of the following statements is true?

- A)  $f(138) = 139$
- B)  $f(138) = 137$
- C)  $f(138) = 2567$
- D)  $f(138) = \frac{5}{137}$

4

Anne reads books every day. She reads  $x$  pages each weekday. Every Saturday and Sunday, she reads 4 times the number of pages she reads on each weekday. If Anne read for 30 days, of which 8 days were Saturdays and Sundays, how many pages,  $y$ , did Anne read?

- A)  $y = 38x$
- B)  $y = 30x$
- C)  $y = 22x$
- D)  $y = 54x$

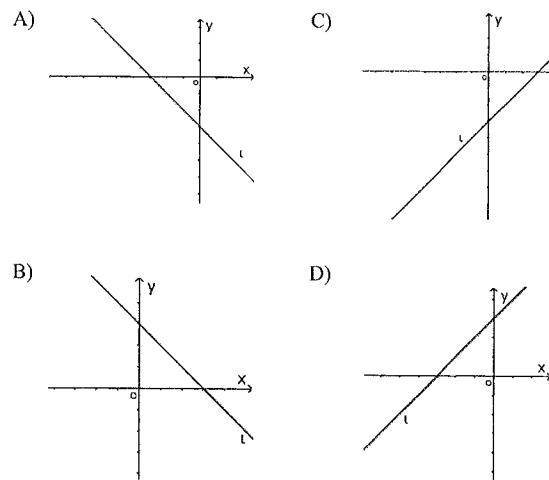
5

If  $g(x) = 3x^3 - 8x + 1$  and  $f(x) = g(3x)$ , what is  $f(1)$ ?

- A) -12
- B) 58
- C) 106
- D) 56

6

Which of the following graphs represent  $y = kx - 2$ , where  $k < 0$ ?



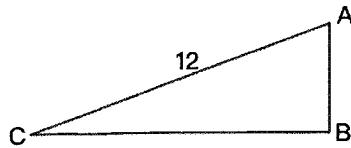
## Practice Test 6

2

Module  
1

2

7



In the right triangle ABC above,  $AC=12$ . Which of the following expressions represents the length of AB?

- A)  $\frac{\cos(A)}{12}$
- B)  $12 \cdot \tan(A)$
- C)  $12 \cdot \cos(A)$
- D)  $12 \cdot \sin(A)$

8

| $x$ | $f(x)$ |
|-----|--------|
| 2   | 2      |
| 6   | 6      |
| 8   | 14     |

Some values of  $f(x)$  and their corresponding values of  $x$  are provided in the table shown above. If  $f(x)$  is a quadratic function  $f(x) = ax^2 + bx + c$ , which of the following equations defines  $f(x)$ ?

- A)  $f(x) = \frac{1}{2}x^2 + 3x + 6$
- B)  $f(x) = \frac{1}{2}x^2 - 3x + 6$
- C)  $f(x) = \frac{1}{2}x^2 - 3x - 6$
- D)  $f(x) = -\frac{1}{2}x^2 + 3x + 6$

9

Line  $l$  intersects circle  $x^2 + y^2 = r^2$  and  $(3, 4)$  is a point on the circle. What is the diameter of the circle?

10

| Item               | Price (each) |
|--------------------|--------------|
| A bottle of wine   | 30           |
| A bar of chocolate | 5            |
| A papaya           | 15           |
| A basket           | 5            |

A grocery store sells holiday baskets with various products. The table above shows the regular price of each of the items. Each basket contains 2 bottles of wine, 4 bars of chocolate, and 5 papayas. If the price of the basket was 15% off the sum of each of the items' prices, what is the sale price for each basket?

11

It takes Clark 30 minutes to walk from his house to school. His speed for the first half of his walk is 100 meters per minute, and his speed for the second half of his walk is 150 meters per minute. What is the total distance, in meters, between Clark's house and the school?

- A) 3600
- B) 1800
- C) 900
- D) 2400

## Practice Test 6

2

Module  
1

2

12

|        | Bachelor's | Master's | Total |
|--------|------------|----------|-------|
| Java   | 300        | 61       | 361   |
| Python | 280        | 57       | 337   |
| Github | 84         | 18       | 102   |
| Total  | 664        | 136      | 800   |

A tech company posted information regarding their employees' software preferences and the post-secondary degrees they have. If one employee is chosen at random, what is the probability that the employee prefers using Java and has a bachelor's degree?

- A)  $\frac{300}{361}$
- B)  $\frac{75}{156}$
- C)  $\frac{3}{8}$
- D)  $\frac{83}{100}$

13

Andrew wants to purchase a precisely 8.5 feet long ladder. When he arrives at the store, he realizes that the marked lengths of all the ladders are in inches. How many inches long should the ladder he purchases be?

14

$$3y + x = 0$$

If  $(x, y)$  is a solution to the equation above and  $y \neq 0$ , what is the ratio of  $\frac{x}{y}$ ?

- A) 3
- B)  $\frac{1}{3}$
- C) -3
- D)  $-\frac{1}{3}$

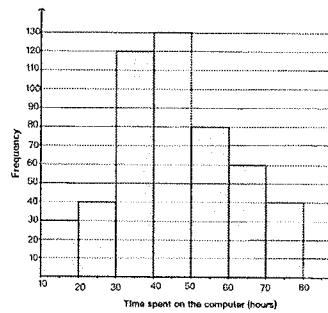
15

$$3x^2 - 5x - 12 = 0$$

How many solutions does the given equation have?

- A) One
- B) Two
- C) Three
- D) None

16



In a recent survey, 500 college students were asked how many hours they spent on their computers each week. The results are shown in the histogram above. How many of the 500 students spend more than 40 hours on their computer each week?

- A) 130
- B) 310
- C) 250
- D) 120

17

There are two types of guest rooms in a hotel. The triple room charges \$25 per person per night and double rooms charge \$35 per person per night. A tourist group of 50 people stayed in the hotel and paid a total of \$1510 for one night. How many double rooms were booked? (assume each room they booked was full)

- A) 8
- B) 21
- C) 13
- D) 15

## Practice Test 6

2

Module  
1

2

18

A company gave holiday gifts to its clients. 40% of the gifts, 20 gifts, were given to VIP clients. How many gifts were given in total?

19

$$\frac{2x(2x - 3) + 3(2x - 3)}{(4x^2 - 9)}$$

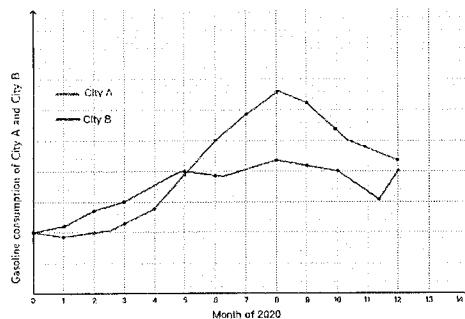
If  $x^2 \neq \frac{9}{4}$ , which expression is equivalent to the equation above?

- A)  $\frac{2x - 3}{2x + 3}$
- B) 1
- C) 2
- D)  $\frac{4x^2 + 12x - 9}{4x^2 - 9}$

20

Triangles ABC and EFG are similar, where side AB of triangle ABC corresponds to side EF of triangle EFG and  $\frac{AB}{EF} = 3$ . The area of triangle ABC is how many times the area of triangle EFG?

21



The graph above shows gasoline consumption of City A and City B from Jan, 2020 to Dec, 2020. In which month did the two city have the greatest difference in gasoline consumption?

