

SUMMER MATH REVIEW

FOR STUDENTS ENTERING Pre-Calculus CP, Intro to Calculus H, and Calculus H

NAME: _____

Dear Fontbonne Academy Student,

The purpose of this Summer Math Assignments Packet is to help you prepare for the SATs. This is a Practice SAT Test.

INSTRUCTIONS:

- 1. YOU MAY USE A CALCULATOR**
2. You must complete the whole packet and bring it to your first math class in September.
3. You should do all your work neatly on the assignment page. If you need scratch paper, do your work neatly and put the assignment number and problem number on the scratch paper. Keep your scratch paper and bring it to school in September with your packet.

Good luck,

Have a great summer and see you in September!

Math

27 QUESTIONS

DIRECTIONS

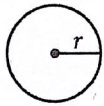
The questions in this section address a number of important math skills. Use of a calculator is permitted for all questions.

NOTES

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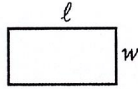
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- Figures provided are drawn to scale.
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- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

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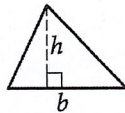


$$A = \pi r^2$$

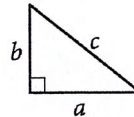
$$C = 2\pi r$$



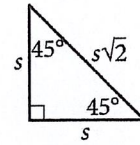
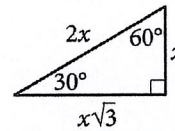
$$A = \ell w$$



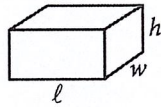
$$A = \frac{1}{2}bh$$



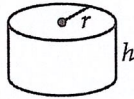
$$c^2 = a^2 + b^2$$



Special Right Triangles



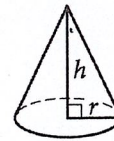
$$V = \ell wh$$



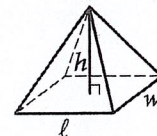
$$V = \pi r^2 h$$



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



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



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

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

The number of radians of arc in a circle is 2π .

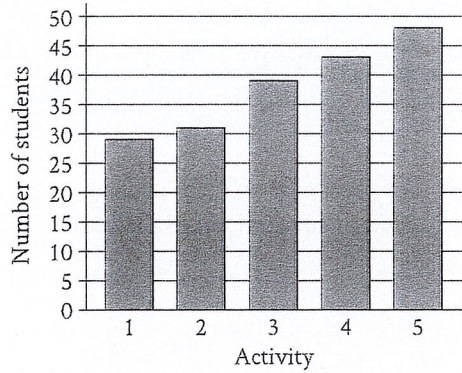
The sum of the measures in degrees of the angles of a triangle is 180.

For multiple-choice questions, solve each problem, choose the correct answer from the choices provided, and then circle your answer in this book. Circle only one answer for each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer circled, or for questions with no answers circled.

For student-produced response questions, solve each problem and write your answer next to or under the question in the test book as described below.

- Once you've written your answer, circle it clearly. You will not receive credit for anything written outside the circle, or for any questions with more than one circled answer.
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- Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

1



A group of students voted on five after-school activities. The bar graph shows the number of students who voted for each of the five activities. How many students chose activity 3?

- A) 25
- B) 39
- C) 48
- D) 50

2

What percentage of 300 is 75?

- A) 25%
- B) 50%
- C) 75%
- D) 225%

3

$$\frac{x^2}{25} = 36$$

What is a solution to the given equation?

- A) 6
- B) 30
- C) 450
- D) 900

4

3 more than 8 times a number x is equal to 83. Which equation represents this situation?

- A) $(3)(8)x = 83$
- B) $8x = 83 + 3$
- C) $3x + 8 = 83$
- D) $8x + 3 = 83$

5

Hana deposited a fixed amount into her bank account each month. The function $f(t) = 100 + 25t$ gives the amount, in dollars, in Hana's bank account after t monthly deposits. What is the best interpretation of 25 in this context?

- A) With each monthly deposit, the amount in Hana's bank account increased by \$25.
- B) Before Hana made any monthly deposits, the amount in her bank account was \$25.
- C) After 1 monthly deposit, the amount in Hana's bank account was \$25.
- D) Hana made a total of 25 monthly deposits.

6

A customer spent \$27 to purchase oranges at \$3 per pound. How many pounds of oranges did the customer purchase?

