8X4P0010

PSAT™ 8/9

Practice Test #2

Make time to take the practice test.
It is one of the best ways to get ready for the PSAT 8/9.

After you have taken the practice test, score it right away at **psat.org/8-9-scoring**.

This version of the PSAT 8/9 Practice Test is for students who will be taking the digital PSAT 8/9 in nondigital format.

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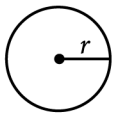
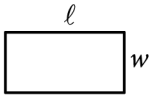
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

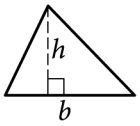
REFERENCE



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



$A = \ell w$



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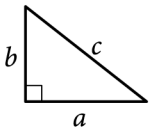
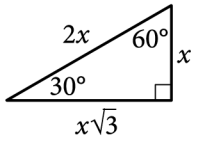
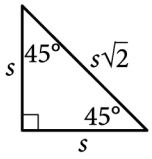
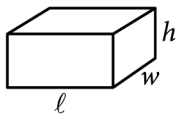


$c^2 = a^2 + b^2$

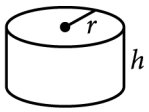




Special Right Triangles



$V = \ell wh$



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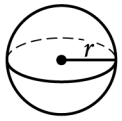
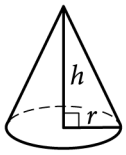


$V = \frac{4}{3}\pi r^3$



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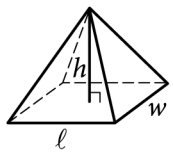

$V = \frac{1}{3}\ell wh$

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.

CONTINUE

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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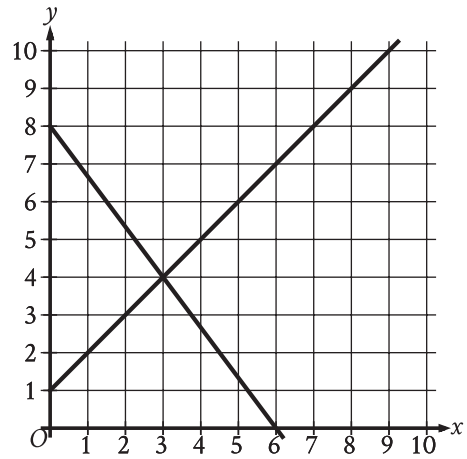
CONTINUE

1



The graph of a system of linear equations is shown. What is the solution (x, y) to the system?

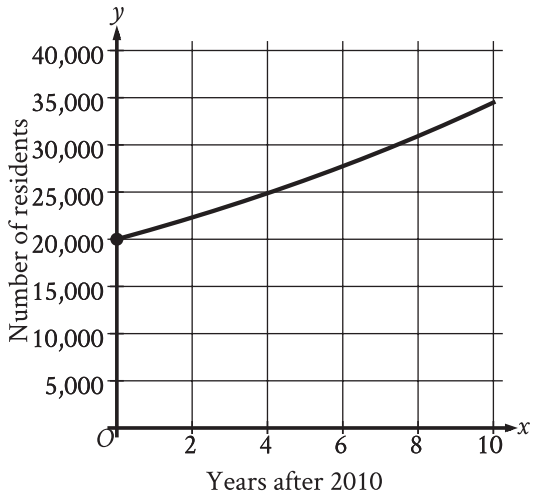
A) $(2, 3)$

B) $(3, 4)$

C) $(4, 5)$

D) $(5, 6)$

2



The graph shown models the number of residents of a certain city x years after 2010. How many residents does this model estimate the city had in 2010?

A) 0

B) 2,000

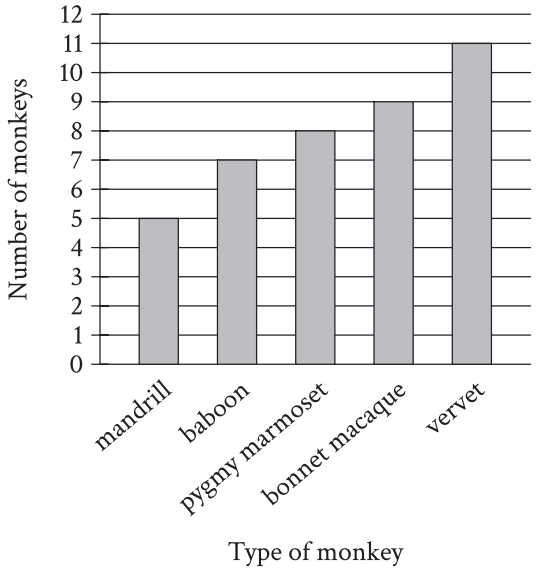
C) 20,000

D) 25,000

CONTINUE

3

The bar graph shows the number of each type of monkey in a sanctuary.