- A) Sept., 2020
- B) Mar., 2020
- C) Aug., 2020
- D) Nov., 2020

22

$$y = 4900 - 70x$$

An assistant was asked to type up a handwritten report with a total of 4900 words. If the assistant types the same number of words every hour, there would be  $y$  words left to type after  $x$  hours, where  $0 \leq x \leq 70$ . Which of the following statements best describes the meaning of 70 in the context?

- A) The number of words left after  $x$  hours
- B) The average number of words the assistant typed each hour
- C) The decreasing number of words the assistant typed
- D) The total number of words the assistant typed in  $x$  hours



**No Test Material On This Page**

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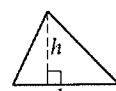
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**REFERENCE**

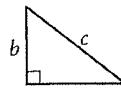
$$\begin{aligned} A &= \pi r^2 \\ C &= 2\pi r \end{aligned}$$



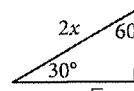
$$A = lw$$



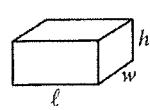
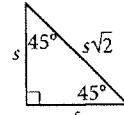
$$A = \frac{1}{2}bh$$



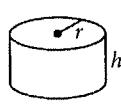
$$c^2 = a^2 + b^2$$



Special Right Triangles



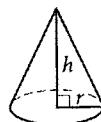
$$V = lwh$$



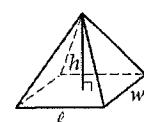
$$V = \pi r^2 h$$



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



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



$$V = \frac{1}{3}lwh$$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is  $2\pi$ .

The sum of the measures in degrees of the angles of a triangle is 180.



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## Practice Test 6

2

Module  
2

2

1

- If  $2m^2 - 4m + 2 = 50$ , what is the negative value of  $2(m - 1)$ ?

2

- In the  $x$ - $y$ -plane, quadratic equation  $y = ax^2 + bx + 11$  passes through the points  $(1, 5)$  and  $(3, 5)$ . What is the value of  $a - b$ ?

- A) 10
- B) -6
- C) -10
- D) 6

3

- Which of the following systems of equations has no solution?

- A)  $y - 2x = 5$   
 $2y - 2x = 2$
- B)  $y - 2x = 5$   
 $2y - 4x = 2$
- C)  $y - 2x = 5$   
 $y - x = 6$
- D)  $y - 2x = 5$   
 $2x - 3y = 1$

4

- In the  $x$ - $y$ -plane, points  $m$ ,  $(14, a)$ , and  $n$ ,  $(2, 1)$ , are on the line  $l$ . If points  $m$  and  $n$  are 13 units apart, which of the following equations represent line  $l$ ?

- A)  $y = -\frac{5}{12}x + \frac{11}{6}$
- B)  $y = \frac{5}{12}x + \frac{1}{6}$
- C)  $y = \frac{1}{6}x + 3$
- D)  $y = -\frac{5}{12}x - \frac{1}{6}$

5

| Distance (km) | Number of days |
|---------------|----------------|
| 22            | 8              |
| 18            | 4              |
| 10            | 5              |
| 5             | 3              |

- A long-distance runner runs varying distances each day. The number of days she ran each distance is shown in the table above. What is the difference between the mode and the range of the data set?

- A) 5
- B) 22
- C) 17
- D) 18

6

- The equation of  $(m - 1)x^2 + 2x - 5 = 0$  has exactly one solution, where  $m$  is a constant. What is the value of  $m$ ?

- A) 5
- B) -5
- C)  $\frac{4}{5}$
- D)  $-\frac{4}{5}$

## Practice Test 6

2

Module  
2

2

7

In a right triangle MOP, one of the acute angles M has a measure of  $30^\circ$  and the other acute angle is  $\angle P$ . What is the value of  $\sin(P)$ ?

A)  $\frac{1}{2}$

B)  $\frac{\sqrt{2}}{2}$

C) 1

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

8

The price of a stock increased by 25% in one year and decreased by 12% the next year. By what percent did the price increase over the two-year period?

A) 13%

B) 25%

C) 10%

D) 12%

9

When initially purchased, a car valued \$56,200. However, it depreciated at a rate of approximately 15% per year within 5 years. What is the value of the car 5 years after purchase? (Neglect the decimals)

10

The function  $f$  is defined by  $f(x) = x - 6$ . What is the  $x$ -intercept of the graph of  $y = f(x)$  in the  $x$ - $y$ -plane?

A)  $(0, 6)$

B)  $(0, -6)$

C)  $(6, 0)$

D)  $(-6, 0)$

11

A water tank has dimensions of width 14 feet, length 20 feet, and height 8 feet. How much water, in cubic meters, is needed to fill the tank? (1 foot = 0.3 meters)

A) 60.48

B) 672

C) 201.6

D) 2240

12

$$3 - \frac{2}{3}x = 8$$

Which equation has the same solution as the given equation?

A)  $3 - 2x = 24$

B)  $6 - 2x = 16$

C)  $9 - 2x = 24$

D)  $2x - 9 = 24$

13

An electric vehicle (EV) traveled at an average speed of 66 miles per hour for 3 hours and had an average energy consumption of 0.25 kilowatt-hour (kwh) per mile. Approximately how many kwh did the EV consume over the entire 3 hour drive?

A) 18.5

B) 49.5

C) 5.5

D) 0.75

## Practice Test 6

2

Module  
2

2

14

Which of the following expressions below is equivalent to  $5x^5 - 26x + 5$ ?

- I.  $(5x - 5)(x - 1)$
- II.  $(x - 5)(5x - 1)$
- III.  $(x - 1)(5x + 1)$

- A) I only
- B) II only
- C) III only
- D) None

15

$$\begin{aligned}y + 2x &< 3 \\x + 2y &> 2\end{aligned}$$

Which of the following pairs of  $(x_0, y_0)$  satisfies the system of inequalities above in the  $x$ - $y$ -plane?

- A)  $(-1, -2)$
- B)  $(-1, 2)$
- C)  $(2, 3)$
- D)  $(-3, -1)$

16

If a circle has a radius of 6 units, what is the length of an arc with a central angle of  $120^\circ$ ?

- A)  $\frac{2}{3}\pi$
- B)  $2\pi$
- C)  $4\pi$
- D)  $3\pi$

17

A department store sells a toaster at a regular price and makes a profit of \$5 per toaster. If the profit of selling 4 toasters at 10% off of the regular price is equal to the profit of selling 5 toasters at \$3 less than the regular price for each toaster, what is the regular price of a toaster?

18

Which expression is equivalent to  $\frac{x(y-6)}{xy^2-6xy} - \frac{3(y-6)}{y-6}$ , where  $y \neq 0$ ?

- A)  $\frac{1}{3}y + 3$
- B)  $\frac{3xy - 12}{xy^2 - 6xy}$
- C)  $\frac{1}{y} - 3$
- D)  $\frac{4x^2}{2x - 1}$

19

Which expression is equivalent to  $\frac{m^{-4} \cdot n^8 \cdot p^{12}}{m^{-2} \cdot n^2 \cdot p^{-2}}$ , where  $m, n$ , and  $p$  are positive?

- A)  $m^{-6} \cdot n^6 \cdot p^{14}$
- B)  $m^{-6} \cdot n^6 \cdot p^{10}$
- C)  $m^{-2} \cdot n^6 \cdot p^{14}$
- D)  $m^2 \cdot n^4 \cdot p^{-6}$



## Practice Test 6

2

Module  
2

2

20

What is the diameter of the circle  $x^2 - 10x + y^2 - 6y + 22 = 0$  in the  $x$ - $y$ -plane?