7

Nasir bought 9 storage bins that were each the same price. He used a coupon for \$63 off the entire purchase. The cost for the entire purchase after using the coupon was \$27. What was the original price, in dollars, for 1 storage bin?

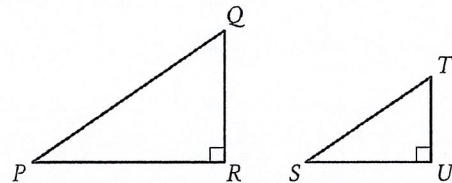
8

x	$f(x)$
0	29
1	32
2	35

For the linear function f , the table shows three values of x and their corresponding values of $f(x)$. Which equation defines $f(x)$?

- A) $f(x) = 3x + 29$
- B) $f(x) = 29x + 32$
- C) $f(x) = 35x + 29$
- D) $f(x) = 32x + 35$

9



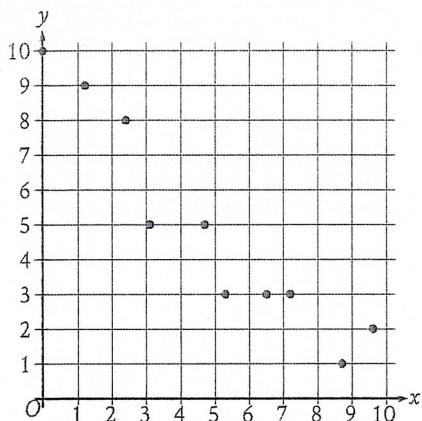
Note: Figures not drawn to scale.

Right triangles PQR and STU are similar, where P corresponds to S . If the measure of angle Q is 18° , what is the measure of angle S ?

- A) 18°
- B) 72°
- C) 82°
- D) 162°

10

The scatterplot shows the relationship between two variables, x and y .



Which of the following equations is the most appropriate linear model for the data shown?

- A) $y = 0.9 + 9.4x$
- B) $y = 0.9 - 9.4x$
- C) $y = 9.4 + 0.9x$
- D) $y = 9.4 - 0.9x$

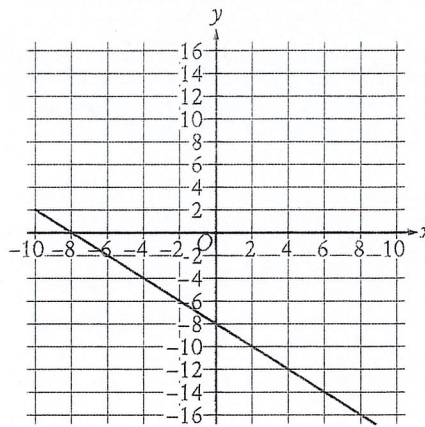
11

$$2.5b + 5r = 80$$

The given equation describes the relationship between the number of birds, b , and the number of reptiles, r , that can be cared for at a pet care business on a given day. If the business cares for 16 reptiles on a given day, how many birds can it care for on this day?

- A) 0
- B) 5
- C) 40
- D) 80

12



What is an equation of the graph shown?

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

13

If $\frac{x}{8} = 5$, what is the value of $\frac{8}{x}$?

14

$$\begin{aligned} 24x + y &= 48 \\ 6x + y &= 72 \end{aligned}$$

The solution to the given system of equations is (x, y) . What is the value of y ?

15

Line t in the xy -plane has a slope of $-\frac{1}{3}$ and passes through the point $(9, 10)$. Which equation defines

line t ?

- A) $y = 13x - \frac{1}{3}$
- B) $y = 9x + 10$
- C) $y = -\frac{x}{3} + 10$
- D) $y = -\frac{x}{3} + 13$

16

The function $f(x) = 206(1.034)^x$ models the value, in dollars, of a certain bank account by the end of each year from 1957 through 1972, where x is the number of years after 1957. Which of the following is the best interpretation of “ $f(5)$ is approximately equal to 243” in this context?

- A) The value of the bank account is estimated to be approximately 5 dollars greater in 1962 than in 1957.
- B) The value of the bank account is estimated to be approximately 243 dollars in 1962.
- C) The value, in dollars, of the bank account is estimated to be approximately 5 times greater in 1962 than in 1957.
- D) The value of the bank account is estimated to increase by approximately 243 dollars every 5 years between 1957 and 1972.