How many more vervets are in this sanctuary than mandrills?

A) 11

B) 6

C) 5

D) 3

4

$$3x + 5(x + 4) = 76$$

What value of x is the solution to the given equation?

A) 7

B) 8

C) 56

D) 72

5

The function f is defined by $f(x) = \frac{16}{x}$. What is the value of $f(x)$ when $x = 17$?

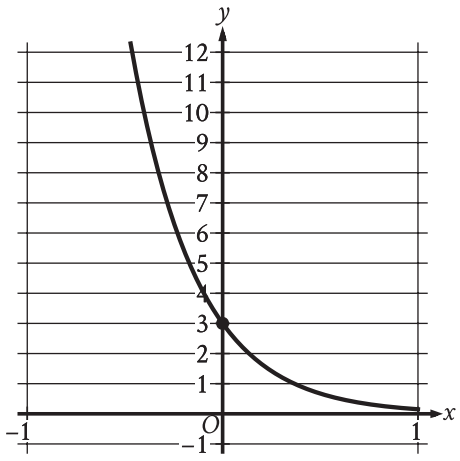
A) $\frac{16}{17}$

B) $\frac{17}{16}$

C) 16

D) 17

6



The graph of the exponential function f is shown, where $y = f(x)$. The y-intercept of the graph is $(0, y)$. What is the value of y ?

CONTINUE

7

For a party, 50 dinner rolls are needed. Dinner rolls are sold in packages of 12. What is the minimum number of packages that should be bought for the party?

8

21 is 21% of what number?

A) 0
B) 1
C) 42
D) 100

9

To repair a refrigerator, a technician charges \$60 per hour for labor plus \$120 for parts. Which function f represents the total amount, in dollars, the technician will charge for this job if it takes x hours?

A) $f(x) = x + 120$
B) $f(x) = 60x$
C) $f(x) = 60x + 120$
D) $f(x) = 60x - 120$

10

The function f is defined by $f(x) = 80 - 6x$. What is the value of $f(7)$?

A) 13
B) 38
C) 74
D) 81

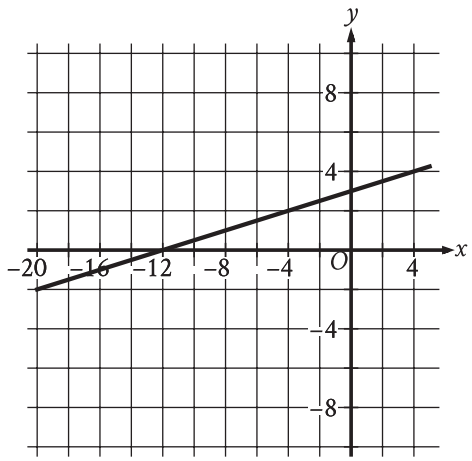
11

Naomi bought both rabbit snails and nerite snails for a total of \$52. Each rabbit snail costs \$8 and each nerite snail costs \$6. If Naomi bought 2 nerite snails, how many rabbit snails did she buy?

A) 5
B) 12
C) 14
D) 50

CONTINUE

12



The graph of the linear function f is shown, where $y = f(x)$. What is the x-intercept of the graph of f ?

A) $(-12, 0)$

B) $(0, 0)$

C) $\left(\frac{1}{4}, 0\right)$

D) $(12, 0)$

13

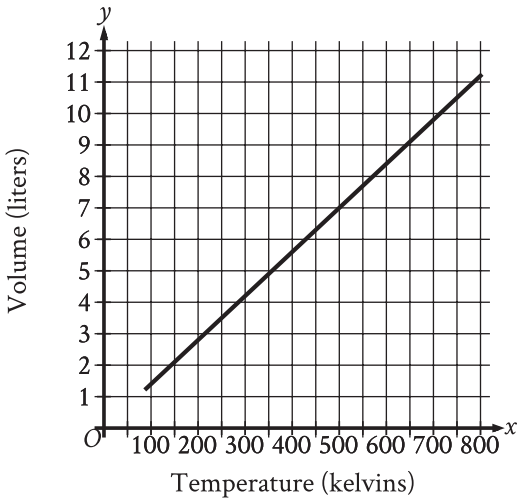
A triangle has a base length of 40 centimeters and a height of 90 centimeters. What is the area, in square centimeters, of the triangle?