- A)  $2\sqrt{3}$
- B) 12
- C)  $4\sqrt{3}$
- D) 6

21

| Mode of transportation | Number of students |
|------------------------|--------------------|
| Drive                  |                    |
| Bike                   | 33                 |
| Walk                   | 22                 |
| Other                  | 19                 |
| Total                  | 100                |

A university conducted a survey in which 100 students were selected randomly and asked about the mode of transportation they take to get to campus. The results are shown in the incomplete table above. If the university has a total of 8000 students, how many of them drive to the campus?

22

The function  $f$  is defined by  $f(x) = 8x^2 + 3$ . In the  $x$ - $y$ -plane, the graph of  $y = p(x)$  is the result of shifting the graph of  $y = f(x)$  down 8 units. Which equation defines the function  $p$ ?

- A)  $p(x) = 8x^2 + 11$
- B)  $p(x) = 8x^2 - 5$
- C)  $p(x) = x^2 + 3$
- D)  $p(x) = x^2 - 3$

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2

Module  
1

2

35:00

## Section 2, Module 1: Math



⋮

1

Mark for Review

Which of the following points represent the intersections of the function  
 $f(x) = 3x^2 + 36x + 96$  with the  $x$  axis?

(A)  $(4, 0)$  A(B)  $(0, -4)$  B(C)  $(-8, 0)$  C(D)  $(0, 0)$  D

III

IV

TEST QUBE

Question 1 of 22 &gt;

## Section 2, Module 1: Math



⋮

3

Mark for Review

James created a unique shape by combining without overlapping three identical equilateral triangles. If each triangle has a side length of 10 centimeters, what is the closest total area of this special shape?

(A)  $140\text{cm}^2$  A(B)  $43.30\text{cm}^2$  B(C)  $129.90\text{cm}^2$  C(D)  $229.90\text{cm}^2$  D

V

## Section 2, Module 1: Math



⋮

2

Mark for Review

Jimmy is booking a hotel which costs \$80 per night and a \$100 one-time fee. Considering Jimmy's budget of \$1200, what is the maximum number of days Jimmy can stay at the hotel?

(A) 12

 A

(B) 13

 B

(C) 14

 C

(D) 15

 D

VI

TEST QUBE

Question 2 of 22 &gt;

VII

TEST QUBE

Question 3 of 22 &gt;

## Section 2, Module 1: Math



⋮

4

Mark for Review

A bag contains 18 marbles, 13 of which are red and 5 of which are blue. Three marbles are drawn at random, without replacement. What is the probability that all three marbles are red?

(A)  $1/18$  A(B)  $143/408$  B(C)  $13/126$  C(D)  $1/4$  D

TEST QUBE

Question 4 of 22 &gt;

Back

Next

## 2

Module  
1

## 2

## Section 2, Module 1: Math

Annotate

5

Mark for Review

In a random selection of 230 voters, they were asked about their satisfaction with a policy. Out of these voters, 80 expressed dissatisfaction. If a total of 17,250 people were to vote for the policy, what is the best estimate of votes that indicate satisfaction with the policy?

(A) 11250

(A)

(B) 6000

(B)

(C) 16470

(C)

(D) 8000

(D)

## Section 2, Module 1: Math

Annotate

7

Mark for Review

What is the product of the solutions for  $x$  in the given equation?

$$x(x + 8) = 4x^2 + 45x + 20$$

(A)  $\frac{37}{3}$ 

(A)

(B) 37

(B)

(C)  $\frac{20}{3}$ 

(C)

(D) 20

(D)

TESTQUBE

Question 5 of 22 &gt;

IV

## Section 2, Module 1: Math

Annotate

6

Mark for Review

In triangle  $ABC$ , the following information is given: Angle  $B$  measures 90 degrees, and Angle  $C$  measures 30 degrees. If the length of side  $AB$  is 20, what is the length of side  $AC$ ?

(A)  $20\sqrt{3}$ 

(A)

(B) 40

(B)

(C) 60

(C)

(D) 15

(D)

V

VI

VII

TESTQUBE

Question 6 of 22 &gt;

TESTQUBE

Question 7 of 22 &gt;

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12

Module  
1

21

## Section 2, Module 1: Math

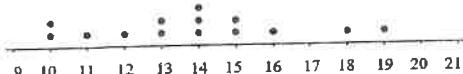


8

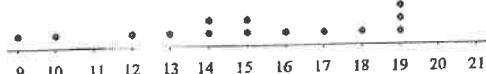
Mark for Review

Based on the dot plot provided, which of the following descriptions best characterizes the distribution of data sets A and B?

Data set A:



Data set B:



IV

- (A) Data set A has greater mean and standard deviation than Data set B.
- (B) Data set A has greater mean but lower standard deviation than Data set B.
- (C) Data set A has smaller mean but greater standard deviation than Data set B.
- (D) Data set A has smaller mean and standard deviation than Data set B.

V

VI

VII

## Section 2, Module 1: Math



9

Mark for Review

The given function  $f(x) = (x + 4)(x + 3)$  is translated up by 3 units. At which  $y$ -coordinate does this graph intersect  $x = 3$ ?

(A) 45

(A)

(B) 48

(B)

(C) 50

(C)

(D) 52

(D)

TESTS QUBE

Question 9 of 22 &gt;

## Section 2, Module 1: Math



10

Mark for Review

If  $2x + 4 = 12$ , what is the value of  $x + 9$ ?

TESTS QUBE

Question 8 of 22 &gt;

TESTS QUBE

Question 10 of 22 &gt;

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2

Module  
1

2

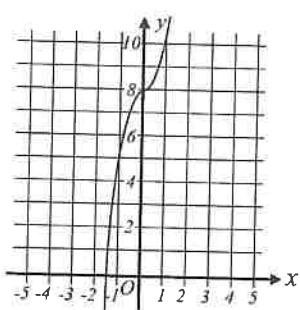
## Section 2, Module 1: Math



⋮

11

Mark for Review

What is the  $y$ -intercept for the given graph below? A 8 B 7 C 1 D -1

## Section 2, Module 1: Math



⋮

12

Mark for Review

Chris rides his bicycle at a constant speed of 30 feet per minute. How long, in seconds, does it approximately take him to reach a point that is 70 feet away?

 A 125 B 130 C 140 D 160

TEST QUBE

Question 12 of 22 &gt;

IV

## Section 2, Module 1: Math



⋮

13

Mark for Review

The length of the garden is 20 meters, and it is 20% longer than its width. What is the approximate width of the garden in meters? (Round your answer to the nearest tenth.)

V

VI

VII

TEST QUBE

Question 11 of 22 &gt;

TEST QUBE

Question 13 of 22 &gt;

Back

Next

## 2

Module  
1

## 2

## Section 2, Module 1: Math



14

Mark for Review

James boards a train leaving a station at 10 : 00 AM and observes that the train is traveling at a speed of 60 miles per hour. Meanwhile, Eve boards another train from the same station, departing one hour later, and her train travels in the same direction at a speed of 70 miles per hour. What time will Eve's train catch up to James' train?

- (A) 1 : 00 PM  
 (B) 2 : 30 PM  
 (C) 4 : 00 PM  
 (D) 5 : 00 PM

IV

TEST QUBE

Question 14 of 22 &gt;

V

## Section 2, Module 1: Math



15

Mark for Review

The store is selling a shirt for \$20. The store is offering a 20% discount on the shirt. If there is a sales tax of 5% on the discounted price, what will be the final price of the shirt?

