1S5P0031

PSAT™ 10

Practice Test #2

Make time to take the practice test.
It is one of the best ways to get ready for the PSAT™ 10.

After you have taken the practice test, score it right away at **psat.org/p10-paper-practice**.

This version of the PSAT 10 Practice Test is for students who will be taking the digital PSAT 10 in nondigital format.

PSAT™ 10

6VPL03

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.
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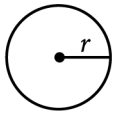
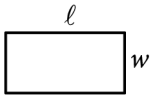
REFERENCE



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



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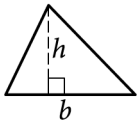

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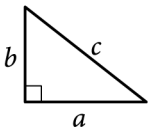

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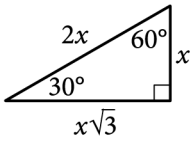
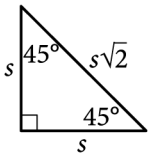
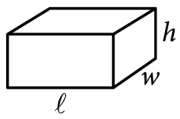
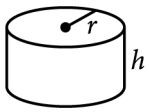




Special Right Triangles



$V = \ell wh$



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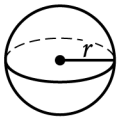
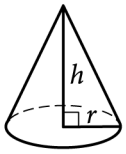
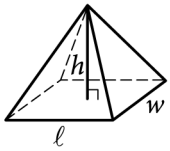


$V = \frac{4}{3}\pi r^3$



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



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

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.

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

$$|x + 45| = 48$$

What is the positive solution to the given equation?

A) 3

B) 48

C) 93

D) 96

2

$$x = 4$$
$$y = 5 - x$$

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

A) 1

B) 4

C) 5

D) 9

3

A mixture consisting of only vitamin D and calcium has a total mass of 150 grams. The mass of vitamin D in the mixture is 50 grams. What is the mass, in grams, of calcium in the mixture?

A) 200

B) 150

C) 100

D) 50

4

A contract for a certain service requires a onetime activation cost of $35 and a monthly cost of $23. Which equation represents this situation, where c is the total cost, in dollars, of this service contract for t months?

A) $c = \frac{t}{23} + 35$

B) $c = \frac{t}{35} + 23$

C) $c = 23t + 35$

D) $c = 35t + 23$

5

The function f is defined by $f(x) = 3x - 8$. What is the value of $f(7)$?

A) 29

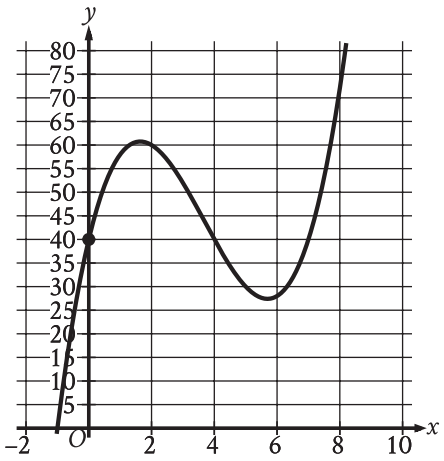
B) 13

C) −5

D) −29

CONTINUE

6



The y-intercept of the graph shown is (x, y). What is the value of y ?

7

$$8x - 7x + 130 = 260$$

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

8

A geologist needs to collect at least 67 samples of lava from a volcano. If the geologist has already collected 63 samples from the volcano, what is the minimum number of additional samples the geologist needs to collect?

A) 130

B) 63

C) 4

D) 0

9

Each of 157 gemstones can be classified as one of three classifications, as shown in the frequency table.

Classification	Frequency
color X	119
color Y	3
color Z	35

If one of the gemstones is selected at random, what is the probability of selecting a gemstone of color Y?

A) $\frac{3}{157}$

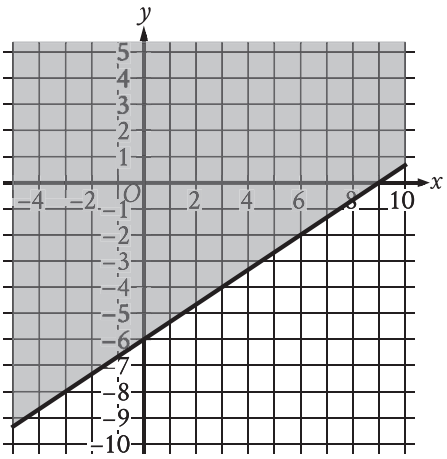
B) $\frac{35}{157}$

C) $\frac{119}{157}$

D) $\frac{154}{157}$

CONTINUE

10



The shaded region shown represents the solutions to which inequality?