14

A participant in a bicycle race completes the race with an average speed of 24,816 yards per hour. What is this average speed, in miles per hour? (1 mile = 1,760 yards)

15

Hydrogen is placed inside a container and kept at a constant pressure. The graph shows the estimated volume y, in liters, of the hydrogen when its temperature is x kelvins.



What is the estimated volume, in liters, of the hydrogen when its temperature is 500 kelvins?

A) 0

B) $\frac{7}{500}$

C) 7

D) $\frac{500}{7}$

CONTINUE

16

$$p + 34 = q + r$$

The given equation relates the variables p, q, and r. Which equation correctly expresses p in terms of q and r ?

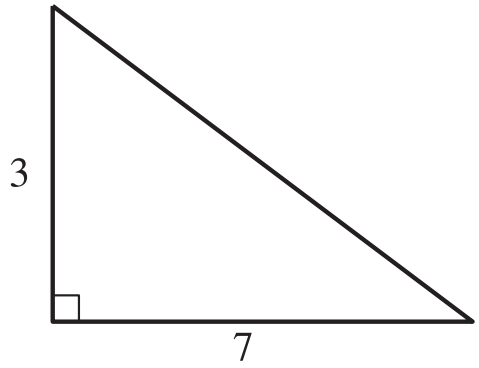
A) $p = q + r + 34$

B) $p = q + r - 34$

C) $p = -q - r + 34$

D) $p = -q - r - 34$

17



Note: Figure not drawn to scale.

The lengths of the legs of a right triangle are shown. Which of the following is closest to the length of the triangle's hypotenuse?

A) 3.2

B) 5

C) 7.6

D) 20

18

The number of coins in a collection increased from 9 to 90. What was the percent increase in the number of coins in this collection?

A) 10%

B) 81%

C) 90%

D) 900%

19

$$2x + y = 37$$

In triangle QRS, sides QR and RS each have a length of x centimeters and side SQ has a length of y centimeters. The given equation represents this situation. Which of the following is the best interpretation of 37 in this context?

A) The difference, in centimeters, between the lengths of sides QR and SQ

B) The difference, in centimeters, between the lengths of sides QR and RS

C) The sum of the lengths, in centimeters, of the three sides of the triangle

D) The length, in centimeters, of one of the two sides of equal length

CONTINUE

20

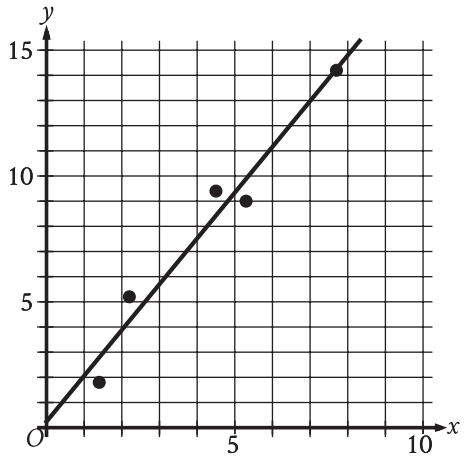
What is the slope of the graph of $y = \frac{5x}{13} - 23$ in the xy-plane?

21

To study fluctuations in composition, samples of pumice were taken from 29 locations and cut in the shape of a cube. The length of the edge of one of these cubes is 3.000 centimeters. This cube has a density of 0.230 grams per cubic centimeter. What is the mass of this cube, in grams?

22

In the given scatterplot, a line of best fit for the data is shown.



Which of the following is closest to the slope of the line of best fit shown?

A) 0.2

B) 0.7

C) 1.8

D) 2.6

CONTINUE

23

The length of a rectangle is 50 inches and the width is x inches. The perimeter is at most 210 inches. Which inequality represents this situation?

A) $2x + 100 \leq 210$

B) $2x + 100 \geq 210$

C) $2x + 50 \leq 210$

D) $2x + 50 \geq 210$

24

Which of the following expressions is equivalent to $8x^{10} - 8x^9 + 88x$?