- (A) \$15.00  
 (B) \$15.20  
 (C) \$16.00  
 (D) \$16.80

VII

TEST QUBE

Question 15 of 22 &gt;

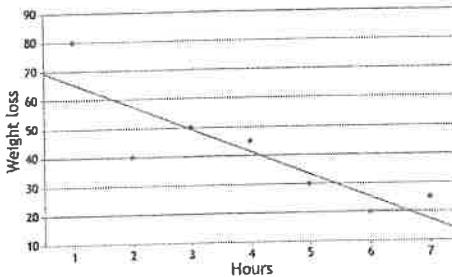
## Section 2, Module 1: Math



16

Mark for Review

The scatter plot provided illustrates the relationship between hours of exercise and the corresponding weight loss. Additionally, the graph includes a line of best fit as well. Which of the following best approximates the slope of the line of best fit?



- (A) 8  
 (B) -8  
 (C) 10  
 (D) -10

TEST QUBE

Question 16 of 22 &gt;

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2

Module  
1

2

## Section 2, Module 1: Math



17

Mark for Review

For the quadratic function  $f(x)$ ,  
 $f(1) = 4$ ,  $f(2) = 7$   
 Which equation could define  $f(x)$ ?

- (A)  $f(x) = x^2 + 3$
- (B)  $f(x) = 2x^2 - 1$
- (C)  $f(x) = x^2 + x + 3$
- (D)  $f(x) = 3x^2 - 2$

A

B

C

D

## Section 2, Module 1: Math



19

Mark for Review

With the given system of equations  
 $2x + 3y = 25$   
 $x = 2y$

What is the value of  $x$ ?

TESTSQUARE

Question 17 of 22 &gt;

IV

## Section 2, Module 1: Math



18

Mark for Review

A hotel has a rectangular swimming pool with dimensions 20 meters in length and 15 meters in width. The manager fills the pool with water to a depth of 2 meters. What is the volume of water in the pool, measured in cubic meters?

- (A) 450 cubic meters
- (B) 400 cubic meters
- (C) 300 cubic meters
- (D) 600 cubic meters

A

B

C

D

V

TESTSQUARE

Question 18 of 22 &gt;

VI

VII

TESTSQUARE

Question 19 of 22 &gt;

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2

Module  
1

2

## Section 2, Module 1: Math



20

Mark for Review

The table provided displays the preference distribution of students from three classes. If a student is chosen randomly from the total student population, what is the probability that the selected student prefers Math class?

|         | Math | English | Science | Total |
|---------|------|---------|---------|-------|
| Class A | 40   | 20      | 15      | 75    |
| Class B | 80   | 50      | 30      | 160   |
| Class C | 30   | 10      | 20      | 60    |
| Total   | 150  | 80      | 65      | 295   |

 A 160/295 B 60/295 C 80/295 D 150/295

IV

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## Section 2, Module 1: Math



21

Mark for Review

Considering the given function  $f(x) = 1.5x + 30$ , if there exists a linear function  $g$  that is parallel to function  $f$  and intersects at the point  $(-4, 2)$ , what is the  $y$ -intercept of function  $g$ ?

TEST QUBE

Question 21 of 22 &gt;

## Section 2, Module 1: Math



22

Mark for Review

Alice is trying to determine the optimal allocation of hours between her two jobs. She aims to work a total of 30 hours per week while earning \$300 in total. The first job offers a pay rate of \$5 per hour, and the second job pays \$15 per hour. How many hours should Alice work for the first job in order to achieve her desired earnings and total hours?

 A 20 hours B 15 hours C 10 hours D 30 hours

TEST QUBE

Question 20 of 22 &gt;

TEST QUBE

Question 22 of 22 &gt;

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Next

2

Module  
2

35:00

## Section 2, Module 2: Math



1

Mark for Review

What value of  $x$  is the solution for the following equation below?

$$6x - 3x - 15 = 75$$

I

2

## Section 2, Module 2: Math



3

Mark for Review

Alex takes a tram and bicycle from home to his workplace. The tram travels at a constant speed of 15 miles per hour and the bicycle at 10 miles per hour. The distance between his home and workplace is 10 miles and it takes 45 minutes for him to travel one-way. How long did Alex travel on the tram?

(A) 12 minutes

A

(B) 15 minutes

B

(C) 24 minutes

C

(D) 30 minutes

D

III

## TESTQUBE

Question 1 of 22 &gt;

IV

## Section 2, Module 2: Math



2

Mark for Review

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

$$\begin{aligned} 3m + 4n &= 7 \\ 4m + 3n &= 10 \end{aligned}$$

(A) -3

A

(B) -1

B

(C) 1

C

(D) 3

D

V

## Section 2, Module 2: Math



4

Mark for Review

Which of the systems of equations have infinitely many solutions?

(A)  $2x + 4y = 3$  and  $6x + 12y = 9$ 

A

(B)  $-x - y = 5$  and  $x - y = 5$ 

B

(C)  $4x - y = -2$  and  $4x - y = 2$ 

C

(D)  $3x + 3y = 1$  and  $3x - 3y = -1$ 

D

VI

## TESTQUBE

Question 2 of 22 &gt;

VII

## TESTQUBE

Question 4 of 22 &gt;

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## 2

Module  
2

## 2

## Section 2, Module 2: Math

Annotate

5

Mark for Review

The function  $g$  is defined by  $g(x) = 3x^2 - 6x + 4$ .  
For what value of  $x$  does  $g(x) = 28$ ?

- (A) -4  
(B) -2  
(C) 3  
(D) 5

 (A)  
 (B)  
 (C)  
 (D)

IV

TESTSQUARE

Question 5 of 22 &gt;

## Section 2, Module 2: Math

Annotate

7

Mark for Review

The given equation relates the numbers  $a$ ,  $b$ , and  $c$ .  
Which of the following correctly expresses  $b$  in terms of  $a$  and  $c$ ?  
 $c = 3a^2 - 2b$

- (A)  $b = \frac{3a^2+c}{2}$   
(B)  $b = \frac{3}{2a^2-c}$   
(C)  $b = \frac{3a^2-c}{2}$   
(D)  $b = 3a^2 - c$

 (A)  
 (B)  
 (C)  
 (D)

V

## Section 2, Module 2: Math

Annotate

6

Mark for Review

What value of  $b$  would result in no real solution for the given equation below?

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

- (A) 4  
(B) 5  
(C) 6  
(D) 7

 (A)  
 (B)  
 (C)  
 (D)

VI

TESTSQUARE

Question 6 of 22 &gt;

TESTSQUARE

Question 7 of 22 &gt;

## Section 2, Module 2: Math

Annotate

8

Mark for Review

Jake is shopping at a store and plans to purchase both cookies and chips. The price of each cookie is \$2.5, while each chip costs \$1.5. Jake intends to buy 6 chips and wishes to spend a minimum of \$26 but no more than \$27 in total. How many cookies should Jake include in the purchase?

VII

TESTSQUARE

Question 8 of 22 &gt;

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Module  
2

2

## Section 2, Module 2: Math



⋮

9

Mark for Review

Which of the following expressions is equivalent to  $\frac{(a^4b^3c^5)(a^{-1}b^2c^6)}{(ab^2c^{-3})}$ , where  $a$ ,  $b$ , and  $c$  are positive?