A) $y \geq \frac{2}{3}x - 6$

B) $y \geq \frac{2}{3}x + 6$

C) $y \geq \frac{2}{3}x - 9$

D) $y \geq \frac{2}{3}x + 9$

11

In triangle ABC, $AB = 4{,}680$ millimeters (mm) and $BC = 4{,}680$ mm. Which statement is sufficient to prove that triangle ABC is equilateral?

A) $AC = 4{,}680$ mm

B) $AC = 468$ mm

C) $AC = 46.8$ mm

D) $AC = 4.68$ mm

12

$$P(t) = 24.8(1.036)^t$$

The function P gives the predicted population, in millions, of a certain country for the period from 1984 to 2018, where t is the number of years after 1984. According to the model, what is the best interpretation of the statement "$P(8)$ is approximately equal to 32.91"?

A) In 1984, the predicted population of this country was approximately 8 million.

B) In 1984, the predicted population of this country was approximately 32.91 million.

C) 8 years after 1984, the predicted population of this country was approximately 32.91 million.

D) 32.91 years after 1984, the predicted population of this country was approximately 8 million.

13

A right circular cylinder has a volume of 377 cubic centimeters. The area of the base of the cylinder is 13 square centimeters. What is the height, in centimeters, of the cylinder?

14

The list gives the mass, in grams, of 5 alpine marmots.

4,010; 4,010; 3,030; 4,050; 3,050

What is the mean mass, in grams, of these 5 alpine marmots?

CONTINUE

15

$$x = 3$$
$$y = (15 - x)^2$$

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

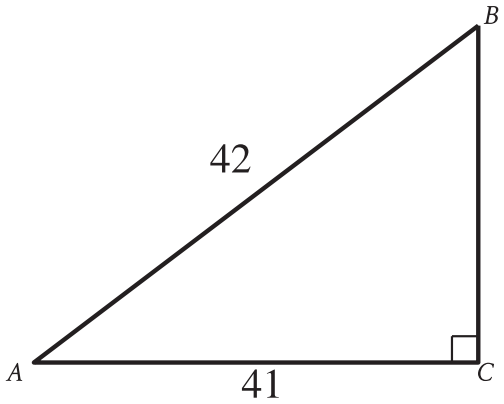
A) 432

B) 54

C) 45

D) 18

16



Note: Figure not drawn to scale.

What is the value of $\cos A$ in the triangle shown?

A) $\frac{42}{41}$

B) $\frac{41}{42}$

C) $\frac{1}{42}$

D) $\frac{1}{41}$

17

A circle has a radius of 43 meters. What is the area, in square meters, of the circle?

A) $\frac{43\pi}{2}$

B) 43π

C) 86π

D) $1{,}849\pi$

18

An object has a mass of 168 grams and a volume of 24 cubic centimeters. What is the density, in grams per cubic centimeter, of the object?

A) 7

B) 144

C) 192

D) 4,032

CONTINUE

19

A company has a newsletter. In January 2018, there were 1,300 customers subscribed to the newsletter. For the next 24 months after January 2018, the total number of customers subscribed to the newsletter each month was 7% greater than the total number subscribed the previous month. Which equation gives the total number of customers, c, subscribed to the company's newsletter m months after January 2018, where $m \leq 24$?