A) $x(7x^{10} - 7x^9 + 87x)$

B) $x(8^{10} - 8^9 + 88)$

C) $8x(x^{10} - x^9 + 11x)$

D) $8x(x^9 - x^8 + 11)$

25

$$\frac{3}{5}x + \frac{3}{4}y = 7$$

Which table gives three values of x and their corresponding values of y for the given equation?

A)

x	y
1	$\frac{113}{20}$
2	$\frac{101}{20}$
4	$\frac{77}{20}$

B)

x	y
1	$\frac{47}{5}$
2	$\frac{44}{5}$
4	$\frac{38}{5}$

C)

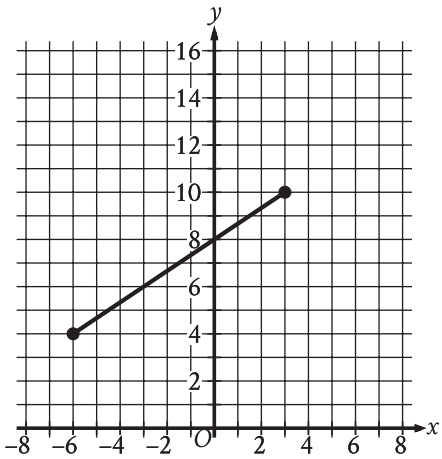
x	y
1	$\frac{148}{15}$
2	$\frac{136}{15}$
4	$\frac{112}{15}$

D)

x	y
1	$\frac{128}{15}$
2	$\frac{116}{15}$
4	$\frac{92}{15}$

CONTINUE

26



The line segment shown in the *xy*-plane represents one of the legs of a right triangle. The area of this triangle is $36\sqrt{13}$ square units. What is the length, in units, of the other leg of this triangle?

A) 12

B) 24

C) $3\sqrt{13}$

D) $18\sqrt{13}$

27

The solutions to $x^2 + 6x + 7 = 0$ are r and s, where $r < s$. The solutions to $x^2 + 8x + 8 = 0$ are t and u, where $t < u$. The solutions to $x^2 + 14x + c = 0$, where c is a constant, are $r + t$ and $s + u$. What is the value of c ?

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

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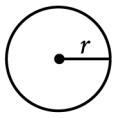

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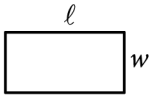

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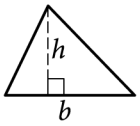

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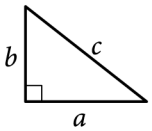

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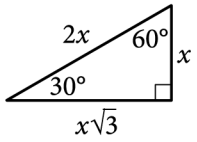

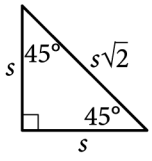

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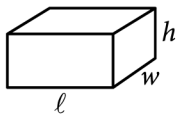

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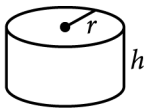

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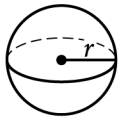

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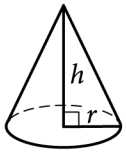
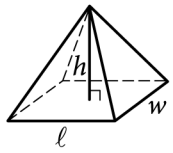


$V = \frac{1}{3}\pi r^2 h$



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

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

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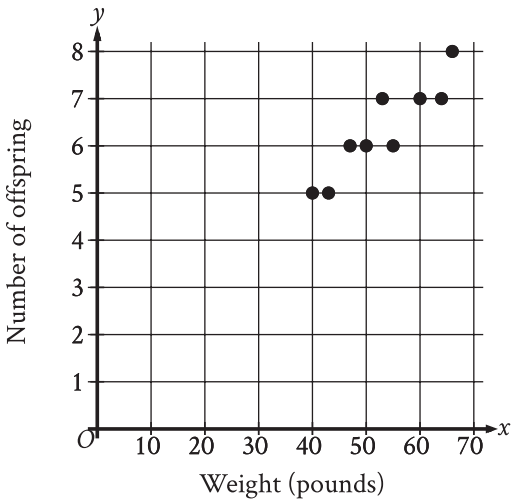
CONTINUE

1

The scatterplot shows the relationship between the weight, in pounds, of each of 9 female gray wolves on April 30 and the number of offspring each gray wolf produced.



How many offspring did the 50-pound gray wolf produce?