(A)  $a^{-4}b^{12}c^{-10}$

Ⓐ

(B)  $a^{-4}b^3c^{-10}$

Ⓑ

(C)  $a^4b^7c^6$

Ⓒ

(D)  $a^2b^3c^8$

Ⓓ

## Section 2, Module 2: Math

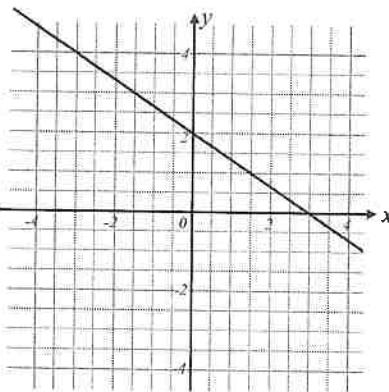


⋮

10

Mark for Review

What is the slope for the given linear function below?



(A)  $-3/2$

Ⓐ

(B)  $-2/3$

Ⓑ

(C)  $2/3$

Ⓒ

(D)  $3/2$

Ⓓ

IV

V

VI

VII

## 2

Module  
2

## 2

## Section 2, Module 2: Math



11

Mark for Review

The function  $f$  is defined by  $f(x) = -2x + 6$  and function  $g$  is defined by  $g(x) = -f(x)$ . What is the value of  $g(-1)$ ?

II

III

IV

V

VI

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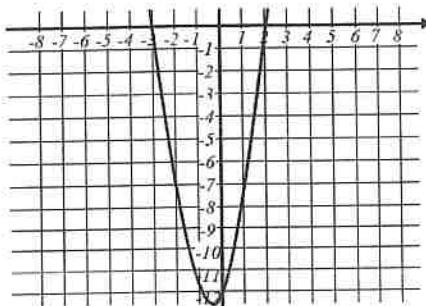
## Section 2, Module 2: Math



12

Mark for Review

Which of the following equations defines the function  $f$  as shown in the graph below?



(A)  $f(x) = -2x^2 + 2x + 12$

 A

(B)  $f(x) = -2x^2 - 2x + 12$

 B

(C)  $f(x) = 2x^2 - 2x - 12$

 C

(D)  $f(x) = 2x^2 + 2x - 12$

 D

## 2

Module  
2

## 2

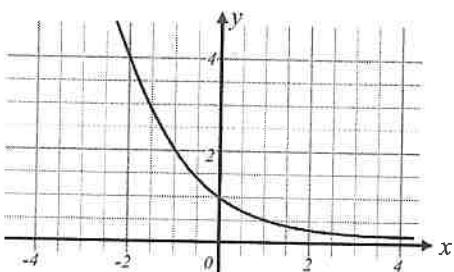
## Section 2, Module 2: Math



13

Mark for Review

The function  $f(x)$  is illustrated below. What is the value of  $f(-2)$ ?



(A) -4

(B) -2

(C) 2

(D) 4

## Section 2, Module 2: Math



14

Mark for Review

To produce 10 grams of dough, a mixture is prepared by combining 8 grams of flour, 1.5 grams of water, and 0.5 grams of sugar. If there is a total of 65 grams of dough, how many grams of water is included in the mixture? (Ignore the gram sign.)

TESTQUBE

Question 14 of 22 &gt;

II

III

IV

## Section 2, Module 2: Math



15

Mark for Review

Jeremy ordered a steak and wine at a restaurant. The steak costs 28 dollars and wine 12 dollars. Jeremy must pay 10 percent tax to the total amount of food he paid and an additional tip of 6 dollars above that. How much money does Jeremy have to pay at the restaurant? (ignore the dollar sign)

V

VI

VII

TESTQUBE

Question 13 of 22 &gt;

TESTQUBE

Question 15 of 22 &gt;

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## 2

Module  
2

## 2

## Section 2, Module 2: Math

Annotate



16

Mark for Review

Class A comprises 50 students, where 22 students can speak Spanish, 16 students can speak French, and 4 students can speak both languages. What is the probability that a randomly selected student from Class A speaks neither Spanish nor French?

(A) 16%

 A

(B) 24%

 B

(C) 32%

 C

(D) 36%

 D

IV

TESTS<sup>Q</sup>UBE

Question 16 of 22 &gt;

## Section 2, Module 2: Math

Annotate



17

Mark for Review

Anna weighs 125 pounds. Determine Anna's weight in tons. (1 pound = 0.45 kilograms and 1 kilogram = 0.001 ton)

(A) 0.0056 tons

 A

(B) 0.056 tons

 B

(C) 0.56 tons

 C

(D) 5.6 tons

 D

V

TESTS<sup>Q</sup>UBE

Question 17 of 22 &gt;

VII

## Section 2, Module 2: Math

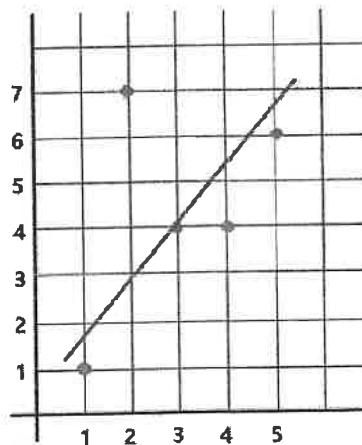
Annotate



18

Mark for Review

Which of the following equations best represents the line of best fit for the scatterplot below?

(A)  $y = 1.2x + 0.5$  A(B)  $y = -1.2x + 0.5$  B(C)  $y = 1.2x - 0.5$  C(D)  $y = -1.2x - 0.5$  DTESTS<sup>Q</sup>UBE

Question 18 of 22 &gt;

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## Section 2, Module 2: Math



19

Mark for Review

What is the volume of a pyramid with a length of 6, a width of 4 and a height of 5?

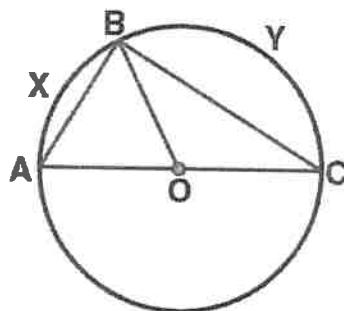
## Section 2, Module 2: Math



20

Mark for Review

In the diagram below, triangle  $ABC$  is circumscribed by circle with a center  $O$ . If  $\angle BAC$  is  $40^\circ$ , what is  $\angle BCA$ ?

(A)  $30^\circ$ (B)  $40^\circ$ (C)  $50^\circ$ (D)  $60^\circ$ 

IV

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2

## Section 2, Module 2: Math



⋮

21

Mark for Review

A ladder, initially 15 feet long, is leaning exactly at the top of the building with the base of the ladder positioned 9 feet from the building. When the ladder is pulled 3 feet farther from the building, the top of the ladder drops to a new height. Let's denote the angle between the newly adjusted ladder and the ground as  $A$ . Find the value of  $\sin(A)$ .

IV

TEST QUBE

Question 21 of 22 &gt;



⋮

## Section 2, Module 2: Math

22

Mark for Review

Consider an equilateral triangle  $A$  with a side length of 4 cm. If triangle  $B$  is similar to triangle  $A$  and has side lengths that are 50 percent longer than that of triangle  $A$ , what is the area of triangle  $B$ ?