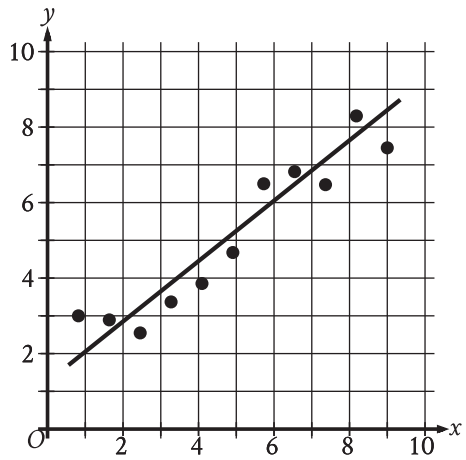
A) $c = 1{,}300(0.07)^m$

B) $c = 1{,}300(1.07)^m$

C) $c = 1{,}300(1.7)^m$

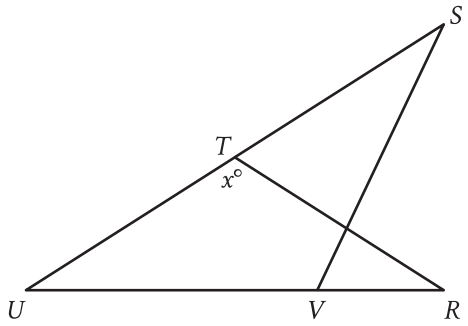
D) $c = 1{,}300(7)^m$

20



The scatterplot shows the relationship between two variables, x and y. A line of best fit is also shown. For how many of the 11 data points does the line of best fit predict a greater y-value than the actual y-value?

21



Note: Figure not drawn to scale.

In the figure, $RT = TU$, the measure of angle VST is 29°, and the measure of angle RVS is 41°. What is the value of x ?

22

$$-12x + 14y = 36$$
$$-6x + 7y = -18$$

How many solutions does the given system of equations have?

A) Exactly one

B) Exactly two

C) Infinitely many

D) Zero

CONTINUE

23

The expression $0.35x$ represents the result of decreasing a positive quantity x by what percent?

A) 3.5%

B) 35%

C) 6.5%

D) 65%

24

Objects R and S each travel at a constant speed. The speed of object R is half the speed of object S. Object R travels a distance of $4x$ inches in y seconds. Which expression represents the time, in seconds, it takes object S to travel a distance of $24x$ inches?

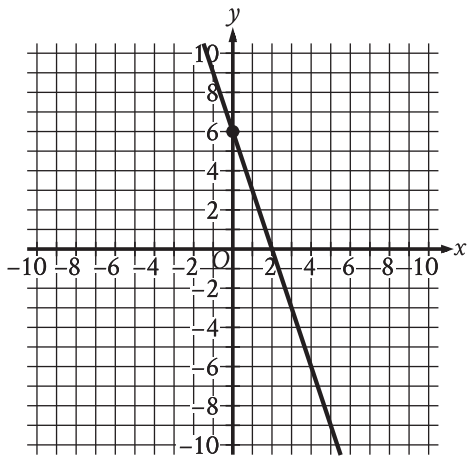
A) $12y$

B) $3y$

C) $16y$

D) $6y$

25



The graph shows a linear relationship between x and y. Which equation represents this relationship, where R is a positive constant?

A) $Rx + 18y = 36$

B) $Rx - 18y = -36$

C) $18x + Ry = 36$

D) $18x - Ry = -36$

CONTINUE

26

A sample of a certain alloy has a total mass of 50.0 grams and is 50.0% silicon by mass. The sample was created by combining two pieces of different alloys. The first piece was 30.0% silicon by mass and the second piece was 80.0% silicon by mass. What was the mass, in grams, of the silicon in the second piece?

A) 9.0

B) 16.0

C) 20.0

D) 30.0

27

The product of two positive integers is 462. If the first integer is 5 greater than twice the second integer, what is the smaller of the two integers?

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.

No Test Material On This Page

Math

27 QUESTIONS

DIRECTIONS

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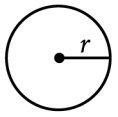

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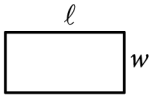

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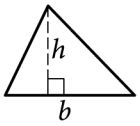

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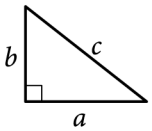
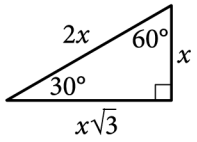
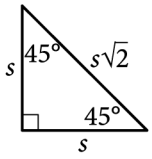
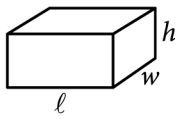


$c^2 = a^2 + b^2$

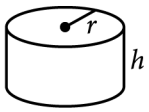




Special Right Triangles



$V = \ell wh$



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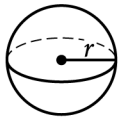
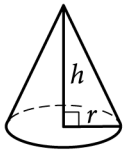
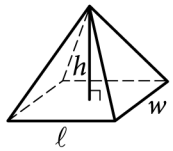