17

For a certain rectangular region, the ratio of its length to its width is 35 to 10. If the width of the rectangular region increases by 7 units, how must the length change to maintain this ratio?

- A) It must decrease by 24.5 units.
- B) It must increase by 24.5 units.
- C) It must decrease by 7 units.
- D) It must increase by 7 units.

18

Square P has a side length of x inches. Square Q has a perimeter that is 176 inches greater than the perimeter of square P. The function f gives the area of square Q, in square inches. Which of the following defines f ?

- A) $f(x) = (x + 44)^2$
- B) $f(x) = (x + 176)^2$
- C) $f(x) = (176x + 44)^2$
- D) $f(x) = (176x + 176)^2$

19

$$\frac{14x}{7y} = 2\sqrt{w+19}$$

The given equation relates the distinct positive real numbers w , x , and y . Which equation correctly expresses w in terms of x and y ?

A) $w = \sqrt{\frac{x}{y}} - 19$

B) $w = \sqrt{\frac{28x}{14y}} - 19$

C) $w = \left(\frac{x}{y}\right)^2 - 19$

D) $w = \left(\frac{28x}{14y}\right)^2 - 19$

20

Point O is the center of a circle. The measure of arc RS on this circle is 100° . What is the measure, in degrees, of its associated angle ROS ?

21

The expression $6\sqrt[5]{3^5x^{45}} \cdot \sqrt[8]{2^8x}$ is equivalent to ax^b , where a and b are positive constants and $x > 1$.

What is the value of $a + b$?

22

A right triangle has sides of length $2\sqrt{2}$, $6\sqrt{2}$, and $\sqrt{80}$ units. What is the area of the triangle, in square units?

A) $8\sqrt{2} + \sqrt{80}$

B) 12

C) $24\sqrt{80}$

D) 24

23

The expression $4x^2 + bx - 45$, where b is a constant, can be rewritten as $(hx + k)(x + j)$, where h , k , and j are integer constants. Which of the following must be an integer?

A) $\frac{b}{h}$

B) $\frac{b}{k}$

C) $\frac{45}{h}$

D) $\frac{45}{k}$

24

$$y = 2x^2 - 21x + 64$$
$$y = 3x + a$$

In the given system of equations, a is a constant. The graphs of the equations in the given system intersect at exactly one point, (x, y) , in the xy -plane. What is the value of x ?

- A) -8
- B) -6
- C) 6
- D) 8

25

An isosceles right triangle has a hypotenuse of length 58 inches. What is the perimeter, in inches, of this triangle?

- A) $29\sqrt{2}$
- B) $58\sqrt{2}$
- C) $58 + 58\sqrt{2}$
- D) $58 + 116\sqrt{2}$

26

In the xy -plane, a parabola has vertex $(9, -14)$ and intersects the x -axis at two points. If the equation of the parabola is written in the form $y = ax^2 + bx + c$, where a , b , and c are constants, which of the following could be the value of $a + b + c$?

- A) -23
- B) -19
- C) -14
- D) -12

27

Function f is defined by $f(x) = -a^x + b$, where a and b are constants. In the xy -plane, the graph of $y = f(x) - 15$ has a y -intercept at $\left(0, -\frac{99}{7}\right)$. The product of a and b is $\frac{65}{7}$. What is the value of a ?

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

27 QUESTIONS

DIRECTIONS

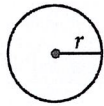
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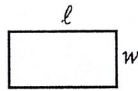
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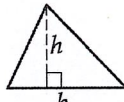


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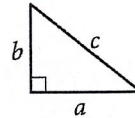
$$C = 2\pi r$$



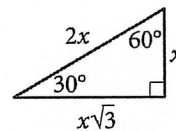
$$A = lw$$



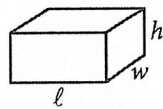
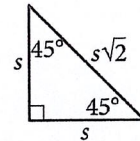
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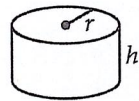
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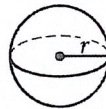
Special Right Triangles



$$V = lwh$$



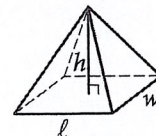
$$V = \pi r^2 h$$



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



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



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

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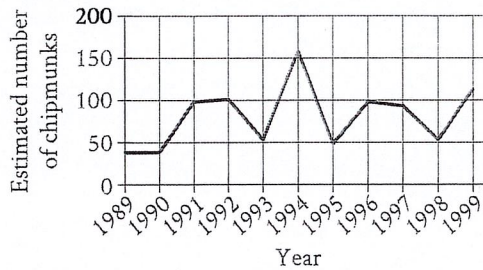
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1

The line graph shows the estimated number of chipmunks in a state park on April 1 of each year from 1989 to 1999.