(A)  $4\sqrt{3}$ 

Ⓐ

(B)  $6\sqrt{3}$ 

Ⓑ

(C)  $8\sqrt{3}$ 

Ⓒ

(D)  $9\sqrt{3}$ 

Ⓓ

VI

VII

TEST QUBE

Question 22 of 22 &gt;

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2

Module  
1

35:00

## Section 2, Module 1: Math



⋮

1

Mark for Review

How do the mean and standard deviation of Class A compare to those of Class B based on the scores of their students given in the list below?

|         |    |    |    |    |    |
|---------|----|----|----|----|----|
| Class A | 60 | 70 | 65 | 78 | 62 |
| Class B | 78 | 35 | 45 | 50 | 40 |

(A) Class A has a greater mean but lower standard deviation than Class B.

(B) Class A has a greater mean and standard deviation than Class B.

(C) Class A has a lower mean but greater standard deviation than Class B.

(D) Class A has a lower mean and lower standard deviation than Class B.

## Section 2, Module 1: Math

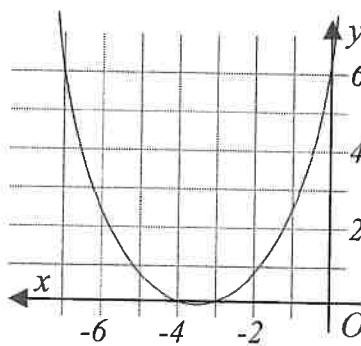


⋮

2

Mark for Review

What is the most appropriate function to describe the graph depicted below?



(A)  $(x + 4)(x + 3)$

(B)  $(x + 4)(x + 3) + 6$

(C)  $0.5(x + 4)(x + 3)$

(D)  $2(x + 4)(x + 3)$

III

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Module  
1

2

## Section 2, Module 1: Math



3

Mark for Review

Out of 300 residents in a town, a sample was randomly selected and asked if they were satisfied with the air quality. 30% of those surveyed responded positively. Based on this result, what is the most accurate estimate of the total number of residents in the town who are satisfied with the air quality?

(A) 60

 A

(B) 30

 B

(C) 90

 C

(D) 120

 D

III

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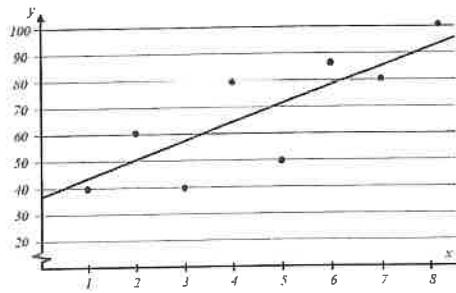
## Section 2, Module 1: Math



4

Mark for Review

Which equation provides the best estimate for the slope of the line of best fit for the given graph below?



(A) -8

 A

(B) 20

 B

(C) -20

 C

(D) 8

 D

2

Module  
1

2

## Section 2, Module 1: Math

Annotate

5

Mark for Review

Which expression is equivalent to  $(a^4b^3c^{-1})(b^2c^{-3})$ , where  $a, b$ , and  $c$  are positive?

(A)  $a^8b^{-9}c^3$

Ⓐ

(B)  $a^4b^5c^{-4}$

Ⓑ

(C)  $a^4b^6c^3$

Ⓒ

(D)  $a^8b^3c^{-2}$

Ⓓ

TEST QUBE

Question 5 of 22 &gt;

## Section 2, Module 1: Math

Annotate

6

Mark for Review

The function  $g$  represents the distance, in miles, from home to school after driving  $m$  miles. Based on this model, what is the initial distance in miles from home to school?

$$g(m) = -0.5m + 20$$

(A) 15

Ⓐ

(B) 10

Ⓑ

(C) 20

Ⓒ

(D) None of the above

Ⓓ

TEST QUBE

Question 6 of 22 &gt;

## Section 2, Module 1: Math

Annotate

7

Mark for Review

Given that a table provides the distribution of favorite classes and grade levels of 100 students, what is the likelihood of randomly selecting a student who is a sophomore and has Math as their favorite class?

| Grade     | Favorite Class |         |         |       |
|-----------|----------------|---------|---------|-------|
|           | Math           | English | Science | Total |
| Freshman  | 9              | 8       | 5       | 22    |
| Sophomore | 8              | 9       | 12      | 29    |
| Junior    | 4              | 10      | 8       | 22    |
| Senior    | 9              | 13      | 5       | 27    |
| Total     | 30             | 40      | 30      | 100   |

(A)  $2/25$

Ⓐ

(B)  $3/10$

Ⓑ

(C)  $29/100$

Ⓒ

(D)  $1/2$

Ⓓ

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TEST QUBE

Question 7 of 22 &gt;

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Module  
1

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## Section 2, Module 1: Math



8

Mark for Review

II A right triangle  $ABC$  is similar to right triangle  $DEF$ , where angle  $B$  corresponds to angle  $E$  and angle  $A$  corresponds to angle  $D$ . If the length of  $AB$  is 3,  $BC$  is 4, and  $DE$  is 6, what is the length of  $DF$ ? (Angles  $B$  and  $E$  are right angles.)

(A) 12

A

(B) 5

B

(C) 10

C

(D) 8

D

III

IV

TESTQUBE

Question 8 of 22 &gt;

## Section 2, Module 1: Math



10

Mark for Review

What is the  $y$ -coordinate of the  $y$ -intercept of function  $g$  if it is perpendicular to  $h(x) = 0.5x + 48$  and passes through the  $x$ -intercept at  $(3, 0)$ ?

(A) 6

A

(B) -2

B

(C) 48

C

(D) -6

D

V

## Section 2, Module 1: Math



9

Mark for Review

V Which of the following would be the approximate value of James' house after a year if it is currently worth \$200,000 and its value increases by 25 percent every three months?

(A) \$250,000

A

(B) \$390,625

B

(C) \$312,500

C

(D) \$488,281

D

VI

VII

TESTQUBE

Question 9 of 22 &gt;

## Section 2, Module 1: Math



11

Mark for Review

On the election ballot, there was a proposal for a new grading policy. The results showed that there were twice as many students who voted in favor of the proposal as those who voted against it. If there were 2,000 students who voted against the proposal, how many students voted in favor of it?

(A) 1000

A

(B) 2000

B

(C) 4000

C

(D) 6000

D

TESTQUBE

Question 11 of 22 &gt;

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## Section 2, Module 1: Math



⋮

12

Mark for Review

What is the volume, in cubic centimeters, of a rectangular prism with a length of 10 cm, a width of 6 cm, and a height of 8 cm?

TESTS<sup>®</sup>QUBE

Question 12 of 22 &gt;

## Section 2, Module 1: Math



⋮

13

Mark for Review

How many real solutions does the equation below have?

$$8x^2 + 17x + 3 = 0$$

(A) Exactly one

 A

(B) Zero

 B

(C) Infinitely many

 C

(D) Exactly two

 D

V

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## Section 2, Module 1: Math

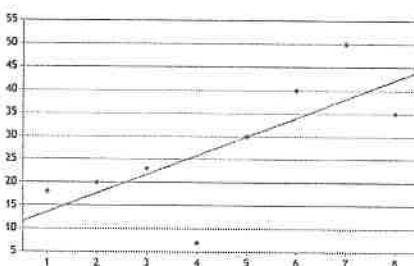


⋮

14

Mark for Review

Which equation among the options below best represents the line of best fit in the scatterplot displaying the relationship between variables  $x$  and  $y$ ? (Note: The graph below does not illustrate  $x = 0$ .)