A) 8

B) 7

C) 6

D) 5

2

$$y = 4$$
$$x = y + 6$$

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

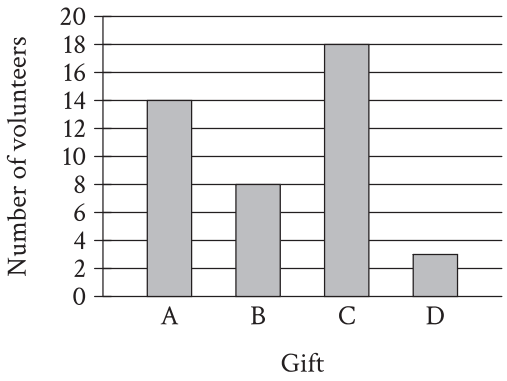
A) 10

B) 6

C) 4

D) 2

3



In April, there were 43 volunteers in a cleanup project. Each volunteer was asked to choose a small gift labeled A, B, C, or D. The bar graph shows the number of volunteers who chose each gift. How many volunteers chose gift C?

A) 3

B) 8

C) 14

D) 18

4

$$-13, 4, 23$$

A data set of three numbers is shown. If a number from this data set is selected at random, what is the probability of selecting a negative number?

A) 0

B) $\frac{1}{3}$

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

D) 1

CONTINUE

5

A line in the xy-plane has a slope of $-\frac{1}{2}$ and passes through the point $(0, 3)$. Which equation represents this line?

A) $y = -\frac{1}{2}x - 3$

B) $y = -\frac{1}{2}x + 3$

C) $y = \frac{1}{2}x - 3$

D) $y = \frac{1}{2}x + 3$

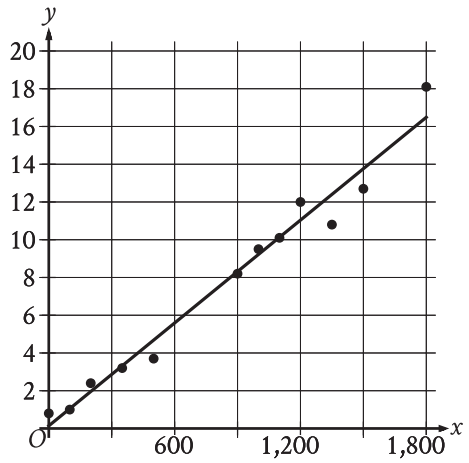
6

A product costs 11.00 dollars per pound. What is the cost, in dollars, for 6 pounds of the product?

7

The equation $46 = 2x + 2y$ gives the perimeter of a rectangular rug that has length x, in feet, and width y, in feet. The width of the rug is 8 feet. What is the length, in feet, of the rug?

8



Twelve data points are shown in the scatterplot. A line of best fit for the data is also shown. At $x = 1{,}200$, which of the following is closest to the y-value predicted by the line of best fit?

A) 16

B) 14

C) 11

D) 6

9

Which expression is equivalent to $(8yz)(y)(7z)$?

A) $56y^2z^2$

B) $56y^2z$

C) $56yz$

D) $16yz$

CONTINUE

10

A food truck buys forks for \$0.04 each and plates for \$0.48 each. The total cost of x forks and y plates is \$661.76. Which equation represents this situation?

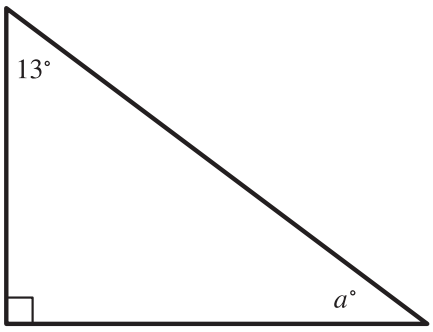
A) $0.48x - 0.04y = 661.76$

B) $0.04x - 0.48y = 661.76$

C) $0.48x + 0.04y = 661.76$

D) $0.04x + 0.48y = 661.76$

11



Note: Figure not drawn to scale.

In the right triangle shown, what is the value of a ?

A) 13

B) 77

C) 90

D) 103

12

Gabriella deposits \$35 in a savings account at the end of each week. At the beginning of the 1st week of a year there was \$600 in that savings account. How much money, in dollars, will be in the account at the end of the 4th week of that year?

A) 460

B) 635

C) 639

D) 740

13

$$x^2 = (22)(22)$$

What is the positive solution to the given equation?

14

The ratio 140 to m is equivalent to the ratio 4 to 28. What is the value of m ?

15

If $3x - 27 = 24$, what is the value of $x - 9$?

A) 1

B) 8

C) 24

D) 35

CONTINUE

16

For the linear function f, $f(0) = 17$ and $f(1) = 17$. Which equation defines f ?