Based on the line graph, in which year was the estimated number of chipmunks in the state park the greatest?

- A) 1989
- B) 1994
- C) 1995
- D) 1998

2

A fish swam a distance of 5,104 yards. How far did the fish swim, in miles? (1 mile = 1,760 yards)

- A) 0.3
- B) 2.9
- C) 3,344
- D) 6,864

3

Which expression is equivalent to $12x^3 - 5x^3$?

- A) $7x^6$
- B) $17x^3$
- C) $7x^3$
- D) $17x^6$

4

$$x + y = 18$$

$$5y = x$$

What is the solution (x, y) to the given system of equations?

- A) (15, 3)
- B) (16, 2)
- C) (17, 1)
- D) (18, 0)

5

The point $(8, 2)$ in the xy -plane is a solution to which of the following systems of inequalities?

- A) $x > 0$
 $y > 0$
- B) $x > 0$
 $y < 0$
- C) $x < 0$
 $y > 0$
- D) $x < 0$
 $y < 0$

6

$$|x - 5| = 10$$

What is one possible solution to the given equation?

7

$$f(x) = 7x + 1$$

The function gives the total number of people on a company retreat with x managers. What is the total number of people on a company retreat with 7 managers?

8

$$h(x) = x^2 - 3$$

Which table gives three values of x and their corresponding values of $h(x)$ for the given function h ?

A)

x	1	2	3
$h(x)$	4	5	6

B)

x	1	2	3
$h(x)$	-2	1	6

C)

x	1	2	3
$h(x)$	-1	1	3

D)

x	1	2	3
$h(x)$	-2	1	3

9

The function f is defined by $f(x) = 270(0.1)^x$. What is the value of $f(0)$?

- A) 0
- B) 1
- C) 27
- D) 270

10

To estimate the proportion of a population that has a certain characteristic, a random sample was selected from the population. Based on the sample, it is estimated that the proportion of the population that has the characteristic is 0.49, with an associated margin of error of 0.04. Based on this estimate and margin of error, which of the following is the most appropriate conclusion about the proportion of the population that has the characteristic?

- A) It is plausible that the proportion is between 0.45 and 0.53.
- B) It is plausible that the proportion is less than 0.45.
- C) The proportion is exactly 0.49.
- D) It is plausible that the proportion is greater than 0.53.

11

A moving truck can tow a trailer if the combined weight of the trailer and the boxes it contains is no more than 4,600 pounds. What is the maximum number of boxes this truck can tow in a trailer with a weight of 500 pounds if each box weighs 120 pounds?

- A) 34
- B) 35
- C) 38
- D) 39

12

$$-4x^2 - 7x = -36$$

What is the positive solution to the given equation?

- A) $\frac{7}{4}$
- B) $\frac{9}{4}$
- C) 4
- D) 7

13

The table summarizes the distribution of color and shape for 100 tiles of equal area.

	Red	Blue	Yellow	Total
Square	10	20	25	55
Pentagon	20	10	15	45
Total	30	30	40	100

If one of these tiles is selected at random, what is the probability of selecting a red tile? (Express your answer as a decimal or fraction, not as a percent.)

14

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

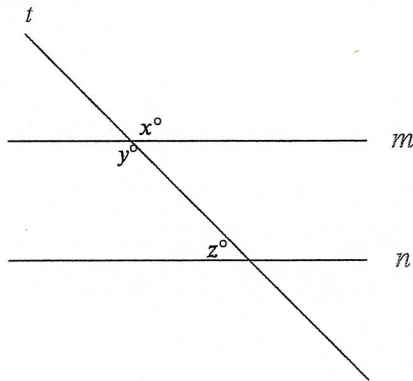
For the given function f , the graph of $y = f(x)$ in the xy -plane is parallel to line j . What is the slope of line j ?

15

A proposal for a new library was included on an election ballot. A radio show stated that 3 times as many people voted in favor of the proposal as people who voted against it. A social media post reported that 15,000 more people voted in favor of the proposal than voted against it. Based on these data, how many people voted against the proposal?