(A)  $1.25x + 20$

 A

(B)  $-1.25x + 20$

 B

(C)  $4x + 10$

 C

(D)  $-4x - 10$

 D

IV

TESTS<sup>®</sup>QUBE

Question 13 of 22 &gt;

TESTS<sup>®</sup>QUBE

Question 14 of 22 &gt;

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## Section 2, Module 1: Math



15

Mark for Review

Bob bought a phone that was on sale at a store. The phone was on 70% discount but included a 20% tax which ended up costing Bob 900 dollars. What was the original price of the phone?

(A) \$1000

(A)

(B) \$1500

(B)

(C) \$2500

(C)

(D) \$3000

(D)

TESTQUBE

Question 15 of 22 &gt;

## Section 2, Module 1: Math



16

Mark for Review

What is the area, in square meters, of a rectangular garden that has a perimeter of 100 meters and where the length is 10 meters more than the width?

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VII

TESTQUBE

Question 16 of 22 &gt;

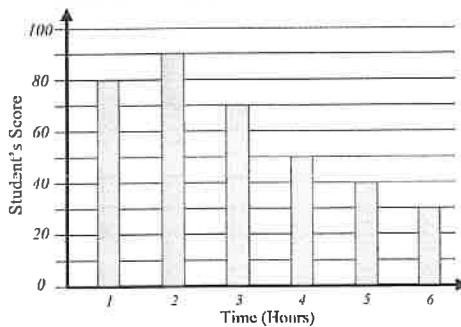
## Section 2, Module 1: Math



17

Mark for Review

The bar graph below shows the scores for each student in Mr. Jackson's math class where each student spent different amounts of time preparing for the exam. What is the average score of the students based on the bar graph?




## Section 2, Module 1: Math



16

Mark for Review

What is the area, in square meters, of a rectangular garden that has a perimeter of 100 meters and where the length is 10 meters more than the width?

TESTQUBE

Question 17 of 22 &gt;

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## Section 2, Module 1: Math



18

Mark for Review

In a game of rock paper scissors, two players, Bob and Alice, choose one of the three choices at random. What is the probability that both players choose the same shape?

(A)  $\frac{1}{3}$ 

(A)

(B)  $\frac{1}{9}$ 

(B)

(C)  $\frac{2}{3}$ 

(C)

(D) 1

(D)

TESTQUBE

Question 18 of 22 &gt;

## Section 2, Module 1: Math



19

Mark for Review

A bag contains 10 red marbles, 5 blue marbles, and 4 green marbles. If two marbles are drawn at random, without replacement, what is the probability that both marbles are red?

(A)  $\frac{10}{19}$ 

(A)

(B)  $\frac{5}{19}$ 

(B)

(C)  $\frac{3}{11}$ 

(C)

(D)  $\frac{3}{18}$ 

(D)

TESTQUBE

Question 19 of 22 &gt;

## Section 2, Module 1: Math



20

Mark for Review

James owns a rectangular garden that has a length of 10 meters and a width of 8 meters. He wants to put a circular pond in the center of the garden, and the pond has a radius of 2 meters. Which of the following best approximates the area of the garden that is not covered by the pond?

(A) 40.32 square meters

(A)

(B) 64.47 square meters

(B)

(C) 80.43 square meters

(C)

(D) 67.43 square meters

(D)

TESTQUBE

Question 20 of 22 &gt;

## Section 2, Module 1: Math



21

Mark for Review

A circle passes through the points  $(-3, 3)$  and  $(9, 3)$ . The two points, when connected together by a line, passes through the center of the circle. Find the radius of the circle.



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TESTQUBE

Question 21 of 22 &gt;

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## Section 2, Module 1: Math



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22

Mark for Review

An elevator can carry a maximum of 1,000 pounds. The elevator operator weighs 200 pounds and each passenger weighs 150 pounds. What is the maximum number of passengers that the elevator can carry if the elevator is already carrying a load of 300 pounds?

(A) 4 passengers

A

(B) 3 passengers

B

(C) 2 passengers

C

(D) 5 passengers

D

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35:00

## Section 2, Module 2: Math

Annotate

1

Mark for Review

What is the value of  $x$  that satisfies the two systems of equations given below? ( $x \geq 0$ )

$$\begin{aligned}x^2 - y &= 18 \\x &= 2y + 8\end{aligned}$$

(A) -4

A

(B) -2

B

(C) 2

C

(D) 4

D

## Section 2, Module 2: Math

Annotate

3

Mark for Review

If  $6x - 3 = 15$ , what is the value of  $15x - 35$ ?

TESTSQUARE

Question 1 of 22 &gt;

I

TESTSQUARE

Question 3 of 22 &gt;

III

## Section 2, Module 2: Math

Annotate

2

Mark for Review

Elizabeth is participating in a quiz show. For every question she gets correct, she earns 2 points. For every question she gets incorrect, she loses 1 point. If there are a total of 20 questions and she earned 19 points in total, how many questions did she answer incorrectly?

(A) 6

A

(B) 7

B

(C) 8

C

(D) 9

D

## Section 2, Module 2: Math

Annotate

4

Mark for Review

Rectangle A has a width 3 cm shorter than the length. If the perimeter of rectangle A is 26, what is the width of rectangle A?

(A) 5cm

A

(B) 6cm

B

(C) 7cm

C

(D) 8cm

D

TESTSQUARE

Question 2 of 22 &gt;

VII

TESTSQUARE

Question 4 of 22 &gt;

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## 2

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## 2

## Section 2, Module 2: Math



⋮

5

Mark for Review

A travel agency is selling two types of tickets, Ticket *A* and Ticket *B*, for the observatory deck. Ticket *A* costs \$15 each, and Ticket *B* costs \$25 each. In one day, the travel agency sold a total of 57 tickets and earned a total revenue of \$1,065. How many Ticket *B*'s were sold that day?

 A 7 A B 14 B C 21 C D 28 D

## IV

TEST QUBE

Question 5 of 22 &gt;

## V

In the given equation below,  $b$  is a constant. The equation has one real solution. What is the value of  $b$  when  $b > 0$ ?

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

## VI

TEST QUBE

Question 6 of 22 &gt;

## VII

Module  
2

## 2

## Section 2, Module 2: Math



⋮

7

Mark for Review

Which of the following is not a factor of  $2x^3 + 7x^2 - 19x - 60$ ?

 A -4 A B 3 B C  $-5/2$  C D  $2/3$  D

## IV

TEST QUBE

Question 7 of 22 &gt;

## V

## Section 2, Module 2: Math



⋮

8

Mark for Review

Which of the following expressions is equivalent to  $a^6 \div a^4$ ?

 A  $a^{6+4}$  A B  $a^{6-4}$  B C  $a^{6 \times 4}$  C D  $a^{6/4}$  D

## Section 2, Module 2: Math



9

Mark for Review

In the  $xy$ -plane, what is the area of a polygon that satisfies the condition of the three inequalities shown below?

$$y \leq \frac{4}{3}x + 4$$

$$y \leq -x + 4$$

$$y \geq 0$$

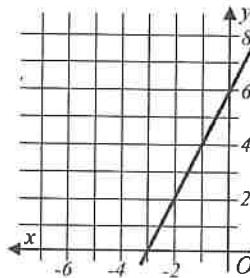
## Section 2, Module 2: Math



10

Mark for Review

What is the  $x$ -intercept of the graph below?