$V = \frac{4}{3}\pi r^3$



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



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

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

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

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

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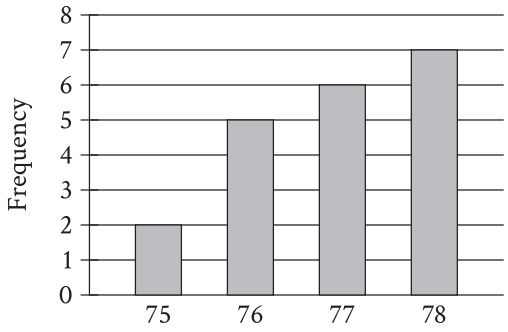
CONTINUE

1

The bar graph shows the distribution of the number of walnuts per container for 20 containers at a grocery store.



How many of these containers of walnuts contain exactly 78 walnuts?

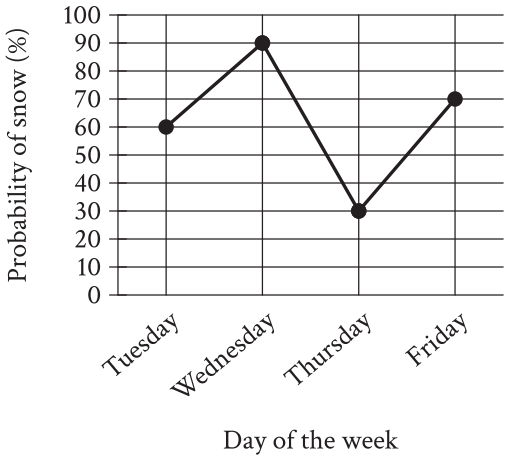
A) 2

B) 7

C) 20

D) 78

2



The line graph shows the probability of snow, as a percent, at a certain location for each day during a four-day period. According to the line graph, for which day during this four-day period is the probability of snow 30%?

A) Tuesday

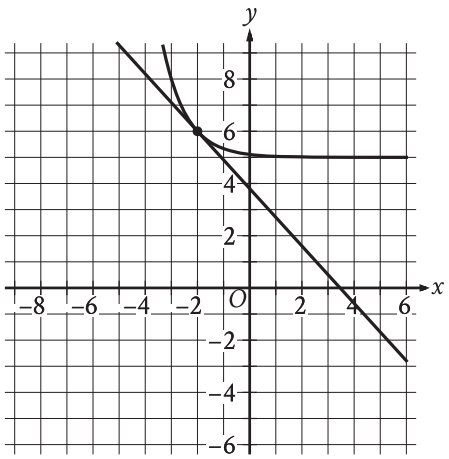
B) Wednesday

C) Thursday

D) Friday

CONTINUE

3



The graph of a system of a linear equation and a nonlinear equation is shown. What is the solution (x, y) to this system?

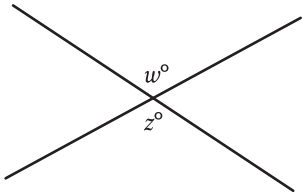
A) $(6, 0)$

B) $(-2, 6)$

C) $(0, -2)$

D) $(0, 0)$

4



Note: Figure not drawn to scale.

In the figure, two lines intersect at a point. If $w = 136$, what is the value of z ?

A) 36

B) 44

C) 68

D) 136

5

Which expression is equivalent to $19(x^2 - 7)$?