- A) 7,500
- B) 15,000
- C) 22,500
- D) 45,000

16



Note: Figure not drawn to scale.

In the figure, lines m and n are parallel. If $x = 6k + 13$ and $y = 8k - 29$, what is the value of z ?

- A) 3
- B) 21
- C) 41
- D) 139

17

$$-3x + 21px = 84$$

In the given equation, p is a constant. The equation has no solution. What is the value of p ?

- A) 0
- B) $\frac{1}{7}$
- C) $\frac{4}{3}$
- D) 4

18

$$f(x) = (x - 10)(x + 13)$$

The function f is defined by the given equation. For what value of x does $f(x)$ reach its minimum?

- A) -130
- B) -13
- C) $-\frac{23}{2}$
- D) $-\frac{3}{2}$

19

The function $f(x) = \frac{1}{9}(x-7)^2 + 3$ gives a metal ball's height above the ground $f(x)$, in inches, x seconds after it started moving on a track, where $0 \leq x \leq 10$. Which of the following is the best interpretation of the vertex of the graph of $y = f(x)$ in the xy -plane?

- A) The metal ball's minimum height was 3 inches above the ground.
- B) The metal ball's minimum height was 7 inches above the ground.
- C) The metal ball's height was 3 inches above the ground when it started moving.
- D) The metal ball's height was 7 inches above the ground when it started moving.

20

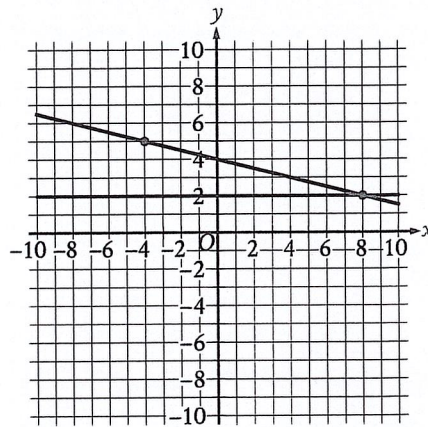
In triangle JKL , $\cos(K) = \frac{24}{51}$ and angle J is a right angle. What is the value of $\cos(L)$?

21

$$-x^2 + bx - 676 = 0$$

In the given equation, b is a positive integer. The equation has no real solution. What is the greatest possible value of b ?

22



If a new graph of three linear equations is created using the system of equations shown and the equation $x + 4y = -16$, how many solutions (x, y) will the resulting system of three equations have?

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

23

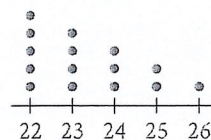
$$f(x) = 5,470(0.64)^{\frac{x}{12}}$$

The function f gives the value, in dollars, of a certain piece of equipment after x months of use. If the value of the equipment decreases each year by $p\%$ of its value the preceding year, what is the value of p ?

- A) 4
- B) 5
- C) 36
- D) 64

24

Data Set A



The dot plot represents the 15 values in data set A. Data set B is created by adding 56 to each of the values in data set A. Which of the following correctly compares the medians and the ranges of data sets A and B?

- A) The median of data set B is equal to the median of data set A, and the range of data set B is equal to the range of data set A.
- B) The median of data set B is equal to the median of data set A, and the range of data set B is greater than the range of data set A.
- C) The median of data set B is greater than the median of data set A, and the range of data set B is equal to the range of data set A.
- D) The median of data set B is greater than the median of data set A, and the range of data set B is greater than the range of data set A.

25

The equation $x^2 + (y - 1)^2 = 49$ represents circle A. Circle B is obtained by shifting circle A down 2 units in the xy -plane. Which of the following equations represents circle B?

- A) $(x - 2)^2 + (y - 1)^2 = 49$
- B) $x^2 + (y - 3)^2 = 49$
- C) $(x + 2)^2 + (y - 1)^2 = 49$
- D) $x^2 + (y + 1)^2 = 49$

26

Two identical rectangular prisms each have a height of 90 centimeters (cm). The base of each prism is a square, and the surface area of each prism is K cm^2 .

If the prisms are glued together along a square base, the resulting prism has a surface area of $\frac{92}{47}K$ cm^2 .

What is the side length, in cm, of each square base?

- A) 4
- B) 8
- C) 9
- D) 16

27

210 is $p\%$ greater than 30. What is the value of p ?

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.