A) $f(x) = \frac{1}{17}$

B) $f(x) = 1$

C) $f(x) = 17$

D) $f(x) = 34$

17

The function $f(x) = 55.20 - 0.16x$ gives the estimated surface water temperature $f(x)$, in degrees Celsius, of a body of water on the xth day of the year, where $220 \leq x \leq 360$. Based on the model, what is the estimated surface water temperature, in degrees Celsius, of this body of water on the 326th day of the year?

A) 55.20

B) 3.04

C) −0.16

D) −52.16

18

$$y = -\frac{1}{5}x$$

$$y = \frac{1}{7}x$$

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

A) −5

B) 0

C) 2

D) 7

19

A sample of a certain isotope takes 29 years to decay to half its original mass. The function $s(t) = 184(0.5)^{\frac{t}{29}}$ gives the approximate mass of this isotope, in grams, that remains t years after a 184-gram sample starts to decay. Which statement is the best interpretation of $s(87) = 23$ in this context?

A) Approximately 23 grams of the sample remains 87 years after the sample starts to decay.

B) The mass of the sample has decreased by approximately 23 grams 87 years after the sample starts to decay.

C) The mass of the sample has decreased by approximately 87 grams 23 years after the sample starts to decay.

D) Approximately 87 grams of the sample remains 23 years after the sample starts to decay.

CONTINUE

20

How many fluid ounces are equivalent to 76 quarts? (8 fluid ounces = 1 cup and 4 cups = 1 quart)

21

A piece of wire with a length of 32 inches is cut into two parts. One part has a length of x inches, and the other part has a length of y inches. The value of x is 4 more than 3 times the value of y. What is the value of x ?

22

The table gives the perimeters of similar triangles TUV and XYZ, where $\overline{TU}$ corresponds to $\overline{XY}$. The length of $\overline{TU}$ is 18.

	Perimeter
Triangle TUV	37
Triangle XYZ	333

What is the length of $\overline{XY}$?

A) 2

B) 18

C) 55

D) 162

23

A sphere has a radius of $\frac{17}{5}$ feet. What is the volume, in cubic feet, of the sphere?

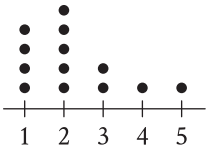
A) $\frac{5\pi}{17}$

B) $\frac{68\pi}{15}$

C) $\frac{32\pi}{5}$

D) $\frac{19{,}652\pi}{375}$

24



Number of bursts

The dot plot represents a data set of the number of bursts for 13 eruptions of a steam vent. If an additional eruption with 11 bursts is added to this data set to create a new data set of 14 eruptions, which of the following measures will be greater for the new data set than for the original data set?

I. The median number of bursts

II. The mean number of bursts

A) I and II

B) I only

C) II only

D) Neither I nor II

CONTINUE

25

A factory makes 9-inch, 7-inch, and 4-inch concrete screws. During a certain day, the number of 9-inch concrete screws that the factory makes is 5 times the number n of 7-inch concrete screws, and the number of 4-inch concrete screws is 22. During this day, the factory makes 100 concrete screws total. Which equation represents this situation?

A) $9(5n) + 7n + 4(22) = 100$

B) $9n + 7n + 4n = 100$

C) $5n + 22 = 100$

D) $6n + 22 = 100$

26

The number a is 190% greater than the number b. The number b is 80% less than 24. What is the value of a ?

A) 9.12

B) 13.92

C) 26.40

D) 36.48

27

A right square prism has a height of 14 units. The volume of the prism is 2,016 cubic units. What is the length, in units, of an edge of the base?

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.

PSAT™ 8/9

GENERAL DIRECTIONS

- You may work on only one module at a time.
- If you finish a module before time is called, check your work on that module only. You may NOT turn to any other module.

TIMING

Reading and Writing, Module 1: 39 minutes

Reading and Writing, Module 2: 39 minutes

10-minute break

Math, Module 1: 43 minutes

Math, Module 2: 43 minutes

The above are standard times. If you are approved for accommodations involving additional time, you should give yourself that time when you practice.

MARKING YOUR ANSWERS

- Be sure to answer your questions properly in this book.
- Circle only one answer to 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.

USING YOUR TEST BOOK

- You may use the test book for scratch work.
- You may not fold or remove pages or portions of a page from this book, or take the book from the testing room.