A) $19x^2 - 133$

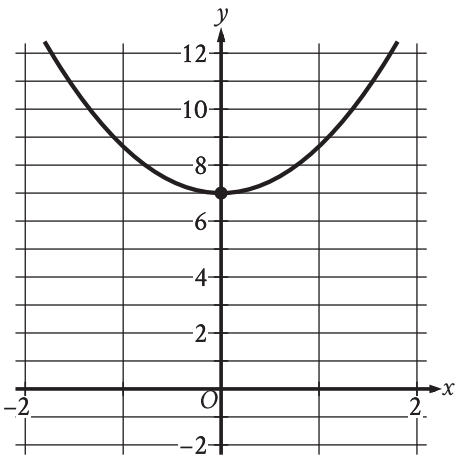
B) $19x^2 - 26$

C) $19x^2 - 7$

D) $19x^2 + 12$

CONTINUE

6



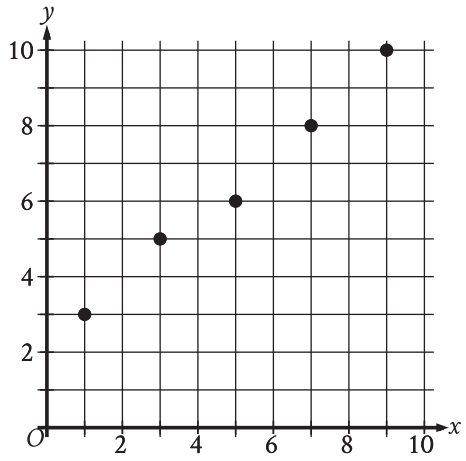
The parabola shown intersects the y-axis at the point (x, y). What is the value of y ?

7

If $2x + 3 = 9$, what is the value of $6x - 1$?

8

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



Which equation is the most appropriate linear model for this relationship?

A) $y = -0.9x - 2.2$

B) $y = -0.9x + 2.2$

C) $y = -0.9x$

D) $y = 0.9x + 2.2$

9

$$d = 16 - \frac{x}{30}$$

The equation shown gives the estimated amount of diesel d, in gallons, that remains in the gas tank of a truck after being driven x miles, where $0 \leq x \leq 480$. What is the estimated amount of diesel, in gallons, that remains in the gas tank of the truck when $x = 300$?

A) 0

B) 6

C) 14

D) 16

CONTINUE

10

$$g(x) = 11x + 4$$

For the given linear function g, which table shows three values of x and their corresponding values of $g(x)$?

A)

x	$g(x)$
−1	7
0	11
1	15

B)

x	$g(x)$
−1	−4
0	0
1	4

C)

x	$g(x)$
−1	−7
0	4
1	15

D)

x	$g(x)$
−1	−11
0	0
1	11

11

The pressure exerted on a scuba diver at sea level is 14.70 pounds per square inch (psi). For each foot the scuba diver descends below sea level, the pressure exerted on the scuba diver increases by 0.44 psi. What is the total pressure, in psi, exerted on the scuba diver at 105 feet below sea level?

A) 60.90

B) 31.50

C) 14.70

D) 0.44

12

The function f is defined by $f(x) = 4x^{-1}$. What is the value of $f(21)$?

A) −84

B) $\frac{1}{84}$

C) $\frac{4}{21}$

D) $\frac{21}{4}$

13

The area of a rectangle is 57 square inches. The length of the longest side of the rectangle is 19 inches. What is the length, in inches, of the shortest side of this rectangle?

14

How many yards are equivalent to 77 rods? (5.5 yards = 1 rod)

CONTINUE

15

$$x^2 - 12x + 27 = 0$$

How many distinct real solutions does the given equation have?

A) Exactly two

B) Exactly one

C) Zero

D) Infinitely many

16

For the linear function g, the graph of $y = g(x)$ in the xy-plane has a slope of 2 and passes through the point (1, 14). Which equation defines g ?

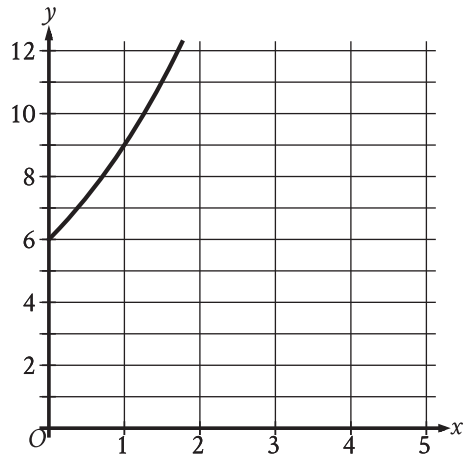
A) $g(x) = 2x$

B) $g(x) = 2x + 2$

C) $g(x) = 2x + 12$

D) $g(x) = 2x + 14$

17



The graph gives the estimated population y, in thousands, of a town x years since 2003, where $0 \le x \le 5$. Which of the following best describes the increase in the estimated population from $x = 0$ to $x = 1$?

A) The estimated population at $x = 1$ is 0.5 times the estimated population at $x = 0$.

B) The estimated population at $x = 1$ is 1.5 times the estimated population at $x = 0$.