(A)  $(-3, 0)$ 

(A)

(B)  $(3, 0)$ 

(B)

(C)  $(0, 6)$ 

(C)

(D)  $(6, 0)$ 

(D)

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## Section 2, Module 2: Math



11

Mark for Review

The function  $f$  is defined by  $f(x) = 2x - 5$ . In the  $xy$ -plane, the graph  $f(x)$  is shifted 1 unit to the left and 4 units up. What is the  $x$ -intercept of the new function?

(A) -1

Ⓐ

(B) -0.5

Ⓑ

(C) 0.5

Ⓒ

(D) 1

Ⓓ

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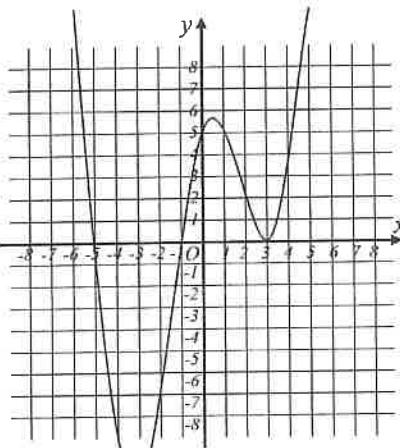
## Section 2, Module 2: Math



12

Mark for Review

The graph of  $y = g(x)$  is shown below. For how many values of  $x$  does  $g(x) = 0$ ?



(A) 0

Ⓐ

(B) 1

Ⓑ

(C) 2

Ⓒ

(D) 3

Ⓓ

## 2

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## 2

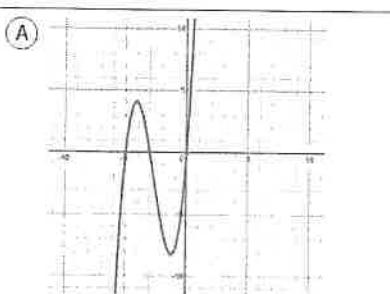
## Section 2, Module 2: Math

Annotate

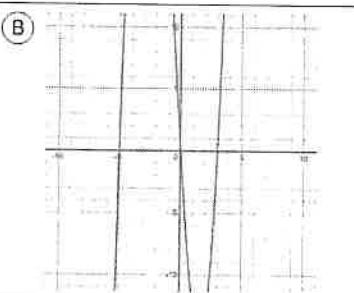
13

Mark for Review

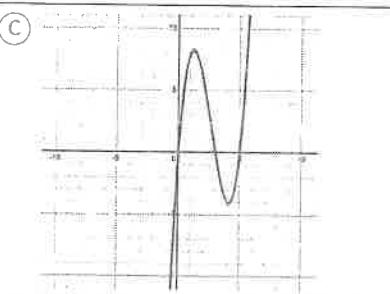
Which of the following graphs correctly represents the function  $f(x) = x(x - 3)(x + 5)$ ?



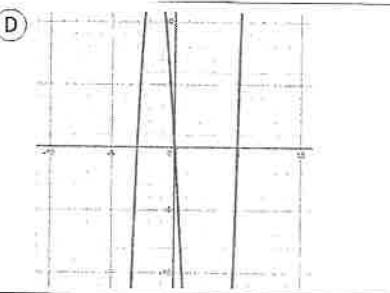
A



B



C



D

TESTCUBE

Question 13 of 22 &gt;

## Section 2, Module 2: Math

Annotate

14

Mark for Review

The equation below defines the function  $g$ . What is the maximum value of  $g(x)$ ?

$$g(x) = \frac{-5}{3}x^2 - 10x + 9$$

II

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IV

TESTCUBE

Question 14 of 22 &gt;

## Section 2, Module 2: Math

Annotate

15

Mark for Review

For a particular factory that manufactures pens, 6 out of every 100 pens are defective. If this machine produces 500 pens a day, how many defects in total are expected to be found in a week? (The machine produces all seven days a week from Monday to Sunday.)

V

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VII

TESTCUBE

Question 15 of 22 &gt;

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## 2

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## Section 2, Module 2: Math



16

Mark for Review

Alex is depositing his money at a bank. Alex estimates that, starting from present, the value of money will increase by 0.5 percent every 10 years. If the present amount of money deposited is \$7,500, which of the following represents the estimate of the amount of money, in dollars,  $x$  years from now?

(A)  $7,500(1.05)^{x/10}$

(A)

(B)  $7,500(1.005)^{x/10}$

(B)

(C)  $7,500(1.05)^{10/x}$

(C)

(D)  $7,500(1.005)^{10/x}$

(D)

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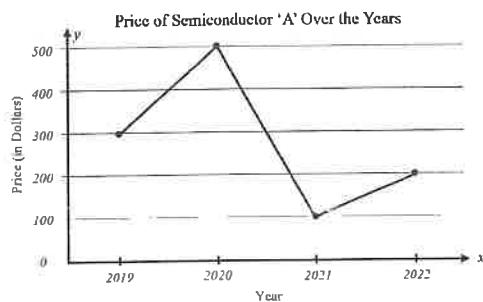
## Section 2, Module 2: Math



17

Mark for Review

The line graph below shows the price of semiconductor A over the years from 2019 to 2022. Which time interval, spanning from 2019 to 2022, exhibits the largest difference in the price of semiconductor A?



(A) 2019 to 2020

(A)

(B) 2020 to 2021

(B)

(C) 2021 to 2022

(C)

(D) None of the above

(D)

## 2

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## 2

## Section 2, Module 2: Math



18

Mark for Review

There is a 12-sided die which is labeled with a number from 1 to 12, with a different number on each side. If the die is rolled once, what is the probability the number is either an odd or even number?

(A) 0

(A)

(B)  $\frac{1}{12}$ 

(B)

(C)  $\frac{1}{2}$ 

(C)

(D) 1

(D)

TESTQUBE

Question 18 of 22 &gt;

IV

## Section 2, Module 2: Math



20

Mark for Review

A circle has an equation of  $x^2 + 6x + y^2 - 10y + 18 = 0$ . What is the radius of this circle?

(A) 2

(A)

(B) 4

(B)

(C) 8

(C)

(D) 16

(D)

TESTQUBE

Question 20 of 22 &gt;

V

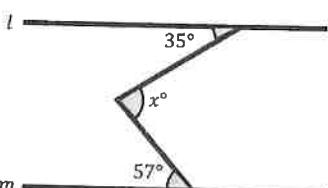
## Section 2, Module 2: Math



19

Mark for Review

In the diagram below, the lines  $l$  and  $m$  run parallel to each other. What is the measure of angle  $x$  in degrees?




TESTQUBE

Question 19 of 22 &gt;

VI

## Section 2, Module 2: Math



21

Mark for Review

What is the circumference of a circle with an area of  $16\pi$ ?

(A)  $2\pi$ 

(A)

(B)  $4\pi$ 

(B)

(C)  $8\pi$ 

(C)

(D)  $16\pi$ 

(D)

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TESTQUBE

Question 21 of 22 &gt;

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## Section 2, Module 2: Math



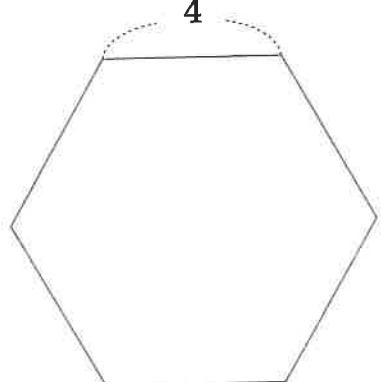
Annotate

22

Mark for Review

Find the area of a regular hexagon with each side length of 4. Round your answer to the nearest tenth.

4



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