C) The estimated population at $x = 1$ is 2.5 times the estimated population at $x = 0$.

D) The estimated population at $x = 1$ is 3.5 times the estimated population at $x = 0$.

CONTINUE

18

In March, the price of a collectible card was $15.50. In April, the price of the collectible card was $17.36. The price of the collectible card in April was p% of the price of the collectible card in March. What is the value of p ?

A) 12

B) 88

C) 112

D) 188

19

$$x = 8a(b + 9)$$

The given equation relates the positive numbers a, b, and x. Which equation correctly expresses a in terms of b and x ?

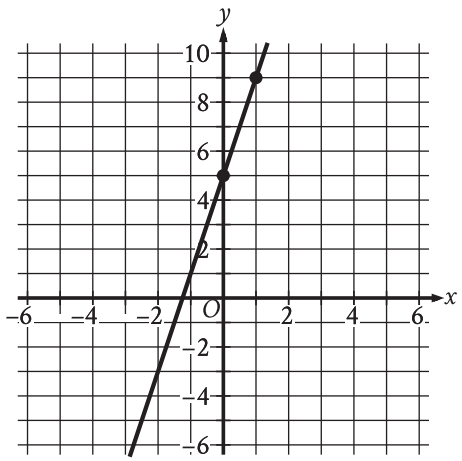
A) $a = \frac{x}{8} - (b + 9)$

B) $a = \frac{x}{8(b + 9)}$

C) $a = \frac{8(b + 9)}{x}$

D) $a = 8x(b + 9)$

20



Line j is shown in the xy-plane. Line k (not shown) is parallel to line j. What is the slope of line k ?

21

A line segment that has a length of 115 centimeters (cm) is divided into three parts. One part is 47 cm long. The other two parts have lengths that are equal to each other. What is the length, in cm, of one of the other two parts of equal length?

CONTINUE

22

$$p(x) + 57 = x^2$$

The given equation relates the value of x and its corresponding value of $p(x)$ for the function p. What is the minimum value of the function p ?

A) −3,249

B) −57

C) 57

D) 3,249

23

x	y
−18	−48
7	52

The table shows two values of x and their corresponding values of y. In the xy-plane, the graph of the linear equation representing this relationship passes through the point $\left(\frac{1}{7}, a\right)$. What is the value of a ?

A) $-\frac{4}{11}$

B) $-\frac{4}{77}$

C) $\frac{4}{7}$

D) $\frac{172}{7}$

24

$$y = 576^{(2x+2)}$$

The graph of the given equation in the xy-plane has a y-intercept of (r, s). Which of the following equivalent equations displays the value of s as a constant, a coefficient, or the base?

A) $y = 331{,}776^{(x+1)}$

B) $y = 24^{(4x+4)}$

C) $y = \frac{1}{24}(24)^{(4x+5)}$

D) $y = \frac{1}{576}(576)^{(2x+3)}$

25

If $k - x$ is a factor of the expression $-x^2 + \frac{1}{29}nk^2$, where n and k are constants and $k > 0$, what is the value of n ?

A) −29

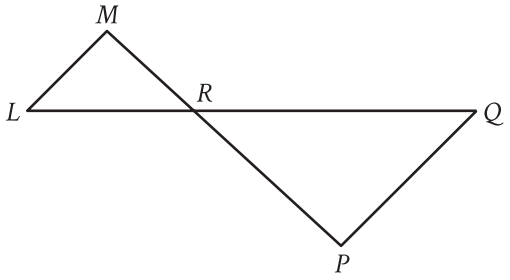
B) $-\frac{1}{29}$

C) $\frac{1}{29}$

D) 29

CONTINUE

26



Note: Figure not drawn to scale.

In the figure, $\overline{LQ}$ intersects $\overline{MP}$ at point R, and $\overline{LM}$ is parallel to $\overline{PQ}$. The lengths of $\overline{MR}$, $\overline{LR}$, and $\overline{RP}$ are 6, 7, and 11, respectively. What is the length of $\overline{LQ}$?

A) $\frac{119}{11}$

B) $\frac{77}{6}$

C) $\frac{113}{6}$

D) $\frac{119}{6}$

27

$$5(x + 7) = 15(x - 17)(x + 7)$$

What is the sum of the solutions to the given equation?

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™ 10

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.